February 2014

Developing Outpatient Therapy Payment Alternatives: Payment Alternatives Report

Task 4, Deliverable 2

Prepared for

Ann Meadow, ScD
Centers for Medicare & Medicaid Services
Center for Medicare & Medicaid Innovation
Research and Rapid Cycle Evaluation Group
Mail Stop WB-06-05
7500 Security Boulevard
Baltimore, MD 21244-1850

Prepared by

Peter Amico, PhD
Gregory Pope, MS
Poonam Pardasaney, ScD, DPT, MS
Walter Adamache, PhD
Anne Deutsch, RN, PhD, CRRN
Traci Gordon, BA
Jill A. Dever, PhD
RTI International

Benjamin Silver, BA
Brown University

RTI Project Number 0213520.000.004

[This page intentionally left blank.]

DEVELOPING OUTPATIENT THERAPY PAYMENT ALTERNATIVES:

PAYMENT ALTERNATIVES REPORT

by Jill A. Dever, Project Director
Peter Amico, Gregory Pope, Walter Adamache, Poonam Pardasaney, Anne Deutsch,
Traci Gordon, and Benjamin Silver (Brown University)

Federal Project Officer: Ann Meadow, Sc.D.

RTI International

CMS Contract No. HHSM-500-2012-00169G

February 2014

This project was funded by the Centers for Medicare & Medicaid Services under contract no. HHSM-500-2012-00169G. The statements contained in this report are solely those of the authors and do not necessarily reflect the views or policies of the Centers for Medicare & Medicaid Services. RTI assumes responsibility for the accuracy and completeness of the information contained in this report.

RTI International is a trade name of Research Triangle Institute.

[This page intentionally left blank.]

CONTENTS

List of Appendices

List of Tables

List of Figures

[This page intentionally left blank.]

1. INTRODUCTION AND OVERVIEW

The purpose of the Developing Outpatient Therapy Payment Alternatives (DOTPA) project is to explore and identify characteristics of one or more approaches for reimbursing outpatient therapy under Medicare Part B that could serve as an alternative to the current fee-for-service (FFS) plus annual cap system.[1] The universe of outpatient rehabilitation under Part B—physical therapy (PT), occupational therapy (OT), and speech-language pathology (SLP)—is one of the most variable Medicare benefits in terms of patient case-mix characteristics, prior medical history and treatment, setting types, coding practices, clinical schools of thought, and the resulting treatment plans and utilization patterns. This report is exploratory in nature and serves as a discussion vehicle for possible alternative payment system(s). The research presented here does not aim to provide a completed, finalized model for a new payment system. Instead, selected characteristics that exist for an alternative payment system are discussed within the context of this diversity. Results are presented which include an analysis of patient case-mix not previously available, with the goal of enabling the Centers for Medicare & Medicaid Services (CMS) to make informed decisions about the payment alternatives and research for the future. Some of the research is focused on specific alternatives of interest to CMS, as well as others identified as potential strong candidates.

Section 2 provides a description of the current system for reimbursing outpatient therapy services under Medicare Part B including the associated FFS-based Medicare Physician Fee Schedule (MPFS) and the annual reimbursement limitations or therapy caps. Problems and inefficiencies associated with this system are discussed where appropriate. The pros and cons, potential effects in the short- and long-term, and feasibility of implementation of possible alternatives to this system—some of which have been previously discussed by CMS and others—are summarized. This provides an orientation to and framework for the analyses presented in the latter sections of this report.

Section 3 of the report describes the construction of the analytic data files including newly developed variables, and methodological/data issues such as missing data in the assessments. The source files include Medicare administrative data (claims and enrollment data) and primary data collected during DOTPA.

The remainder of the report presents our analyses of annual and episode therapy expenditures. The analyses are divided into two parts. Part I deals with the annual therapy cap and Part II addresses episodes of therapy utilization. Each part contains a section with analytic results from administrative data on all (100-percent of) therapy users, and a section with analytic results from merged clinician observation report, patient self-report, and claims information on the much smaller DOTPA sample. The main goal of both sections is to identify variables that are useful in case-mix-adjusting therapy expenditures, either annually (Part I) or by episode (Part II).

In the *Analyses Part I: Annual Therapy Expenditures Cap* section of the report, analyses of a revised annual cap for therapy expenditures are presented. This payment alternative is

[1] See http://www.cms.gov/Medicare/Billing/TherapyServices/ for more information on current Medicare therapy payment policies.

explored in two ways. Section 4 details the design and results of descriptive and model-based analyses using only Medicare administrative data where 100-percent of Medicare Part-B therapy claims are included. In addition, Section 4 simulates the therapy cap under different scenarios in order to present budget-neutral cap options. In Section 5, the analytic files are reduced to include only those beneficiaries who participated in DOTPA in an attempt to risk-adjust the annual cap using the clinician assessment and patient self-report data. Again, both descriptive and model-based analyses are presented with a special focus on the identification of DOTPA CARE assessment measures that are predictive of annual therapy utilization and expenditures.

We then turn to an analysis of episodes of care in the *Analyses Part II: Payment Episodes and Case-Mix Groups* section of the report. The ability to identify and predict expenditures for an episode from the FFS claims is explored, along with a more detailed examination of the population case-mix within an episode-based system. Section 6 contains analysis results comprised entirely of administrative data where therapy claims are grouped into episodes of care by discipline based on “clean periods” during which no therapy was received in that discipline. The approach here is similar to that found in Section 4 except that in Section 6 observations defined at the beneficiary episode-level instead of the calendar year. Additionally, Section 6 explores a mixed fee-for service (FFS) and episode payment model as an alternative to pure episode-based payment. Section 7 combines claims information with DOTPA assessment data to analyze predictors of therapy expenditures. Section 8 uses a classification and regression tree (CART) methodology in an attempt to identify mutually exclusive groups of beneficiaries with similar resource intensity.

A summary of the report’s key findings can be found in an accompanying executive summary. An overview of the research presented here will also be included in the DOTPA Final Report along with an executive summary of the *DOTPA Measurement Report* highlighted below (Kline et al., 2014), a discussion of the lessons learned from the project, and recommendations for future research toward designing and implementing an alternative payment system.

2. THERAPY PAYMENT ISSUES AND ALTERNATIVES

In this section we review therapy payment issues and alternatives. We begin in Section 2.1 by describing the current Medicare payment approach for outpatient therapy services. In light of significant problems and concerns with the current payment system summarized in Section 2.2, we discuss in Section 2.3 three options for a revised payment system with aspects that are addressed in this report. In Section 2.4, we briefly describe several payment revision options not addressed in this report. The section is concluded in Section 2.5 with a discussion of the major research issues in therapy payment policy analyzed in this report.

2.1 Current Payment Policy

We first describe the fee-for-service (FFS) nature of current Medicare payment for therapy services. Then, we discuss the therapy caps that have been superimposed on the FFS payment system to limit Medicare therapy expenditures.

2.1.1 Reimbursement Structure

Outpatient rehabilitation services are reimbursed under Medicare Part B under the Medicare Physician Fee Schedule (MPFS). A group of 74 HCPCS[2] codes are used to indicate the specific service that was provided. Many of these services are billed in 15-minute increments; some, however, are recorded at the visit level (American Medical Association, 2012). ICD-9[3] diagnosis codes are required on the claims, as well as modifier codes applied to each claim-line to indicate the therapy discipline providing the service.

Providers of outpatient therapy bill for services in one of two ways depending on the type of institution.

- Hospital outpatient departments (HOPDs), skilled/nursing facilities (S/NFs)[4], comprehensive outpatient rehabilitation facilities (CORFs), rehabilitation agencies (sometimes referred to as outpatient rehabilitation facilities [ORFs]), and home health agencies (HHAs) submit claims as an organization using an institutional claim form (1450 or UB-04 form).

- Private practice therapists, physicians, and certain non-physician practitioners submit claims as practicing clinicians using a professional claim (1500 form).

The organizational unit of the billing entity is the principal difference between these claims; much of the information contained is the same (Centers for Medicare & Medicaid Services [CMS], 2012b). Institutional settings tend to offer a more comprehensive set of services and disciplines of therapy than private practices, though CMS does not require a specific set of services in order to be a Medicare provider.

---

2 HCPCS = Healthcare Common Procedure Coding System.

3 ICD-9 = International Classification of Diseases, Ninth Revision.

4 The therapy services furnished in private, no-skilled nursing facilities (NFs) are billed by the private therapist or other enrolled Medicare provider under contract. However, for the purposes of the analyses presented in the subsequent sections, we group skilled and no-skilled nursing facilities together under the acronym S/NF.

2.1.2 Therapy Cap

At the focal point of the Balance Budget Act's approach to cost containment was to extend the annual, discipline-specific limit (cap) on Part B therapy billing per beneficiary, already in place for private practices, to all settings except hospital outpatient departments (Balanced Budget Act of 1997, 1997). Physical therapy (PT) and speech-language pathology (SLP) are currently subject to a single, combined cap; occupational therapy (OT) has a separate cap, and the PT/SLP and OT caps are the same. The caps are $1,900 in 2013, and were set at $1,880 in 2012 and $1,870 in 2011. The therapy caps are based on allowed charges. Therefore, patient deductible and coinsurance amounts applied to therapy services count toward the amount accrued on each patient's cap.

Implementation was scheduled for January 1999; however, a moratorium was placed on the cap for that year (106th Congress of the United States of America, 1999). Proponents of the moratorium suggested that the cap would limit some beneficiaries' ability to obtain the care they needed once it was reached, and that providers would have difficulty understanding the regulations and maintaining compliance (American Physical Therapy Association, 2012). Subsequent legislation extended the moratorium through the end of 2005, with the exception of a short period in 2003 (108th Congress of the United States of America, 2003).

In 2006, the moratorium on the cap was lifted and an exceptions process was added to the policy, allowing cases with a justified need to exceed the cap (109th Congress of the United States of America, 2006). The exceptions process at first required a manual application from the provider, though some ICD-9 CM codes were accepted automatically. The policy was amended in 2007 to automatically trigger an exception when a beneficiary reached the cap through use of the KX modifier code on the claim. Providers are required to maintain sufficient documentation to justify the beneficiary's need for the additional services being requested (CMS, 2012a). This documentation is subject to review and audit by CMS. Legislation passed in March 2012 instituted a requirement of manual review for any beneficiaries whose calendar-year expenditures exceed $3,700 (112th Congress of the United States of America, 2012).

Care received from HOPDs was not subject to the cap when the limit was first implemented. A beneficiary who had exceeded the cap could theoretically receive therapy from an HOPD without limit so long as there was a documented medical need. Legislation in 2012 removed this exemption, making all outpatient therapy[5] subject to the same limitations regardless of setting (112th Congress of the United States of America, 2012).

2.2 Problems with the Current Payment Approach

In 2010, Medicare payments for outpatient therapy services totaled approximately $4.08 billion; this constituted an increase of 3.5 percent from 2009 and 32.5 percent from 2006 (mean annual growth of 8.1 percent; Silver et al., 2013). Policymakers have expressed concern about the value of this spending, and whether all of it is medically necessary and targeted to beneficiaries' needs (MedPAC, 2006; GAO 2005). The current approach to reimbursing therapy

[5] Currently, critical access hospitals are the only exception to this policy.

services under Medicare Part B contains several structural inefficiencies which generate both an administrative burden for providers and incentives for high-service provision and cost growth. Additionally, while substantial information is collected on the types of services provided to patients (as is necessary for any comprehensive FFS billing system), very little meaningful information beyond diagnosis codes is collected about the underlying condition or specific impairments causing the need for therapy.

As previously noted, outpatient therapy services are billed through 74 HCPCS procedure codes that describe what services were provided to the patient during the therapy session. Some codes are untimed and may only be billed once per session; other codes are timed (typically in 15-minute intervals) and may be billed multiple times per session. These highly disaggregated billing codes do not determine the efficient amount of medically-necessary services for different types of patients and may incentivize service use. The various utilization edits, applied by Medicare to try to limit payment to medically necessary services and to avoid over-utilization and abuse, are a testament to the tendency of the current codes towards these problems. However, these utilization edits are a compensatory measure, not a long-term solution.

The therapy caps present several additional concerns. A universal limitation that is not sensitive to the specific needs of the patient can effectively limit excessive service use at a beneficiary level. Exceptions, however, will almost certainly exist. The automatic exceptions process that currently exists has, in effect, turned the therapy cap into a soft limitation which can be relatively easily exceeded. Though CMS audits documentation to ensure that exceptions are being granted to only medically-necessary cases, review processes are costly and burdensome for all parties involved. Complete enforcement of compliance is not realistic. Furthermore, audits are often focused on higher-cost cases, though it is estimated that cases exceeding the therapy cap represented only the costliest 19 percent of PT patients in calendar year 2010 (Silver et al., 2013). Consequently, very little attention is paid to whether the services provided to the rest of the PT patients, those who do not reach the cap, are clinically appropriate.

A system of payment that is sensitive to the needs of the patient must be based on effective measures of those needs. One weakness of the current system is that ICD-9 CM diagnosis codes are the only information related to the patient’s condition collected on therapy claims, and the codes are often not an accurate representation of the needs of the patient. In the context of outpatient rehabilitation, the term diagnosis could refer to either the underlying *etiologic diagnosis* resulting in the need for therapy, or the *symptom and/or impairment diagnosis*, representing the symptoms and/or impairments being treated by the therapist. For example, a patient recovering from a stroke may have difficulty walking. The underlying etiologic diagnosis for this patient could be Cerebral Artery Occlusion (Stroke; ICD-9 CM code 434.91), while the symptom/impairment diagnosis could be Abnormality of Gait (ICD-9 CM code 781.2). The following is an example of ICD-9 CM coding guidelines for outpatient therapy provided by the Medicare Administrative Contractor WPS:

> *When physical medicine and rehabilitation services are performed for beneficiaries who have suffered musculoskeletal or neurological complications secondary to some other disease, use the ICD-9- CM code for the sign/symptom/complication diagnosis. The underlying condition may also be coded, but is not required. However, the underlying, causal pathological condition alone will not be sufficient for coverage (CMS Billing and*

Coding Guidelines, Outpatient Rehabilitation Therapy Services billed to Medicare Part B, article effective date, 01/15/2010).[6]

Since reporting the underlying causal condition (recorded in, for example, the patient's plan of care) is not required on therapy claims, it can be difficult to ascertain the medical classification related to the need for therapy. Moreover, medical classification usually does not provide information about severity of impact, potential for change, environmental factors, patient goals, or a range of other issues bearing on treatment needs. In short, additional measures of severity and medical complexity are needed to characterize a patient's needs.

2.3 Options for a Revised Payment Approach

DOTPA focuses on three options for a revised payment approach for outpatient therapy. Refinements to the current FFS with cap approach are discussed in Section 2.3.1, episode-based payment is discussed in Section 2.3.2., and mixed FFS-episode payment is discussed in Section 2.3.3.

2.3.1 Option 1 – Refinements to Fee-for-Service with Cap

A possible alternative approach to the therapy benefit is to modify the current FFS cap-based system to address the problems noted above. Continuing with a FFS methodology has the advantage of an already existing infrastructure for providers, CMS, and administrative-billing contractors. To address the current issues outlined in Section 2.2, however, several modifications to the current policy could be considered.

Increase Beneficiary Cost-sharing Above the Cap

At the beneficiary level, cost-sharing could be increased when total annual beneficiary therapy expenditures exceed the therapy cap.[7] The implicit assumption behind this option is that therapy services beyond the cap are less likely to be medically necessary and of high value, and beneficiaries wishing to obtain them should pay more of the cost. Additional research would be required to suggest the cap level and within which group of patients would this medically unnecessary treatment likely occur.

Moreover, many beneficiaries obtain supplemental coverage (e.g., MediGap[8]) which potentially shields them from much of the Medicare Part B cost-sharing. As such, increasing beneficiary cost-sharing may have little effect on most beneficiaries' out-of-pocket costs, while increasing out-of-pocket costs for beneficiaries without supplemental insurance who may have lower income. Although increasing beneficiary cost-sharing above the cap would shift costs from Medicare onto other parties, little reduction in low-value therapy utilization might occur; this assumes policymakers assign a lower value to benefits above the cap. Research would be needed to confirm this assumption.

---

[6] http://downloads.cms.gov/medicare-coverage-database/lcd_attachments/28531_4/L28531_PHYSMED009_Coding_V1.pdf

[7] The discussion here could include the idea of a set cap lower than the current value.

[8] http://www.medicare.gov/supplement-other-insurance/medigap/whats-medigap.html

Reduce Provider Payments above the Cap

Medicare allowed charges could be reduced for services provided above the therapy caps, lessening the incentives for providers to continue providing therapy. Again, the rationale would be that services above the cap are likely to be lower-value services for many beneficiaries, and Medicare's payment should reflect the value of what is being purchased. Like most financial limitations on care, this policy carries a risk of adversely affecting beneficiaries with a genuine need for additional services and the providers who treat them. An exceptions policy would likely be needed, but would potentially re-introduce the enforcement feasibility problems in the current system. As above, research would be needed to confirm this assumption and to set the level of provider payment.

Risk-adjusted Cap

Risk-adjustment is an important component of any alternative reimbursement system. In an FFS system of payment, risk-adjustment could function as a method of predicting therapy utilization and subsequently setting limits and/or targeting utilization review. In essence, the risk-adjusted cap option would be a revision of the cap-based approach, calibrated to the specific needs of the patient, assuming the risk-adjustment is sufficiently precise. The therapy caps would be adjusted in accordance with therapy expenditures predicted for each individual based on their clinical characteristics, and possibly, utilization history. Because the goal is to cap excessive, low-value utilization, rather than mean utilization, an upper percentile of utilization would be predicted (e.g., the 80th percentile) and set as the individual's cap. Beneficiaries exceeding their specific cap could then be targeted for administrative control policies such as increased provider documentation requirements, utilization review, higher cost sharing, or reduced provider payments.

The high level of variability in case-mix characteristics among the outpatient therapy population makes such a proposal a challenge. Currently available administrative data including diagnosis codes could be used in such a model. In addition to diagnosis information, other patient characteristics, such as age, functional status, and comorbidities, would be important to include in a risk-adjustment model. For instance, resource needs may be expected to differ between a 55-year old, otherwise-healthy male with a new stroke resulting in mild motor deficits only, compared with an 80-year old male with multiple comorbidities presenting with a new stroke and significant resultant motor and cognitive deficits. These patient attributes may influence a beneficiary's need for outpatient therapy, and therefore are subject to inclusion in the risk-adjustment model.

Effective risk-adjustment will require an assessment instrument or some method of collecting clinical measures of functional impairment. This report presents analyses that evaluate the prediction of therapy expenditures with beneficiary complexity measured by the DOTPA Continuity Assessment Record and Evaluation (CARE) instruments (see Section 3). Ultimately, additional measures of functional impairment and severity may be needed to adequately predict therapy utilization.

Separate or Combined Caps by Discipline

The three disciplines of therapy covered under the Medicare Part B benefit address different needs; however, they often work in concert to rehabilitate patients with complex multi-disciplinary conditions. An important question is whether limitations should be set separately by discipline or whether a single limit on utilization should apply to all therapy provided to the patient.

Discipline-specific limitations have the advantage of clearly defining how much of a particular type of therapy should be ascribed to a patient for a particular need. They also distinguish the limitations for cases where the therapists are working with a patient concurrently for unrelated conditions, or where patients are receiving therapy from different disciplines in different settings. A combined cap provides for a single limitation that encompasses the entire underlying need. It allows patients or providers more freedom to use services across disciplines as they deem appropriate. Most beneficiaries (82.3 percent of therapy users in 2010) receive therapy from only one discipline in a calendar year and the vast majority of those beneficiaries were users of PT (71.7 percent; Silver et al., 2013).

Under a budget-neutral combined cap that is lower than the sum of the individual caps, the same proportion of Medicare therapy expenditures would fall below the combined cap as fall below three discipline-specific caps. A combined cap would be lower than the sum of individual therapy caps because a combined cap would not limit individuals whose expenditure for a single discipline exceeds the discipline-specific caps. For example, if each discipline-specific cap were $2,000, a combined cap based on the sum of the three individual caps is 3 X $2,000 = $6,000. Beneficiaries with any mix of spending where each discipline amount is below the discipline-specific cap are also below this combined cap. But, beneficiaries with expenditures that exceed one or two of the discipline-specific caps can still be below the combined cap. For instance, if a beneficiary had $3,000 of PT spending and zero spending on OT and SLP, she would be above the PT cap of $2,000 but below the summed combined cap of $6,000. Therefore, a budget-neutral combined cap would be less than $6,000 (but above $2,000). If her PT expenditures were greater than $6,000, then she would have exceeded both the discipline-specific and combined caps.

Hypothetically, suppose a budget-neutral combined cap of $3,000 resulted in the same percentage of Medicare expenditures below the cap as three discipline-specific caps of $2,000. Such a combined cap would help beneficiaries requiring more than $2,000 in discipline-specific therapy services. For example, if a beneficiary required $2,500 in OT services, she would be above the OT-specific cap of $2,000, but below the combined cap of $3,000. But a combined cap would hurt beneficiaries requiring high levels of therapy from multiple disciplines. For example, suppose a beneficiary required $2,000 of therapy from each of the three disciplines. Under the $2,000 discipline-specific caps, this beneficiary's needs could be met within the caps. But with a combined cap of $3,000, half of this beneficiary's total expenditures of $6,000 would be above the cap.

In short, a budget-neutral combined cap helps beneficiaries with a high need for therapy from a particular discipline, while hurting those with high demand for multiple disciplines of therapy. A combined cap also constrains total (all discipline) therapy spending at a lower level, which may disadvantage the highest-need beneficiaries (e.g., severely impaired stroke patients who require PT, OT, and SLP rehabilitation). In the example in the preceding paragraph, a hypothetical budget-neutral combined cap limits total individual therapy spending to $3,000, while with separate discipline caps total individual therapy spending can be as high as $6,000.

A budget-neutral combined cap makes some beneficiaries better off and some worse off versus separate, discipline-specific caps. A combined cap is not a "Pareto improvement" making all beneficiaries better off. But an argument could be made for a combined cap on equity grounds. A combined cap would essentially give each beneficiary an equal budget to spend on appropriate and medically necessary therapy. Under separate caps, some beneficiaries effectively have a much higher budget. Consider a stroke patient needing high amounts of therapy from all three disciplines. With caps of $2,000 per discipline, this patient can accumulate $6,000 in total therapy expenditures below the caps. Compare this patient to a hip fracture patient who needs a high amount of PT only. Her therapy expenditure cap is only $2,000. Even if the caps are not binding and are used only to target utilization review, it could make more sense to review beneficiaries whose total, rather than discipline-specific, therapy spending is high.

The degree of substitutability[9] among the three therapy disciplines affects the impact of separate caps by discipline versus a combined cap. As just argued, a beneficiary who has a high demand for a single type of therapy is in general worse off with separate caps than with a budget-neutral combined cap. But, the more substitutable the disciplines of therapy are, the less constrained this beneficiary is under separate caps. As the disciplines are more substitutable, a beneficiary constrained by the cap on a single discipline can obtain additional equivalent therapy from the other disciplines, raising her overall receipt of therapy. If the disciplines of therapy were perfect substitutes for each other, a budget-neutral combined cap is the sum of the individual discipline caps, and all beneficiaries are equally well off with separate caps or a combined cap. Conversely, if there is no substitutability among the different therapy disciplines, separate caps by discipline are binding on beneficiaries with a high need for the services of a particular discipline. Medicare spending under discipline-specific caps will also rise with greater substitutability among disciplines, as beneficiaries shift utilization from disciplines where they have reached the cap to disciplines where they have not. Though the literature is not clear, if there is a high degree of substitutability among disciplines, there is no point in separate caps, as beneficiaries can evade them by shifting utilization to the other disciplines.

Community versus Institutional Residents

Long-term residents of nursing facilities account for a substantial fraction of Medicare outpatient-therapy spending (MedPAC, 2006). These patients are often more medically complex, leading to more therapy need than the average patient receiving Part B therapy. They are also more likely to receive therapy from multiple disciplines. As a result, DOTPA employed distinct

---

9 In economics, substitute goods are goods which may replace each other in use. For example in an outpatient therapy context, patients with swallowing disorders are typically treated by SLPs; however, some OTs are trained as swallowing specialists and treat patients with swallowing disorders. Also, patients working on transfer skills might receive treatment from a PT or an OT.

versions of the CARE assessment tailored to the needs of the outpatient population and institutional residents.

Policymakers are concerned about the appropriateness and medical necessity of services delivered to nursing facility residents. These beneficiaries' utilization is not constrained by the time and travel cost of the patient visiting the therapy practice. Rather, therapists come to or work at the nursing facility to deliver services.

Possibly, different payment approaches need to be considered for the nursing facility population. While there is a general lack of evidence, it is possible that care provided to nursing facility residents may constitute more therapy days over an extended period of time[10] and a greater potential focus on maintenance than in the community; this care may be better-suited to an annual limitation than care provided to community-dwelling patients. Additionally, as previously described for the community-dwelling patients, a combined therapy cap could limit total individual therapy expenditures to a lower level than discipline-specific caps.

2.3.2 Option 2 – Episode Payment

While a revised FFS methodology represents a practical approach to redesigning outpatient therapy reimbursement, a more comprehensive alternative is an episode-based payment system. Episode-based payment means paying a single price or bundled payment for all services provided in an episode of care. Generically, an episode of care is a set of clinically-related services provided for a medical or therapy condition of one patient from the initiation to the termination of treatment.

Pros and Cons of Episode-Based Payment

Before describing what type of episodes could be developed for outpatient therapy payment, it is useful to review the general advantages and disadvantages of episode-based payment versus FFS payment and annual caps. The major advantage of episode-based payment is the incentive for within-episode efficiency associated with a prospective fixed payment. Episodes bundle services into a single unit of payment and the provider can increase its profit by reducing the level of services provided within the episode, including eliminating inappropriate, medical-unnecessary, or low-value services. The incentive for efficiency applies to all episodes, short as well as long (as opposed to annual caps which only affect high utilizers). Capping payments at an episode level has more clinical face-validity than annual caps because episodes are a clinically meaningful unit of treatment. Episodes can also provide a useful locus for outcome, efficiency, and quality measurement; pay for performance; and provider profiling for measuring a provider's quality, efficiency, and outcomes of care.

---

[10] Using an annual definition of therapy utilization on 100% Medicare outpatient therapy claims from calendar year 2010, it was found that in a calendar year nursing facility residents had means of 22 therapy days and 80 calendar days (about 4 therapy days per week) and community-dwelling residents had means of 12 therapy days and 66 calendar days (about 3 therapy days per week). (Source: RTI analysis of 2011-2012 MEDPAR Medicare Claims.)

Episode payment has several significant disadvantages. Total spending is the payment per episode multiplied by the number of episodes. Episode payment does not control the number of episodes and thus, unlike annual caps, does not limit overall spending. In fact, episode payment establishes incentives for providers to create more episodes, especially those with a short time span. A provider can potentially generate large profits by creating short episodes for which it receives full payment for an average-cost episode. Depending on billing rules, providers can also potentially unpack episodes by billing for multiple episodes for conditions that are treated simultaneously.

Another disadvantage of episode payment is that it could create incentives to withhold care provided within the episode. Providers can increase their profits not only by eliminating unnecessary care but by eliminating needed care. Episode payment could create incentives for selection, or avoiding high-need patients. With a fixed payment, providers can profit by treating low-cost patients and avoiding high-cost patients. Risk-adjustment overcomes this incentive to some extent, but risk-adjustment is imperfect. Stated another way, episode payment, which is based on average episode costs, overpays for short episodes and underpays for long episodes with more services. Depending on a provider's volume of episodes, episode payment may substantially increase provider financial risk. A low-volume provider could suffer substantial financial losses from an outlier episode.

A final disadvantage of episode payment is that defining and implementing episodes can be complex. Paying by episode requires the establishment of (1) logic to assign services to episodes and risk-adjustment categories; (2) policies to address multiple disciplines (for concurrent episodes), providers and settings involved in an episode and to address cost outliers; and (2) procedures to manage the cost implications of concurrent episodes for a single beneficiary.

Definition of Episodes

Several definitions of therapy episodes are possible. Five alternative definitions are as follows:

1. A *fixed episode* is triggered by an initiating event, and includes all (discipline-specific) therapy services that are provided within a fixed length of time following the initiating event. The fixed-episode length could be, for example, 30, 60, or 90 days. Initiating events could include a therapy claim that is preceded by a clean period of 30, 60, or 90 days without any therapy claims; a hospital discharge; a surgery (inpatient or outpatient); or an injury (e.g., fracture).

2. A *variable episode* is surrounded by clean periods of no therapy use. The clean periods are typically 30, 60, or 90 days. For example, if a 60-day clean period is adopted, then a therapy episode begins with a claim with no therapy claims in the preceding 60 days, and the episode ends with a claim without a therapy claim in the subsequent 60 days.

3. An *annual episode* is defined as all therapy services occurring in a one-year (12-month) period. This episode definition is independent of the actual utilization of

therapy services. It begins and ends on the first and last days of the year, regardless of use of services. The annual episode definition is used in defining and applying Medicare's current therapy caps.

4. A *clinical episode* is defined by certain clinical criteria, as opposed to the previous definitions based on calendar time and service utilization. For example, CMS' definition of an outpatient therapy episode is: "For the purposes of therapy policy, an outpatient therapy episode is defined as the period of time, in calendar days, from the first day the patient is under the care of the clinician (e.g., for evaluation or treatment) for the current condition(s) being treated by one therapy discipline (PT, OT, or SLP) until the last date of service for that discipline in that setting" (CMS Billing and Coding Guidelines, Outpatient Rehabilitation Therapy Services billed to Medicare Part B, article effective date, 01/15/2010). In this case, it would be the therapist's responsibility to identify the start and end dates of the episode based on when the patient begins and then is no longer receiving services for that clinical need.

5. An *expenditure-based episode* is one that is dependent solely on therapy expenditures. For example, expenditures up to the annual therapy expenditure cap could be considered an "episode," or the first segment of an episode of care. Expenditures from the initial therapy cap to the manual review therapy cap could be considered a second episode, or the second segment of an episode. Episodes based on expenditures would be less gameable in the time dimension than time-based episodes. For example, episodes based on 60-day renewable periods could be gamed by a provider shifting a service to the next 60 day period to qualify for an additional episode payment. Expenditure-based episodes would not be gameable by moving services in time, but could be gameable through the provision of extra services to exceed expenditure thresholds.

Hybrid definitions are also possible. In our analysis of the CARE-claims data described later in this report, we used a clinician-identified (clinical) start of the episode, but a 60-day clean period definition for the end of the episode.

There are several considerations in adopting a therapy-episode definition. One decision is discipline-specific versus multiple-discipline episodes. For community residents, we analyze discipline-specific episodes, meaning that multiple concurrent episodes may exist. This premise is similar to option 4 listed above. For example, a PT and a SLP episode may run concurrently, but only one episode for a given discipline may occur at the same time. For nursing facility residents, combined discipline episodes may be more appropriate. Another decision is whether episodes should be setting specific.

Setting refers to the type of provider such as HOPDs versus private practice. This is in contrast to option 4 above where setting refers to the individual provider location (e.g. a private practice). In this report, we do not consider different outpatient settings in defining episodes because we want therapy payment to be driven by patient characteristics and not the type of provider delivering the services. This means that a patient moving from a private practice to a different rehabilitation provider would only appear as one episode, and services in all outpatient settings are included in the episode. Policies must also be developed to specify how episodes are defined when multiple providers are involved, whether within the same type of setting or not, and when multiple conditions are treated.

Fixed-length episodes may be renewable or non-renewable. Medicare's HHA-payment system uses 60-day episodes that are infinitely renewable. Some sort of renewability or outlier policy seems essential for episode-therapy payment because outpatient therapy courses of treatment can range from 1 day to a period of over one year. Renewable episodes provide a means of paying more for long episodes while subjecting shorter episodes to full-episode payment. Average-episode payment over a large number of episodes may equal the average FFS payment, preserving access for very expensive, high-need patients. It is also possible that payment could be based on an initial fixed episode (e.g., of 60 days length), then payment could revert to FFS after the initial episode payment period. Paying FFS after the initial episode would eliminate any incentive to create a second episode to receive another lump-sum episode payment; however, policies would also be needed to dis-incentivize the FFS use or limit it as previously discussed.

An episode definition must also specify what services qualify for the episode. It is possible to eliminate some services from the episode course of care; for example, an unusually expensive service might be paid only through FFS to preserve access to the treatment. Some therapy services may be more suited for episode payment than others. For example courses of treatment beginning with an evaluation, such as 97001—physical therapy evaluation and 97003—occupational therapy evaluation are likely appropriate for episode payment.

CMS currently requires that all therapy services be provided under a therapy plan of care, but does not require a billable evaluation to begin an episode of care (under the manual definition of clinical episode cited on p. 19) or to establish a plan of care. Episodes may begin with treatment only (under a plan of care), such as CPT code 97110—therapeutic procedure. To initiate episodes, one option for CMS would be to establish a new HCPCS code or code modifier that therapists would use to indicate that they had begun an episode of care according to the CMS definition of outpatient therapy episode of care quoted above. The presence of this code would trigger the episode lump-sum payment, and various billing rules concerning it would have to be established, such as that a single therapy provider could not bill for more than one episode initiation for the same patient within 60 days.

Episode payment may also require outlier payment policies for particularly expensive or inexpensive cases. An explicit high-cost or outlier policy may be established, or renewable episodes could be used as an implicit type of high-cost outlier policy. A short-stay outlier policy could pay less than the full-episode payment for short, low-cost episodes. For example, Medicare's home-health episode payment system pays FFS if the home-health episode, defined as a 60-day period, only consists of a few home care visits. However, it should be recognized that short-stay episode policies do not solve the incentives of episode payment for providers to create more short episodes. It simply shifts the incentive problem. Paying less for short episodes does reduce the incentive to create short episodes. But it establishes a new incentive to change short episodes to longer episodes that qualify for the full-episode payment. For example, if at least three therapy visits are required for full episode payment, therapists have an incentive to convert 1- and 2-visit episodes to 3-visit episodes.

Case-mix Adjustment of Episodes

Case-mix adjustment will be a critical component of any alternative approach to reimbursing Part-B therapy services because case-mix adjustment matches payment to beneficiary need and provider cost. FFS payment allows therapists to bill for provided services and cap exceptions allow for cases with a documented need to exceed established limits. To properly allocate funding in an episode-based payment system, however, a deeper understanding of patient case-mix, possibly including current functional impairment and medical history, is needed. It will also be important to understand episode treatment content, since a medically complex patient may be treated for a minor problem, or an uncomplicated patient may be treated for a serious acute problem. Like diagnosis-related groups and other bundled payment systems, therapy episode case-mix adjustment could involve both characteristics of the patient (e.g., diagnosis, impairment) and what the provider does in the episode (e.g., procedure).

Some elements that potentially can contribute to developing a measurement of patient complexity and episode content are patient medical history, service utilization history, current (at time of evaluation) primary diagnosis, current functional status, and episode therapy need. Some of these pieces of information are available in Medicare administrative data; however, most are not currently collected. In DOTPA, the CARE instrument was used as the basis for the project assessment instrument to capture such measures on beneficiaries beginning a course of Part B therapy. Later in this report we describe the results of our analysis building episodes of outpatient care from Medicare claims and these data, and we present an exploratory analysis of therapy case-mix groups.

Payment Adjustment for Truncated Episodes

A number of outliers exist in the utilization data leading to unusually short or long courses of treatment. One of the more common is an artificially truncated plan of care. The therapy population in many cases is ambulatory and community dwelling so beneficiaries, for a variety of reasons, may begin a course of therapy with a provider and discontinue prior to completion of the plan of care. Patients may decide after a certain number of visits that they are "feeling better," or they may feel that the pain sometimes caused by physical therapy exercises is not worth the intended goal of the treatment. Part B therapy calls for a beneficiary liability of 20% coinsurance, which some patients may find too costly, or they may simply be dissatisfied with the experience with their current therapist and elect to switch to a new one. Additionally, many Medicare beneficiaries live in different parts of the country depending on the season (i.e., snowbirds), and if a course of therapy is in progress at the end of one of those seasons, the beneficiary would be unable to continue at the current location. He/she may choose to resume therapy at their new location, or simply to stop, depending on their functional status at that point. In all of these cases, the ambulatory status of the patient causes the length of the course of therapy with that provider to be shorter than clinically indicated, and as such, generates lower overall cost within that particular setting.

Another common case is the evaluation-only or single-session episode. In this scenario, for example, a patient is referred to outpatient therapy but after evaluation the therapist determines that the patient would not benefit from the therapy prescribed. The therapist may feel that the patient's condition requires a different discipline or specialty within the therapist's discipline, or that the underlying need is actually medical in nature and therapy is not indicated. The patient's condition may also be longstanding with a history of limited/no improvement under similar courses of therapy, or a simple need may exist which requires only one session of therapy (sometimes without even an evaluation). The opposite is also possible, where a patient may require substantially more therapy than is predicted by the payment system. Though the case-mix classification and the associated reimbursement can be quite detailed, substantially costlier outliers caused by an unusual characteristic that the system is not sensitive to inevitably exist.

As mentioned previously, a payment system may need outlier mechanisms to account for very long expensive episodes, and for truncated and therefore less expensive episodes. One possibility is having multiple severity levels built into the case-mix classification, similar to those used in the Medicare Severity Diagnosis Related Group (MS-DRG). This would still be a rather blunt approach and may not successfully account for all of the outlier cases. A more patient-specific approach could apply a prospective episode payment which accounts for the vast majority of cases in the case-mix group, and then employ a FFS or per-diem approach above and beyond the episode payment for the more expensive outliers. Documentation would be needed to justify the added expense. As an additional cost containment measure, the FFS or per-diem allowed charges for services beyond the fixed payment could be set below the marginal cost of the services being reimbursed. This would allow providers to recover some of their costs for patients with a genuine need while dis-incentivizing over-use of the exception and incentivizing efficiency and lower cost growth. Such a policy could have adverse effects on providers that specialize in highly complex patients.

CMS must also have a mechanism for identifying the cases which end prematurely and result in a lower cost to the provider. Such cases, especially those where therapy continued in a different setting, would call for a reduced payment to the first provider which more closely matches the actual cost of the therapy provided. This could be accomplished a number of ways including capturing the dates of the start and end of care and the number of therapy visits.

2.3.3 Option 3 – Mixed Fee-for-Service and Episode Payment

An alternative to pure FFS or pure lump-sum episode payment is mixed payment. Mixed payment is a hybrid of FFS and episode payment. A lump-sum is paid per episode, but FFS payment also continues. The lump-sum payment is lower than the amount paid in a pure-episode payment, and FFS payment is reduced in comparison to a pure FFS payment. For example, in a three-year transition from current FFS payment, FFS payment could be lowered to 90 percent, 80 percent, and 70 percent of current full-FFS payment. Concomitantly, the lump-sum payment would rise from 10 percent to 20 percent to 30 percent of expected total episode payment. The lump-sum payment could be risk-adjusted. In the long run, once better risk-adjustment and outcome measures are developed, an even higher percentage of total payment can occur through the lump-sum.

A numerically specific, hypothetical stylized example of mixed payment versus episode and FFS payment is as follows. Suppose FFS payment per therapy visit is $75, and the average episode length is 8 visits, for an average total episode payment of 8 X $75 = $600. Pure FFS payment pays $75 per therapy visit. Pure episode payment pays a lump sum of $600 per episode, regardless of the number of therapy visits during the episode. Mixed payment, with a 70 percent/30 percent split of total average payment between FFS and episode lump sum, pays (70 percent) X ($75) = $52.50 per therapy visit, and (30 percent) X ($600) = $180 as a lump sum per episode. Average total payment per episode is the same under mixed payment as under FFS or episode payment, because average total mixed payment at the average episode length of 8 visits is $180 + 8 X $52.50 = $600.

Mixed payment recognizes that the optimal marginal payment for services is neither full FFS payment nor pure episode payment. Full FFS payment overpays for extra services by paying above the marginal cost per service (e.g., per therapy visit), incentivizing overprovision of services. Pure episode payment underpays for extra services by paying nothing at the margin, risking stinting and under-provision of services. Mixed payment introduces episode payment incentives for efficiency, but retains a reduced FFS payment for marginal services. Reducing FFS payments lowers incentives for overprovision of services. The lower lump-sum payment in a mixed payment system, as compared to pure episode payment, reduces incentives for stinting (i.e., selection of low-cost cases) and creation of unnecessary episodes (especially short-length episodes). Reducing the lump-sum payment also limits provider financial risk.

Additional advantages of mixed payment are that Medicare shares in any savings from reduced utilization in response to the efficiency incentives created by the lump-sum payment. If therapy utilization falls, Medicare saves on the FFS portion of mixed payment. With pure episode payment, Medicare does not capture any savings unless it sets episode payment at a lower level, or constrains the annual update to episode payment. Mixed payment pays more on average for the first visits in an episode of care—which are likely to be of higher value—and less for the later visits in an episode of care—which may be of lower value.

Importantly, maintaining some FFS payment as in mixed payment strengthens risk-adjustment. Payment is greater for higher-need, more-expensive cases *both* through risk-adjustment of the lump-sum payment *and* through the continued but reduced FFS payment. Payment is lower for lower-need, less-expensive cases through the same two mechanisms. Underpayment for longer episodes and overpayment for shorter episodes is less than under pure episode payment. For example, if FFS payment were continued at a 70 percent rate, effectively this alone achieves an R^2 of 49 percent (= 70% X 70%) in explaining therapy expenditures.[11] A 49 percent R^2 is much higher than therapy risk-adjustment models not using utilization have achieved. The reduced FFS payment substitutes for the lack of strong risk-adjustment by paying less for shorter-length, less complex episodes of care, and paying more for longer, more complex episodes of care.

A desirable payment system is not simply a statistical problem of predicting expenditures as accurately as possible for various types or populations of patients. While accurate risk-adjustment is desirable, even an episode payment system with a 100-percent R^2 in predicting

[11] Let E = therapy expenditures and PE = predicted therapy expenditures. In mixed payment, 70 percent of E is paid as a FFS payment, i.e., the payment system's PE = 0.7*E. R^2 = the ratio of explained, or predicted, expenditure variance to total expenditure variance. That is, R^2 = Var(PE)/Var(E) = Var(0.7*E)/Var(E) = (0.7*0.7)*Var(E)/Var(E) = 0.49.

expenditures with completely non-gameable adjusters would not implement the best payment system. The incentives of providers to supply services must be taken into account. Pure episode payment risks stinting and under-provision of services, the opposite of the problem that plagues FFS. Mixed payment occupies a middle ground.

Many of the payment systems that CMS currently uses to pay for post-acute care—the HHA and SNF prospective payment systems for example—implicitly recognize and attempt to deal with the problems of episode payment enumerated above. These systems recognize the advantages of paying for utilization by incorporating strong elements of utilization in their case-mix systems (therapy visits or minutes). HHA payment also has a low-utilization (small number of visits) adjustment. Outlier policies exist to pay more for extreme high-utilization (cost) cases. In these systems utilization heavily determines payment. These payment systems *are* in fact mixed payment systems, although they are labeled "episode payment."

The advantage of the mixed payment system as described here is that it incorporates paying for utilization in a much simpler, more transparent, and more continuous fashion than the current post-acute payment systems. Because all services are paid at a reduced FFS percentage, there is no "lumpiness" such as has plagued Medicare HHA payment—various thresholds of number of visits discontinuously[12] trigger higher payment and providers predictably lump their utilization at these thresholds to obtain the higher payment. This perspective on mixed payment contrasts with MedPAC's position that therapy should be paid for without reference to actual therapy utilization (MedPAC, 2013, Recommendation 8-3). The mixed payment approach suggests that in fact therapy payment *should* be based on therapy utilization, but through a reduced FFS payment combined with a lump-sum episode payment. Therapy utilization should be incorporated into therapy payment in a simple, transparent, and continuous fashion, such as in the mixed payment system described in this section.

Mixed payment could be implemented in any of the episode definition approaches described previously. A particularly simple and possibly attractive approach would be to pay for the first 60 days of an outpatient therapy episode using mixed-episode payment, then pay FFS for the remainder of the episode post-60-days. In this approach, the advantages of episode payment would apply to most episodes while very long outlier episodes would be paid FFS to ensure access for the highest-need patients.

However, what would beneficiary cost sharing be under part prospective/part reduced FFS episode payment? If beneficiaries paid 20 percent coinsurance on the reduced FFS payments only, their cost sharing would fall. One possibility is for beneficiaries to pay the same coinsurance per service as under current law—20 percent coinsurance on the full allowed charge, not on the allowed charge reduced by for example 30 percent. Or, beneficiaries could pay the 20 percent coinsurance on the lump sum portion of provider reimbursement as well as on the reduced FFS component. In this case, the front-end cost sharing could present a barrier to some

[12] In HHA payment, patients move to a higher-payment episode case-mix category as they exceed certain number of visit thresholds. For example, hypothetically, if a patient has 10 rather than 9 therapy visits during an episode, episode payment will be higher. The visit thresholds have been adjusted several times by CMS.

patients accessing care, while the smaller copayments per service could increase beneficiary demand for services, even while providers have an incentive to reduce utilization.

2.4 Other Payment Options Not Addressed in this Report

In this report we discuss several possible alternatives for reimbursing therapy and present analyses of some of these alternatives. This report is not exhaustive however, and there are other proposals for payment revisions which we briefly discuss in this section.

2.4.1 Revised Fee-for-Service Billing Codes

A revised FFS billing codes approach was recommended by Computer Science Corporation (CSC) in 2010. A modified version of this concept is supported by the American Physical Therapy Association. The CSC approach involves a simplification of the billing reporting system to a series of 12 HCPCS billing codes (reduced from the current list of 74 billing codes).[13] These codes are defined by a cross-tabulation of the intensity of the services provided and the severity of the patient's condition, and also distinguish between the evaluation visit and subsequent visits in the plan of care. One of these 12 codes would be billed for each therapy encounter or visit.

This proposal maintains the current FFS basis of payment, but represents a more bundled approach to therapy payment. Billing and payment is on a per-visit basis rather than a per-service basis. Each visit is characterized by the complexity of the patient condition and the intensity of therapy services provided during the visit. The billing therapist (or medical coder) would determine which code to bill using the corresponding documentation. This proposal would make billing for therapy services more like physician billing for evaluation and management services.

Per-visit payment establishes incentives and a budget to limit the intensity of services provided at each therapy encounter. Using an annual definition of outpatient therapy utilization, the mean allowed charges per therapy day were found to be $72.42. However, it does not provide any incentives for efficiency in number of visits or length of episode, the main driver of variations in therapy expenditures. A variant of this approach is to reimburse therapy on a per-diem basis and establish limits on the number of days for a particular course of therapy. This per-diem system is similar to the approach currently employed for Part A covered stays in SNFs, in which services are reimbursed on a per-diem basis based on the resource intensity of the services (both therapy and non-therapy) provided to the resident. This system, however, only contains a standard 100-day limit after which Part A services end. It should also be noted that, per MedPAC's March 2013 Report to Congress, the current SNF PPS therapy reimbursement model also contains an inherent incentive to provide high amounts of therapy, as the amount of reimbursement increases with increased resource utilization. Therefore, such an alternative might not produce the type of efficiencies in resource utilization sought by employing a per-visit standard or moving away from the current FFS payment system.

---

[13] Computer Sciences Corporation (2010). See also https://www.apta.org/APS/.

2.4.2 Incorporating Outcomes into Payment

Outcomes are frequently discussed as an important factor in setting payment. They are a core component of quality measures and any pay-for-performance based payment system. While we consider these important areas of investigation, we did not analyze them in this project. These outcome measures need to be better understood before trying to reform payments. The CARE assessments used during data collection were designed to capture information on the patient's completion of therapy. However, in some cases this information was not available such as in cases without a discharge assessment because the patient did not complete the plan of care. There are also currently very few standardized quality measure available in the outpatient rehabilitation world making measurement of outcomes difficult. Future research could examine outcomes using the available CARE discharge assessments.

An approach that could incorporate outcomes or other measures of the value of care therapists provide is a value-based payment modifier. As required by the Affordable Care Act, CMS is currently developing a value-based modifier for physician payment. A similar approach to reward more valuable care might be possible for therapy if standardized indicators of outcomes and other value-based metrics could be developed for therapy.

2.5 Summary of Research Issues in Therapy Payment for This Report

The list of research issues relevant to outpatient therapy payment is extensive and this report is not intended to exhaustively address all of them. In this report, we present exploratory analyses of therapy expenditure risk and case-mix measurement that will be critical to the development of alternative payment approaches.

This report focuses on two main applications of risk/case-mix adjustment. One main focus is on refining the annual therapy cap by risk adjusting the limit for beneficiary characteristics. We examine cap risk-adjustment using administrative data, patient self-report data, and clinician assessment. The second main focus is on case-mix adjustment of episode payment. Again, both administrative data and patient report and assessment data are employed.

The major emphasis of this report is on exploring the utility of the data collected through the DOTPA CARE assessment in explaining annual and episode therapy expenditures. In analyzing the DOTPA data, we build on measures of beneficiary functional ability using the assessment information (Kline et al., 2014). We also explore information available from Medicare claims and administrative data, both when merged with the DOTPA sample and alone.

[This page intentionally left blank.]

3. DOTPA ANALYTIC FILE METHODOLOGY

RTI International generated four DOTPA analytic files discussed below to investigate payment alternatives for outpatient therapy. These four files resulted from a combination of Medicare claims information, Medicare enrollment data, and the DOTPA CARE assessments we collected from participating providers. Section 3.1 provides a summary of data collection procedures; Section 3.2 provides an overview of data sources; Section 3.3 discusses particular variables of interest from the administrative and claims files; Section 3.4 discusses the CARE assessment variables; and Section 3.5 provides details of the four analytic files.

3.1 Summary of Primary Data Collection Procedures

Provider site recruitment began in late 2010 and continued on a rolling basis until early 2012. A site coordinator was identified for each provider from among their staff and acted as the primary point-of-contact with the project team. Primary data collection of patient assessments began in March 2011 and continued through June 2012 within a set of provider sites recruited for DOTPA.

After the site owner reviewed the details of the project and agreed to participate, the site coordinators received comprehensive web-based training on the DOTPA data collection protocol and the relevant assessment instrument. Monthly group conference calls were also held with site coordinators to discuss beneficiary-recruitment goals (established by the project team from historical patient counts) and their progress toward these goals, and to address any questions or issues common to multiple providers. A project help-desk was established to assist the coordinators with any immediate issues and to answer questions; key help-desk discussions were summarized for the group at the monthly meetings (Silver & Dever, 2013).

Patient assessments were collected at most provider sites over a 6-month period. The number of assessments obtained varied across providers due to differences among sites in the number of patients treated at each provider during the data collection period, the proportion of patients using Medicare Part B, and the availability of staff to collect and submit completed assessment forms. Many practices included all of their patients in the data collection, while others with fewer resources agreed to a systematic method of selecting patients. Practicing therapists, office staff, and the patients themselves (or proxy respondents if the patient was unable) all contributed to completion of the assessment.

The assessment was administered at both the beginning (admission assessment) and end (discharge assessment) of a course of therapy to capture the initial patient condition and a measure of change/improvement in the patient’s condition.

A total of 162 providers actively participated in DOTPA with the largest number of participating sites coming from private practice (42.0 percent; ***Table 3-1***). Cumulatively, these providers submitted a total of 6,662 complete admission assessments that contained sufficient information for analyses (***Table 3-2***).

3.2 Overview of Data Sources

3.2.1 Claims and Enrollment Administrative Data

Administrative data are readily available for all Medicare beneficiaries through the claims and enrollment process. To generate statistics and perform the analyses in Sections 4 through 8, all outpatient therapy fee-for-service (FFS) claims obtained from CMS service dates November 1, 2009, through December 31, 2012, were analyzed. The source of the claims was dependent on the therapy setting. For outpatient therapy occurring in a facility—hospital, skilled or other nursing facility (S/NF), comprehensive outpatient rehabilitation facility (CORF), outpatient rehabilitation facility (ORF), or home health agency (HHA)—therapy claims came from the Outpatient File for Institutional Claims (*Outpatient File*). For outpatient therapy occurring in a private practice or physician's office – a physical therapist in private practice (PTPP), an occupational therapist in private practice (OTPP), a speech language pathologist in private practice (SLPPP), physician, or non-physician practitioner (NPP), including those provided to long term residents in nursing facilities – therapy claims came from the Carrier File for Non-institutional Claims (*Carrier File*). One hundred percent of the (professional care) records from November 2009 through December 2012 were extracted from both the Outpatient and Carrier Files.

Medicare enrollment data for the sample were obtained from the Denominator and Beneficiary Summary file (*Denominator File*) using the beneficiary's Health Insurance Claim Number (HICN) from the CARE assessment. A beneficiary's HICN may change from year to year, thus a *Cross-Reference File* was used to find all possible HICNs for each beneficiary from 2009 through 2012. The Denominator and Cross-Reference Files were used in combination to verify that the HICN reported on the CARE assessment was valid and to ensure that administrative claims records were properly matched. For CARE records that did not have any matching claims, an attempt was made to match CARE assessments with non-matching HICN using the beneficiary's gender and date of birth. CARE assessment records without a match (n=375) were dropped from the analysis.

The 2011 Medicare Provider Analysis and Review file (*MedPAR File*) was used to examine the inpatient utilization history of the sample. The MedPAR database tracks a beneficiary's inpatient history in hospitals and SNFs. Calendar Year (CY) 2011 hospitalization records were retained for the beneficiaries to further understand the patient's hospitalization history. A patient's inpatient history is potentially predictive of therapy expenditures by providing information on principal diagnoses, major procedures, and patient acuity and comorbidities among those who were hospitalized.

3.2.2 DOTPA CARE Patient Survey and Clinician Assessment Data

The CARE assessments were designed to collect clinical data that facilitated both the distinction of the three therapy disciplines (Physical Therapy [PT], Occupational [OT], and Speech-Language Pathology [SLP]), as well as their inter-relations for patients requiring therapy from multiple disciplines. Three setting-specific versions of the CARE assessment were developed: (*i*) CARE-C used in community outpatient settings, (*ii*) CARE-F Nursing Facility used in nursing facility settings, and (*iii*) CARE-F Day Rehabilitation used in day rehabilitation settings. Day rehabilitation settings, while not defined as a distinct Medicare provider type, are typically hospital outpatient departments that provide comprehensive, coordinated multidisciplinary therapy services, including PT, OT, and SLP, at a higher frequency and intensity (typically 3-5 hours per day, 3-5 days per week) compared with traditional outpatient therapy departments. Day rehabilitation beneficiaries typically live in the community, and have intensive, multidisciplinary therapy needs, such as following brain injury, stroke, and spinal cord injury.

While several assessment items were consistent across the three CARE versions, setting-specific items were also included to capture the unique characteristics of beneficiaries within each setting. Data collection on the CARE-C assessments was discipline-specific, i.e., if a patient was treated by multiple disciplines, each discipline completed a separate CARE-C assessment form and indicated the discipline type on the form. Data collection on the CARE-F assessments was not discipline-specific, i.e., if a patient was treated by multiple disciplines, all clinicians reported clinical assessment data on the same CARE-F form. The CARE-F assessments identified all disciplines that provided any therapy services to the patient. Contrary to the instructions given to providers, 93 CARE-F assessments did not indicate any discipline.[14]

The CARE assessments were evaluated for valid HICNs, matching beneficiary eligibility data, and matching claim lines using the administrative sources discussed in the previous section. The final CARE sample included 6,490 unique beneficiaries with 6,662 admission assessments—a total of 5,822 CARE-C admission assessments, 655 CARE-F nursing facility admission assessments, and 185 CARE-F day-rehabilitation admission assessments. Further details on the number of beneficiaries with multiple assessments can be seen in ***Table 3-3***. Given the small number of CARE-F day rehabilitation assessments and that day rehabilitation is not a distinct Medicare provider type, only descriptive analyses of therapy expenditures are reported for the day rehabilitation sample. Risk-adjusted payment analyses using claims, enrollment, and CARE assessment data were conducted only for all CARE-C sample cases and for the CARE-F nursing facility sample.

Assessment data from all CARE-C and CARE-F admission assessments used in the analyses underwent psychometric testing for each group respectively.[15] The procedures and results of this testing are provided in the *DOTPA Measurement Report* (Kline et al., 2014).

3.3 Administrative and Claims Variables

3.3.1 Enrollment Variables

Two categories of variables were extracted from the Enrollment Database (EDB) and Denominator Files: those used to define beneficiary eligibility and those that contain beneficiary

[14] Discipline-specific analyses were not conducted with the CARE-F data. Instead, all disciplines were combined into a series of models. Identification of the disciplines for those without such information was not pursued.

[15] Sample sizes for the various analyses presented in this report [RTI] The measurement report and the DOTPA Measurement Report used the same initial sample, (5,822 CARE-C assessments and 840 CARE-F assessments). However, each episode definition excluded different parts of the data so that the final sample used in this report was not identical to what was tested in the measurement report.

demographic information. To ensure all FFS Medicare-paid therapy claim lines were captured, a series of restrictions was specified to define the subset of eligible beneficiaries. For a given episode definition, the beneficiary must have been continually enrolled in Part-B FFS, and Medicare must be the primary payer for the duration of the episode. Part-B was defined using the Medicare entitlement/buy-in indicator; FFS status was defined using the Medicare Health Maintenance Organization (group health plan) indicator; Medicare as the primary payer was defined using the Medicare primary payer code. If these requirements were not met, the beneficiaries were dropped from the specific analyses.

Demographic variables in addition to enrollment variables were used to characterize the outpatient therapy population and as predictors of outpatient therapy expenditures in the regression analyses discussed in this report. The variables of interest are age, sex, the original reason for entitlement (e.g., disability), dual-eligible status (Medicaid), end-stage renal disease (ESRD) status and State.

The long-term institutionalized (LTI) indicator was obtained from Minimum Data Set (MDS) assessments in order to identify beneficiaries residing in long-term care settings, a subgroup with different utilization patterns from the community-residing population. The LTI flag indicates the presence of a 3-month MDS assessment, which occurs when a person has been resident in a facility for at least 3 months. This variable is used to define “institutional” status in Medicare Advantage risk adjustment. It is routinely constructed from data in the MDS data repository for use in Medicare administrative operations.

3.3.2 Claims Information

Claims Variables

The key variables of interest from the outpatient and carrier claims included the line-allowed charges and line payments. The line-allowed charges were the total allowed charge of which Medicare paid a portion. That portion was captured by the line-payment variable, which is the amount paid by Medicare for the services on each line of the claim. The dates of service, modifier codes, unit counts, and beneficiary identification information were also retained. These were all used to construct the episodes, which are described further in Section 3.4.

From the *MedPAR File*, which identifies hospitalizations in the calendar year of the patient’s Part B therapy, several key variables for the CY 2011 analysis were identified. These included the diagnostic related group (DRG), facility type, type of stay (short, long, SNF), whether the patient’s inpatient stay included an outlier payment, and whether physical therapy, occupational therapy, or speech-language pathology services were billed during their hospitalization.

DRGs were used as indicators of an acute care hospitalization and the reason for the hospitalization. DRGs are Medicare’s basis of payment for stays in short-term acute-care hospitals. DRGs classify all hospitalizations into one and only one of approximately 750 groups based on the patient’s principal diagnosis (the reason for the hospitalization), complicating conditions, and procedures performed. A beneficiary may have had multiple hospitalizations during 2011. Binary variables indicating the occurrence of at least one hospitalization based on

DRG in 2011 were created. A beneficiary may have indicator (dummy) variables for more than one DRG, but multiple hospitalizations for the same DRG will not be measured by the binary variable. DRGs are investigated on a concurrent basis, that is, DRGs occurring in the same year as the year of expenditures are analyzed. Thus, DRGs capture therapy associated with acute events that are serious enough to require hospitalization or a surgical procedure.

Hierarchical Condition Categories (HCCs) were also used to predict therapy expenditures. HCCs are diagnostic categories created from the International Classification of Diseases-9 (ICD-9) diagnosis codes on claims. Physician and other clinically-trained professional diagnoses (including from physical and occupational therapists, speech-language pathologists, and pain management specialists) are used to populate HCCs. HCCs are used in risk adjustment of Part-C capitation payments to Medicare Advantage plans, and they are intended to predict total Medicare-covered non-drug expenditures. HCCs are prospective, meaning that diagnoses from the prior year are used to predict expenditures. Thus, HCCs capture chronic conditions and the sequelae of acute conditions, not emergent acute conditions in the expenditure year. Seventy payment HCCs are used for Medicare Advantage, which reflect clinically significant, high cost conditions. CMS created these same 70 HCCs for the entire Medicare population, FFS enrollees as well as Medicare Advantage enrollees.

Claims Inclusion Criteria

Information regarding outpatient therapy service utilization and beneficiaries was obtained from claims that providers submit to Medicare for reimbursement. Rules were established for each file to identify which claims were acceptable for the payment alternatives analysis as discussed below.

- *Carrier File*. Therapy claims from the Carrier file were retained for analysis if the claim and claim lines were not denied; there was no payment by a primary payer other than Medicare; service-unit line counts were less than 1,000; patient gender was specified; the provider, identified by the Health Care Financing Administration (HCFA) specialty code on the claim line, was allowed to render therapy services[16]; and Healthcare Common Procedure Coding System (HCPCS) codes were classified as therapy, as specified by CMS (Centers for Medicare and Medicaid Services, 2010).[17]

- *Outpatient File.* The same inclusion criteria for the Carrier File were applied to the claims from the Outpatient file with several additional requirements. The claims and claim lines were retained for analysis if the "Type of Bill" indicated a therapy-service provider[18]; the services rendered were not paid under the Outpatient Prospective Payment System; a revenue center code identifying therapy services (0420-0449) was

---

[16] These HCFA specialty codes include: 01-31, 33, 34, 36-41, 44, 46, 48, 50, 65-67, 70, 72, 76-79, 81-86, 89-94, or 97-99.

[17] Therapy HCPCS codes were defined as those classified "Always Therapy" codes (a specific therapy service regardless of the provider) or "Sometimes Therapy" codes with a required therapy modifier (GP = Physical Therapy; GO = Occupational Therapy; or GN = Speech Language Pathology).

present with a non-missing, non-zero revenue-center rate. The HCPCS codes were the same as the codes used for the Carrier file, but they also included additional restriction for S/NF "Always Therapy" codes, which require a facility type of S/NF and type of service of inpatient SNF Part B (22X) or outpatient SNF (23X).

- *MedPAR File.* Hospitalization records were retained for those beneficiaries who were hospitalized in CY 2011. This allowed for additional understanding of the patient's hospitalization history, which provides added information to the Outpatient and Carrier claims.

Identifying Discipline

Once the therapy claims were identified, their disciplines were determined. Discipline-specific payment models were considered for the payment alternatives analysis. Four HCPCS modifier fields in the *Carrier File* and five fields in the *Outpatient File* were used to identify the discipline for each claim. For cases where more than one modifier field was used (indicating the use of more than one discipline), the first therapy modifier code took precedence. When all of the HCPCS modifier codes were missing, the HCFA specialty code of the provider in the *Carrier File* ("65" = PT, "67" = OT, and "15" = SLP) and the revenue center codes in the *Outpatient File* ("042X" = PT, "043X" = OT, and "044X" = SLP) were used to determine discipline. Any claims in the carrier file without these secondary sources to determine discipline defaulted to PT, the most prevalent form of therapy. ***Table 3-4*** shows some potential example claim scenarios from the carrier and outpatient files. The carrier file scenario would default to OT because the first modifier code is GO. If the modifier codes were missing, the HCFA specialty codes would be used. In the outpatient file, because the modifier codes are all missing, the revenue center code is used to default the line to PT.

After identifying and classifying therapy claims, expenditures were calculated. Since the analyses presented in this report cover years 2010-2012, expenditures were standardized to 2012 dollars using the Medicare Economic Index (MEI). For claims from the Carrier File, the line-allowed charge and line-payment amount were adjusted. For claims from the Outpatient File, the line-allowed charge was calculated—using the revenue center payment amount, revenue center rate, the revenue center cash deductible, and revenue unit count—and then adjusted. These adjusted line expenditures were used to determine expenditure trends and aggregated to determine episode payment based on the episode definition. No adjustments for geographic variations in payment were made.

Census Divisions

Using the state variable from the denominator file, we constructed nine census divisions which are used in the regression analyses in the following sections. These divisions, defined using the US Census Bureau's definition, are as follows:

---

[18] Providers included hospital outpatient departments (HOPD), skilled or other nursing facilities (S/NF), comprehensive outpatient rehabilitation facilities (CORF), outpatient rehabilitation facility (ORF), and home health agencies (HHA). These are covered by the following codes composed of facility type in the first digit and type of service in the second digit: 12, 13, 22, 23, 34, 74 and 75.

- Division 1: New England - Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont
- Division 2: Middle Atlantic - New Jersey, New York, Pennsylvania
- Division 3: East North Central - Indiana, Illinois, Michigan, Ohio, Wisconsin
- Division 4: West North Central - Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota
- Division 5: South Atlantic - Delaware, District of Columbia, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, West Virginia
- Division 6: East South Central - Alabama, Kentucky, Mississippi, Tennessee
- Division 7: West South Central - Arkansas, Louisiana, Oklahoma, Texas
- Division 8: Mountain - Arizona, Colorado, Idaho, New Mexico, Montana, Utah, Nevada, Wyoming
- Division 9: Pacific - Alaska, California, Hawaii, Oregon, Washington

3.4 CARE Assessment Variables

CARE assessment items were used for the payment alternatives analyses, and are described below. The CARE assessments contain three sections: administrative information, patient-reported information (Self-Report), and provider-reported information (Clinician-Observed). Questions were asked to gather information regarding several domains, including the patients' medical, functional, and cognitive status; social support; and living situation/environment. Of note, the CARE data for payment analysis were taken from the admission assessments only; data from discharge assessments were not used for payment analyses.

3.4.1 Primary and Secondary Diagnoses from the CARE Assessment

In Section III (provider-reported information) of the CARE assessments, providers were asked to "select one primary and all secondary medical conditions based on available patient medical information." Providers could select diagnoses from a list of 22 categories designed to broadly group diagnoses by body system. The list of diagnoses included a mix of etiologic or medical diagnoses, and symptoms or impairments resulting from underlying medical conditions. While many providers followed instructions to select a single primary diagnosis, some providers selected multiple primary diagnoses, while others selected no primary diagnosis. ***Table 3-5*** lists the percent of CARE-C and CARE-F assessments with zero, single, and multiple primary diagnoses. Multiple primary diagnoses were reported in 11.7 percent of CARE-C PT assessments, 11.7 percent of CARE-C OT assessments, and 25.6 percent of CARE-C SLP assessments, as well as 18.3 percent of CARE-F nursing facility assessments, and 2.7 percent of CARE-F day rehabilitation assessments. No primary diagnosis was reported in 1.4 percent of CARE-C PT assessments, 1.5 percent of CARE-C OT assessments, 1.3 percent of CARE-C SLP assessments, 3.5 of CARE-F nursing facility assessments, and 1.1 percent of CARE-F day rehabilitation assessments.

The secondary diagnoses reported in the CARE admission assessments included patients' comorbidities. These diagnoses were used to supplement the primary diagnosis in predicting resource needs. ***Tables 3-6*** and ***3-7*** display original frequencies of primary and secondary diagnoses from CARE-C admission assessments by therapy discipline for the 5,822 CARE-C assessments in the final analytic file; the diagnoses are listed under the 22 broad categories on the CARE assessments. ***Appendix Tables 3-1*** and ***3-2*** show analogous data for the CARE-F admission assessments.

Key interpretations from Table 3-6 regarding CARE-C primary diagnoses are as follows:

- A primary diagnosis was not reported on a total of 81 CARE-C assessments, with a concentration in the PT assessments (69 missing; see ***Table 3-6***).

- For CARE-C PT assessments, musculoskeletal diagnoses were collectively the most frequently reported (n = 3,716), with Osteoarthritis (n = 927), Other Musculoskeletal Conditions (n = 642), Joint Replacement (n = 478), and Sprain/Strain (n = 373) being the most common. Other commonly reported PT primary diagnoses were Pain, Not Pain Syndrome (n = 577), Gait or Balance Disorder (n = 326), and Generalized Weakness (n = 262).

- For CARE-C OT assessments, musculoskeletal diagnoses were also the most frequently reported (n = 321) with Fracture (n = 74) and Osteoarthritis (n = 71) being the most common. Stroke (n = 65) and Lymphedema (n = 52) were other commonly reported OT primary diagnoses.

- For CARE-C SLP assessments, Stroke (n = 99) was the most commonly reported individual primary diagnosis. Collectively, Neurological Conditions (n = 66) were commonly reported, followed by Communication, Voice, or Speech Disorders (n = 46).

Key interpretations from Appendix Table 3-1 for the CARE-F primary diagnoses are as follows:

- A primary diagnosis was not reported on a total of 25 CARE-F assessments.

- *Circulatory* diagnoses were collectively the most commonly reported (n = 242), followed by *musculoskeletal* diagnoses (n = 180).

- At the individual diagnosis level, *stroke* was the most commonly reported primary diagnosis (n = 147) followed by *Alzheimer's Disease* (n = 96) and *dementia* (n = 77).

3.4.2 Primary Diagnosis Groups for PT and OT CARE-C Assessments

To synthesize primary diagnosis data for use in payment analyses, discipline-specific primary diagnosis groups were created. The intent was to define diagnostic case-mix groups such that within-group homogeneity would be optimized in terms of both clinical characteristics and resource needs. While we initially examined the possibility of defining one set of primary diagnosis groups for use across disciplines, discipline-specific diagnosis groups were deemed necessary given the differences in scope of practice, patient populations, and patient problems addressed by the three disciplines. Empirically, the different distributions of primary diagnoses across the three disciplines supported the creation of discipline-specific diagnosis groups (***Table 3-6***).

Primary diagnosis groups for PT and OT are presented in ***Table 3-8***. These primary diagnosis groups are different from the 22 broad categories on the CARE assessments presented in ***Table 3-6***. The intent of the 22 CARE assessment categories was not to create homogenous case-mix groups for analysis, but rather to broadly group diagnoses by body system for ease of selection by providers. ***Appendix Tables 3-3*** and ***3-4*** show the detailed classification of each individual diagnosis into the primary diagnosis groups, for PT and OT, along with the frequencies of diagnosis groups and individual diagnoses. Of note, the individual diagnoses frequencies presented in ***Appendix Tables 3-3*** and ***3-4*** represent frequencies after conducting diagnostic reassignments described below. Therefore, several individual diagnoses frequencies differ from the frequencies reported in ***Table 3-6***. Since beneficiaries may have had multiple diagnoses within a group, the primary diagnosis group frequencies in ***Appendix Tables 3-3*** and ***3-4*** are sometimes smaller than the sum of individual diagnosis frequencies within the group.

Our approach in creating the PT and OT primary diagnosis groups listed in ***Table 3-8*** was two-fold: (i) to create groups that reflected the underlying primary etiologic diagnosis necessitating therapy, to the extent possible; and (ii) to create groups that were mutually-exclusive. An "*Unspecified and Miscellaneous Diagnoses*" group was created for both PT and OT in order to categorize diagnoses that were unlikely to be primary therapy diagnoses, such as schizophrenia, or that were uncommonly encountered in the data. While the above reasoning largely guided our diagnosis group definitions, it was also important to ensure an adequate sample size within each group for analytic purposes. The desired minimum sample size for each diagnosis group was set at 50. While most groups met the minimum desired sample size, some exceptions were made at this preliminary stage for groups that were best kept distinct due to their unique clinical characteristics. An example includes the PT primary diagnosis group of *Genitourinary Disorders* that had a sample size of 27 beneficiaries; though small, the *Genitourinary Disorders* group was kept distinct because of its unique impairments, reasons for therapy, and intervention needs relative to other groups. A 'No Primary Diagnosis' group was created to classify beneficiaries who did not have a primary diagnosis identified on their CARE assessment.

Creating Groups Reflecting Underlying Etiologic Diagnoses

As previously stated, diagnoses listed on the CARE assessments represented a mix of etiologic diagnoses, and symptoms or impairments. We classified the CARE-C PT primary diagnoses as major etiologic, other etiologic, or symptom/impairment diagnoses (see ***Table 3-8***). We categorized CARE-C OT primary diagnoses as etiologic or symptom/impairment; due to small sample sizes, we were unable to distinguish between major and other etiologic diagnoses for the OT sample. *Gait or Balance Disorder; Generalized Weakness; Pain, Not Pain Syndrome; Pain Syndrome; and Complex Regional Pain Syndrome* were flagged as symptom/impairment diagnoses for both PT and OT. Since symptoms and impairments can result from varying etiologic diagnoses, case-mix heterogeneity can be present to a greater extent in ‘symptom or impairment diagnoses’ groups compared with the etiologic diagnoses groups. For instance, beneficiaries could present with *Gait or Balance Disorder* due to varying etiologic diagnoses such as *Osteoarthritis* or *Stroke*, with varying treatment and resource needs. When asked to comment on expected resource needs for different conditions, our TEP members also indicated that the approach, given a specific impairment, could vary depending on the underlying diagnosis. Additionally, other payment systems, such as the Inpatient Rehabilitation Facility - Prospective Payment System, use primary diagnosis as the key factor in defining case-mix groups. Therefore, to the extent possible, we sought to create primary diagnosis groups that classified beneficiaries according to the underlying etiologic diagnoses for which they presented to therapy.

Beneficiaries with an ‘impairment’ primary diagnosis reported on the CARE-C assessment were assigned/reassigned to underlying etiologic diagnosis groups, when an etiologic diagnosis could be identified from the patient’s additional primary or secondary diagnoses data. The detailed diagnosis group assignment/reassignment logic is presented in Appendix B, and summarized below:

1. *Gait or Balance Disorder or Generalized Weakness as a primary diagnosis - PT and OT:*

    a. Beneficiaries with a primary diagnosis of *Gait or Balance Disorder* or *Generalized Weakness* along with etiologic primary diagnoses were assigned to primary diagnosis group(s) based on the etiologic diagnoses. To prevent loss of impairment information, *Gait or Balance Disorder* and/or *Generalized Weakness* were recoded to secondary diagnoses.

       For instance, if a PT beneficiary’s CARE-C assessment indicated two primary diagnoses, including *Gait or Balance Disorder* and *Stroke*, this beneficiary would be assigned to the *Stroke* primary diagnosis group, as Stroke would represent the underlying etiology for the presenting *Gait or Balance Disorder*. This beneficiary would also be assigned to the *Gait or Balance Disorder* secondary diagnosis group.

    b. Beneficiaries with a single primary diagnosis of *Gait or Balance Disorder* or *Generalized Weakness* were assigned to primary diagnosis group(s) based on their secondary diagnoses, if etiologic secondary diagnoses had been reported. The etiologic secondary diagnoses were recoded to primary diagnoses, and *Gait or Balance Disorder* and *Generalized Weakness* were recoded to secondary diagnoses.

    c. Beneficiaries with a single primary diagnosis of *Gait or Balance Disorder* or *Generalized Weakness* and no etiologic secondary diagnosis were assigned to the “*Unspecified and Miscellaneous Diagnoses*” primary group.

2. *Pain Primary Diagnosis Group - PT:*

a. Beneficiaries belonging to the Pain primary diagnosis group (***Table 3-8***), who also had musculoskeletal, neurological, genitourinary, and/or miscellaneous primary diagnoses, were assigned to primary diagnosis group(s) based on these other primary diagnoses. The *Pain* group diagnoses were recoded to secondary diagnoses.

b. Beneficiaries who only belonged to the Pain primary diagnosis group (***Table 3-8***) and had musculoskeletal and/or neurological secondary diagnoses, were reassigned to a primary diagnosis group based on the secondary musculoskeletal and/or neurological diagnoses. The original musculoskeletal and/or neurological secondary diagnoses were recoded to primary diagnoses, and the original Pain group primary diagnoses were recoded to secondary diagnoses.

c. When beneficiaries from the Pain primary diagnosis group could not be reassigned to an underlying etiologic diagnosis group, they remained in the Pain group.

3. *Pain, Not Pain Syndrome, Pain Syndrome, Complex Regional Pain Syndrome - OT:*

a. Beneficiaries with a primary diagnosis of *Pain*, *Not Pain Syndrome*, *Pain Syndrome*, or *Complex Regional Pain Syndrome* belonged to the OT "*Unspecified and Miscellaneous Diagnoses*" primary group. When beneficiaries belonged to the "*Unspecified and Miscellaneous Diagnoses*" group along with other etiologic primary diagnosis groups, assignment to the "*Unspecified and Miscellaneous Diagnoses"* group was dropped and assignment to the other etiologic groups was retained. Any primary diagnoses from the "*Unspecified and Miscellaneous Diagnoses*" group were recoded to secondary diagnoses.

b. Beneficiaries with Pain-related diagnoses who did not have underlying etiologic primary diagnoses remained in the "*Unspecified and Miscellaneous Diagnoses*" primary group.

Other reassignments conducted to ensure that beneficiaries were assigned to the appropriate underlying etiologic diagnosis group are as follows:

1. When beneficiaries had both *Osteoarthritis* and *Joint Replacement* as primary diagnoses, *Joint Replacement* was retained as a primary diagnosis, and *Osteoarthritis* was recoded to a secondary diagnosis.

2. Beneficiaries with a single primary diagnosis of *Osteoarthritis* and a secondary diagnosis of *Joint Replacement* were assigned to the *Joint Replacement* primary diagnosis group. *Joint replacement* was recoded to the primary diagnosis and *Osteoarthritis* was recoded to a secondary diagnosis.

3. When beneficiaries had a primary diagnosis of *Diabetes Mellitus* and a secondary diagnosis of *Amputation*, *Amputation* was recoded to a primary diagnosis and *Diabetes Mellitus* was recoded to a secondary diagnosis.

4. When beneficiaries had a primary diagnosis of *Hypertension* and a secondary diagnosis of *Stroke*, *Stroke* was recoded to a primary diagnosis and *Hypertension* was recoded to a secondary diagnosis.

5. When beneficiaries had *Stroke* as a primary or secondary diagnosis, and one or more of the following circulatory primary diagnoses [*Atrial Fibrillation & Other Dysrhythmia (bradycardia, tachycardia), Coronary Artery Disease (angina, myocardial infarction), Deep Vein Thrombosis, Heart Failure (including pulmonary edema), Peripheral Vascular Disease/Peripheral Arterial Disease, Other Circulatory diagnoses*], then *Stroke* was treated as the primary diagnosis, and the circulatory diagnoses were recoded to secondary diagnoses.

6. When beneficiaries had *Paralysis* as a primary diagnosis and *Stroke* as a primary or secondary diagnosis, *Stroke* was made the primary diagnosis and *Paralysis* was ignored as a diagnosis. Additionally, when beneficiaries had both *Paralysis* and *Stroke* as secondary diagnoses, *Paralysis* was ignored as a secondary diagnosis. (This reassignment logic was also applied to SLP cases.)

7. When beneficiaries had *TIA* as a primary diagnosis and *Stroke* as a primary or secondary diagnosis, *Stroke* was made the primary diagnosis and *TIA* was ignored as a diagnosis. Additionally, when beneficiaries had both *TIA* and *Stroke* as secondary diagnoses, *TIA* was ignored as a secondary diagnosis. (This reassignment logic was also applied to SLP cases).

8. When beneficiaries belonged to the "*Unspecified and Miscellaneous Diagnoses*" primary group along with other etiologic primary diagnosis groups, assignment to the "*Unspecified and Miscellaneous Diagnoses"* group was dropped and assignment to the other etiologic groups was retained. Any primary diagnoses from the "*Unspecified and* Miscellaneous Diagnoses" group were recoded to secondary diagnoses.

Creating Mutually-Exclusive Primary Diagnosis Group Assignments

As previously stated, although the CARE assessment asked providers to select a single primary diagnosis, some assessments had multiple primary diagnoses reported. To ensure that beneficiaries with multiple primary diagnoses were only classified into a single diagnosis group, we conducted group reassignments as outlined below:

1. For PT beneficiaries:

    a. Beneficiaries who could be classified into multiple major etiologic groups were reassigned to the "*Multiple Major Etiologies*" primary diagnosis group; all other primary diagnosis group assignments were ignored.

    b. Beneficiaries who could be classified into multiple etiologic groups including one major etiologic group were reassigned to the "*Multiple Etiologies, One Major*" primary diagnosis group; all other primary diagnosis group assignments were ignored.

c. Beneficiaries who could be classified into multiple etiologic groups, excluding major etiologic groups were reassigned to the "*Multiple Etiologies, No Major*" primary diagnosis group; all other primary diagnosis group assignments were ignored.

2. For OT beneficiaries:

   a. Beneficiaries who could be classified into multiple etiologic groups were reassigned to the "*Multiple Etiologies"* primary diagnosis group; all other primary diagnosis group assignments were ignored.

Appendix Tables 3-5 and ***3-6*** provide cross-tabulations of PT and OT beneficiaries' initial diagnosis groups (preliminary groups based on original primary diagnoses reported on CARE-C admission assessments) versus final diagnosis groups assigned for analyses (after the above reassignments). While the initial diagnosis groups were not mutually-exclusive and beneficiaries could be classified within multiple groups, the final diagnosis groups after reassignment are mutually-exclusive. ***Appendix Tables 3-5*** and ***3-6*** show that the majority of beneficiaries initially classified into impairment diagnosis groups (*Gait or Balance Disorder, Pain, Generalized Weakness*) were reclassified into etiologic diagnosis groups after reassignment. These appendix tables also show the initial diagnosis groups that were reclassified into the multiple etiology groups for both PT and OT.

3.4.3 Secondary Diagnosis Groups for PT and OT CARE-C Assessments

Diagnosis groupings were also created for the secondary diagnoses reported in CARE-C assessments. ***Table 3-9*** lists the secondary diagnosis groupings by therapy discipline. These secondary diagnosis groupings were intended to represent patients' co-existing conditions or comorbidities that could influence resource needs. Indeed, a comparison of primary and secondary diagnoses distributions in ***Tables 3-6*** and ***3-7*** demonstrates that the majority of clinicians used secondary diagnoses to represent patients' co-existing conditions or comorbidities. While musculoskeletal and neurological conditions were common as both primary and secondary diagnoses, diagnoses such as diabetes mellitus, hypertension, atrial fibrillation, and mental health disorders were considerably more common as secondary rather than primary diagnoses.

Given the primary diagnoses were intended to represent underlying etiologic diagnoses, whereas the secondary diagnoses were intended to represent co-existing conditions influencing resource needs, we did not apply the primary diagnosis grouping logic to categorize secondary diagnoses. An example of an important difference between primary and secondary diagnosis groupings is in the assignment of mental health diagnoses, such as anxiety disorder and depression, and cognitive/communication disorders. While cognitive/communication and mental health problems are unlikely to present as primary etiologic diagnoses for PT and OT, they are important comorbidities that could affect the amount of PT and OT provided. Thus, while cognitive/communication and mental health disorders were assigned to the "Miscellaneous Diagnoses" group when presenting as primary diagnoses, they were assigned to distinct groups when presenting as secondary diagnoses. We created distinct "Communication and Cognition Disorders" and "Mental Health" secondary diagnosis groups in the PT sample; due to a smaller

OT sample size, we created a combined "Cognitive, Communication and Mental Health Disorders" secondary diagnosis group in the OT sample. These distinct secondary diagnosis groups allow for examination of the unique influence of cognitive/communication and mental health disorders on PT and OT resource use. A '*No Secondary Diagnosis*' group was created to classify beneficiaries who did not have a secondary diagnosis identified on their CARE assessment.

Finally, while we initially intended to use the same secondary diagnosis group definitions for both PT and OT, smaller frequencies for certain diagnoses in the OT sample required different, more condensed secondary diagnosis groupings for OT. ***Appendix Tables 3-7*** and ***3-8*** present the individual secondary diagnoses that constitute the PT and OT secondary diagnosis groups, along with frequencies of the individual diagnoses. The individual diagnosis frequencies in the ***Appendix Tables 3-7*** and ***3-8*** represent frequencies after diagnostic reassignments were conducted. Therefore, these individual diagnoses frequencies may differ from the frequencies reported in ***Table 3-7***.

3.4.4 Diagnosis Groups for SLP CARE-C Assessments

Unlike the PT and OT diagnosis groupings, we made no distinction between patients' primary and secondary diagnoses for SLP CARE-C assessments (***Table 3-8***). Additionally, we created two sets of diagnosis groups for SLP: (*i*) Impairment Diagnosis groups, and (*ii*) Medical Diagnosis groups. The impairment diagnosis groups were mutually-exclusive, as were the medical diagnosis groups. However, beneficiaries could belong to both an impairment diagnosis group and a medical diagnosis group. The difference in approach for SLP was largely guided by clinical considerations, and to a smaller extent, by analytical considerations, i.e., sample size.

SLP practice is focused on a narrower, more well-defined range of impairments, mainly including cognitive, communication, and swallowing impairments. The underlying etiologic diagnoses for impairments treated by SLPs also have a narrower range, with the majority being neurological or oncological in nature. Indeed, examination of individual SLP primary diagnoses frequencies (***Table 3-6***) shows that Stroke was the most common etiologic diagnosis. Given the narrower range of impairment and etiologic diagnoses encountered in SLP practice, it is desirable that patients be classified into both impairment and etiologic diagnoses groups when these data are available. Empirically, the large proportions of SLP patients with Communication, Voice, or Speech Disorders, and Swallowing Disorder listed as secondary diagnoses (***Table 3-7***) suggested that collapsing primary and secondary diagnoses would be the best approach for grouping patients with these impairments. From an analytical perspective, given the small SLP sample size, eliminating the distinction between primary and secondary diagnoses increased diagnosis group sample sizes.

Appendix Table 3-9 shows the individual primary and secondary diagnoses that constitute each SLP impairment diagnosis group and medical diagnosis group. A "Miscellaneous Diagnoses" medical group was created to categorize conditions that were unlikely to present as underlying etiologic diagnoses, or were uncommonly encountered in the data. '*No Impairment Diagnosis*' and '*No Medical Diagnosis*' groups were created to classify beneficiaries who did not have an impairment diagnosis or medical diagnosis identified on their CARE assessment.

3.4.5 Primary Diagnosis Groups for CARE-F Assessments

Similar to CARE-C, our approach for CARE-F was to create primary diagnosis groups that reflected the underlying etiologic diagnosis necessitating therapy, to the extent possible, and to create mutually-exclusive diagnosis groups. An "*Unspecified and Miscellaneous Diagnoses*" group was created in order to categorize diagnoses that were unlikely to be primary therapy diagnoses, or that were uncommonly encountered in the data. All primary diagnosis groups in the CARE-F nursing facility sample met the desired minimum sample size of 50, with the exception of the "*Multiple Etiologies"* group that had 48 beneficiaries (***Table 3-10***). Unlike discipline-specific diagnosis groups created for CARE-C, a single set of primary diagnosis groups was created for the CARE-F assessments, given CMS's objective to analyze a combined expenditures cap for PT, OT, and SLP in the CARE-F nursing facility setting.

Eight primary diagnosis groups for CARE-F admission assessments are presented in ***Table 3-10***. These groups differ from the 22 broad categories presented in ***Appendix Table 3-1*** that were designed for ease of diagnosis selection on the CARE assessments. ***Appendix Table 3-10*** shows the detailed classification of each individual diagnosis into the primary diagnosis groups, along with the frequencies of diagnosis groups and individual diagnoses. The individual diagnoses frequencies presented in ***Appendix Table 3-10*** represent frequencies after conducting diagnostic reassignments described below, and may differ from individual diagnoses frequencies reported in ***Appendix Table 3-1***. Since beneficiaries may have had multiple diagnoses within a group, the primary diagnosis group frequencies in ***Appendix Table 3-10*** are sometimes smaller than the sum of individual diagnosis frequencies within the group.

Similar to CARE-C, *Gait or Balance Disorder*, *Generalized Weakness*, *Pain (Not Pain Syndrome)*, *Pain Syndrome*, and *Complex Regional Pain Syndrome* were flagged as symptom/impairment diagnoses. Beneficiaries with an 'impairment' primary diagnosis were assigned/reassigned to their underlying etiologic diagnoses when identifiable from their additional primary or secondary diagnoses data. The detailed diagnosis group assignment/reassignment logic is presented in ***Appendix C*** and summarized below.

1. *Gait or Balance Disorder* or *Generalized Weakness* as primary diagnoses*:*

    a. Beneficiaries with a primary diagnosis of *Gait or Balance Disorder* or *Generalized Weakness* were initially assigned to the "*Unspecified and Miscellaneous Diagnoses*" primary group. Reassignment of the "*Unspecified and Miscellaneous Diagnoses*" primary group is described below.

    b. Beneficiaries with a single primary diagnosis of *Gait or Balance Disorder* or *Generalized Weakness* who also belonged to any of the following secondary diagnosis groups—Osteoarthritis, Osteoporosis, Unspecified, and Miscellaneous Musculoskeletal; Circulatory (including Lymphatic); Pulmonary/Respiratory; Stroke; Parkinson's, Peripheral Nervous System, and Other Neurological Disorders; Dementia/Alzheimer's, and Other Cognitive Disorders—were assigned to primary diagnosis group(s) based on the diagnoses within the listed secondary diagnosis group(s). The etiologic secondary diagnoses were recoded to primary diagnoses, and *Gait or Balance Disorder* and *Generalized Weakness* were recoded to secondary diagnoses.

c. Beneficiaries with a single primary diagnosis of *Gait or Balance Disorder* or *Generalized Weakness* who did not belong to any of the secondary diagnosis groups listed above remained in the "*Unspecified and Miscellaneous Diagnoses*" primary group.

2. *Pain (Not Syndrome), Pain Syndrome,* or *Complex Regional Syndrome* as primary diagnoses:

   a. Beneficiaries with a primary diagnosis of *Pain (Not Syndrome), Pain Syndrome,* or *Complex Regional Syndrome* were initially assigned to the "*Unspecified and Miscellaneous Diagnoses*" primary group. Reassignment of the "*Unspecified and Miscellaneous Diagnoses*" primary group is described below.

   b. Beneficiaries with a single primary diagnosis of *Pain (Not Syndrome), Pain Syndrome,* or *Complex Regional Syndrome* who also belonged to any of the following secondary diagnosis groups—Osteoarthritis; Osteoporosis, Unspecified, and Miscellaneous Musculoskeletal; Stroke; Parkinson's, Peripheral Nervous System, and Other Neurological Disorders—were assigned to primary diagnosis group(s) based on the diagnoses within the listed secondary diagnosis group(s). The etiologic secondary diagnoses were recoded to primary diagnoses, and *Pain (Not Syndrome), Pain Syndrome,* and *Complex Regional Syndrome* were recoded to secondary diagnoses.

   c. Beneficiaries with a single primary diagnosis of *Pain (Not Syndrome), Pain Syndrome,* or *Complex Regional Syndrome* who did not belong to any of the secondary diagnosis groups listed above remained in the "*Unspecified and Miscellaneous Diagnoses*" primary group.

Other reassignments conducted to ensure that beneficiaries were assigned to the appropriate underlying etiologic diagnosis group are as follows:

1. When beneficiaries had a single primary diagnosis of *Osteoarthritis* and a secondary diagnosis of *Joint Replacement*, *Joint replacement* was recoded to the primary diagnosis and *Osteoarthritis* was recoded to a secondary diagnosis.

2. When beneficiaries had a primary diagnosis of *Diabetes Mellitus* and a secondary diagnosis of *Amputation*, *Amputation* was recoded to a primary diagnosis and *Diabetes Mellitus* was recoded to a secondary diagnosis.

3. When beneficiaries had a primary diagnosis of *Hypertension* and a secondary diagnosis of *Stroke*, *Stroke* was recoded to a primary diagnosis and *Hypertension* was recoded to a secondary diagnosis.

4. When beneficiaries had *Stroke* as a primary or secondary diagnosis, and one or more of the following circulatory primary diagnoses—*Atrial Fibrillation & Other Dysrhythmia (bradycardia, tachycardia), Coronary Artery Disease (angina, myocardial infarction), Deep Vein Thrombosis, Heart Failure (including pulmonary edema), Peripheral Vascular Disease/Peripheral Arterial Disease, Other Circulatory diagnoses*—then *Stroke* was treated as the primary diagnosis, and the circulatory diagnoses were recoded to secondary diagnoses.

5. When beneficiaries had *Paralysis* as a primary diagnosis and *Stroke* as a primary or secondary diagnosis, *Stroke* was made the primary diagnosis and *Paralysis* was ignored as a diagnosis. Additionally, when beneficiaries had both *Paralysis* and *Stroke* as secondary diagnoses, *Paralysis* was ignored as a secondary diagnosis.

6. When beneficiaries had *TIA* as a primary diagnosis and *Stroke* as a primary or secondary diagnosis, *Stroke* was made the primary diagnosis and *TIA* was ignored as a diagnosis. Additionally, when beneficiaries had both *TIA* and *Stroke* as secondary diagnoses, *TIA* was ignored as a secondary diagnosis.

7. When beneficiaries belonged to the "*Unspecified and Miscellaneous Diagnoses*" primary group along with other primary diagnosis groups (Groups 1-5, ***Table 3-10***), assignment to the "*Unspecified and Miscellaneous Diagnoses"* group was dropped and assignment to the other groups was retained. Any primary diagnoses from the "*Unspecified and Miscellaneous Diagnoses*" group were recoded to secondary diagnoses.

To create mutually-exclusive primary diagnosis groups, beneficiaries who belonged to multiple groups after running the above reassignments were reassigned to a "*Multiple Etiologies*" group.

Appendix Table 3-11 provides cross-tabulations of CARE-F nursing-facility beneficiaries' initial diagnosis groups (based on original primary diagnoses reported on CARE-F admission assessments) versus final diagnosis groups assigned for analyses (after the above reassignments). While the initial diagnosis groups were not mutually-exclusive, the final diagnosis groups are mutually-exclusive.

3.4.6 Secondary Diagnosis Groups for CARE-F Assessments

Eighteen secondary diagnosis groupings for CARE-F admission assessments are presented in ***Table 3-11***. Similar to CARE-C, these secondary diagnosis groups were intended to represent patients' co-existing conditions or comorbidities that could influence resource needs. The clinical reasoning guiding CARE-F secondary diagnosis group definitions was similar to the reasoning applied when defining CARE-C PT and OT secondary diagnosis groups, with any differences being primarily related to sample size. ***Appendix Table 3-12*** presents the individual secondary diagnoses that constitute the CARE-F secondary diagnosis groups, along with frequencies of the individual diagnoses. Since ***Appendix Table 3-12*** lists individual diagnosis frequencies after diagnostic reassignments, these frequencies may differ from individual diagnosis frequencies reported in ***Appendix Table 3-2***.

3.4.7 Primary Reason for Therapy from the CARE Assessment

The CARE assessment required providers to identify the patients' primary reason for therapy under three broad categories: Body Functions, Body Structures, and Activities and Participation. Providers were instructed to select at least one body function, one body structure, and one activity/participation associated with patients' primary reason for therapy; providers could select multiple body functions, body structures, and activity/participation items. The primary-reason-for-therapy items are based on the World Health Organization's (WHO) International Classification of Functioning, Disability, and Health (ICF). According to the ICF, 'Body Functions' are physiological functions of body systems (including psychological functions); 'Body Structures' are anatomical parts of the body such as organs, limbs and their components; an 'Activity' is the execution of a task or action by an individual; and 'Participation' is involvement in a life situation (World Health Organization, 2001).

Table 3-12 and ***Appendix Table 3-13*** contain the distributions of Body Functions, Body Structures, and Activities and Participation for the CARE-C and CARE-F patient populations, respectively. Among the 5,822 CARE-C admission assessments (***Table 3-10***), a 'Body Function' reason for therapy was not identified in 215 cases (3.7 percent), a 'Body Structure' reason for therapy was not identified in 553 cases (9.5 percent), and an 'Activity and Participation' reason for therapy was not identified in 466 cases (8.0 percent). At the discipline-level, a 'Body Function' reason for therapy was not identified in 3.3 percent of PT cases, 3.2 percent of OT cases, and 14.5 percent of SLP cases. A 'Body Structure' reason for therapy was not identified in 8 percent of PT cases, 13.6 percent of OT cases, and 30.4 percent of SLP cases. An 'Activity and Participation' reason for therapy was not identified in 7.8 percent of PT cases, 7 percent of OT cases, and 15.4 percent of SLP cases. As may be expected, *Muscle Function* was the most common Body Function identified as primary reason for therapy among PT and OT beneficiaries, while *Specific Mental Functions* was most commonly identified among SLP beneficiaries. Among PT beneficiaries, the most common Body Structure identified as primary reason for therapy was *Lumbar Spine*, followed by *Knee* and *Hip*. Among OT beneficiaries, *Hand*, *Fingers*, *Wrist* and *Shoulder* were the most common Body Structures reported as reasons for therapy. Among SLP beneficiaries, the *Tongue*, *Mouth*, and *Larynx* were the most commonly reported Body Structures. The most common Activities and Participation items reported as reasons for therapy were *Walking & Moving Around* for PT beneficiaries, *Self-Care* for OT beneficiaries, and *Communication: Expression* for SLP beneficiaries.

Among the 840 CARE-F admission assessments as shown in ***Appendix Table 3-13***, a 'Body Function' reason for therapy was not identified in 61 cases (7.3 percent), a 'Body Structure' reason for therapy was not identified in 46 cases (5.4 percent), and an 'Activity and Participation' reason for therapy was not identified in 66 cases (7.9 percent). The most commonly-reported Body Functions were *Muscle Functions (*70.6 percent), *Movement Functions* (49.6 percent), and *Functions of Joints and Bones* (33.6 percent). The most commonly-reported Body Structures were *General/No Specific Body Location* (31.6 percent), *Knee* (28.2 percent), and *Hip* (24.9 percent), with other Limb-related and Voice, Speech, and Swallowing structures also being commonly reported. The most commonly reported Activity and Participation items were *Walking & Moving Around* (52.1 percent), *Changing and Maintaining Body Position* (46.2 percent), and *Self-Care* (43.4 percent).

3.4.8 Body Function, Body Structure, and Activity Groups for CARE-C Assessments

Similar to the diagnosis groups, we created Body Function, Body Structure, and Activity groups for use in payment analysis. We chose to not include "Participation" data in payment analysis, the main reason being lack of consistent coding of these items across providers. Participation items not included in analyses were 'moving around using transportation'; 'acquisition of necessities (a place to live, goods and services)'; 'caring for household objects & assisting others'; 'particular interpersonal interactions (relating with strangers, formal and informal relationships, family and intimate relationships)'; 'education'; 'work & employment'; 'economic life'; and 'community, social & civic life.' The inconsistent coding of Participation items, as evidenced during provider helpdesk calls, was partly because the Participation items encompassed more distal reasons for therapy, compared with Body Functions, Body Structures, and Activity items, which encompassed more proximal reasons. For instance, for patients whose proximal reason for therapy was mobility improvement to attain the distal goal of resumption of volunteer work or civic activities, clinicians would more consistently select "Movement Functions" under the Body Functions section, and less consistently select the Participation item "Community, Social & Civic Life" under Activities and Participation. Thus, we did not consider the Participation items to have adequate reliability for use in payment analysis. Additionally, several Participation items, such as 'education' and 'economic life', were sufficiently general or vaguely-defined that their inclusion in a payment model would be problematic.

Body Functions Groupings for CARE-C and CARE-F Assessments

Discipline-specific body functions groups were created for CARE-C PT, OT, and SLP assessments to maximize within-group homogeneity in terms of clinical characteristics and resource needs (***Table 3-13***). ***Appendix Table 3-14*** outlines the individual body functions constituting each CARE-C discipline-specific body functions group, along with individual body function frequencies. An 'Other' category was created for each discipline to categorize body functions that were unlikely to be primary reasons for therapy for the specific discipline, and/or had small frequencies. A single set of five body functions groups was defined for CARE-F admission assessments (***Table 3-14***). ***Appendix Table 3-15*** outlines the individual body functions constituting each CARE-F body-functions group, along with individual body-function frequencies. The body-functions groups are not mutually-exclusive and patients can fall into multiple groups. For both CARE-C and CARE-F, a 'No Body Functions' group was created to categorize assessments that did not have body functions reported under Primary Reason for Therapy.

Body Structures Groupings for CARE-C and CARE-F Assessments

Discipline-specific body structures groups were also created for CARE-C PT, OT, and SLP assessments (***Table 3-15***). An 'Other' category was created for each discipline to categorize body structures that were unlikely to be primary reasons for therapy for the specific discipline, and/or had small frequencies, while a '*No Body Structures*' group was created to categorize assessments that did not have body structures reported under Primary Reason for Therapy. For PT (15 groups), a distinction was made between unilateral and bilateral extremity involvement, as well as between upper spine and lower spine involvement. For OT (7 groups), distinctions were made between unilateral and bilateral upper extremity involvement; however, as OTs less commonly treat isolated lower extremity and spine problems in the outpatient setting, no distinction was made between unilateral and bilateral lower extremity and spine involvement for OT. Four body structure groups were created for SLP to distinguish speech structures, central nervous system structures, other body structures, and no body structures. ***Appendix Table 3-16*** shows the individual body structures constituting each discipline-specific CARE-C body structure group.

A single set of body-structures groups was created for the CARE-F admission assessments (***Table 3-16***). No distinction was made between unilateral and bilateral extremity involvement since the CARE-F population is more complex and less likely to present with isolated extremity involvement compared with the CARE-C population. Additionally, the smaller CARE-F sample size did not allow for distinction between unilateral and bilateral involvement. Similar to CARE-C, '*Other Body Structures*' and '*No Body Structures*' groups were created for CARE-F. ***Appendix Table 3-17*** outlines the individual body structures constituting each CARE-F body-structure group, along with individual body-structure frequencies. Both CARE-C and CARE-F body-structure groups are not mutually-exclusive and beneficiaries can fall into multiple groups.

Activity Groups for CARE-C and CARE-F Assessments

Discipline-specific CARE-C activity groups are presented in ***Table 3-17*** and ***Appendix Table 3-18***. While PT and OT activity groups were similar, SLP activity group definitions differed given the different scope and focus of SLP practice. While a combined 'Cognitive/Communication' group was created for PT and OT, separate 'Cognitive' and 'Communication' groups were created for SLP. Additionally, while separate 'Mobility' and 'Daily Activities' groups were created for PT and OT, a combined 'Mobility/Daily Activities' group was created for SLP. A single set of CARE-F activity groups is presented in ***Table 3-18*** and ***Appendix Table 3-19***. For both CARE-C and CARE-F, an 'Activities Not Reported' group was created to categories assessments that did not have activities reported under Primary Reason for Therapy. Both CARE-C and CARE-F activity groups are not mutually-exclusive, and beneficiaries can fall into multiple groups.

3.5 Rasch Function Scales

In the second section (Self-Report) of the CARE assessment, a series of questions were presented to the patient regarding their self-reported ability to perform various functional activities. In the third section (Clinician-Observed) of the assessment, clinicians were asked to assess the patient's ability to perform various functional activities. From these individual self-report and clinician-observed items, clinically-related items were grouped into function scales using Rasch analysis (Bond and Fox, 2001). A brief explanation of the Rasch analysis model is presented in ***Appendix D.1***. Winsteps software (Linacre, 2012a; 2012b) was used to implement the analysis.

Rasch analysis jointly assesses item-level responses in terms of relative task difficulty and patient's ability to perform the task, to generate scale-specific Rasch ability estimates for patients. The final output is a Rasch ability estimate ranging from 0 to 100 on each Rasch

Function scale for each beneficiary, with higher scores indicating better functional ability. This approach is consistent with the functional scale development work in the Post-Acute Care Payment Reform Demonstration for the institutional and home health post-acute care populations.

A total of 15 function scales were produced from the CARE-C assessments—five from the Self-Report section of the instrument (section 3.4.1) and 10 from the Clinician-Observed section. A total of 12 function scales were produced from the CARE-F nursing facility assessments—two from the Self-Report section of the instrument and ten from the Clinician-Observed section. ***Appendix D.2*** presents the items used in the final scales.

3.5.1 CARE-C Self-Report Rasch Function Scales

The five Rasch function scales derived from the Self-Report section of the CARE assessment are as follows:

1. The *Mobility* scale, which contains 13 items measuring different aspects of mobility, such as bed mobility, transfers, and ambulation;

2. The *Wheelchair* scale, for persons reporting wheelchair use, which contains five items linked to wheelchair mobility;

3. The *Everyday Activities* scale, which contains 12 items assessing patients' ability to engage in everyday tasks, such as personal hygiene, grooming, lifting objects, and household tasks;

4. The *Life Skills* scale, which contains 16 items assessing patients' communication, memory, organization, and planning abilities in daily life[19]; and

5. The *Participation* scale, which contains four items assessing patients' ability to participate in personal, household, and social role functions in daily life.

Items in the Self-Report function scales assessed one of three aspects of a person's functional ability including: (1) amount of difficulty in performing different tasks, rated on a 4-point scale ranging from "no difficulty" to "unable"; (2) amount of help needed in performing different tasks, rated on a 4-point scale ranging from "no help needed" to "unable"; and (3) amount of limitation in performing different tasks, rated on a 5-point scale ranging from "not at all" to "extremely" limited. Additionally, all items in the Self-Report scales had an "I don't do this/I don't know" option.

All except one of the Self-Report function scales have built-in gateway questions that are embedded in the CARE instruments to limit beneficiaries' response burden. A particular response to a gateway question allowed respondents to skip one or more subsequent questions because they were "not applicable". The following is a description of the gateway questions influencing the Self-Report scales (see details in Kline et al., 2014):

[19] Planning abilities in daily life do not include instrumental activities of daily living (IADLs).

- The *Mobility*, *Everyday Activities*, and *Life Skills* Self-Report scales were each preceded by a dichotomous "Yes/No" gateway question, which screened for difficulty in the areas being assessed. A "No" response indicated "no difficulty" and allowed patients to skip the individual items in the scale and proceed to the next section.

- The *Wheelchair* scale was preceded by a dichotomous "Yes/No" gateway question inquiring about wheelchair use. A "No" response indicated no wheelchair use and allowed patients to skip items constituting the *Wheelchair* scale.

- The *Participation* scale did not have a gateway question.

3.5.2 CARE-C Clinician-Observed Rasch Function Scales

The first three Clinician-Observed scales, broadly referred to as "Physical Function Scales," included the following:

1. The *Self-Care* scale, which has five items similar in content to the Self-Report Everyday Activities scale;

2. The *Mobility* scale, which has 13 items similar in content to the Self-Report Mobility scale, and includes wheelchair mobility items; and

3. The *Instrumental Activities of Daily Living* (IADL) scale, which has three items measuring a patient's ability to manage medication, make a light meal, and wipe down a surface and clean the cloth.

Items in the Physical Function Clinician-Observed scales rated patients' performance on various tasks using a 6-point scale ranging from 1 (Dependent) to 6 (Independent). Patients using assistive device(s) were scored based on their performance using the device. Additionally, items in these scales had an "Activity Not Assessed" response code, indicating that an activity was not assessed because (1) it was not clinically relevant for the patient, or (2) the therapist did not feel that the item could be coded based upon his/her skill, knowledge, or training. Provider calls and TEP discussions indicated that clinicians occasionally left items blank if they deemed the activity unsafe for the beneficiary to perform.

The remaining seven Clinician-Observed scales are broadly referred to as "Cognition and Communication" scales. Items in these scales were structured with four questions: two regarding a patient's ability to complete a specific activity and two asking whether a patient needed assistance to complete the activity. The Cognition and Communication scales included the following:

- *Problem Solving*

- *Memory*

- *Attention*

- *Language Comprehension*

- *Language Expression*
- *Speech*
- *Functional Voice*

Items in the Cognition and Communication scales rated the proportion of time patients were able to perform activities on a 4-point scale, ranging from “Never or rarely” (less than 20 percent of the time) to “Always” (at least 80 percent of the time).

As discussed for the Self-Report scales, gateway questions also preceded certain Clinician-Observed scales, as described below (see details in Kline et al., 2014):

- The *Cognition and Communication* scales were preceded by “Yes/No” gateway questions, which screened for presence of cognitive or communication problems. A “Yes” response required clinicians to respond to items in the corresponding scales, while a “No” or “Not Assessed” response allowed clinicians to skip the corresponding scales.
- The *Physical Function Scales* did not have a gateway question.

3.5.3 CARE-F Nursing Facility Self-Report Rasch Function Scales

Unlike the CARE-C admission assessments, CARE-F nursing facility assessments did not include self-report questions related to Everyday Activities, Life Skills, and Participation, given their limited relevance to patients in such settings. The two Rasch function scales derived from the Self-Report section of the CARE-F nursing facility assessment are:

1. The *Mobility* scale[20], which contains 4 items related to bed mobility, transfers, and ambulation; and
2. The *Wheelchair* scale, for persons reporting wheelchair use, which contains four items linked to wheelchair mobility.

Items in the Self-Report function scales assessed either (1) amount of difficulty in performing different tasks, rated on a 4-point scale ranging from “no difficulty” to “unable”; or (2) amount of help needed in performing different tasks, rated on a 4-point scale ranging from “no help needed” to “unable”. All items in the Self-Report scales also had an “I don’t know/Unknown” option.

The Self-Report *Mobility* scale has a “Yes/No” gateway question, screening for difficulty with mobility. A “No” response indicated “no difficulty” and allowed patients to skip the individual items in the scale and proceed to the next section. The Self-Report *Wheelchair* scale

[20] The CARE-F self-report Mobility subscale, termed Patient Ability in the Measurement Report, was modified through analysis and currently contains only items relevant to patient mobility. Therefore terminology that more accurately reflects the current state of the item set is used in the Payment Report.

was preceded by a “Yes/No” gateway question inquiring about wheelchair use. A “No” response indicated no wheelchair use and allowed patients to skip items constituting the *Wheelchair* scale.

3.5.4 CARE-F Clinician-Observed Rasch Function Scales

The first three Clinician-Observed scales, broadly referred to as “*Physical Function Scales*,” included the following:

1. The *Self-Care* scale, which has eight items related to eating, hygiene, and dressing;
2. The *Mobility* scale, which has 15 items related to bed mobility, transfers, walking, picking up an object from the floor, stair negotiation, car transfers, and wheelchair mobility; and
3. The *Instrumental Activities of Daily Living* (IADL) scale, which has seven items measuring a patient’s ability to use a telephone, manage medication, make a light meal, and wipe down a surface and clean the cloth.

Items in the *Physical Function* Clinician-Observed scales rated patients’ performance on various tasks using a 6-point scale ranging from 1 (Dependent) to 6 (Independent). Patients using assistive device(s) were scored based on their performance using the device. Additionally, items in these scales had an “Activity Not Assessed” response code, indicating that an activity was not assessed either because it was not clinically relevant for the patient, or due to medical conditions, safety concerns, or environmental constraints. The *Physical Function Scales* did not have gateway questions.

Seven “*Cognition and Communication*” Clinician-Observed scales were created for CARE-F nursing facility assessments, with items and rating scales similar to corresponding CARE-C scales. As with CARE-C, these scales contained four questions: two questions regarding a patient’s ability to complete specific activities and two questions regarding need for assistance in completing the same activities. The *Cognition and Communication* scales included the following:

- *Problem Solving*
- *Memory*
- *Attention*
- *Language Comprehension*
- *Language Expression*
- *Speech*
- *Functional Voice*

Items in the *Cognition and Communication* scales rated the proportion of time patients were able to perform activities on a 4-point scale, ranging from “Never or rarely” (less than 20 percent of the time) to “Always” (at least 80 percent of the time). The *Cognition and Communication* scales were preceded by “Yes/No” gateway questions, which identified whether or not the beneficiary was being evaluated or treated for cognitive or communication problems. A “Yes” response required clinicians to respond to items in the corresponding scales, while a “No” response allowed clinicians to skip the corresponding scales.

3.5.5 Rasch Functional Ability Estimates

A Rasch functional ability estimate based on the Self-Report and Clinician-Observed scores could be computed for a person when at least one item in the scale had been rated. A Rasch ability estimate could not be computed when no item rating was present in the scale, or when only “not assessed” item responses were present; in these instances, the Rasch ability estimate would be missing.

For CARE-C assessments, the Rasch functional ability estimates were recoded for Self-Report Mobility, Wheelchair, Everyday Activities, and Life Skills scales and Clinician-Observed *Cognition and Communication* scales in the presence of a “No” response to the gateway question indicating no limitations or no wheelchair use. In these cases, the Rasch functional ability estimates were recoded to 100, indicating maximal functional ability on the scale. ***Table 3-19*** shows the proportions of Rasch functional ability estimates from CARE-C admission assessments that were recoded to 100 due to “no limitations” responses to gateway questions; these proportions are presented by discipline. As may be expected, the majority of PT and OT assessments required recoding of the *Cognition and Communication* and Self-Report Life Skills Rasch estimates to 100 due to negative responses to gateway questions, while a considerably smaller proportion of SLP assessments required recoding of *Cognition and Communication* estimates.

For CARE-F nursing facility assessments, the Rasch functional ability estimates were recoded to 100 for the Self-Report Mobility scale in the presence of a “No” response to the gateway question indicating no mobility limitations. Of the 629 CARE-F nursing facility assessments with responses to the Self-Report Mobility gateway question, 15.6 percent had Self-Report Mobility estimates recoded to 100 due to negative responses.

Table 3-20 summarizes the mean Rasch functional ability estimates on the CARE-C Self-Report and Clinician-Observed scales, by discipline. For the PT sample, the Self-Report Participation, Mobility, and Everyday Activity scales had the lowest mean Rasch functional ability estimates, ranging from 70.16 to 76.55; the Clinician-Observed Mobility scale had a mean estimate of 81.77. As may be expected, for the PT sample, the mean Rasch ability estimates on the *Cognition and Communication* scales indicated little to no limitation, with mean estimates being greater than 98 on all scales. For the OT sample, the Self-Report Participation, Everyday Activity, Clinician-Observed Mobility, and Clinician-Observed IADL scales had the lowest mean Rasch ability estimates, ranging from 61.42 to 70.68. While the SLP sample had the lowest mean Rasch ability estimates on the *Cognition and Communication* scales, it also had the lowest mean estimates on the majority of self-report scales and the *Physical Function* scales. The overall lower functional ability estimates of the SLP sample may be related to the fact that the majority of the SLP sample had diagnoses of Stroke or other neurological conditions, while the majority of the PT and OT samples had musculoskeletal diagnoses. Stroke and other neurological conditions accounted for only a small proportion of PT and OT primary diagnoses (see ***Tables 3-6*** and ***3-7***, and ***Appendix Tables 3-3***, ***3-4***, and ***3-9***).

Table 3-21 summarizes mean Rasch functional estimates on the CARE-F nursing facility Self-Report and Clinician-Observed scales; mean Rasch functional ability estimates for the CARE-F day rehabilitation sample are also shown for comparison. Mean CARE-F nursing facility estimates on the self-report and clinician-observed scales ranged from 41.6 to 52.6, while mean CARE-F day rehabilitation estimates ranged from 67.3 to 86.2. The lower mean functional ability estimates of the nursing facility sample compared with the CARE-F day rehabilitation and CARE-C samples is expected, as the nursing facility sample is an inpatient facility sample compared with the community-dwelling day rehabilitation and CARE-C beneficiaries.

3.5.6 Rasch Function Scales for CARE-C Discipline-Specific Models

Since the same CARE-C assessment form was used for PT, OT, and SLP assessments, it was expected that response and assessment rates for the various Rasch function scales would differ based on their relevance to the discipline providing therapy, as well as patient characteristics including primary diagnosis, body functions, body structures, and activities being treated. For instance, low assessment rates for the Clinician-Observed *Mobility* scale would be expected in SLP assessments, given SLPs do not focus on mobility limitations. Not all function scales were expected to be associated with payment; therefore, subsets of Rasch scales were selected for use in discipline-specific payment models based on clinical reasoning. Scales were selected for discipline-specific models if their content (1) reflected patient limitations that were most likely to predict resource use for the respective discipline, considering the discipline's scope of practice and type(s) of patient problems encountered; and (2) was relevant to patient needs and the training, knowledge, and skills of the therapist from that discipline, and would therefore be likely to be completed. Once discipline-specific subsets of Rasch scales were selected, response and assessment rates were examined for each scale, and additional scales were dropped if rates of missing Rasch functional ability estimates were high. ***Table 3-22*** lists the Rasch Function scale subsets used in the CARE-C analysis by therapy discipline.

All missing rates were computed after recoding the relevant Rasch functional ability estimates to 100 when responses to gateway questions indicated no limitations. ***Table 3-23*** shows a stepwise analysis of proportions of missing Rasch ability estimates by therapy discipline for the CARE-C assessments. This table presents the missing rates of individual Rasch function scales by discipline, and the cumulative missing rate as each subsequent scale is added. ***Table 3-24*** presents missing rates by primary diagnosis, body function, body structure, and activity groups for PT; the Rasch scale subsets selected for the PT discipline are asterisked. Analogous data for OT and SLP are available in ***Appendix Tables 3-20*** and ***3-21***. The Clinician-Observed IADL scale was initially selected for the OT-specific models; however, given the high rates of missing Rasch estimates and limited scale content (three items assessing medication management, light meal preparation, and ability to wipe down a surface and clean the cloth), the Clinician-Observed IADL scale was removed from consideration.

For the Clinician-Observed *Physical Function* scales, we further explored whether missing Rasch functional ability estimates resulted from (1) nonresponse, where no response to scale items was selected, or (2) "not assessed" response(s) to one or more scale items. ***Table 3-25*** shows these results for PT by primary diagnosis, body function, body structure, and activity groups. Analogous data for OT and SLP are presented in ***Appendix Tables 3-22*** and ***3-23***. As expected, the vast majority of missing Rasch functional ability estimates was missing due to "not assessed" responses, with very small proportions of estimates missing due to nonresponse. These findings demonstrate that missing Rasch functional ability estimates generally resulted from clinical decision-making, wherein scale items were not assessed either because they were not clinically relevant to the patient, or outside the scope of the therapist's skill, training, or knowledge.

3.5.7 Rasch Function Scales for CARE-F Nursing Facility Models

Since CARE-F nursing facility analysis was not discipline-specific, Rasch functional ability scales were selected for analysis based on response and assessment rates for each scale. ***Table 3-26*** shows a stepwise analysis of proportions of missing Rasch ability estimates for the CARE-F assessments. Self-Report Mobility missing rates were computed after recoding Rasch estimates to 100 when responses to gateway questions indicated no limitations. ***Table 3-27*** presents missing rates by primary diagnosis, body function, body structure, and activity groups. Based on these data, the Self-Report Mobility and Wheelchair scales, and Clinician-Observed Mobility and Self-Care scales were included in CARE-F nursing facility analyses; the remaining clinician-observed scales could not be included given their high missing rates (between 61 and 68 percent).

For the Clinician-Observed Mobility and Self-Care scales, we further explored whether missing Rasch functional ability estimates resulted from (1) nonresponse, where no response to scale items was selected, or (2) "not assessed" response(s) to one or more scale items. ***Table 3-28*** shows these results for the overall CARE-F sample, nursing facilities, and day rehabilitation settings. For the overall CARE-F sample and nursing facility assessments, a larger proportion of Self-Care and Mobility estimates were missing due to "not assessed" responses versus nonresponse. These findings indicate that missing estimates were most frequently related to lack of relevance of scale items to the patient, medical conditions, safety concerns, or environmental constraints.

3.5.8 Clinician-Observed Swallowing Function Items in CARE-C and CARE-F Nursing Facility Assessments

Two Clinician-Observed items related to swallowing were part of the CARE-C and CARE-F assessments, including (1) need for diet modification, with response options being both liquids and solids, either liquids or solids, and none; and (2) level of cueing or assistance needed for swallowing, rated on a 4-point scale ranging from "none" to "maximal." On CARE-C assessments only, the swallowing items were preceded by a gateway question screening for presence of a possible swallowing disorder. A "Yes" response to the gateway question required the clinician to assess the swallowing function items, while a "No" or "Not assessed" response allowed clinicians to skip the items. Swallowing items on CARE-C assessments were recoded to "None" indicating no need for diet modification or cueing when responses to gateway questions were "No". ***Table 3-29*** shows the proportions of swallowing items on CARE-C assessments that were recoded to "None" due to negative responses to the gateway question. Given the relatively small proportion of diagnosis of 'Swallowing Disorders' (n = 60) in the SLP sample, the percent of swallowing items recoded to 'none' in the SLP sample is not surprising. The swallowing items were included in payment analysis for the CARE-C SLP and CARE-F Nursing Facility samples.

3.5.9 Additional CARE-C and CARE-F Nursing Facility Assessment Variables

In addition to the CARE items used to create diagnosis, body function, body structure, and activity groups, and Self-Report and Clinician-Observed function scales, the CARE assessments collected supplemental information hypothesized to be related to outpatient therapy utilization.

Additional CARE-C variables used in payment analysis include number and timeframe of prior surgeries, if any, for the presenting problem[21]; mobility devices used; duration of the patient's presenting problem; indicators of memory/cognition, communication, and swallowing problems; indicators of sadness in the past two weeks; and impact of pain on patients' activities and sleep in the past two days. The indicator item for memory/cognition problems screened for any difficulty with memory, attention, problem-solving, planning, organizing, or judgment was used in PT and OT analyses. The indicator item for communication problems screened for any signs or symptoms of a communication problem, and was also used in PT and OT analyses. The indicator item for swallowing problems screened for any signs or symptoms of a swallowing disorder, and was used only in OT analysis. The frequencies of memory/cognition, communication, and swallowing problems are presented in ***Appendix Tables 5-2***, ***5-3***, ***7-2***, and ***7-3***.

Additional CARE-F Nursing Facility variables used in payment analysis include *history of surgery* for the presenting problem; *mobility devices* used; *onset of presenting condition within past 3 months*; facility or *setting from which the beneficiary was admitted* into Medicare Part B services (skilled nursing facility, long-term nursing facility, or other); *short-stay acute hospital use in the past 2 months*; indicators of *self-care* and *mobility functional abilities* prior to onset of presenting condition; *wheelchair use* prior to onset of presenting condition; *history of two or more falls in the past year*; evaluation or *treatment for cognitive impairment* during the admission assessment; *severity of cognitive impairment*; presence of *respiratory*, *endurance*, and *bladder* or *bowel* impairments; *ability to understand verbal content*; *ability to express wants/ideas*; *inattention*; *disorganized thinking*; *altered level of consciousness/alertness*; indicators of *sadness in the past two weeks*; and *impact of pain on patients' activities* and *sleep* in the past two days.[22]

[21] These surgery indicators are mutually exclusive: *no surgery*; *surgery in the past month*; *surgery more than one month, but not more than three months in the past*; *surgery more than three months in the past*; and surgery indicator missing.

[22] The Rasch scales for Problem Solving, Memory, and Attention were not used in CARE-F models because of their high missing rates (68 percent each). Therefore, the following five individual items from the CARE-F assessment were used to assess cognition and communication domains in the CARE-F nursing facility sample: (i) ability to understand verbal content (Item III.V.C1c); (ii) ability to express ideas and wants (Item III.V.C1d); (iii) inattention (Item III.IV.C1); (iv) disorganized thinking (Item III.IV.C2); and (v) altered level of consciousness/alertness (Item III.IV.C3).

Information about the facilities in which therapy was administered was collected concurrently with patient information through the CARE instruments. In the regression analyses that follow in Section 5 and 7, standard errors are adjusted to take into account potential clustering at the facility level.

3.6 Analytic Data Files

To perform the analyses presented in this report, four analytic data files were created—two data files produced from claims data for the entire Medicare outpatient therapy population (Section 3.5.1) and two data files produced from the CARE assessments combined with claims information (Section 3.5.2). The files both have an episode based expenditure definition and a 12-month expenditure definition. ***Table 3-30*** provides an overview of the episode definitions, data sources, and data ranges for the analytic files created. Each data file was constructed to investigate a different alternative payment system.

3.6.1 One-Hundred Percent Claims Files

Two files were generated solely from claims data: a calendar-year file and a variable-length episode file with 60-day initiating and terminating clean periods. Details of each file are provided below. These files are the basis for descriptive statistics and regression analyses in Sections 4 and 6. The first file is used to explore the possibility of a risk-adjusted annual therapy expenditures cap (see Section 4).The second file is used to understand the characteristics of outpatient therapy episodes of care, specifically 60-day variable-length episodes (see Section 6).

Claims-based Calendar-Year File

The first file, generated from 100 percent claims data, encompasses all therapy expenditures during calendar year 2011 (i.e., service dates from January 1, 2011, through December 31, 2011) for each beneficiary receiving outpatient therapy services. This annual expenditure file did not require clean periods with no expenditures and does not include a run-out period after December 31, 2011. The CY 2011 file was created using only administrative data and includes information from claims, beneficiary enrollment and demographic data, prospective HCCs, and concurrent DRGs for each beneficiary. The beneficiary must have been continually enrolled in Part A and B in 2010 and 2011; they must also be continually enrolled in FFS and Medicare must have been the primary payer for all months during calendar year 2011. The file was constructed to have one aggregated record per beneficiary for the calendar year, by therapy discipline. The total expenditure per episode/discipline was calculated from the claims information for the beneficiary, along with other descriptive data about the episode.

Claims-based Episode File

The second claims based file includes variable-length episodes with 60 day initiating and terminating clean periods. The sample for this file is episodes that began in CY 2010. Unlike the annual definition, the episode definition allows for multiple episodes in the year, is preceded by a 60-day period with no relevant therapy claims and allows for up to a 12 month run-out period through December 2011. The episode is defined by a 60-day clean period both before and after the initiation of therapy claims. The clean period refers to a period of time when there were no outpatient therapy claims or services in the therapy discipline associated with the episode for the beneficiary.

In this file, the earliest episodes began January 1, 2010 with a preceding 60-day clean period between November 1, 2009 and December 31, 2009. A one-year run-out period was defined for all episodes after their initiation date. An episode that started on December 31, 2010 would be able to capture claims until December 31, 2011 or until a 60 day clean period. If a beneficiary's episode began before January 1, 2010 and continued into the calendar year 2010, then that episode was not included in this file. However, subsequent episode(s) for the beneficiary beginning in 2010 and preceded by a 60-day clean period also in 2010 were included in the analysis file.

For an episode to be included in the analysis file, the beneficiary must have been continually enrolled in Part B and FFS, and Medicare must have been the primary payer for all months covered by the episode. A discipline-specific episode for each beneficiary was the organizational unit for the file. The total expenditure per episode/discipline was calculated from claims information for the beneficiary, along with other descriptive data about the episode.

3.6.2 CARE and Claims Merged Files

Two files were created using CARE assessment data merged with claims information (CARE/Claims): an annual file for CY 2011 and a variable-length episode file beginning with the CARE assessment date and terminating with a 60 day clean period. Unlike the 100-percent files, these files only include those beneficiaries present in the final CARE analysis file. The CARE assessment data (e.g., functional scales, reason for therapy, diagnosis) is hypothesized to improve the predictive ability of models forecasting outpatient expenditures. The first file is used to explore the possibility of risk-adjusting the annual therapy expenditures cap (Section 5); the second file is used to predict episode-level expenditures (Section 7) and for the CART analyses to explore relevant case-mix groups for therapy expenditures (Section 8).

CARE/Claims Annual File

The first CARE/Claims file simulates a calendar year with a 12 month period in order to investigate risk-adjusting the Medicare annual therapy expenditures cap. The sample for this file was beneficiaries with CARE assessments in the period March 2011 through February 2012. This period was chosen because the CARE data were not collected throughout either the 2011 or 2012 calendar years. March 2011 was the beginning of the CARE data collection, and the largest amount of data was collected during the 12 months beginning March 2011. All the outpatient therapy expenditures for each DOTPA-CARE beneficiary in this defined 12-month time frame are included in this file. If a beneficiary had more than one CARE assessment within the same discipline, the CARE assessment with the least amount of missing Rasch data was retained. In the case that multiple assessments had the same amount of non-missing data, the assessment with the highest level of impairment, determined using the Rasch functional scores, was used in order that the claims would be matched to a unique assessment for purposes of the analysis of an annual cap.

For inclusion into the analysis file, the beneficiary must have been continually enrolled in Part B and FFS, and Medicare must have been the primary payer for all 12 months. The file was organized by therapy discipline for a CARE beneficiary receiving any therapy services. In other words, multiple records for a beneficiary were included in the file only if they received therapy from multiple disciplines. For each beneficiary, expenditure and utilization information as well as CARE assessment information was included.

CARE/Claims Episode File

The second CARE/Claims file contains information on variable-length episodes with a 60-day terminating claims clean period. The start date of the episode is defined by the admission date recorded on the CARE admission assessment and a requirement that applicable claims fall within 30 days of the CARE admission assessment date. The CARE admission assessment dates range from March 1, 2011, to June 30, 2012. In contrast to the fully claims-based episode definition, these episodes did not require a preceding 60-day claims clean period. Additionally, we only considered the first episode associated with the CARE assessment because the initiating event for the episode was the CARE assessment date. Therefore, there is only one variable length episode defined per CARE admission assessment.[23] Claims with dates of service from March 1, 2011 through December 2012 were included. The end of the episode was defined either by a 60-day clean period of no outpatient therapy claims within that episode's discipline, by censoring the episode on December 31, 2012, or if there was another CARE assessment for the same beneficiary in the same discipline. Thus, all CARE episodes had at least a 6 month run out period, and most had a substantially longer run out period. We did not use the CARE discharge assessment to define the end of the episode because the paired discharge assessments were missing for a substantial fraction of the CARE admission assessments. Therefore, we had to use a different method to define the end of the episode when the discharge assessment was missing, and to be consistent, we used the 60-day claims clean period to define the end of all CARE episodes.

This file included information from the claims, beneficiary enrollment and demographic data, and CARE data for each episode and beneficiary. For an episode to be included in the file the beneficiary must have been continually enrolled in Part B and FFS, and Medicare must have been the primary payer for all months associated with the episode. A discipline-specific episode was the organizational unit for this file.

[23] However, beneficiaries may have more than one episode on the file if they have multiple CARE admission assessments.

Table 3-1
Total number of DOTPA-participating providers by setting

Setting	Providers participating in DOTPA	
	Count	Percent
Total	162	100.0
Private practice (PP)	68	42.0
Hospital outpatient department (HOPD)	31	19.1
Outpatient rehabilitation facility (ORF)	27	16.7
Nursing facility (NF)	21	13.0
Assisted-living facility (ALF)	6	3.7
Day rehabilitation (Day Rehab)	5	3.1
Comprehensive outpatient rehabilitation facility (CORF)	4	2.5

NOTE: † = Fewer than 11 cases.

SOURCE: Developing Outpatient Therapy Payment Alternatives (DOTPA) analytic files, 2013.

Table 3-2a
Total number of DOTPA CARE-C admission assessments by setting and discipline

			Therapy discipline					
	Total		PT		OT		SLP	
Setting	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Total	5,822	100	5,007	100	588	100	227	100
HOPD	1,450	25	1,090	22	210	36	150	66
ORF	998	17	904	18	80	14	14	6
CORF	42	1	†	†	†	†	34	15
ALF	255	4	157	3	76	13	22	10
NF	35	1	††	††	†	†	†	†
PP	3,042	52	2,819	56	††	††	†	†

NOTES:

† = Fewer than 11 cases. †† = Count suppressed to maintain confidentiality of cells with fewer than 11 cases.

1. PT = physical therapy; OT = occupational therapy; SLP = speech and language pathology; ALF = Assisted Living Facility; CORF = Comprehensive Outpatient Rehabilitation Facility; HOPD = Hospital Outpatient Department; ORF = Outpatient Rehabilitation Facility; NF = Nursing Facility; and PP = private practice.

SOURCE: Developing Outpatient Therapy Payment Alternatives (DOTPA) analytic files, 2013.

Table 3-2b
Total number of DOTPA CARE-F admission assessments by setting and discipline

Setting	Count (N)	Percent
Total	840	100
Nursing facility	655	78
Day rehabilitation facility	185	22

SOURCE: Developing Outpatient Therapy Payment Alternatives (DOTPA) analytic files, 2013.

Table 3-3
Total numbers of beneficiaries and admission assessments in the CARE-C and CARE-F samples

	Total	**CARE-C**	**CARE-F**
Total number of beneficiaries	6,490	5,742	748
Total number of admission assessments	6,662	5,822	840
Number of beneficiaries with multiple admission assessments within a discipline (i.e., multiple episodes of care)	110	18	92
Number of beneficiaries with multiple admission assessments due to multiple disciplines	62	62	—

SOURCE: RTI International Analysis of CARE-C data collected from March 2011 through June 2012.

Table 3-4
Example claim scenarios in the Carrier and Outpatient Files used to identify therapy claims

Carrier File Scenario		
Modifier Number	Modifier Code	HCFA Line Specialty Code
Modifier 1	GO	65
Modifier 2	GN	—
Modifier 3	—	—
Modifier 4	—	—
Outpatient File Scenario		
Modifier Number	Modifier Code	Line Revenue Center Code
Modifier 1	—	42X
Modifier 2	—	—
Modifier 3	—	—
Modifier 4	—	—
Modifier 5	—	—

Table 3-5
Percent of admission assessments with no, single, or multiple primary medical diagnoses in CARE admission assessments

	Number of primary diagnoses				
CARE assessment	0	1	2	3	4 or more
CARE-C					
PT	1.38	86.96	7.63	2.22	1.81
OT	1.53	86.73	7.65	2.72	1.37
SLP	1.32	73.13	13.66	5.29	6.60
CARE-F					
Nursing Facility	3.51	78.17	12.82	2.44	3.06
Day Rehabilitation	1.08	96.22	1.62	—	1.08

NOTES:

1. Numbers represent percentages.
2. There are 5,007 PT, 588 OT, and 227 SLP CARE-C admission assessments; there are 655 Nursing Facilities and 185 Day Rehabilitation CARE-F admission assessments
3. PT = Physical Therapy, OT = Occupational Therapy, SLP = Speech-Language Pathology

SOURCE: RTI International Analysis of CARE data collected from March 2011 through June 2012.

Program: PP004-2, TG006-1

Table 3-6
Original primary diagnosis frequencies, by therapy discipline: CARE-C admission assessments

			Discipline					
	Total		PT		OT		SLP	
Original primary diagnoses	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN
Total number of CARE-C admission assessments	5,822	100.00	5,007	100.00	588	100.00	227	100.00
Number of CARE-C admission assessments with no primary diagnosis indicated.	81	1.39	69	1.38	†	†	†	†
A. Musculoskeletal								
Total	4,044	69.46	3,716	74.22	††	††	†	†
Osteoarthritis	999	17.16	927	18.51	††	††	†	†
Other	700	12.02	642	12.82	††	††	†	†
Joint Replacement	493	8.47	478	9.55	15	2.55	—	—
Sprain/Strain	382	6.56	††	††	†	†	—	—
Spinal Stenosis	342	5.87	342	6.83	—	—	—	—
Fracture	317	5.44	242	4.83	††	††	†	†
Tendonitis	287	4.93	254	5.07	33	5.61	—	—
Tendon Rupture	142	2.44	134	2.68	†	†	—	—
Herniated Disc	141	2.42	134	2.68	†	†	†	†
Internal Derangement of Joint	140	2.40	138	2.76	†	†	—	—
Bursitis	105	1.80	102	2.04	†	†	—	—
Nerve Entrapment	105	1.80	71	1.42	34	5.78	—	—

(continued)

Table 3-6 (continued)
Original primary diagnosis frequencies, by therapy discipline: CARE-C admission assessments

	Total		Discipline					
			PT		OT		SLP	
Original primary diagnoses	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN
Contracture	28	0.48	††	††	†	†	—	—
Osteoporosis	24	0.41	††	††	†	†	—	—
Scoliosis	24	0.41	24	0.48	—	—	—	—
Amputation	24	0.41	††	††	†	†	—	—
Rheumatoid Arthritis	21	0.36	††	††	†	†	—	—
Contusion	15	0.26	††	††	†	†	—	—
TMJ Disorder	†	†	†	†	—	—	—	—
Torticollis	—	—	—	—	—	—	—	—
B. Circulatory								
Total	359	6.17	164	3.28	80	13.61	115	50.66
Stroke	245	4.21	81	1.62	65	11.05	99	43.61
Hypertension	44	0.76	35	0.70	†	†	†	†
Other	26	0.45	13	0.26	†	†	†	†
Coronary Artery Disease	15	0.26	††	††	—	—	†	†
Atrial Fibrillation/Dysrhythmia	12	0.21	†	†	†	†	†	†
Heart Failure	12	0.21	†	†	†	†	—	—
TIA	†	†	†	†	†	†	†	†
Peripheral Vascular/Arterial Disease	†	†	†	†	†	†	—	—
Deep Vein Thrombosis	†	†	†	†	—	—	—	—

(continued)

Table 3-6 (continued)
Original primary diagnosis frequencies, by therapy discipline: CARE-C admission assessments

	Total		Discipline					
			PT		OT		SLP	
Original primary diagnoses	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN
C. Lymphatic System								
Total	75	1.29	22	0.44	53	9.01	—	—
Lymphedema	71	1.22	19	0.38	52	8.84	—	—
Other	†	†	†	†	†	†	—	—
D. Pulmonary/Respiratory System								
Total	48	0.82	39	0.78	†	†	†	†
COPD	21	0.36	††	††	†	†	—	—
Asthma	13	0.22	††	††	†	†	—	—
Other	†	†	†	†	†	†	†	†
Pneumonia	†	†	†	†	†	†	—	—
Bronchitis	†	†	†	†	—	—	—	—
Cystic Fibrosis	—	—	—	—	—	—	—	—
E. Integumentary System								
Total	22	0.38	††	††	†	†	—	—
Other	12	0.21	†	†	†	†	—	—
Skin Ulcer/Wound	†	†	†	†	†	†	—	—
Burn	†	†	†	†	—	—	—	—

(continued)

Table 3-6 (continued)
Original primary diagnosis frequencies, by therapy discipline: CARE-C admission assessments

Original primary diagnoses	Total		Discipline PT		Discipline OT		Discipline SLP	
	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN
F. Genitourinary System								
Total	43	0.74	39	0.78	†	†	†	†
Incontinence	27	0.46	††	††	†	†	—	—
Other	11	0.19	†	†	†	†	†	†
Pelvic Pain	†	†	†	†	—	—	—	—
ESRD	†	†	†	†	—	—	—	—
G. Mental Health								
Total	35	0.60	24	0.48	†	†	†	†
Depression	12	0.21	†	†	†	†	†	†
Alzheimer's Disease	†	†	†	†	†	†	†	†
Anxiety Disorder	†	†	†	†	—	—	†	†
Bipolar Disease	†	†	†	†	—	—	†	†
Other	†	†	†	†	†	†	†	†
Attention Disorder	†	†	—	—	—	—	†	†
Schizophrenia	—	—	—	—	—	—	—	—
H. Cancer/Other Neoplasms								
Total	44	0.76	25	0.50	†	†	†	†

(continued)

Table 3-6 (continued)
Original primary diagnosis frequencies, by therapy discipline: CARE-C admission assessments

			Discipline					
	Total		PT		OT		SLP	
Original primary diagnoses	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN
I. Metabolic System								
Total	29	0.50	23	0.46	†	†	†	†
Diabetes Mellitus	27	0.46	21	0.42	†	†	†	†
Other	†	†	†	†	—	—	—	—
J. Generalized Weakness								
Total	306	5.26	262	5.23	††	††	†	†
K. Infectious Diseases								
Total	†	†	†	†	†	†	—	—
L. HIV								
Total	—	—	—	—	—	—	—	—
M. Gastrointestinal Disorders								
Total	11	0.19	†	†	—	—	†	†
N. Immune Disorders								
Total	†	†	†	†	†	†	—	—
O. Anemia/Other Hematological Disorders								
Total	†	†	†	†	—	—	—	—
Anemia	†	†	†	†	—	—	—	—
Other	—	—	—	—	—	—	—	—

(continued)

Table 3-6 (continued)
Original primary diagnosis frequencies, by therapy discipline: CARE-C admission assessments

	Total		Discipline					
			PT		OT		SLP	
Original primary diagnoses	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN
P. Congenital Abnormalities								
Total	†	†	†	†	†	†	—	—
Musculoskeletal Congenital Anomalies	†	†	†	†	†	†	—	—
Neurological Congenital/Developmental Anomalies	†	†	†	†	†	†	—	—
Other	—	—	—	—	—	—	—	—
Q. Neurological Conditions								
Total	367	6.30	230	4.59	71	12.07	66	29.07
Parkinson's	107	1.84	63	1.26	20	3.40	24	10.57
Other	84	1.44	57	1.14	16	2.72	11	4.85
PNS Disorder	68	1.17	††	††	†	†	—	—
Multiple Sclerosis	31	0.53	18	0.36	†	†	†	†
Traumatic Brain Injury	30	0.52	†	†	†	†	13	5.73
Non-Traumatic Brain Injury	13	0.22	†	†	†	†	†	†
Specific Diseases of CNS	11	0.19	†	†	†	†	†	†
Head Injury	†	†	†	†	†	†	†	†
Seizure Disorder	†	†	†	†	—	—	†	†
Guillain-Barre Syndrome	†	†	†	†	†	†	—	—

(continued)

Table 3-6 (continued)
Original primary diagnosis frequencies, by therapy discipline: CARE-C admission assessments

	Total		Discipline					
			PT		OT		SLP	
Original primary diagnoses	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN
Encephalopathy	†	†	†	†	†	†	—	—
Cranial Nerve Injury	†	†	†	†	—	—	†	†
Cranial Neuralgia	†	†	†	†	—	—	—	—
Complex Regional Syndrome	†	†	†	†	—	—	—	—
Retinopathy	†	†	†	†	—	—	—	—
Huntington's Disease	—	—	—	—	—	—	—	—
R. Cognition/Judgment								
Total	53	0.91	16	0.32	13	2.21	24	10.57
Dementia	24	0.41	†	†	†	†	†	†
Memory Impairment	21	0.36	†	†	†	†	11	4.85
Executive Function Disorder	13	0.22	†	†	†	†	†	†
Other	†	†	†	†	†	†	—	—
Pragmatics Disorder	†	†	†	†	—	—	—	—
S. Communication, Voice, or Speech Disorder								
Total	51	0.88	†	†	†	†	46	20.26
Aphasia	18	0.31	—	—	†	†	††	††
Cognitive Communication Disorder	13	0.22	—	—	—	—	13	5.73
Voice Disorder (Dysphonia)	11	0.19	—	—	—	—	11	4.85

(continued)

Table 3-6 (continued)
Original primary diagnosis frequencies, by therapy discipline: CARE-C admission assessments

Original primary diagnoses	Total N	Total ColPctN	PT N	PT ColPctN	OT N	OT ColPctN	SLP N	SLP ColPctN
Speech Disorder	11	0.19	†	†	—	—	†	†
Apraxia of Speech	†	†	—	—	†	†	†	†
Reading/Writing Dysfunction	†	†	—	—	—	—	†	†
Other	†	†	†	†	†	†	†	†
T. Swallowing Disorder (Dysphagia)								
Total	22	0.38	—	—	—	—	22	9.69
U. Sensory Disorders/Gait or Balance Disorder								
Total	370	6.36	342	6.83	††	††	†	†
Gait/Balance Disorder	336	5.77	326	6.51	†	†	†	†
Vision Impairment	25	0.43	†	†	16	2.72	†	†
Other	†	†	†	†	—	—	—	—
Hearing Impairment	†	†	†	†	†	†	—	—
V. Other Conditions and Symptoms								
Total	746	12.81	722	14.42	††	††	†	†
Pain, not syndrome	590	10.13	577	11.52	††	††	†	†
Vertigo	90	1.55	††	††	†	†	—	—
Other	41	0.70	33	0.66	†	†	†	†

(continued)

Table 3-6 (continued)
Original primary diagnosis frequencies, by therapy discipline: CARE-C admission assessments

			Discipline					
	Total		PT		OT		SLP	
Original primary diagnoses	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN
Pain Syndrome	22	0.38	††	††	†	†	—	—
Paralysis	†	†	†	†	†	†	—	—
Obesity	†	†	†	†	—	—	—	—

NOTES:

† = Fewer than 11 cases. †† = Count suppressed to maintain confidentiality of cells with fewer than 11 cases.

1. N = Count of CARE-C admission assessments
2. Diagnoses within a category are sorted in descending order of Total Frequency.
3. There were a total of 6,955 primary diagnoses recorded on 5,822 CARE-C admission assessments. More than one primary diagnosis was recorded on some admission assessments.
4. PT = Physical Therapy, OT = Occupational Therapy, SLP = Speech-Language Pathology, TMJ = Temporomandibular Joint Disorder; TIA = Transient Ischemic Attack; COPD = Chronic Obstructive Pulmonary Disease; ESRD = End-Stage Renal Disease; CNS = Central Nervous System; PNS = Peripheral Nervous System

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims/CARE data.

Program: TG002

Table 3-7
Original secondary diagnosis frequencies, by therapy discipline: CARE-C admission assessments

	Total		Discipline					
			PT		OT		SLP	
Original secondary diagnoses	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN
Total number of CARE-C admission assessments	5,822	100.00	5,007	100.00	588	100.00	227	100.00
Number of CARE-C admission assessments with no secondary diagnosis indicated.	81	100.00	69	1.38	†	†	†	†
A. Musculoskeletal								
Total	3,375	57.97	3,043	60.77	301	51.19	31	13.66
Osteoarthritis	1,934	33.22	1,757	35.09	166	28.23	11	4.85
Joint Replacement	487	8.36	429	8.57	††	††	†	†
Other	470	8.07	425	8.49	††	††	†	†
Osteoporosis	460	7.90	414	8.27	††	††	†	†
Spinal Stenosis	383	6.58	364	7.27	††	††	†	†
Sprain/Strain	311	5.34	293	5.85	18	3.06	—	—
Tendonitis	248	4.26	218	4.35	††	††	†	†
Herniated Disc	213	3.66	201	4.01	††	††	†	†
Fracture	190	3.26	163	3.26	††	††	†	†
Rheumatoid Arthritis	161	2.77	141	2.82	††	††	†	†
Bursitis	160	2.75	152	3.04	†	†	—	—
Internal Derangement of Joint	155	2.66	143	2.86	12	2.04	—	—

(continued)

Table 3-7 (continued)
Original secondary diagnosis frequencies, by therapy discipline: CARE-C admission assessments

			Discipline					
	Total		PT		OT		SLP	
Original secondary diagnoses	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN
Scoliosis	136	2.34	129	2.58	†	†	†	†
Nerve Entrapment	122	2.10	109	2.18	13	2.21	—	—
Contracture	92	1.58	67	1.34	25	4.25	—	—
Tendon Rupture	56	0.96	††	††	†	†	—	—
Contusion	39	0.67	††	††	†	†	—	—
TMJ Disorder	19	0.33	††	††	†	†	—	—
Amputation	†	†	†	†	†	†	—	—
Torticollis	—	—	—	—	—	—	—	—
B. Circulatory								
Total	2,300	39.51	1,998	39.90	229	38.95	73	32.16
Hypertension	1,719	29.53	1,501	29.98	167	28.40	51	22.47
Coronary Artery Disease	390	6.70	339	6.77	34	5.78	17	7.49
Other	325	5.58	281	5.61	††	††	†	†
Atrial Fibrillation/Dysrhythmia	268	4.60	231	4.61	26	4.42	11	4.85
Stroke	193	3.32	168	3.36	20	3.40	†	†
TIA	120	2.06	105	2.10	†	†	†	†
Peripheral Vascular/Arterial Disease	108	1.86	90	1.80	††	††	†	†
Heart Failure	96	1.65	83	1.66	††	††	†	†
Deep Vein Thrombosis	73	1.25	63	1.26	†	†	†	†

(continued)

Table 3-7 (continued)
Original secondary diagnosis frequencies, by therapy discipline: CARE-C admission assessments

	Total		Discipline					
			PT		OT		SLP	
Original secondary diagnoses	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN
C. Lymphatic System								
Total	67	1.15	56	1.12	†	†	†	†
Lymphedema	53	0.91	46	0.92	†	†	†	†
Other	15	0.26	††	††	†	†	—	—
D. Pulmonary/Respiratory System								
Total	606	10.41	527	10.53	62	10.54	17	7.49
Asthma	269	4.62	240	4.79	††	††	†	†
COPD	197	3.38	165	3.30	††	††	†	†
Other	123	2.11	110	2.20	††	††	†	†
Bronchitis	106	1.82	96	1.92	†	†	†	†
Pneumonia	67	1.15	50	1.00	††	††	†	†
Cystic Fibrosis	†	†	—	—	†	†	—	—
E. Integumentary System								
Total	108	1.86	87	1.74	21	3.57	—	—
Other	57	0.98	46	0.92	11	1.87	—	—
Skin Ulcer/Wound	52	0.89	41	0.82	11	1.87	—	—
Burn	†	†	†	†	—	—	—	—

(continued)

Table 3-7 (continued)
Original secondary diagnosis frequencies, by therapy discipline: CARE-C admission assessments

			Discipline					
	Total		PT		OT		SLP	
Original secondary diagnoses	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN
F. Genitourinary System								
Total	282	4.84	241	4.81	††	††	†	†
Incontinence	141	2.42	121	2.42	††	††	†	†
Other	122	2.10	103	2.06	††	††	†	†
ESRD	23	0.40	††	††	†	†	—	—
Pelvic Pain	12	0.21	††	††	†	†	—	—
G. Mental Health								
Total	584	10.03	479	9.57	75	12.76	30	13.22
Depression	414	7.11	342	6.83	53	9.01	19	8.37
Anxiety Disorder	209	3.59	174	3.48	††	††	†	†
Bipolar Disease	46	0.79	33	0.66	†	†	†	†
Other	43	0.74	38	0.76	†	†	†	†
Alzheimer's Disease	22	0.38	17	0.34	†	†	†	†
Attention Disorder	12	0.21	†	†	†	†	†	†
Schizophrenia	†	†	†	†	—	—	†	†
H. Cancer/Other Neoplasms								
Total	463	7.95	402	8.03	48	8.16	13	5.73

(continued)

Table 3-7 (continued)
Original secondary diagnosis frequencies, by therapy discipline: CARE-C admission assessments

Original secondary diagnoses	Total N	Total ColPctN	PT N	PT ColPctN	OT N	OT ColPctN	SLP N	SLP ColPctN
			Discipline					
I. Metabolic System								
Total	812	13.95	695	13.88	94	15.99	23	10.13
Diabetes Mellitus	743	12.76	640	12.78	83	14.12	20	8.81
Other	84	1.44	69	1.38	††	††	†	†
J. Generalized Weakness								
Total	1,376	23.63	1,224	24.45	††	††	21	9.25
K. Infectious Diseases								
Total	34	0.58	28	0.56	†	†	†	†
L. HIV								
Total	†	†	†	†	†	†	—	—
M. Gastrointestinal Disorders								
Total	151	2.59	116	2.32	26	4.42	†	†
N. Immune Disorders								
Total	25	0.43	20	0.40	†	†	†	†
O. Anemia/Other Hematological Disorders								
Total	108	1.86	96	1.92	†	†	†	†
Anemia	103	1.77	91	1.82	†	†	†	†
Other	†	†	†	†	—	—	—	—

(continued)

Table 3-7 (continued)
Original secondary diagnosis frequencies, by therapy discipline: CARE-C admission assessments

	Total		Discipline					
			PT		OT		SLP	
Original secondary diagnoses	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN
P. Congenital Abnormalities								
Total	31	0.53	26	0.52	†	†	†	†
Musculoskeletal Congenital Anomalies	16	0.27	††	††	†	†	—	—
Neurological Congenital/ Developmental Anomalies	†	†	†	†	†	†	—	—
Other	†	†	†	†	†	†	†	†
Q. Neurological Conditions								
Total	525	9.02	412	8.23	87	14.80	26	11.45
PNS Disorder	199	3.42	158	3.16	††	††	†	†
Other	166	2.85	141	2.82	††	††	†	†
Seizure Disorder	61	1.05	45	0.90	†	†	†	†
Parkinson's	44	0.76	36	0.72	†	†	†	†
Head Injury	37	0.64	29	0.58	†	†	†	†
Traumatic Brain Injury	16	0.27	14	0.28	†	†	†	†
Specific Diseases of CNS	14	0.24	†	†	†	†	†	†
Non-Traumatic Brain Injury	14	0.24	†	†	†	†	†	†
Multiple Sclerosis	12	0.21	†	†	†	†	†	†
Encephalopathy	†	†	†	†	†	†	—	—

(continued)

Table 3-7 (continued)
Original secondary diagnosis frequencies, by therapy discipline: CARE-C admission assessments

			Discipline					
	Total		PT		OT		SLP	
Original secondary diagnoses	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN
Complex Regional Syndrome	†	†	†	†	—	—	—	—
Retinopathy	†	†	†	†	†	†	—	—
Cranial Neuralgia	†	†	†	†	—	—	—	—
Cranial Nerve Injury	†	†	†	†	†	†	†	†
Huntington's Disease	†	†	—	—	†	†	—	—
Guillain-Barre Syndrome	†	†	†	†	—	—	—	—
R. Cognition/Judgment								
Total	—	—	—	—	—	—	—	—
Executive Function Disorder	—	—	—	—	—	—	—	—
Dementia	—	—	—	—	—	—	—	—
Memory Impairment	—	—	—	—	—	—	—	—
Pragmatics Disorder	—	—	—	—	—	—	—	—
Other	—	—	—	—	—	—	—	—
S. Communication, Voice, or Speech Disorder								
Total	178	3.06	39	0.78	11	1.87	128	56.39
Cognitive Communication Disorder	82	1.41	†	†	†	†	76	33.48
Aphasia	58	1.00	††	††	†	†	45	19.82
Speech Disorder	52	0.89	†	†	†	†	42	18.50

(continued)

Table 3-7 (continued)
Original secondary diagnosis frequencies, by therapy discipline: CARE-C admission assessments

	Total		Discipline					
			PT		OT		SLP	
Original secondary diagnoses	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN
Reading/Writing Dysfunction	42	0.72	††	††	†	†	26	11.45
Voice Disorder (Dysphonia)	32	0.55	†	†	†	†	30	13.22
Apraxia of Speech	19	0.33	†	†	†	†	13	5.73
Other	13	0.22	†	†	†	†	†	†
T. Swallowing Disorder (Dysphagia)								
Total	53	0.91	††	††	†	†	38	16.74
U. Sensory Disorders/Gait or Balance Disorder								
Total	1,191	20.46	1,026	20.49	108	18.37	57	25.11
Gait/Balance Disorder	860	14.77	792	15.82	48	8.16	20	8.81
Vision Impairment	273	4.69	193	3.85	47	7.99	33	14.54
Hearing Impairment	231	3.97	175	3.50	37	6.29	19	8.37
Other	36	0.62	25	0.50	†	†	†	†
V. Other Conditions and Symptoms								
Total	2,200	37.79	1,978	39.50	208	35.37	14	6.17
Pain, not syndrome	1,770	30.40	1,612	32.19	††	††	†	†
Obesity	198	3.40	171	3.42	††	††	†	†
Other	168	2.89	140	2.80	††	††	†	†

(continued)

Table 3-7 (continued)
Original secondary diagnosis frequencies, by therapy discipline: CARE-C admission assessments

	Total		Discipline					
			PT		OT		SLP	
Original secondary diagnoses	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN
Pain Syndrome	139	2.39	123	2.46	††	††	†	†
Vertigo	121	2.08	109	2.18	†	†	†	†
Paralysis	23	0.40	13	0.26	†	†	†	†

NOTES:

† = Fewer than 11 cases. †† = Count suppressed to maintain confidentiality of cells with fewer than 11 cases.

1. N = Count of CARE-C admission assessments
2. Diagnoses within a category are sorted in descending order of Total Frequency.
3. PT = Physical Therapy, OT = Occupational Therapy, SLP = Speech-Language Pathology, TMJ = Temporomandibular Joint Disorder; TIA = Transient Ischemic Attack; COPD = Chronic Obstructive Pulmonary Disease; ESRD = End-Stage Renal Disease; CNS = Central Nervous System; PNS = Peripheral Nervous System

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims/CARE data.

Program: TG002

Table 3-8
Primary diagnosis groups and frequencies, by therapy discipline: CARE-C admission assessments

PT (21 groups)	N	OT (9 groups)	N	SLP - Impairment (4 groups)	N	SLP - Medical (4 groups)	N
Osteoarthritis (Major Etiologic)	759	Major Musculoskeletal, excluding Fracture and Joint Replacement	110	Cognitive Communication Disorders only	136	Stroke	104
Unspecified and Miscellaneous Musculoskeletal (Other Etiologic)	608	Fracture and Joint Replacement	99	Cognitive Communication and Swallowing Disorders	34	Neurological, Excluding Stroke	75
Joint Replacement (Major Etiologic)	584	Minor, Unspecified, and Miscellaneous Musculoskeletal	93	No Impairment Diagnosis	34	Miscellaneous Diagnoses	38
Herniated Disc and Other Major Musculoskeletal (Major Etiologic)	492	Neurological, excluding Stroke	70	Swallowing Disorders only	23	No Medical Diagnosis	†
Sprain/Strain (Other Etiologic)	334	Stroke	63	—	—	—	—
Bursitis/Tendonitis (Other Etiologic)	315	Circulatory (including Lymphatic) and Pulmonary/Respiratory	58	—	—	—	—
Spinal Stenosis (Major Etiologic)	310	Unspecified and Miscellaneous Diagnoses	51	—	—	—	—
Multiple Etiologies, One Major	278	Multiple Etiologies	35	—	—	—	—
Multiple Major Etiologies	272	No Primary Diagnosis	†	—	—	—	—
Fracture (Major Etiologic)	234	—	—	—	—	—	—
Unspecified and Miscellaneous Diagnoses (Other Etiologic)	140	—	—	—	—	—	—
Vertigo (Other Etiologic)	86	—	—	—	—	—	—
Stroke (Major Etiologic)	83	—	—	—	—	—	—

(continued)

Table 3-8 (continued)
Primary diagnosis groups and frequencies, by therapy discipline: CARE-C admission assessments

PT (21 groups)	N	OT (9 groups)	N	SLP - Impairment (4 groups)	N	SLP - Medical (4 groups)	N
Peripheral Nervous System and Other Major Neurological Disorders (Major Etiologic)	82	—	—	—	—	—	—
Parkinson's and Other Progressive Neurological (Major Etiologic)	75	—	—	—	—	—	—
Circulatory (including Lymphatic) and Pulmonary/Respiratory (Other Etiologic)	70	—	—	—	—	—	—
Multiple Etiologies, No Major	69	—	—	—	—	—	—
No Primary Diagnosis	69	—	—	—	—	—	—
Pain (Impairment)	61	—	—	—	—	—	—
Unspecified and Miscellaneous Neurological (Other Etiologic)	59	—	—	—	—	—	—
Genitourinary Disorders (Other Etiologic)	27	—	—	—	—	—	—

NOTES:

† = Fewer than 11 cases.

1. PT = Physical Therapy, OT = Occupational Therapy, SLP = Speech-Language Pathology
2. N = Count of CARE-C admission assessments classified in each primary diagnosis group.
3. Primary diagnosis groups are mutually-exclusive within each discipline.
4. Primary diagnosis groups are sorted in descending order of count within each therapy discipline.
5. See Appendix for frequencies of individual diagnoses comprising these groups.
6. SLP primary and secondary diagnoses were incorporated into the SLP impairment and medical diagnosis groups.

SOURCE: RTI International Analysis of CARE-C data collected from March 2011 through June 2012.

Program: TG002

Table 3-9
Secondary diagnosis groups and frequencies, by therapy discipline: CARE-C admission assessments

PT (23 groups)	N	OT (11 groups)	N
Pain	2,210	Osteoarthritis and Other Major Musculoskeletal	243
Osteoarthritis	1,613	Unspecified and Miscellaneous Diagnoses	224
Generalized weakness	1,457	Generalized weakness	168
Hypertension	1,411	Hypertension	162
Gait or Balance Disorder	1,075	Pain	156
Spinal Stenosis, Herniated Disc, and Other Major Musculoskeletal	871	Circ. (including Lymphatic) and Pulmonary/Respiratory	142
Circ. (including Lymphatic System)	807	Cognitive, Communication, and Mental Health Disorders	115
Osteoporosis, Sprain/Strain, and Other Minor Musculoskeletal	786	Osteoporosis, Unspecified, and Miscellaneous Musculoskeletal	108
Unspecified and Miscellaneous Diagnoses	700	Peripheral Nervous System and Other Neuro. Disorders	104
Diabetes Mellitus	592	Diabetes Mellitus	85
Pulmonary/Respiratory System	477	No Secondary Diagnosis	65
No Secondary Diagnosis	461	—	—
Mental Health	410	—	—
Cancer and Other Neoplasms	372	—	—
Unspecified Musculoskeletal	340	—	—
Joint Replacement	231	—	—
Communication and Cognition Disorders	215	—	—
Unspecified and Miscellaneous Neuro.	183	—	—
Peripheral Nervous System and Other Major Neuro. Disorders	173	—	—
Vision Impairment	170	—	—
Obesity	156	—	—

(continued)

Table 3-9 (continued)
Secondary diagnosis groups and frequencies, by therapy discipline: CARE-C admission assessments

PT (23 groups)	N	OT (11 groups)	N
Stroke	117	—	—
Vertigo	85	—	—

NOTES:

1. PT = Physical Therapy, OT = Occupational Therapy, SLP = Speech-Language Pathology, Neuro. = Neurological, Circ. = Circulatory
2. N = Count of CARE-C admission assessments classified in each secondary diagnosis group.
3. Secondary diagnosis groups are sorted in descending order of count within each therapy discipline.
4. Secondary diagnosis groups are not mutually-exclusive.
5. See Appendix for frequencies of individual diagnoses comprising these groups.
6. SLP primary and secondary diagnoses were incorporated into the SLP impairment and medical diagnosis groups.

SOURCE: RTI International Analysis of CARE-C data collected from March 2011 through June 2012.

Program: TG002

Table 3-10
CARE-F primary diagnosis groups and frequencies

Primary diagnosis groups	Overall (N)	Nursing facility (N)	Day rehabilitation facility (N)
Musculoskeletal	156	99	57
Stroke	147	71	76
Dementia/Alzheimer's Disease	134	134	—
Unspecified and Miscellaneous Diagnoses	117	††	†
Parkinson's, Other Neurological, and Swallowing Disorders	116	85	31
Circulatory (including Lymphatic) and Pulmonary/Respiratory	95	††	†
Multiple Etiologies	50	††	†
No Primary Diagnosis	25	††	†

NOTES:

† = Fewer than 11 cases. †† = Count suppressed to maintain confidentiality of cells with fewer than 11 cases.

1. N = Count of CARE-F admission assessments classified in each primary diagnosis group.
2. Primary diagnosis groups are not discipline-specific.
3. Primary diagnosis groups are mutually exclusive.
4. The table is sorted by the sample size (N).
5. See Appendix for frequencies of individual diagnoses comprising these groups.

SOURCE: RTI International Analysis of CARE-F data collected from March 2011 through June 2012.

Program: PP006

Table 3-11
CARE-F secondary diagnosis groups and frequencies

Secondary diagnosis groups	Overall (N)	Nursing facility (N)	Day rehabilitation facility (N)
Unspecified and Miscellaneous Diagnoses	486	424	62
Hypertension	476	372	104
Circulatory (including Lymphatic)	406	314	92
Mental Health	392	362	30
Osteoporosis, Unspecified, and Miscellaneous Musculoskeletal	309	260	49
Osteoarthritis	225	190	35
Generalized Weakness	225	211	14
Pulmonary/Respiratory	214	181	33
Gait or Balance Disorder	209	178	31
Communication, Voice, or Speech Disorders	200	154	46
Diabetes Mellitus	197	166	31
Swallowing Disorders	192	173	19
Parkinson's, Peripheral Nervous System, and Other Neurological Disorders	191	152	39
Pain	135	117	18
Vision Impairment	120	100	20
Dementia/Alzheimer's and Other Cognitive Disorders	118	††	†
Stroke	62	††	†
No Secondary Diagnosis	39	26	13

NOTES:

† = Fewer than 11 cases. †† = Count suppressed to maintain confidentiality of cells with fewer than 11 cases.

1. N = Count of CARE-F admission assessments classified in each secondary diagnosis group.
2. Secondary diagnosis groups are not discipline-specific.
3. Secondary diagnosis groups are not mutually exclusive.
4. The table is sorted by the Overall sample size (N).
5. See appendix for frequencies of individual diagnoses comprising these groups.

SOURCE: RTI International Analysis of CARE-F data collected from March 2011 through June 2012.

Program: PP006

Table 3-12
Original primary reason for therapy (body function, body structure, and activities and participation), by therapy discipline: CARE-C admission assessments

	Total		Discipline					
			PT		OT		SLP	
Original primary reason for therapy	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN
Total number of CARE-C Admission Assessments	5,822	100.00	5,007	100.00	588	100.00	227	100.00
Number of CARE-C Admission Assessments where no Primary Reason for Therapy was indicated.	118	2.03	99	1.98	†	†	†	†
A. Body Function								
Muscle Functions	4,354	74.79	3,936	78.61	††	††	†	†
Functions of Joints & Bones	3,458	59.40	3,153	62.97	††	††	†	†
Pain	3,052	52.42	2,839	56.70	213	36.22	—	—
Movement Functions	2,431	41.76	2,190	43.74	††	††	†	†
Proprioceptive & Touch	383	6.58	319	6.37	64	10.88	—	—
Vestibular	297	5.10	††	††	†	†	—	—
Specific Mental Functions	238	4.09	45	0.90	66	11.22	127	55.95
Cardiovascular	149	2.56	112	2.24	37	6.29	—	—
Voice & Speech	92	1.58	†	†	†	†	88	38.77
Functions of Skin	84	1.44	42	0.84	42	7.14	—	—
Global Mental Functions	83	1.43	39	0.78	19	3.23	25	11.01
Respiratory	69	1.19	50	1.00	†	†	††	††
Seeing	59	1.01	21	0.42	††	††	†	†

(continued)

Table 3-12 (continued)
Original primary reason for therapy (body function, body structure, and activities and participation), by therapy discipline: CARE-C admission assessments

	Total		Discipline					
			PT		OT		SLP	
Original primary reason for therapy	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN
Urinary	29	0.50	††	††	†	†	—	—
Hearing	22	0.38	17	0.34	†	†	†	†
Digestive	19	0.33	†	†	—	—	††	††
Immunological & Hematological	†	†	†	†	†	†	—	—
Other Sensory Functions	†	†	†	†	†	†	†	†
Metabolism/Endocrine	†	†	†	†	†	†	—	—
Genital & Reproductive	†	†	†	†	†	†	—	—
Functions of Hair & Nails	†	†	†	†	—	—	—	—
Number of CARE-C Admission Assessments where no Primary Reason for Therapy - Body Function was indicated.	215	3.69	163	3.26	19	3.23	33	14.54
B. Body Structure								
Body Structure Movement								
Lumbar Spine	1,517	26.06	1,501	29.98	16	2.72	—	—
Cervical Spine	584	10.03	570	11.38	††	††	†	†
General/No Specific Body Location	559	9.60	446	8.91	91	15.48	22	9.69
Pelvic Girdle	405	6.96	††	††	†	†	—	—
Thoracic Spine	343	5.89	††	††	†	†	—	—
Head	118	2.03	87	1.74	†	†	††	††

(continued)

Table 3-12 (continued)
Original primary reason for therapy (body function, body structure, and activities and participation), by therapy discipline: CARE-C admission assessments

	Total		Discipline					
			PT		OT		SLP	
Original primary reason for therapy	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN
Body Structure Limb								
Knee	1,474	25.32	1,442	28.80	32	5.44	—	—
Hip	1,257	21.59	1,233	24.63	24	4.08	—	—
Shoulder	1,058	18.17	896	17.89	162	27.55	—	—
Thigh	705	12.11	685	13.68	20	3.40	—	—
Foot/Ankle	702	12.06	666	13.30	36	6.12	—	—
Calf	493	8.47	457	9.13	36	6.12	—	—
Hand	388	6.66	113	2.26	275	46.77	—	—
Wrist	328	5.63	103	2.06	225	38.27	—	—
Fingers	317	5.44	74	1.48	243	41.33	—	—
Arm	278	4.77	138	2.76	140	23.81	—	—
Elbow	225	3.86	99	1.98	126	21.43	—	—
Toes	151	2.59	127	2.54	24	4.08	—	—
Body Structure Voice, Speech, and Swallowing								
Tongue	79	1.36	—	—	—	—	79	34.80
Mouth	74	1.27	†	†	—	—	††	††
Larynx	59	1.01	—	—	—	—	59	25.99
Pharynx	49	0.84	†	†	—	—	††	††
Nose	†	†	—	—	—	—	†	†

(continued)

Table 3-12 (continued)
Original primary reason for therapy (body function, body structure, and activities and participation), by therapy discipline: CARE-C admission assessments

	Total		Discipline					
			PT		OT		SLP	
Original primary reason for therapy	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN
Body Structure Other								
Peripheral Nervous System	190	3.26	157	3.14	††	††	†	†
Central Nervous System	180	3.09	131	2.62	14	2.38	35	15.42
Ear	91	1.56	78	1.56	††	††	†	†
Cardiovascular, Immunological, & Respiratory Systems	88	1.51	74	1.48	†	†	†	†
Eye	34	0.58	15	0.30	19	3.23	—	—
Skin	32	0.55	14	0.28	18	3.06	—	—
Genitourinary & Reproductive Systems	11	0.19	†	†	†	†	—	—
Digestive, Metabolic, & Endocrine Systems	†	†	†	†	—	—	†	†
Number of CARE-C Admission Assessments where no Primary Reason for Therapy - Body Structure was indicated.	553	9.50	404	8.07	80	13.61	69	30.40
C. Activities and Participation								
Walking & moving	3,492	59.98	3,381	67.53	††	††	†	†
Handling Objects	2,631	45.19	2,265	45.24	366	62.24	—	—
Body Position	2,260	38.82	2,106	42.06	††	††	†	†
Household tasks	1,984	34.08	1,651	32.97	321	54.59	12	5.29

(continued)

Table 3-12 (continued)
Original primary reason for therapy (body function, body structure, and activities and participation), by therapy discipline: CARE-C admission assessments

			Discipline					
	Total		PT		OT		SLP	
Original primary reason for therapy	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN
Self Care	1,504	25.83	1,098	21.93	392	66.67	14	6.17
Community, Social & Civic life	970	16.66	811	16.20	115	19.56	44	19.38
Caring for Objects/Helping Others	746	12.81	606	12.10	††	††	†	†
General Tasks	490	8.42	307	6.13	115	19.56	68	29.96
Moving using Transportation	481	8.26	450	8.99	††	††	†	†
Education	429	7.37	385	7.69	29	4.93	15	6.61
Applying Knowledge	256	4.40	63	1.26	71	12.07	122	53.74
Work & Employment	187	3.21	143	2.86	††	††	†	†
Expressive Communication	180	3.09	34	0.68	12	2.04	134	59.03
Acquisition of Necessities	162	2.78	124	2.48	††	††	†	†
Receptive Communication	131	2.25	31	0.62	†	†	††	††
Basic Learning	93	1.60	37	0.74	22	3.74	34	14.98
General Interpersonal Interactions	92	1.58	47	0.94	18	3.06	27	11.89
Purposeful Sensory (watching, listening)	89	1.53	53	1.06	25	4.25	11	4.85
Specific Interpersonal Interactions	69	1.19	43	0.86	†	†	††	††
Conversation & Communication Devices	65	1.12	†	†	†	†	55	24.23
Economic Life	37	0.64	26	0.52	†	†	†	†

(continued)

Table 3-12 (continued)
Original primary reason for therapy (body function, body structure, and activities and participation), by therapy discipline: CARE-C admission assessments

	Total		Discipline					
			PT		OT		SLP	
Original primary reason for therapy	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN
Number of CARE-C Admission Assessments where no Primary Reason for Therapy - Activity and Participation was indicated.	466	8.00	390	7.79	41	6.97	35	15.42

NOTES:

† = Fewer than 11 cases. †† = Count suppressed to maintain confidentiality of cells with fewer than 11 cases.

1. N = Count of CARE-C admission assessments
2. Body Functions, Body Structures, and Activities and Participation were sorted in descending order of total frequency.
3. Subgroups do not sum up to group totals, because multiple primary reasons for therapy could be identified.
4. Body Structure - Limbs were recorded by right/left side of the body. The right/left side counts were combined in this table.
5. PT = Physical Therapy, OT = Occupational Therapy, SLP = Speech-Language Pathology

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims/CARE data.

Program: TG001

Table 3-13
Body function groups and frequencies, by therapy discipline: CARE-C admission assessments

PT (8 groups)	N	OT (7 groups)	N	SLP (4 groups)	N
Motor Functions	4,495	Motor Functions	487	Mental Functions	130
Pain	2,839	Pain	213	Voice and Speech Functions	88
Proprioceptive and Touch Functions	319	Other Body Functions	101	Other Body Functions	42
Vestibular Functions	287	Mental Functions	70	No Body Functions	33
No Body Functions	163	Proprioceptive & Touch Functions	64	—	—
Other Body Functions	152	Sensory Functions	36	—	—
Cardiovascular and Respiratory	134	No Body Functions	19	—	—
Genitourinary Functions	27	—	—	—	—

NOTES:

1. N = Count of CARE-C admission assessments classified in each body function group.
2. The table is sorted by the sample size (N).
3. See Appendix for frequencies of individual body functions comprising these groups.
4. PT = Physical Therapy, OT = Occupational Therapy, SLP = Speech-Language Pathology

SOURCE: RTI analysis of 2011–2012 Outpatient Therapy Medicare Claims/CARE data.

Programs: TG003

Table 3-14
Body function groups and frequencies: CARE-F admission assessments

Body function groups	Overall (N)	Nursing facility (N)	Day rehabilitation facility (N)
Motor Functions	688	514	174
Other Body Functions	184	130	54
Pain	137	102	35
Mental Functions	131	86	45
No Body Functions	57	††	†

NOTES:

† = Fewer than 11 cases. †† = Count suppressed to maintain confidentiality of cells with fewer than 11 cases.

1. N = Count of CARE-F admission assessments classified in each body function group.
2. The table is sorted by the sample size (N).
3. Body function groups are not discipline-specific.
4. See appendix for frequencies of individual body functions comprising these groups.

SOURCE: RTI International Analysis of CARE-F data collected from March 2011 through June 2012.

Program: PP006

Table 3-15
Body structure groups and frequencies, by therapy discipline: CARE-C admission assessments

PT (16 groups)	N	OT (7 groups)	N	SLP (4 groups)	N
Lower Spine	1,609	Unilateral Wrist/Hand/Fingers	233	Voice, Speech, and Swallowing	99
Unilateral Knee	979	Unilateral Shoulder/Arm/Elbow	155	No Body Structures	69
Unilateral Hip/Thigh	856	Bilateral Upper Extremity	106	Other Body Structures	58
Upper Spine	791	General/No Specific Body Location	91	Central Nervous System	35
Unilateral Shoulder/Arm/Elbow	777	Lower Extremity and Spine	82	—	—
Bilateral Lower Extremity	739	Other Body Structures	82	—	—
Unilateral Calf/Foot/Ankle	447	No Body Structures	80	—	—
General/No Specific Body Location	446	—	—	—	—
No Body Structure	404	—	—	—	—
Bilateral Upper Extremity	194	—	—	—	—
Peripheral Nervous System	157	—	—	—	—
Central Nervous System	131	—	—	—	—
Unilateral Wrist/Hand/Fingers	124	—	—	—	—
Other Body Structures	120	—	—	—	—
Ear	78	—	—	—	—
Unilateral Toes	55	—	—	—	—

NOTES:
1. N = Count of CARE-C admission assessments classified in each body structure group.
2. The table is sorted by the sample size (N).
3. See Appendix for individual body structures and counts which compose these groups.
4. PT = Physical Therapy, OT = Occupational Therapy, SLP = Speech-Language Pathology

SOURCE: RTI analysis of 2011–2012 Outpatient Therapy Medicare Claims/CARE data.
Programs: TG003

Table 3-16
Body structure groups and frequencies: CARE-F admission assessments

Body structure groups	Overall (N)	Nursing facility (N)	Day rehabilitation facility (N)
General/No Specific Body Location	265	228	37
Knee	237	140	97
Hip and Thigh	216	130	86
Shoulder/Arm/Elbow	208	127	81
Wrist/Hand/Fingers	193	118	75
Calf/Foot/Ankle/Toes	181	115	66
Voice, Speech, and Swallowing	168	143	25
Other Body Structures	106	65	41
Spine	81	65	16
No Body Structure	42	††	†

NOTES:

† = Fewer than 11 cases. †† = Count suppressed to maintain confidentiality of cells with fewer than 11 cases.

1. N = Count of CARE-F admission assessments classified in each body structure group.
2. The table is sorted by the sample size (N).
3. Body structure groups are not discipline-specific.
4. See Appendix for frequencies of individual body structures comprising these groups.

SOURCE: RTI International Analysis of CARE-F data collected from March 2011 through June 2012.

Program: PP006

Table 3-17
Activity groups and frequencies, by therapy discipline: CARE-C admission assessments

PT (4 groups)	N	OT (4 groups)	N	SLP (4 groups)	N
Mobility	3,799	Daily Activities	512	Communication	144
Daily Activities	3,067	Mobility	191	Cognitive	132
No Activities	463	Cognitive/Communication	94	Mobility and Daily Activities	87
Cognitive/Communication	93	No Activities	53	No Activities	39

NOTES:

1. N = Count of CARE-C admission assessments classified in each activity group.
2. The table is sorted by the sample size (N).
3. See Appendix for individual activity items and counts which compose these groups.
4. PT = Physical Therapy, OT = Occupational Therapy, SLP = Speech-Language Pathology

SOURCE: RTI analysis of 2011–2012 Outpatient Therapy Medicare Claims/CARE data.

Programs: TG003

Table 3-18
Activity groups and frequencies: CARE-F admission assessments

Activity structure groups	Overall (N)	Nursing facility (N)	Day rehabilitation facility (N)
General/No Specific Body Location	571	417	154
Knee	469	321	148
Hip and Thigh	165	114	51
Shoulder/Arm/Elbow	72	29	43
Wrist/Hand/Fingers	71	††	†

NOTES:

† = Fewer than 11 cases. †† = Count suppressed to maintain confidentiality of cells with fewer than 11 cases.

1. N = Count of CARE-F admission assessments classified in each activity group.
2. The table is sorted by the sample size (N).
3. Activity groups are not discipline-specific.
4. See appendix for frequencies of individual activities comprising these groups.

SOURCE: RTI International Analysis of CARE-F data collected from March 2011 through June 2012.

Program: PP006

Table 3-19
Percent of Rasch function estimates recoded to full ability (100), by therapy discipline: CARE-C admission assessments

Rasch Measure	PT		OT		SLP	
	N	Percent Recoded	N	Percent Recoded	N	Percent Recoded
SR Mobility	4,752	38.6	554	43.5	215	34.9
SR Wheelchair	4,598	92.9	544	79.6	209	77.0
SR Everyday Activities	4,736	40.6	552	26.3	216	36.6
SR Life Skills	4,694	76.8	549	63.4	215	22.8
CO Problem Solving	3,280	95.0	414	73.9	181	20.4
CO Memory	3,282	95.0	411	74.5	182	20.3
CO Attention	3,290	94.7	417	73.4	184	20.1
CO Language Comprehension	3,508	98.3	419	94.7	209	17.7
CO Language Expression	3,507	98.3	420	94.5	208	17.8
CO Speech	3,499	98.5	418	95.0	207	17.9
CO Functional Voice	3,490	98.8	414	95.9	195	19.0

NOTES:

1. N = The total sample that had responses to the gateway question.
2. Percent Recoded = The percent of Rasch estimates of the total sample for each discipline which were recoded to Full Ability (100) due to Negative Responses to Gateway Questions. Rasch estimate: 0 (low ability) – 100 (high ability)
3. PT = Physical Therapy, OT = Occupational Therapy, SLP = Speech-Language Pathology, SR = Self-Reported Rasch estimates; CO = Clinician Observed Rasch estimates

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims/CARE data.

Program: PP004

Table 3-20
Mean estimates of the self-reported and clinician-observed Rasch function estimates, by therapy discipline: CARE-C admission assessments

	Total N = 5,822	PT N = 5,007	OT N = 588	SLP N = 227
Self-Reported Rasch Estimates				
Self-Reported Mobility	72.39	72.57	72.34	68.51
Self-Reported Wheelchair	95.63	96.82	89.08	86.66
Self-Reported Everyday Activity	75.04	76.55	64.26	69.58
Self-Reported Life Skills	91.05	92.81	85.87	65.76
Self-Reported Participation	68.76	70.16	61.42	57.06
Clinician-Observed Rasch Estimates				
Clinician-Observed Self-Care	89.75	91.68	76.65	71.61
Clinician-Observed Mobility	80.60	81.77	69.87	67.96
Clinician-Observed IADL	89.40	92.64	70.68	55.56
Clinician-Observed Problem Solving	95.50	98.22	86.64	66.50
Clinician-Observed Memory	95.61	98.19	86.99	68.90
Clinician-Observed Attention	96.08	98.46	87.99	71.32
Clinician-Observed Language Comprehension	98.18	99.48	97.93	76.94
Clinician-Observed Language Expression	98.10	99.52	97.91	74.43
Clinician-Observed Speech	98.59	99.70	98.30	80.33
Clinician-Observed Functional Voice	98.77	99.77	98.80	80.86

NOTES:
1. PT = Physical Therapy, OT = Occupational Therapy, SLP = Speech-Language Pathology, IADL = Instrumental Activities of Daily Living
2. Rasch estimates range from 0 (low ability) to 100 (high ability).
3. Recoded estimates are included in analysis.
4. N is the count of total CARE-C assessments and the total count in each discipline.

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims/CARE data.
Program: PA_STATA_20130626

Table 3-21
Mean estimates of the self-reported and clinician-observed Rasch function estimates: CARE-F admission assessments

Rasch functional measures	Overall N	Overall Mean Rasch estimate	Nursing facility N	Nursing facility Mean Rasch estimate	Day rehabilitation N	Day rehabilitation Mean Rasch estimate
Clinician-Observed Rasch Measures						
Clinician-Observed Mobility	704	50.36	519	44.31	185	67.32
Clinician-Observed Self-Care	679	49.45	508	41.66	171	72.60
Self-Reported Rasch Measures						
Self-Reported Mobility	804	52.87	629	48.09	175	70.04
Self-Reported Wheelchair	792	60.04	617	52.64	175	86.15

NOTES:

1. Rasch estimates range from 0 (no ability) to 100 (full ability).
2. Estimates that were recoded to 100 were included in this analysis. See Section 3.3.9 regarding recoding.
3. N is the count of total CARE-F assessments.

SOURCE: RTI International Analysis of CARE-F data collected from March 2011 through June 2012.

Program: TG006-3

Table 3-22
Rasch function estimates used for CARE-C analyses, by therapy discipline

Therapy discipline	Rasch function estimates
Physical therapy	Self-Reported Mobility Self-Reported Everyday Activities Self-Reported Participation Clinician-Observed Mobility
Occupational therapy	Self-Reported Everyday Activities Self-Reported Participation Self-Reported Life Skills Clinician-Observed Self-Care
Speech-language pathology	Self-Reported Life Skills Clinician-Observed Problem Solving Clinician-Observed Memory Clinician-Observed Attention Clinician-Observed Language Comprehension Clinician-Observed Language Expression Clinician-Observed Speech Clinician-Observed Functional Voice

Table 3-23
Cumulative missing Rasch function estimates, by therapy discipline: CARE-C admission assessments

Rasch estimate		Missing (N)	Cumulative Missing	Marginal Change	Missing Rate	Cumulative Missing Rate
PT						
CO	Mobility	51	51	51	1%	1%
SR	Mobility	255	305	254	5%	6%
SR	Every Day Activities	271	352	47	5%	7%
SR	Life Skills	313	418	66	6%	8%
SR	Wheelchair	409	556	138	8%	11%
SR	Participation	480	744	188	10%	15%
CO	Self-Care	948	1,494	750	19%	30%
CO	Language Comprehension	1,499	2,268	774	30%	45%
CO	Language Expression	1,500	2,270	2	30%	45%
CO	Speech	1,508	2,275	5	30%	45%
CO	Functional Voice	1,517	2,281	6	30%	46%
CO	Combined Cognition Measure	1,704	2,498	0	34%	50%
CO	Memory	1,717	2,486	205	34%	50%
CO	Attention	1,725	2,494	8	34%	50%
CO	Problem Solving	1,727	2,498	4	34%	50%
CO	IADL	1,798	2,913	415	36%	58%
Total Number of CARE-C PT Assessments		5,007	—	—	—	—
OT						
SR	Mobility	34	34	34	6%	6%
SR	Every Day Activities	36	38	4	6%	6%
SR	Life Skills	39	42	4	7%	7%
SR	Wheelchair	44	51	9	7%	9%
CO	Self Care	50	100	49	9%	17%
SR	Participation	56	118	18	10%	20%
CO	Mobility	95	186	68	16%	32%
CO	IADL	138	252	66	23%	43%
CO	Language Expression	168	316	64	29%	54%
CO	Language Comprehension	169	316	0	29%	54%
CO	Combined Cognition Measure	169	334	17	29%	57%
CO	Speech	170	317	1	29%	54%
CO	Memory	171	336	2	29%	57%

(continued)

Table 3-23 (continued)
Cumulative missing Rasch function estimates, by therapy discipline: CARE-C admission assessments

	Rasch estimate	Missing (N)	Cumulative Missing	Marginal Change	Missing Rate	Cumulative Missing Rate
CO	Functional Voice	174	337	1	30%	57%
CO	Problem Solving	174	338	1	30%	57%
CO	Attention	177	339	1	30%	58%
Total Number of CARE-C OT Assessments		588	—	—	—	—
		SLP				
SR	Every Day Activities	11	11	11	5%	5%
SR	Life Skills	12	12	1	5%	5%
SR	Mobility	12	14	2	5%	6%
SR	Wheelchair	18	19	5	8%	8%
CO	Language Comprehension	18	35	16	8%	15%
SR	Participation	19	40	5	8%	18%
CO	Language Expression	19	40	0	8%	18%
CO	Speech	20	44	4	9%	19%
CO	Functional Voice	32	56	12	14%	25%
CO	Memory	43	80	24	19%	35%
CO	Combined Cognition Measure	43	80	0	19%	35%
CO	Attention	45	82	2	20%	36%
CO	Problem Solving	46	82	0	20%	36%
CO	IADL	169	183	101	74%	81%
CO	Self Care	186	210	27	82%	93%
CO	Mobility	187	222	12	82%	98%
Total Number of CARE-C SLP Assessments		227	—	—	—	—

NOTES:
1. PT = Physical Therapy, OT = Occupational Therapy, SLP = Speech-Language Pathology; SR = Self-Reported Rasch estimates; CO = Clinician-Observed Rasch estimates; IADL - Instrumental Activities of Daily Living
2. Each admission assessment could be missing none, one, or more than one Rasch estimate. ‘Missing (N)’ counts the total number of assessments which have no recorded information for that estimate.
3. The order of Rasch Estimates displayed within each discipline is in ascending order of the total number of ‘Missing (N)’ Estimates from all CARE-C Assessments in that discipline.
4. Cumulative Missing counts the total number of assessments that have any missing value for the included estimate and any missing values that appear in each estimate above it.

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims/CARE data.

Program: PA_STATA_20130626

Table 3-24
Percent of missing Rasch function estimates by primary diagnosis, body function, body structure, and activity groups: CARE-C physical therapy admission assessments

CARE-C PT Groups	N	*SR Partici-pation	*SR Mobility	*SR Every-day Activi-ties	*CO Mobility	SR Wheel-chair	SR Life Skills	CO Self-Care	CO IADL	CO Problem Solving	CO Memory	CO Atten-tion	CO Fxn Voice	CO Speech	CO Lan-guage Expres-sion	CO Lan-guage Compre-hension
Primary diagnosis groups																
Osteoarthritis	759	9.70	4.60	4.50	0.90	8.20	5.10	14.80	32.40	32.10	32.10	32.50	28.50	28.50	28.20	28.20
Unspecified and Miscellaneous Musculoskeletal	608	11.20	6.10	5.80	1.00	8.70	6.40	16.60	37.20	36.30	36.00	36.00	29.40	29.30	29.40	29.30
Joint Replacement	584	7.50	3.40	4.50	0.30	5.30	4.80	17.10	37.30	29.60	29.50	29.60	27.10	26.90	26.90	26.70
Herniated Disc and Other Major Musculoskeletal	492	8.10	4.90	5.30	0.40	7.30	5.50	12.00	25.40	27.40	27.00	27.20	25.20	25.00	25.00	25.20
Sprain/Strain	334	11.70	6.30	7.80	1.20	9.90	8.40	16.80	35.60	35.00	34.70	35.00	32.00	32.00	32.00	32.00
Bursitis/ Tendonitis	315	12.40	5.40	6.00	0.00	9.50	6.30	15.90	29.50	32.40	32.40	32.10	28.60	28.60	28.60	28.60
Spinal Stenosis	310	13.20	6.10	8.10	0.30	10.30	9.00	20.00	32.30	29.00	29.00	29.00	26.10	26.10	26.10	26.10
Multiple Etiologies, One Major	278	7.90	3.20	3.60	0.00	5.40	6.80	21.60	37.40	35.30	35.30	35.30	31.30	30.90	30.60	30.60
Multiple Major Etiologies	272	5.90	5.10	5.50	0.00	9.60	5.50	20.20	38.60	39.30	39.00	38.60	33.50	33.50	33.10	33.10
Fracture	234	7.70	5.60	4.70	0.00	6.40	7.30	11.50	28.20	32.50	31.60	32.50	25.20	25.20	24.80	24.80
Unspecified and Miscellaneous Diagnoses	140	7.10	3.60	3.60	0.00	10.00	5.70	31.40	47.10	42.10	41.40	41.40	35.00	34.30	33.60	33.60
Vertigo	86	16.30	9.30	9.30	0.00	12.80	10.50	37.20	48.80	34.90	33.70	34.90	30.20	30.20	30.20	30.20
Stroke	83	7.20	6.00	6.00	0.00	8.40	6.00	28.90	42.20	48.20	50.60	49.40	48.20	45.80	44.60	45.80

(continued)

Table 3-24 (continued)
Percent of missing Rasch function estimates by primary diagnosis group, body function group, body structure group, and activity group: CARE-C physical therapy admission assessments

CARE-C PT Groups	N	*SR Partici-pation	*SR Mobility	*SR Every-day Activi-ties	*CO Mobility	SR Wheel-chair	SR Life Skills	CO Self-Care	CO IADL	CO Problem Solving	CO Memory	CO Atten-tion	CO Fxn Voice	CO Speech	CO Lan-guage Expres-sion	CO Lan-guage Compre-hension
Peripheral Nervous System and Other Major Neurological Disorders	82	13.40	6.10	7.30	2.40	9.80	7.30	30.50	45.10	40.20	37.80	39.00	32.90	32.90	32.90	32.90
Parkinson's and Other Progressive Neurological	75	6.70	4.00	4.00	0.00	10.70	4.00	45.30	61.30	56.00	56.00	56.00	48.00	45.30	44.00	44.00
Circulatory (including Lymphatic) and Pulmonary/ Respiratory	70	7.10	5.70	4.30	1.40	8.60	4.30	22.90	50.00	42.90	41.40	41.40	31.40	31.40	31.40	31.40
Multiple Etiologies, No Major	69	5.80	2.90	2.90	0.00	4.30	5.80	13.00	30.40	30.40	31.90	33.30	31.90	31.90	30.40	29.00
No Primary Diagnosis	69	13.00	5.80	5.80	34.80	8.70	7.20	47.80	59.40	66.70	68.10	68.10	69.60	69.60	69.60	69.60
Pain	61	13.10	9.80	9.80	3.30	13.10	11.50	37.70	42.60	37.70	37.70	37.70	37.70	37.70	37.70	37.70
Unspecified and Miscellaneous Neurological	59	6.80	3.40	1.70	0.00	5.10	1.70	32.20	55.90	49.20	49.20	49.20	40.70	40.70	40.70	40.70
Genitourinary Disorders	27	11.10	7.40	3.70	0.00	7.40	7.40	25.90	51.90	40.70	40.70	40.70	29.60	29.60	29.60	29.60

(continued)

Table 3-24 (continued)

Percent of missing Rasch function estimates by primary diagnosis group, body function group, body structure group, and activity group: CARE-C physical therapy admission assessments

CARE-C PT Groups	N	*SR Partici-pation	*SR Mobility	*SR Every-day Activi-ties	*CO Mobility	SR Wheel-chair	SR Life Skills	CO Self-Care	CO IADL	CO Problem Solving	CO Memory	CO Atten-tion	CO Fxn Voice	CO Speech	CO Lan-guage Expres-sion	CO Lan-guage Compre-hension
Body function groups																
Motor Functions	4,495	9.20	5.00	5.20	0.40	8.10	6.10	17.90	35.20	33.30	33.10	33.30	29.10	28.90	28.70	28.70
Pain	2,839	10.30	5.00	5.50	0.60	8.00	6.30	17.00	34.60	33.70	33.40	33.60	28.60	28.50	28.50	28.50
Proprioceptive & Touch Functions	319	9.40	4.10	4.40	0.30	6.90	4.10	24.10	42.00	34.50	33.90	34.20	32.00	31.70	31.30	31.30
Vestibular Functions	287	9.80	4.50	5.20	0.00	9.10	7.70	31.00	41.10	33.40	33.10	33.80	31.40	31.00	31.00	30.70
No Body Functions	163	13.50	6.10	6.70	16.60	9.80	8.00	30.70	42.90	52.10	52.10	52.10	49.70	49.70	49.70	49.70
Other Body Functions	152	10.50	3.90	5.90	0.00	7.20	5.30	23.00	38.80	35.50	34.90	35.50	33.60	32.90	32.20	32.20
Cardiovascular & Respiratory	134	5.20	3.70	3.00	0.00	6.00	3.70	19.40	38.80	27.60	27.60	27.60	22.40	20.90	20.90	20.90
Genitourinary Functions	27	11.10	7.40	3.70	0.00	7.40	7.40	18.50	40.70	29.60	29.60	29.60	22.20	22.20	22.20	22.20
Body structure groups																
Lower Spine	1,609	10.60	5.90	6.50	0.30	8.70	7.30	17.00	34.10	32.30	32.10	32.10	27.80	27.70	27.70	27.60
Unilateral Knee	979	7.90	4.40	5.50	0.30	6.90	6.20	16.30	34.70	33.70	34.00	33.80	29.70	29.40	29.40	29.40
Unilateral Hip/Thigh	856	10.40	6.00	6.90	0.40	9.00	7.20	17.80	36.20	32.20	32.20	32.40	28.70	28.30	28.00	27.90
Upper Spine	791	10.90	6.60	6.10	0.60	8.70	6.40	18.60	35.50	31.10	30.80	31.00	25.70	25.40	25.40	25.30
Unilateral Shoulder/Arm/ Elbow	777	9.70	4.80	4.90	0.90	8.80	6.60	15.20	29.70	30.40	30.00	30.20	26.30	26.00	26.00	26.00

(continued)

Table 3-24 (continued)
Percent of missing Rasch function estimates by primary diagnosis group, body function group, body structure group, and activity group: CARE-C physical therapy admission assessments

CARE-C PT Groups	N	*SR Partici-pation	*SR Mobility	*SR Every-day Activi-ties	*CO Mobility	SR Wheel-chair	SR Life Skills	CO Self-Care	CO IADL	CO Problem Solving	CO Memory	CO Atten-tion	CO Fxn Voice	CO Speech	CO Lan-guage Expres-sion	CO Lan-guage Compre-hension
Bilateral Lower Extreme	739	8.40	4.20	3.90	0.00	7.40	5.10	20.40	42.20	35.30	34.90	35.20	31.70	31.30	31.00	31.00
Unilateral Calf/Foot/Ankle	447	8.10	4.30	4.30	0.00	7.80	5.40	17.20	34.50	34.70	34.90	34.50	32.00	31.10	31.10	31.30
General/No Specific Body Location	446	9.60	6.10	6.10	0.40	9.90	7.40	31.80	48.20	42.20	42.40	43.00	36.50	35.90	35.20	35.20
No Body Structure	404	9.40	4.70	4.70	6.90	6.20	5.70	24.80	35.40	41.30	40.80	40.60	36.10	36.10	35.60	35.60
Bilateral Upper Extreme	194	8.20	5.70	3.60	0.50	7.70	6.20	19.60	37.60	35.10	34.50	34.50	26.30	26.30	26.30	26.30
Peripheral Nervous System	157	7.00	4.50	4.50	0.60	5.70	4.50	31.80	45.90	33.80	33.80	33.80	30.60	29.90	29.90	29.90
Central Nervous System	131	9.90	5.30	5.30	0.00	7.60	6.90	41.20	57.30	36.60	35.90	35.90	31.30	30.50	30.50	30.50
Unilateral Wrist/Hand/Fingers	124	8.90	8.10	5.60	0.80	13.70	7.30	16.10	20.20	40.30	41.10	40.30	34.70	33.90	33.90	33.90
Other Body Structures	120	5.00	5.80	5.00	1.70	8.30	4.20	30.00	50.00	30.80	30.00	30.00	27.50	26.70	26.70	26.70
Ear	78	12.80	6.40	6.40	0.00	7.70	6.40	37.20	50.00	38.50	38.50	38.50	34.60	34.60	34.60	34.60
Unilateral Toes	55	7.30	3.60	5.50	0.00	12.70	5.50	18.20	43.60	30.90	30.90	30.90	34.50	34.50	34.50	34.50

(continued)

Table 3-24 (continued)
Percent of missing Rasch function estimates by primary diagnosis group, body function group, body structure group, and activity group: CARE-C physical therapy admission assessments

CARE-C PT Groups	N	*SR Partici-pation	*SR Mobility	*SR Every-day Activi-ties	*CO Mobility	SR Wheel-chair	SR Life Skills	CO Self-Care	CO IADL	CO Problem Solving	CO Memory	CO Atten-tion	CO Fxn Voice	CO Speech	CO Lan-guage Expres-sion	CO Lan-guage Compre-hension
Activity groups																
Mobility	3,799	9.20	4.60	5.10	0.40	7.60	5.90	18.30	36.60	33.00	32.80	33.00	28.80	28.60	28.40	28.30
Daily Activities	3,067	8.50	4.50	5.10	0.50	7.60	5.60	15.80	31.00	30.10	29.80	30.10	25.80	25.70	25.60	25.60
No Activities	463	11.70	7.10	6.70	6.50	9.30	8.60	30.90	46.40	51.80	52.30	51.40	48.80	48.60	48.40	48.40
Cognitive / Communication	93	16.10	10.80	9.70	0.00	15.10	9.70	19.40	34.40	30.10	30.10	30.10	21.50	21.50	21.50	21.50

NOTES:

1. N = Count of CARE-C Admission Assessments classified in the respective diagnosis\body function\body structure group.
2. Each of the groups was sorted in descending order of their count.
3. The estimates denoted with an asterisk (*) were included for the PT payment analysis.
4. Missing Rasch estimates for each Group are displayed as percentages. A Rasch estimate was computed if at least one rated item in the measure was present. If none of the measure items were rated, then the Rasch estimate for the measure was missing.
5. Missing rates for Rasch estimates on the Self-Reported estimates were computed after recoding Rasch estimates to 100 (high ability), when responses to preceding gateway questions were negative.
6. Missing rates for Rasch estimates on Clinician-Observed Cognition and Communication estimates were computed after recoding Rasch estimates to 100 (high ability), when responses to preceding gateway questions were negative.
7. Missing rates for Rasch estimates on Clinician-Observed Mobility, Self-Care, and IADL estimates included non-responses (when no item response was selected) and 'N' responses (indicating that item(s) were not assessed because (a) the item(s) were clinically irrelevant to the patient, and/or (b) the therapist did not feel the item could be coded based upon his/her skill, knowledge, or training.
8. There was a total of 5,007 CARE-C PT Admission Assessments.
9. SR - Self-Reported Rasch Estimate; CO - Clinician-Observed Rasch Estimate; Rasch Estimate: 0 (low ability) – 100 (high ability); IADL - Instrumental Activities of Daily Living; Fxn - Functional

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims/CARE data.

Program: PP004

Table 3-25
Percent of missing clinician-observed Rasch function estimates due to non-response vs. not-assessed responses by primary diagnosis, body function, body structure, and activity groups: CARE-C physical therapy admission assessments

CARE-C PT Groups	N	*CO Mobility		CO Self-Care		CO IADL	
		Non-Response (%)	'N' Response (%)	Non-Response (%)	'N' Response (%)	Non-Response (%)	'N' Response (%)
Overall PT Sample	5,007	0.8	0.3	1.1	17.9	1.5	33.9
Primary diagnosis groups							
Osteoarthritis	759	0.50	0.40	0.30	14.50	0.50	31.50
Unspecified and Miscellaneous Musculoskeletal	608	0.50	0.50	0.80	15.80	1.20	35.40
Joint Replacement	584	0.20	0.20	0.90	16.30	1.00	36.10
Herniated Disc and Other Major Musculoskeletal	492	0.40	0.00	0.80	11.20	1.20	24.20
Sprain/Strain	334	0.30	0.90	0.30	16.50	1.50	33.80
Bursitis/Tendonitis	315	0.00	0.00	1.00	14.90	1.00	28.60
Spinal Stenosis	310	0.00	0.30	0.30	19.70	0.00	31.90
Multiple Etiologies, One Major	278	0.00	0.00	0.70	20.90	3.20	33.10
Multiple Major Etiologies	272	0.00	0.00	0.00	20.20	0.70	37.10
Fracture	234	0.00	0.00	0.00	11.50	0.40	26.90
Unspecified and Miscellaneous Diagnoses	140	0.00	0.00	0.00	31.40	1.40	45.00
Vertigo	86	0.00	0.00	1.20	36.00	1.20	47.70
Stroke	83	0.00	0.00	0.00	28.90	0.00	37.30
Peripheral Nervous System and Other Major Neurological Disorders	82	1.20	1.20	1.20	29.30	1.20	41.50
Parkinson's and Other Progressive Neurological	75	0.00	0.00	0.00	45.30	2.70	58.70
Circulatory (including Lymphatic) and Pulmonary/Respiratory	70	1.40	0.00	1.40	21.40	1.40	48.60
Multiple Etiologies, No Major	69	0.00	0.00	0.00	13.00	0.00	30.40
No Primary Diagnosis	69	34.80	0.00	39.10	8.70	34.80	23.20

(continued)

Table 3-25 (continued)
Percent of missing clinician-observed Rasch function estimates due to non-response vs. not-assessed responses by primary diagnosis, body function, body structure, and activity groups: CARE-C physical therapy admission assessments

CARE-C PT Groups	N	*CO Mobility Non-Response (%)	*CO Mobility 'N' Response (%)	CO Self-Care Non-Response (%)	CO Self-Care 'N' Response (%)	CO IADL Non-Response (%)	CO IADL 'N' Response (%)
Pain	61	1.60	1.60	0.00	37.70	0.00	41.00
Unspecified and Miscellaneous Neurological	59	0.00	0.00	0.00	32.20	0.00	54.20
Genitourinary Disorders	27	0.00	0.00	0.00	25.90	0.00	51.90
Body function groups							
Motor Functions	4,495	0.30	0.20	0.60	17.30	0.90	33.70
Pain	2,839	0.20	0.30	0.70	16.30	0.80	33.40
Proprioceptive & Touch Functions	319	0.00	0.30	0.30	23.80	1.30	39.50
Vestibular Functions	287	0.00	0.00	0.30	30.70	1.70	38.70
No Body Functions	163	16.00	0.60	16.00	14.70	18.40	24.50
Other Body Functions	152	0.00	0.00	0.00	23.00	1.30	35.50
Cardiovascular & Respiratory	134	0.00	0.00	1.50	17.90	0.00	35.80
Genitourinary Functions	27	0.00	0.00	0.00	18.50	0.00	37.00
Body structure groups							
Lower Spine	1,609	0.20	0.10	0.30	16.70	0.60	33.30
Unilateral Knee	979	0.30	0.00	0.40	15.90	0.80	33.40
Unilateral Hip/Thigh	856	0.40	0.00	0.10	17.60	0.60	35.00
Upper Spine	791	0.10	0.50	0.10	18.50	1.00	34.10
Unilateral Shoulder/Arm/Elbow	777	0.40	0.50	0.90	14.30	0.80	28.30
Bilateral Lower Extreme	739	0.00	0.00	0.90	19.50	1.10	40.50
Unilateral Calf/Foot/Ankle	447	0.00	0.00	0.70	16.60	1.30	32.20
General/No Specific Body Location	446	0.00	0.40	0.40	31.40	1.60	44.60
No Body Structure	404	6.40	0.50	6.40	18.30	7.90	26.50

(continued)

Table 3-25 (continued)
Percent of missing clinician-observed Rasch function estimates due to non-response vs. not-assessed responses by primary diagnosis, body function, body structure, and activity groups: CARE-C physical therapy admission assessments

CARE-C PT Groups	N	*CO Mobility Non-Response (%)	*CO Mobility 'N' Response (%)	CO Self-Care Non-Response (%)	CO Self-Care 'N' Response (%)	CO IADL Non-Response (%)	CO IADL 'N' Response (%)
Bilateral Upper Extreme	194	0.50	0.00	0.50	19.10	0.50	36.60
Peripheral Nervous System	157	0.00	0.60	1.30	30.60	0.00	45.20
Central Nervous System	131	0.00	0.00	0.80	40.50	0.80	53.40
Unilateral Wrist/Hand/Fingers	124	0.00	0.80	1.60	14.50	0.80	19.40
Other Body Structures	120	0.80	0.80	1.70	28.30	1.70	47.50
Ear	78	0.00	0.00	1.30	35.90	1.30	48.70
Unilateral Toes	55	0.00	0.00	0.00	18.20	1.80	41.80
Activity groups							
Mobility	3,799	0.30	0.10	0.50	17.80	0.90	35.00
Daily Activities	3,067	0.10	0.30	0.50	15.40	0.50	29.90
No Activities	463	5.80	0.60	6.30	24.60	8.00	38.20
Cognitive / Communication	93	0.00	0.00	2.20	17.20	1.10	31.20

NOTES:

1. N = Count of CARE-C admission assessments classified in each diagnosis\body function\body structure groups.
2. Each group was sorted in descending order of count.
3. The scale denoted with an asterisk (*) was included for the PT payment analysis.
4. Missing Rasch estimates for each group are displayed as percentages. A Rasch estimate was computed if at least one rated item in the measure was present. If none of the measure items were rated, then the Rasch estimate for the measure was missing.
5. Non-response indicates no response was checked for the items in the measure resulting in a missing Rasch estimate.
6. 'N' responses indicate that item(s) were not assessed because (a) the item(s) were clinically irrelevant to the patient, and/or (b) the therapist did not feel the item could be coded based upon his/her skill, knowledge, or training.
7. PT - Physical Therapy; SR - Self-Reported Rasch Measure; CO - Clinician-Observed Rasch Measure; IADL - Instrumental Activities of Daily Living

SOURCE: RTI International Analysis of CARE-C data collected from March 2011 through June 2012.

Program: PP004

Table 3-26
Cumulative missing Rasch function estimates: CARE-F nursing facility admission assessments

	Rasch measure	Missing (N)	Cumulative total	Marginal change	Missing rate	Cumulative missing rate
SR	Mobility	26	26	26	4%	4%
SR	Wheelchair	38	42	16	6%	6%
CO	Mobility	136	164	122	21%	25%
CO	Self Care	147	233	69	22%	36%
CO	IADL	397	420	187	61%	64%
CO	Language Comprehension	410	546	126	63%	83%
CO	Language Expression	411	546	0	63%	83%
CO	Speech	413	546	0	63%	83%
CO	Functional Voice	418	547	1	64%	84%
CO	Problem Solving	446	589	42	68%	90%
CO	Memory	446	589	0	68%	90%
CO	Attention	446	589	0	68%	90%
CO	Combined Cognition	446	589	0	68%	90%
SR	Everyday Activities	655	655	66	100%	100%
SR	Participation	655	655	0	100%	100%
SR	Life Skills	655	655	0	100%	100%
Total Number of CARE-C PT Assessments		655	—	—	—	—

NOTES:

1. SR - Rasch Self-Reported Measure; CO - Rasch Clinician-Observed Measure; IADL - Instrumental Activities of Daily Living
2. Each admission assessment could be missing none, one, or more than one Rasch Measure. 'Missing' counts the total number of assessments which have no recorded information for that scale.
3. The order of Rasch Scales displayed within each discipline is in ascending order of the total number of 'Missing' Scales from all CARE C Assessments in that discipline.
4. Cumulative Missing counts the total number of assessments that have any missing value for the included measure and any missing values that appear in each measure above it.

SOURCE: RTI International Analysis of CARE-F data collected from March 2011 through June 2012.

Program: PA_STATA_20130926

Table 3-27
Percent of missing Rasch function estimates by primary diagnosis group, body function group, body structure group, and activity group: CARE-F Nursing Facility admission assessments

CARE-F groups	N	SR Mobility	SR Wheelchair	CO Mobility	CO Self-care
Primary diagnosis groups					
Dementia/Alzheimer's disease	134	3.73	6.72	22.39	25.37
Unspecified and miscellaneous diagnoses	108	2.78	4.63	19.44	22.22
Musculoskeletal	99	2.02	1.01	6.06	17.17
Circulatory (including lymphatic) and pulmonary/respiratory	87	2.3	3.45	18.39	14.94
Parkinson's, other neurological, and swallowing disorders	85	4.71	5.88	25.88	20
Stroke	71	2.82	9.86	30.99	30.99
Multiple etiologies	48	10.42	10.42	27.08	31.25
No primary diagnosis	23	13.04	13.04	26.09	21.74
Body function groups					
Motor functions	514	2.72	4.28	14.98	19.26
Other body functions	130	3.85	5.38	20.77	13.08
Pain	102	1.96	5.88	7.84	11.76
Mental functions	86	4.65	8.14	22.09	22.09
No body functions	52	13.46	19.23	53.85	53.85
Body structure groups					
General/no specific body location	228	3.95	5.7	8.33	21.93
Voice, speech, and swallowing	143	3.5	6.29	45.45	18.88
Knee	140	2.14	3.57	4.29	22.14
Hip and thigh	130	2.31	3.08	2.31	18.46
Shoulder/arm/elbow	127	2.36	2.36	13.39	11.81
Wrist/hand/fingers	118	1.69	3.39	22.88	14.41
Calf/foot/ankle/toes	115	2.61	2.61	3.48	20
Spine	65	4.62	6.15	23.08	18.46
Other body structures	65	4.62	6.15	10.77	10.77
No body structure	37	16.22	24.32	40.54	35.14

(continued)

Table 3-27 (continued)
Percent of missing Rasch function estimates by primary diagnosis group, body function group, body structure group, and activity group: CARE-F Nursing Facility admission assessments

CARE-F groups	N	SR Mobility	SR Wheelchair	CO Mobility	CO Self-care
Activity groups					
Mobility	417	2.88	4.32	10.07	23.5
Daily activities	321	4.36	6.23	12.46	7.79
Cognitive	114	6.14	7.02	34.21	16.67
No activity	63	7.94	12.7	50.79	46.03
Communication	29	13.79	13.79	24.14	31.03

NOTES:

1. SR - Self-Reported Rasch Estimate; CO - Clinician-Observed Rasch Estimate; Rasch Estimate: 0 (low ability) – 100 (high ability)
2. There were a total of 655 CARE-F nursing facility admission assessments.
3. N = Count of CARE-F admission assessments classified in each of the diagnosis\body function\body structure\activity group.
4. The table is sorted by the sample size (N).
5. Missing Rasch estimates for each Group were displayed as percentages. A Rasch estimate was computed if at least one rated item in the measure was present. If none of the measure items were rated, then the Rasch estimate for the measure was missing.
6. Missing rates for Rasch estimates on the Self-Reported estimates were computed after recoding Rasch estimates to 100 (high ability), when responses to preceding gateway questions were negative.
7. Missing rates for Rasch estimates on Clinician-Observed Mobility and Self-Care estimates included non-responses (when no item response was selected) and 'N' responses (indicating that item(s) were not assessed because the item(s) were clinically irrelevant to the patient, and/or due to medical conditions, safety concerns, or environmental constraints).

SOURCE: RTI International Analysis of CARE-F data collected from March 2011 through June 2012.

Program: TG006-4

Table 3-28
Percent of non-response and not-assessed responses for missing clinician-observed Rasch function estimates by primary diagnosis group, body function groups, body structure group, and activity group: CARE-F nursing facility admission assessments

CARE-F groups	N	CO Mobility Non-response (%)	CO Mobility 'N' response (%)	CO Self-care Non-response (%)	CO Self-care 'N' response (%)
Overall Nursing Facility sample	5,007	0.8	0.3	1.1	17.9
Primary diagnosis groups					
Dementia/Alzheimer's disease	134	11.9	10.4	11.9	13.4
Unspecified and miscellaneous diagnoses	108	0.0	19.4	1.9	20.4
Musculoskeletal	99	1.0	5.1	3.0	14.1
Circulatory (including lymphatic) and pulmonary/respiratory	87	5.7	12.6	5.7	9.2
Parkinson's, other neurological, and swallowing disorders	85	9.4	16.5	5.9	14.1
Stroke	71	14.1	16.9	15.5	15.5
Multiple etiologies	48	10.4	16.7	16.7	14.6
No primary diagnosis	23	17.4	8.7	17.4	4.3
Body function groups					
Motor functions	514	1.6	13.4	3.5	15.8
Other body functions	130	4.6	16.2	3.1	10.0
Pain	102	1.0	6.9	2.0	9.8
Mental functions	86	14.0	8.1	9.3	12.8
No body functions	52	48.1	5.8	50.0	3.8
Body structure groups					
General/no specific body location	228	1.3	7.0	5.3	16.7
Voice, speech, and swallowing	143	16.8	28.7	13.3	5.6
Knee	140	1.4	2.9	6.4	15.7
Hip and thigh	130	0.8	1.5	6.2	12.3
Shoulder/arm/elbow	127	3.1	10.2	3.1	8.7
Wrist/hand/fingers	118	4.2	18.6	2.5	11.9
Calf/foot/ankle/toes	115	0.9	2.6	5.2	14.8
Spine	65	10.8	12.3	4.6	13.8
Other body structures	65	4.6	6.2	1.5	9.2
No body structure	37	35.1	5.4	32.4	2.7

(continued)

Table 3-28 (continued)
Percent of non-response and not-assessed responses for missing clinician-observed Rasch function estimates by primary diagnosis group, body function groups, body structure group, and activity group: CARE-F nursing facility admission assessments

CARE-F groups	N	CO Mobility Non-response (%)	CO Mobility 'N' response (%)	CO Self-care Non-response (%)	CO Self-care 'N' response (%)
Activity groups					
Mobility	417	1.7	8.4	4.8	18.7
Daily activities	321	5.6	6.9	4.0	3.7
Cognitive	114	7.0	27.2	7.0	9.6
No activity	63	38.1	12.7	36.5	9.5
Communication	29	13.8	10.3	17.2	13.8

NOTES:

1. CO - Clinician-Observed Rasch Measure
2. N = Count of CARE-F admission assessments classified in each of the diagnosis\body function\body structure\activity groups.
3. The table is sorted by the sample size (N).
4. Missing Rasch measure estimates for each group were displayed as percentages. A Rasch measure estimate was computed if at least one rated item in the measure was present. If none of the measure items were rated, then the Rasch estimate for the measure was missing.
5. Non-response indicates no response was checked for the items in the measure resulting in a missing Rasch estimate.
6. 'N' responses (indicating that item(s) were not assessed because the item(s) were clinically irrelevant to the patient, and/or due to medical conditions, safety concerns, or environmental constraints).

SOURCE: RTI International Analysis of CARE-F data collected from March 2011 through June 2012.

Program: PP004

Table 3-29
Percent of swallowing function items recoded to 'none', by therapy discipline: CARE-C admission assessments

	PT		OT		SLP	
Swallowing function items	N	Percent recoded	N	Percent recoded	N	Percent recoded
Diet Modification	4,490	67.3	561	67.6	218.0	55.5
Level of Cueing or Assistance	4,488	67.4	561	67.6	216.0	56.0

NOTES:

1. PT = Physical Therapy, OT = Occupational Therapy, SLP = Speech-Language Pathology
2. N = The total sample that had responses to the gateway question.
3. % Recoded = The percent of Rasch estimates of the total sample for each discipline which were recoded to 'None' due to Negative Responses to Gateway Questions.

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims/CARE data.

Program: PP004

Table 3-30
Episode definitions, data sources, and date ranges

Episode definition	Data source	Index event	Date range for index	Run-out time period	End date for run-out
Variable Length with 60-day clean periods	Claims only	60-day clean period and claim	January 1, 2010–December 31, 2010	60-day clean period	December 31, 2011
Calendar Year 2011	Claims only	First claim in Calendar Year 2011	January 1, 2011–December 31, 2011	Last claim in Calendar Year 2011	December 31, 2011
Variable Length with a 60-day terminating clean period	CARE/Claims	CARE admission assessment	March 1, 2011–June 30, 2012	60-day clean period	December 31, 2012
12-month period	CARE/Claims	First claim in time period	March 1, 2011–February 29, 2012	Last claim in time period	February 29, 2012

4. THERAPY ANNUAL EXPENDITURES CAP: ALTERNATIVE POLICIES AND RISK ADJUSTMENT USING ADMINISTRATIVE DATA

Currently, Medicare expenditures on outpatient services are subject to an annual cap (allowed charges) for physical therapy (PT) and speech-language pathology (SLP) combined, and a separate cap for occupational therapy (OT). An exceptions process allows for Medicare coverage of expenditures above the caps (see Section 2). The caps are the same for all beneficiaries. In this section, we first simulate alternative policies for annual expenditure caps by individual or combined therapy disciplines. Then we analyze how the caps might be adjusted for beneficiary need for outpatient therapy services using only available Medicare administrative data. This process is referred to as “risk adjustment of the caps.” We discuss multivariate regression models that predict annual therapy expenditures for both community and institutional residents using patient characteristics. Separate models are evaluated for physical therapy, occupational therapy and speech-language pathology.

4.1 Overview of the Analysis

We analyze the universe of therapy claims, 100 percent of all Medicare outpatient therapy claims from calendar year (CY) 2011. The alternative therapy annual expenditures cap policies simulated are:

- current policy (equal caps for PT/SLP combined and for OT);
- equal discipline-specific caps; and
- a single combined cap for all three disciplines.

To make the three cap policies comparable, we require that they be budget neutral with respect to current policy. By "budget neutral" we mean equal aggregate Medicare allowed charges above and below the caps, assuming no behavioral response to changes in the caps by therapists or beneficiaries. We compare the cap policies on simulated 2011 dollar level of caps, number of Medicare therapy users above and below the cap, and average amount by which those beneficiaries above the cap exceed it.

The risk adjustment analyses predict annual expenditures for each therapy discipline separately. They include a *demographic-only model* that predicts annual therapy expenditures using demographic factors only. In addition to the demographic model, we explore a prospective Hierarchical Condition Categories (HCC) model, a concurrent Diagnosis-Related Groups (DRG) model, and a prior utilization model.

The *prospective HCC model* uses demographics and diagnoses from the prior year (HCCs) to predict current-year therapy expenditures. The focus of the HCC model is on explaining therapy expenditures by the presence of chronic medical conditions that persist from the prior year into the current year, or prior year acute conditions that have sequelae reaching into the current year. The HCC diagnoses are established from physician and hospital diagnoses recorded on Medicare claims over a one-year period, and are more likely to capture serious underlying chronic conditions than therapy claims, on which reporting of co-existing conditions is not required (see Section 2).

The HCC model captures patient functional status only insofar as functional status is related to diagnosis—the HCC model does not directly measure functional status.

The *concurrent DRG model* includes demographics as well as 48 clusters (groupings) of related DRGs that account for the majority of Medicare inpatient spending each year. The DRGs are measured in the same year as therapy expenditures, so the DRG model is a "concurrent" model, as opposed to the HCC model which is "prospective" because it uses prior year diagnoses. DRGs measure diagnoses and procedures that result in hospitalizations in the current year. The focus of the DRG model is using current-year acute conditions and utilization to explain therapy expenditures.

The *concurrent inpatient utilization and prospective risk score model* includes demographics and variables measuring inpatient therapy utilization, type of inpatient facility in which hospitalizations occurred (including skilled nursing facilities, inpatient rehabilitation facilities/units, and other non-acute-short-term hospital stays), outlier expenditure status of hospitalizations, and the HCC prospective risk score measuring prior year diagnostic burden. The focus of the prior utilization model is on whether characteristics of hospital utilization—in particular, inpatient therapy charges—predict outpatient therapy expenditures. This model also examines the relationship of patients' overall disease burden as measured by the prospective HCC risk score to their therapy utilization.

Because hospitalizations occur throughout the year, hospital utilization (DRGs, inpatient therapy charges, etc.) may occur before or after therapy expenditures, which also occur throughout the year. The analysis makes no attempt to sequence the timing of hospitalizations versus therapy expenditures. For example, joint replacement surgery may occur after a course of therapy failed to resolve joint pain; in this case, the hospitalization for joint replacement may postdict the pre-hospital therapy. We do not sequence hospital predictive information and therapy expenditures because this section contains analyses related to risk adjustment of the annual therapy expenditures caps. Annual expenditures are not organized on an episode or other time-sequenced basis. Annual periods may contain entire single episodes of therapy treatment, entire multiple episodes of therapy care, beginnings of episodes that are right-censored by the end of the calendar year, endings of episodes that are left-censored by the beginning of the calendar year, and combinations of the preceding. Complex patterns of multiple hospitalizations and episodes of therapy utilization could occur. Other sections in this report include analyses of therapy expenditures and predictors organized on an episode basis.

We present separate multivariate regression models for each of the HCC model, the DRG model, and the concurrent inpatient utilization model (all models contain the demographic factors). These factors could be combined in a single model. But in this exploratory analysis, separate models facilitate interpretation and exposition. For example, in a model that included both HCCs and DRGs, their intercorrelations would affect their coefficients, and it would be difficult to distinguish the separate effects of the HCCs and the DRGs. Future work could explore a combined model, if that seems indicated.

4.2 Analytic Methods

This section uses claims data from a calendar year because the current Medicare therapy cap is based on a calendar year. Therefore, results from the analyses are comparable to the current payment system with the exception that the results discussed here comprise analyses on each discipline cap separately and the current system bundles PT and SLP cap together.

4.2.1 Sample and Data

Annual expenditure data were collected for any beneficiary who had outpatient therapy claims between January 1, 2011 and December 31, 2011, i.e., CY 2011. The claims from each discipline were analyzed separately. This means that a beneficiary with a PT claim would have a record that includes all PT claims that occurred during CY 2011. Enrollment, outpatient, and carrier-claims data were used to construct annual expenditures, the basis for the final analytic data set used in this section. Records were included in the analytic data file if a beneficiary was:

- Continually enrolled in Parts A and B in CYs 2011 and 2010; and
- Medicare was the primary payer and continually enrolled in fee-for-service (FFS) in CY 2011.

Although they are eligible to receive outpatient (Part B) therapy services, we excluded beneficiaries only enrolled in Part B of Medicare from the analyses of this section because HCCs, DRGs, and our other hospitalization-related variables are not available for Part B-only beneficiaries. In 2012, only 0.65 percent of Medicare beneficiaries (persons with either Medicare Part A or Part B coverage) had only Part B coverage[24]; therefore, excluding Part B-only beneficiaries should have a negligible impact on our findings. We required continuous Parts A/B enrollment in 2010 as well as 2011 so that prospective HCCs using 2010 diagnoses could be constructed for all sample beneficiaries. HCCs require a 12-month base year to build a diagnostic profile. This sample restriction eliminates new Medicare enrollees (beneficiaries newly enrolling in Medicare after January 2010) from our sample. Approximately 5 percent of Medicare beneficiaries are new enrollees in a given year; most of them are 65 years old.

4.2.2 Statistical Estimation Techniques

All of the following models are specified as ordinary least squares (OLS) multiple regression or quantile regression where SAS PROC REG and PROC QUANTREG were used, respectively, to produce the results. Annual expenditures are predicted by demographics, prior hospitalizations, and beneficiary diagnoses. The dependent variables are the untransformed 12-month discipline-specific therapy expenditures. The coefficients represent the incremental change in annual therapy expenditures controlling for the other variables in the model.

[24] Centers for Medicare & Medicaid Services, Medicare & Medicaid Statistical Supplement, 2013 Edition, Table 2.1. Available at http://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/MedicareMedicaidStatSupp/2013.html, accessed September 2013.

By predicting actual expenditures, we avoid the need for “retransformation” of the dependent variable that would be necessary with another standard approach, predicting the natural log of expenditures. Predicting actual expenditures is more sensitive to expenditure outliers in small samples. In this section, the sample sizes are quite large and the results should not be sensitive to expenditure outliers. OLS predicts the conditional mean of a response variable *y* as a linear function of *k* independent variables. We implicitly assume that the estimated relationship between the risk markers and mean expenditures is the same as the relationship between the risk markers and the expenditure cap.

We also use quantile regression (Koenker and Hallock, 2001) to examine the sensitivity of the parameter estimates to predicting mean expenditures versus the expenditure cap. While OLS estimates the conditional mean of the response variable, quantile regression predicts a specified quantile of therapy expenditures, such as the quantile of expenditures corresponding to the therapy cap. The quantile (percentile) of 2011 annual expenditures corresponding to (closest in dollar value to) the CY 2011 cap of $1,870 was determined for each therapy discipline. This was the 81st, 77th and 79th percentile for PT, OT, and SLP, respectively.[25] The quantile regression coefficient estimates represent the incremental change in the therapy cap (i.e., in the specified percentile of expenditures) due to a one-unit change in the explanatory variables. For example, hypothetically, if a binary indicator variable for Medicaid had a coefficient of $500 in a quantile regression for the 80th percentile of therapy expenditures, this would mean that beneficiaries dually enrolled in Medicare and Medicaid are predicted to have $500 higher 80th percentile therapy expenditures than Medicare beneficiaries not also enrolled in Medicaid, other model covariates being equal. Factors explaining therapy expenditures may have a different incremental impact on the therapy cap than they do on mean expenditures.

4.2.3 Model Specifications

Three expenditure models were estimated in the analyses: physical therapy, occupational therapy, and speech-language pathology. The models were analyzed separately because of the difference in patient needs and reasons for therapy between the different disciplines. Within each of the disciplines, four different models are analyzed: 1) Demographic Model; 2) Prospective HCC Model; 3) Concurrent DRG Model; and 4) Concurrent Inpatient Utilization and Prospective Risk Score Model. Each of these models includes a different set of covariates, other than the demographic covariates, which are included in all models.

Demographic Model

The demographic model includes the following characteristics: age, sex, age originally entitled by disability status (defined in the next paragraph), dually-eligible (Medicaid) status, end-stage renal disease (ESRD) status, and long-term institutionalized (LTI) status. Beneficiaries who are currently disabled (e.g., under 65 years old) are captured in the age groups under age 65.The demographic model provides estimates of what can be predicted without information from a patient’s service utilization, using Medicare enrollment data only. The HCC, DRG, and

---

[25] We estimated a cap applied separately to each of the three therapy disciplines, although the actual therapy cap applies to PT and SLP combined and to OT separately.

prior utilization models can be compared against the demographic model to understand the added predictive value of information from service utilization.

Age and sex groups were defined using a 0-34 age band followed by 10-year intervals until the age of 54 and then five-year age bands until the age of 95 or older. These are the age/sex cells used in the Medicare Advantage risk-adjustment model. Age is assigned based on the age of the beneficiary on February 1, 2011. Medicaid status is determined if the beneficiary was ever enrolled in Medicaid during the 12-month analysis period. ESRD indicates that the beneficiary had end-stage renal disease at any time in 2011. Age originally entitled by disability ("originally disabled") indicates that, among beneficiaries currently entitled to Medicare by age (i.e., currently 65 years of age or older), their original (i.e., first) reason for Medicare entitlement was disability (in the past, when they were less than 65 years old). “Disabled” and “aged” indicate that the current reason for Medicare entitlement is disability or age. LTI indicates if the patient was long-term institutionalized at any point during 2011.

The demographic model is defined as

$$\begin{aligned} C_{AD} = {} & a_0 + a_1 AgeSex + a_2 ESRD + a_3 DisabledFemale + a_4 DisabledMale \\ & + a_5 MedicaidFemaleAge + a_6 MedicaidMaleAge \\ & + a_7 MedicaidDisabledFemale + a_8 MedicaidDisabledMale \\ & + a_9 LTI \end{aligned} \tag{4.1}$$

where a_0 is the intercept and the remaining *a*-terms are the estimated model coefficients; *AgeSex* is categorized age of the beneficiary in 10-year intervals within sex of the beneficiary; *DisabledFemale* and *DisabledMale* indicates that the original reason for entitlement was disability interacted with the beneficiary’s sex; *MedicaidFemaleAge* and *MedicaidMaleAge* indicates if the beneficiary was ever enrolled in Medicaid during the 12 month period between March 1, 2011 and February 29, 2012 (i.e., dual-eligibility) interacted with the beneficiary’s sex and age group; and *MedicaidDisabledFemale* and *MedicaidDisabledMale* is the interaction of the indicators for Medicaid enrollment, Medicare entitlement due to disability, and the beneficiary’s sex.

Prospective HCC Model

HCCs are used to risk-adjust “per member per month” Medicare Advantage capitation payments. HCCs are diagnostic categories created from the International Classification of Diseases-9 (ICD-9) diagnosis codes on claims. (See Pope et al., [2004] for a full description of HCCs.) HCCs are defined for non-hospitalized beneficiaries, as well as hospitalized beneficiaries. The HCC model is prospective, meaning HCCs are created with prior year diagnoses. HCCs based on 2010 diagnoses were used to predict 2011 expenditures in the following analyses. Hospital, physician, and other clinically trained professional diagnoses (including from physical and occupational therapists, speech-language pathologists, physical medicine and rehabilitation physicians, and pain management specialists) are used to populate HCCs. Seventy payment-HCCs are used for Medicare Advantage, which reflect clinically significant, high-cost conditions. Many of the 70 payment-HCCs are chronic conditions such as diabetes, congestive heart failure, and chronic obstructive pulmonary disease. Also, acute conditions that require follow-up therapy, such as hip fracture and traumatic amputation, are included among the HCCs. Most therapy or rehabilitation diagnoses are not included among the HCCs, but some of the more serious conditions that can require therapy are included. These include stroke, rheumatoid arthritis, multiple sclerosis, paralysis, hip fracture, and others. These diagnoses are from the prior year and do not measure current-year acute conditions. Diagnoses such as osteoarthritis, spinal stenosis, low back pain, tendonitis, and shoulder pain are not included in the 70 payment-HCCs.

CMS creates prospective HCCs for Medicare beneficiaries enrolled in both Medicare Advantage and in FFS. We use these CMS-created HCCs in our analysis. New Medicare enrollees (those enrolled in Medicare for less than 12 months, who have not yet accumulated a 12-month base year diagnostic profile) and beneficiaries enrolled in Medicare Part B only do not have HCCs because they lack the appropriate data for CMS to create them. They were excluded from the analysis as described in Section 4.2.1.

The prospective HCC model is defined as

$$\begin{aligned} C_{AH} = {} & a_0 + a_1 AgeSex + a_2 ESRD + a_3 DisabledFemale + a_4 DisabledMale \\ & + a_5 MedicaidFemaleAge + a_6 MedicaidMaleAge \\ & + a_7 MedicaidDisabledFemale + a_8 MedicaidDisabledMale \\ & + a_9 LTI + a10 HCC \end{aligned} \tag{4.2}$$

where *HCC* is a variable representing the 70 payment HCCs discussed above. The remaining terms are defined for expression (4.1).

Concurrent DRG Model

DRGs were used both as indicators of a hospitalization and the reason for the hospitalization. DRGs are Medicare's basis of payment for stays in short-term acute-care hospitals. They classify all hospitalizations into one and only one of approximately 750 groups based on the patient's principal diagnosis (the reason for the hospitalization), complicating conditions, and procedures performed. In general, DRGs are intended to predict annual therapy utilization associated with serious acute events that occur during the year and result in hospitalization. Variations in therapy expenditures among non-hospitalized beneficiaries cannot be predicted with DRGs. If a patient was hospitalized multiple times for the same DRG, he or she is coded with the same indicator variable as for one hospitalization. That is, multiple versus single hospitalizations in the same DRG are not distinguished in our DRG variables; they indicate “hospitalized at least once in this DRG in 2011.”

We condensed the approximately 750 DRGs into 48 bundles that CMS defined for its Bundled Payment for Care Improvement initiative.[26] The 48 bundles cover more than 200 DRGs that account for 70 percent of Medicare hospital spending. Heart attack, hip and knee surgery,

[26] http://innovation.cms.gov/initiatives/Bundled-Payments/.

hip/pelvic fracture, chronic obstructive pulmonary disease and renal failure are among the list of 48 bundles. The 48 groups generally bundle related DRGs distinguished by the presence of a complication or comorbidity or major complication or comorbidity. That is, DRG triplets of "DRG X," "DRG X with complication," and "DRG X with major complication" are bundled. Preliminary analysis indicated that the presence of a complication or major complication was generally not important in explaining outpatient therapy expenditures. The 48 DRG clusters also bundle related DRGs not differentiated by complication or major complication; for example, various DRGs involving amputation comprise one of the 48 clusters. We added a 49th residual bundle that includes any of the remaining DRGs.

The concurrent DRG model is defined as

$$\begin{aligned} C_{AC} = a_0 &+ a_1 AgeSex + a_2 ESRD + a_3 DisabledFemale + a_4 DisabledMale \\ &+ a_5 MedicaidFemaleAge + a_6 MedicaidMaleAge \\ &+ a_7 MedicaidDisabledFemale + a_8 MedicaidDisabledMale \\ &+ a_9 LTI + a10 DRG \end{aligned} \tag{4.3}$$

where *DRG* is a variable representing the 48 DRG clusters discussed above. The remaining terms are defined for expression (4.1).

Concurrent Inpatient Utilization and Prospective Risk Score Model

The final model is comprised of variables (in addition to demographics) from concurrent inpatient utilization that may be predictive of therapy expenditures. These variables are mostly drawn from the MedPAR inpatient hospitalization data file. The inpatient utilization model includes the following variables: facility type, stay type, outlier payment, therapy payment, and the prospective HCC risk score. All of these variables besides the risk score are binary variables that indicate if the patient was ever in one of these categories during the year. These variables do not reflect multiple hospitalizations unless they had different characteristics that would not be captured in the initial hospitalization.

Facility type is classified into 16 categories, which include cancer hospital, acute hospital, critical access hospital (CAH), long-term care hospital, inpatient rehabilitation facility, children's hospital, psychiatric hospital, skilled nursing facility, inpatient rehabilitation facility unit (Prospective Payment System [PPS exempt]), psychiatric unit (PPS exempt), swing bed in a short-term acute care hospital, swing bed in a long-term care hospital, swing bed in a rehabilitation hospital, rehabilitation unit in a CAH (PPS exempt), swing bed in a CAH, or a psychiatric unit in CAH (PPS exempt). Stay type indicates long-stay, short-stay, or SNF stay; these are defined from the third position of the provider number.[27]The outlier payment indicator is a binary variable that indicates any outlier payment for a hospitalization.

For PT, OT, and SLP, multiple binary variables were created that capture the amount of discipline-specific total charges that the patient had during their inpatient stay. These variables

[27] SNF Stay (Prvdr3 = 5, 6, U, W, Y, or Z), Short-Stay (Prvdr3 = 0, M, R, S, T), Long-Stay (All Others)

are subdivided into 4 different categories based on the hospital charge amount for inpatient therapy services. The categories are as follows: $.01-$1,000, $1,000.01-$5,000, $5,000.01-$10,000, $10,000.01+. Hospital charges reflect both the price the hospital sets per unit of service, as well as the units of service provided. That is, total inpatient charges reflect per unit price differences among hospitals, as well as intensity (units) of service supplied to individual inpatients.

Finally, we include the prospective HCC risk score, which is a payment-weighted measure of health status based on demographics and prior-year diagnoses. The HCC risk score incorporates the same 70 payment-HCCs that are used in the prospective HCC model discussed above; but, in the risk score, the HCCs are weighted by the incremental total Medicare Parts A and B expenditures they predict in the following year, and are summed into a single score. A Medicare beneficiary with average predicted Parts A/B expenditures has a risk score of 1.00. A beneficiary with a risk score of 0.50 has half of the average predicted Parts A/B expenditures, and a beneficiary with a risk score of 10.00 has ten times the average predicted Parts A/B expenditures. The mean risk score in our sample of outpatient therapy users is 1.35 and the median is 1.04. The range of the risk score in our analytic sample is 0.11 to 15.29; the first to 99th percentile range is 0.27 to 5.35; the 5th to 95th percentile range is 0.30 to 3.48; the 10th to 90th percentile range is 0.38 to 2.71; and the inter-quartile range is 0.61 to 1.72.

The concurrent inpatient utilization and prospective risk score model is defined as

$$\begin{aligned}C_{AU} = a_0 &+ a_1 AgeSex + a_2 ESRD + a_3 DisabledFemale + a_4 DisabledMale \\ &+ a_5 MedicaidFemaleAge + a_6 MedicaidMaleAge \\ &+ a_7 MedicaidDisabledFemale + a_8 MedicaidDisabledMale \\ &+ a_9 LTI + a_{10} FacilityType + a_{11} StayType + a_{12} Outlier \\ &+ a_{13} PTExpenditure + a_{14} OTExpenditure + a_{15} SLPExpenditure \\ &+ a_{16} HCCRiskScore\end{aligned} \tag{4.4}$$

where *FacilityType* is the indicator for one of the 16 categories for facility type; *StayType* is the indicator for type of stay (long, short or SNF); *Outlier* is an indicator for any outlier hospitalization payment; *PTExpenditure*, *OTExpenditure*, and *SLPExpenditure* are the categorized discipline-specific total hospital charges for PT, OT, and SLP, respectively; and *HCCRiskScore* is the risk score based on the 70 payment HCCs discussed above. The remaining terms are defined for expression (4.1).

4.3 Descriptive Analysis of Beneficiary Characteristics and Annual Expenditure Distributions

This section presents descriptive information for beneficiaries using outpatient therapy in CY 2011, and for their therapy expenditure and utilization distributions. We present the information aggregated across therapy disciplines and specific to each discipline.

4.3.1 Beneficiary Characteristics

There were 4,087,723 unique beneficiary users of outpatient therapy services (any discipline) in CY 2011. Of these, 3,655,812 used PT services (89.3 percent), 858,189 used OT service (21.0 percent), and 423,922 used SLP services (10.4 percent). ***Table 4-1a*** shows the average age of the beneficiaries who received outpatient therapy. There was not a large difference in age between disciplines, but OT and SLP users were somewhat older on average than PT users; the mean age ranged from 74 years old for PT beneficiaries to 78 years old for SLP beneficiaries.

In addition to age, we examined gender, ESRD status, currently entitled by disability (disabled) status, dual-eligibility (Medicaid) status and LTI status of the beneficiaries across disciplines. ***Table 4-1b*** shows the percentages of these additional variables among therapy users by discipline and overall. PT, OT, and SLP were comprised predominately of females. All of the disciplines had less than two percent ESRD patients, with the highest concentration being in OT. PT and OT had higher percentages of patients who were currently disabled (14.03 and 13.47 percent, respectively). OT and SLP had a higher share of dual-eligible beneficiaries (Medicaid) in comparison to PT. Thirty-nine percent of SLP users were dual-eligible. Beneficiaries who were institutionalized for at least one month during the year made up 10 percent of the overall therapy population. PT, OT, and SLP users were 8, 28, and 38 percent LTI, respectively. Last, 87 percent of therapy users were white, 8 percent were black, and the remaining 5 percent were from other racial or ethnic groups (data not shown).

We also examined characteristics for those beneficiaries who were in the top 10 percent of annual expenditures (***Table 4-1c***). On average, a higher percentage of these beneficiaries were female than the general therapy population across all disciplines; however, the differences are small. PT and OT had a higher percentage of ESRD patients. Currently, disabled beneficiaries were less prevalent in all three disciplines among the high-cost beneficiaries. Dual-eligible status was much higher for OT and SLP; 49 and 55 percent of high-cost beneficiaries were dual-eligible, respectively. Finally, LTI beneficiaries were a large percentage of high-cost beneficiaries in all three disciplines. PT, OT, and SLP high-cost beneficiaries were 15, 49, and 61 percent LTI, respectively.

4.3.2 Annual Expenditure Characteristics

Overall, there were a total of 4,937,923 annual beneficiary/years with therapy expenditures in one of the three therapy disciplines in CY 2011. A beneficiary can be counted more than once in this total if they had utilization in more than one therapy discipline in CY 2011. PT is the most prevalent discipline, representing 74 percent of the overall beneficiary/years. OT represents 17 percent of the overall beneficiary/years. SLP accounts for the remaining 9 percent of the beneficiary/years.

Table 4-2 shows aggregated annual data for each discipline and for combined disciplines in the Medicare population. The table includes the total allowed charges, Medicare payments, therapy days, calendar days, allowed charges per therapy day, payments per therapy day[28], and therapy days per week. Allowed charges are the total provider payment allowed by Medicare, including both beneficiary and Medicare payments. Medicare payments represent the amount that Medicare paid and the remaining balance is the cost-sharing responsibility of the beneficiary. Therapy days are the total number of days for which a beneficiary received therapy. Calendar days are a count of the total days between the first visit and the last visit during the 12-month period. Calendar days could represent a single complete episode of therapy care, multiple complete episodes, part of a censored episode, or combinations of partial, complete, and censored episodes.

The average allowed charges for the 12-month period was $1,281 overall, $1,257 for PT, $1,364 for OT and $1,306 for SLP. The median charges were $792, $813, $731, and $673 for the total, PT, OT and SLP, respectively. Medicare pays 80 percent of the allowed charge after the Part-B deductible; therefore, Medicare payments were approximately 20 percent below the allowed charge. Allowed charges per therapy day were highest for SLP ($120), followed by OT ($92) and PT ($89). Annual therapy allowed charges varied 222-fold, from $35 at the first percentile to $7,762 at the 99th percentile. Annual allowed charge variation was driven mostly by variation in therapy days (75 at the 99th percentile to 1 at the first percentile), rather than by variation in allowed charges per therapy day ($195 at the 99th percentile to $29 at the first percentile).

The average patient received 14 distinct days of therapy during the course of a 12-month period with a median of 9 therapy days; this pattern also existed across disciplines. Total calendar days averaged 68 days with a median of 34 days. OT and SLP appear to have more condensed and intense courses of therapy, averaging 58 and 49 calendar days, respectively, compared to 73 for PT. The increased intensity can be seen by the average number of therapy days per week which ranged from 2.56 for PT to 4.12 for SLP.

Table 4-3 shows the same information for beneficiary annual expenditures that were in the top 10 percent of overall annual expenditures. The average allowed charge for these beneficiaries is $4,957 overall and $4,723 for PT, $5,574 for OT and $5,397 for SLP. The average number of therapy days is 48, which is more than 3 times the amount in the general population. The average among the disciplines is 46 for PT, 55 for OT and 50 for SLP. The intensity of the therapy was not the driver of the additional expenditures; therapy days per week were lower for the high-cost expenditure beneficiaries. Rather, the duration of therapy services in calendar days was the primary driver. Calendar days are dramatically higher for the highest-cost beneficiaries: 194 for PT, 177 for OT, and 156 for SLP. The allowed charges per therapy day are slightly lower for the highest annual cost beneficiaries.

4.4 Simulation of Alternative Outpatient Therapy Annual Expenditure Cap Policies

Currently, Medicare annual therapy expenditure caps are established for PT and SLP expenditures combined, and for OT separately. Two alternative policies are to have separate

[28] Therapy days are dates with any Medicare therapy services for a given beneficiary. Payments per therapy day are total payments for all services with the same date of service for a given beneficiary.

caps for each therapy discipline or to have a single cap for all disciplines. Separate caps by discipline may be appropriate if there is little or no substitution of services among therapy disciplines, and the goal is to control spending by discipline. A single combined cap may be more appropriate if there is considerable substitution of services among disciplines and the goal is to control overall outpatient therapy spending.

In 2011, the therapy expenditure cap was $1,870 for PT/SLP combined and for OT. We simulated equal discipline-specific caps[29] and a single combined cap for 2011. The two alternative cap policies were constrained to be budget neutral with respect to current policy. Budget neutrality means that the same aggregate Medicare allowed charges (across all sample beneficiaries) is above and below the cap(s) for each policy. The budget neutral caps were identified by using a binary search algorithm, then calculating expenditures above (equivalently below) the cap, and iteratively adjusting the cap, until budget neutrality versus current policy was achieved. In other words, the universe of possible cap sets for each alternative (one alternative being three separate discipline-specific caps, and the other alternative consisting of a single cap for all disciplines combined) were analyzed and sorted in ascending order. Then the aggregate dollars above and below each possible cap set were computed in the sample data and arrayed. In each step, the algorithm compares the budget neutral aggregate dollars above and below the cap set with the middle element of the array. If the values match, then a matching element has been found and its cap value is returned. Otherwise, if the budget neutral value is less than the middle element's key, then the algorithm repeats its action on the sub-array to the left of the middle element or, if the search key is greater, on the sub-array to the right. This process is repeated until the cap values are identified where the value of the aggregate dollars above and below the cap are equal to the existing cap system. The budget neutrality simulation assumes no behavioral response to changes in caps on the part of providers or beneficiaries. If lowering the cap on one therapy discipline causes substitution to another discipline, Medicare spending will be higher than we simulate, and the alternative policy budget neutral cap will be lower. None of the simulated caps are risk adjusted. Risk-adjusted caps would flag different groups of beneficiaries with potentially excessive spending, because predicted need for therapy would differ from beneficiary to beneficiary.

Results of the cap policy simulation are shown in ***Tables 4-4a and 4-4b***. Simulations were run for all beneficiaries, community residents only, and institutional (nursing facility) residents only.[30] For all beneficiaries, equal discipline-specific caps that are budget neutral to current policy are $1,710 for each of PT, OT, and SLP. For beneficiaries needing only one discipline of therapy, this alternative cap policy reduces the allowed charges cap from the current (2011) cap of $1,870 to $1,710. But for beneficiaries needing large amounts of both PT and SLP, the maximum increases from $1,870 combined under current policy (the current PT/SLP cap in 2011) to $3,420 combined under the alternative policy ($1,710 PT cap + $1,710 SLP cap).

---

[29] Discipline-specific caps that are not equal could be envisaged, perhaps different dollar caps for each discipline that are the same percentile of each discipline's expenditure distribution. However, as described above, the quantile (percentile) of 2011 annual expenditures corresponding to (closest in dollar value to) the CY 2011 cap of $1,870 was determined for each therapy discipline. This was the 81st, 77th and 79th percentile for PT, OT, and SLP, respectively. Given how close these percentiles are, equal discipline-specific caps seem appropriate.

[30] Budget neutrality was enforced separately in each simulation.

For beneficiaries needing large amounts of all three disciplines, the maximum increases from $3,740 under current policy (= $1,870 [PT/SLP cap] + $1,870 [OT cap]) to $5,130 under discipline-specific caps (= $1,710 [PT cap] + $1,710 [OT cap] + $1,710 [SLP cap]).

For all beneficiaries, the simulated budget-neutral single combined-disciplines cap is $2,485. For those beneficiaries needing only one discipline of therapy, the cap rises from $1,870 under current policy to $2,485 under the alternative policy. For beneficiaries needing large amounts of both PT and SLP therapy, the maximum also rises from $1,870 to $2,485. But for beneficiaries needing large amounts of all three disciplines, the maximum falls from $3,740 (= $1,870 [PT/SLP cap] + $1,870 [OT cap]) to $2,485 (combined cap). Also, maximum spending under a combined cap is only about half of maximum spending under discipline-specific caps: $2,485 compared to $5,130 (= $1,710 [PT cap] + $1,710 [OT cap] + $1,710 [SLP cap]).

Table 4-4a shows that under the current cap policy in 2011, the annual allowed charges of 21 percent of outpatient therapy users exceed at least one cap, by an average amount of $2,211. Under equal discipline-specific caps, 23 percent of outpatient therapy users exceed at least one cap, but by a smaller average amount of $1,991. Under a single combined-disciplines cap, 16 percent of outpatient therapy users exceed the cap, but by a larger average of $2,926. A single combined cap flags a smaller proportion of beneficiaries with potentially excessive utilization, but these beneficiaries' spending is farther above the cap, on average.

The cap simulation results for community residents reported in ***Table 4-4a*** are similar to the all-beneficiary results already discussed, though a lower proportion of community residents exceed the caps. The pattern of results for institutional residents is also similar, but the numerical results deviate more from the all-beneficiary results than does the community resident simulation. The institutional resident discipline-specific cap ($1,574) is lower than the all-beneficiary discipline-specific cap ($1,710), but the institutional resident combined cap ($2,959) is higher than the all-beneficiary combined cap ($2,485). Forty-one percent, 46 percent, and 34 percent of institutional residents exceed the current, discipline-specific, and combined caps, respectively, much higher proportions than of all beneficiaries. The average amount by which institutional residents exceed the cap is also much higher than for all beneficiaries.

In addition to its annual therapy expenditures caps, legislation passed in March 2012 instituted a requirement of manual review for any beneficiary whose calendar-year Medicare Part B therapy expenditures exceed caps of $3,700 (for PT/SLP combined, and separately for OT). We also simulated the alternative budget-neutral therapy expenditure cap policies for this manual review threshold of $3,700. The data and methodology were identical to the simulation of the annual therapy cap, except that the $1,870 current policy caps were replaced with the manual review cap of $3,700. Results are shown in ***Table 4-4c***. The patterns for the manual review cap under alternative policies are similar what was seen for the annual expenditures cap, but of course the dollar amounts are higher and the number of beneficiaries affected is smaller. ***Table 4-4d*** shows CY2011 frequencies and mean annual therapy expenditures by subgroups of beneficiaries who are users of the seven possible combinations of therapy disciplines. Seventy two percent of therapy users use PT only. Eighty two percent use only one of the three therapy disciplines. Eleven percent of all therapy users use PT and OT, and four percent use all three disciplines. Annual therapy expenditures are lowest for single discipline users, higher for users of two disciplines, and highest for users of all three disciplines. Discipline-specific annual expenditure caps match this expenditure pattern best (see ***Table 4-4b***). Contrary to the data shown in ***Table 4-4d***, a single combined cap does not vary at all with number of disciplines used. The current cap policy does not allow higher expenditures for those who utilize both PT and SLP services than it does for those who utilize only PT or SLP services. Discipline-specific caps allow for the highest total expenditures by users of all three disciplines, who in fact have the highest total therapy spending. ***Table 4-4e*** and ***Table 4-4f*** show the same distributions by community residents and long term institutionalized residents respectively.

4.5 Predicting Annual Outpatient Therapy Expenditures: Multivariate Regression Results

This section presents the multivariate regression models described above for predicting annual outpatient PT, OT and SLP expenditures.

4.5.1 Physical Therapy

Table 4-5 shows the results of the demographic, prospective HCC, concurrent DRG, and concurrent inpatient utilization and prospective risk score models for physical therapy. ***Appendix Table 4-1 shows*** the means and standard deviations for each of the explanatory variables in the PT model.

Demographic Model

The intercept term in the model represents a 65-69 year old female who did not have ESRD, Medicaid, aged originally entitled by disability, or LTI status in 2011. The other coefficients can be interpreted relative to this category of beneficiary. The age-sex coefficients are negative until the age of 70-74 and then become positive, indicating that PT expenditures among users are higher for the aged than for the disabled. However, age effects on the expenditures of therapy users are relatively small. Long term institutional residence has by far the strongest effect of any of the demographic variables on outpatient PT expenditures . Holding all else constant, a beneficiary using physical therapy who was an institutional resident during the year spent an additional $892 on physical therapy. Dually-eligible aged beneficiaries have higher physical therapy expenditures for both males ($267) and females ($206).

Prospective HCC Model

When the prospective HCCs (including chronic conditions or sequelae of acute conditions requiring PT) are added to the demographic characteristics, the explanatory power of the model increases from an R^2 of 4.0 percent to 5.5 percent. Each of the HCCs is an additive amount in addition to the intercept and the demographic coefficients to get total predicted annual expenditures. In the prospective HCC model, the age/sex coefficients decrease (become more negative or less positive). ESRD beneficiaries, originally disabled beneficiaries and dual-eligible beneficiaries who are also disabled all have negative coefficients. However, dual-eligible male beneficiaries predict an additional $209, dual-eligible females predict an additional $155, and LTI beneficiaries predict an additional $739 of physical therapy expenditures.

The HCCs coefficients are interpreted as the incremental effect on annual PT expenditures of having the HCC diagnosis in the prior year as opposed to not having it. The highest HCC coefficients are for: 1) Hemiplegia/Hemiparesis ($372); 2) Quadriplegia, Other Extensive Paralysis ($352); 3) Paraplegia ($331); 4) Hip Fracture/Dislocation ($320); 5) Parkinson's and Huntington's Disease ($317); and 6) Severe Head Injury ($296). Other HCCs of note include Traumatic Amputation, Multiple Sclerosis, Cerebral Palsy and Other Paralytic Syndromes, and Spinal Cord Disorders/Injuries. Each of these conditions, which occurred in the prior year, predicts more than $200 of additional annual PT expenditures.

Concurrent DRG Model

When the concurrent (current year) DRG clusters are added to the demographic characteristics, the explanatory power of the model increases from an R^2 of 4.0 percent to 4.9 percent. Each of the concurrent DRG groups' coefficients is an additive amount in addition to the intercept and the demographic coefficients to get total predicted annual PT expenditures. The concurrent DRG model age/sex coefficients are similar to their values in the demographic only model. ESRD beneficiaries, originally disabled beneficiaries and dual-eligibles who are also disabled all have small, generally negative coefficients. However, dual-eligible aged beneficiaries predict an additional $295 for males and $228 for females, and LTI beneficiaries predict an additional $887 of physical therapy expenditures.

The DRG bundles are interpreted as the effect of having a hospitalization in one or more of the DRGs in the bundle as opposed to not having a hospitalization in one of the bundle DRGs during the year. The highest predictors of PT expenditure were 1) Double Joint Replacement of the Lower Extremity ($732); 2) Major Joint Upper Extremity ($725); 3) Revision of the Hip or Knee ($477); 4) Other Knee Procedures ($433); and 5) Major Joint Replacement of the Lower Extremity ($432). Other DRG bundles of note include: Combined Anterior/Posterior Spinal Fusion; Lower Extremity and Humerus Procedure Except Hip, Foot, Femur; Complex Non-Cervical Spinal Fusion; Hip and Femur Procedures Except Major Joint; and Amputation. All of these predict at least an additional $300 in annual outpatient PT expenditures.

Concurrent Inpatient Utilization and Prospective Risk Score Model

When the utilization variables and risk score are added to the demographic characteristics, the explanatory power of the model increases from an R^2 of 4.0 percent to 5.4 percent. Each of the utilization variables acts as an additive amount in addition to the intercept and the demographic coefficients to get the total predicted annual expenditures. In the utilization model, the age/sex coefficients are similar in magnitude and sign to the other models. ESRD beneficiaries, originally disabled beneficiaries and dual-eligible beneficiaries who are also disabled all have negative coefficients. However, aged dual-eligible beneficiaries predict an additional $231 for males and $180 for females; LTI beneficiaries predict an additional $821 of physical therapy expenditures.

The coefficients on facility type are incremental to those beneficiaries who were not hospitalized during 2011. Facility type is a negative predictor or insignificant for all facility types, other factors constant. Stays in Inpatient Rehabilitation Facilities (IRF) predict a drop of $223 in outpatient PT expenditures. Skilled Nursing Facilities (SNF) stays and Long-Term Care Hospital (LTCH) stays predict drops of $151 and $206 respectively. Among inpatient stay types, short stays predict slightly higher outpatient PT annual expenditures, other factors equal, while SNF stays predict slightly lower expenditures. Hospital stays with outlier payments are associated with slightly lower incremental expenditures.

The regression also includes variables that indicate the level of inpatient charges for therapy, by PT, OT and SLP discipline. If a beneficiary receives physical therapy in the inpatient setting, on average they have higher annual expenditures in the outpatient PT environment. This ranges from $69 of additional outpatient PT for a beneficiary who has inpatient PT charges of $.01-$1000 up to an additional $709 of outpatient PT for a beneficiary who has more than $10,000 of inpatient PT charges. SLP inpatient charges negatively predict outpatient PT expenditures, except when SLP charges are $10,000+. OT inpatient charges positively, but not monotonically, predict additional outpatient PT expenditures of approximately $100.

The prospective HCC risk score predicts an additional $114 per-unit increase in the risk score. For example, a beneficiary with a risk score of 5 (about the 99th percentile of risk scores) is predicted to have 5 X $114 = $570 in additional outpatient PT expenditures.

4.5.2 Occupational Therapy

Table 4-6 shows the results of the demographic, prospective HCC, concurrent DRG, and concurrent inpatient utilization and prospective risk score models for occupational therapy. ***Appendix Table 4-1*** shows the means and standard deviations for each of the explanatory variables in the OT model.

Demographic Model

The OT demographic model R^2 is 6.9 percent; this has almost double the explanatory power of the PT demographic model and is the highest R^2 of any of the discipline-specific demographic models. The intercept term in the model represents a 65-69 year old female who did not have ESRD, Medicaid, aged originally entitled by disability, or LTI status in 2011. The other coefficients can be interpreted as the difference from beneficiaries with these characteristics. The age-sex coefficients show a tendency of OT expenditures to rise with age, among users. ESRD beneficiaries have a positive coefficient ($92) and LTI beneficiaries account for an additional $742 of expenditures on outpatient OT. Dually-eligible aged beneficiaries have higher OT expenditures for both males ($483) and females ($352). The interaction of being dually-eligible and disabled is also positive and significant for males ($307) and females ($273). This interaction was not positive in any of the PT models.

Prospective HCC Model

When the prospective HCCs are added to the demographic characteristics, the explanatory power of the model increases from an R^2 of 6.9 percent to 8.7 percent. The age/sex coefficients remain largely the same when the HCCs are added. ESRD status now predicts slightly lower OT expenditures. Dual-eligible status continues to predict higher expenditures. LTI status predicts an additional $616 of outpatient OT expenditures.

The highest HCC coefficients are for: 1) Severe Head Injury ($365); 2) Schizophrenia ($357); 3) Hemiplegia/Hemiparesis ($332); and 4) Parkinson's and Huntington's Diseases ($261). Other HCCs of note include Cerebral Hemorrhage, Hip Fracture/Dislocation, Major Depressive, Bipolar and Paranoid Disorders, and Quadriplegia, Other Extensive Paralysis. Each of these conditions, which occurred in the prior year, predicts more than $200 of additional annual OT expenditures.

Concurrent DRG Model

When the concurrent DRGs are added to the demographic characteristics, the explanatory power of the model increases from an R^2 of 6.9 percent to 7.1 percent. The age/sex coefficients are similar to the prospective HCC model. The DRG bundles that predict the highest OT expenditure are: 1) Major Joint Upper Extremity ($372); 2) Lower Extremity and Humerus Procedure Except Hip, Foot, Femur ($298); 3) Amputation ($257); 4) Stroke ($190); and 5) Hip and Femur Procedures Except Major Joint ($190). Other DRG bundles of note include: Urinary Tract Infection, Fractures Femur and Hip/Pelvis, Removal of Orthopedic Devices, Red Blood Cell Disorders, and Complex Non-Cervical Spinal Fusion (not significant). All of these predict at least an additional $100 in annual outpatient OT expenditures.

Concurrent Inpatient Utilization and Prospective Risk Score Model

When the utilization variables and risk score are added to the demographic characteristics, the explanatory power of the model increases from an R^2 of 6.9 percent to 8.4 percent. In the utilization model, the demographic coefficients are similar in magnitude and sign to the other models.

The coefficients on facility type are incremental to those beneficiaries who were not hospitalized during 2011. Facility type is a negative predictor or insignificant for all facility types, other factors constant. Stays in Inpatient Rehabilitation Facilities (IRF) predict a drop of $375 in outpatient OT expenditures. Skilled Nursing Facilities (SNF) stays predict a drop of $78. Among inpatient stay types, SNF stays predict lower expenditures. Hospital stays with outlier payments are associated with slightly lower incremental expenditures.

The regression also includes variables that indicate the level of inpatient charges for therapy, by PT, OT and SLP discipline. If a beneficiary receives occupational therapy in the inpatient setting, they have higher annual expenditures in the outpatient OT environment. A low level of inpatient therapy charges is actually associated with a decline of $103 in outpatient OT expenditures, but a beneficiary who has inpatient OT charges of more than $10,000 has an additional $626 of outpatient OT. SLP inpatient charges positively predict outpatient OT expenditures, with impacts ranging from $52 to $456 as inpatient SLP charges increase. PT inpatient charges also positively predict outpatient OT expenditures, with effects ranging from $101 to $237 as inpatient PT charges increase.

The prospective HCC risk score predicts an additional $137 per-unit increase in the risk score. For example, a beneficiary with a risk score of 5 (about the 99th percentile of risk score) is predicted to have 5 X $137 = $685 in additional outpatient OT expenditures.

4.5.3 Speech Language Pathology

Table 4-7 shows the results of the demographic, prospective HCC, concurrent DRG, and concurrent inpatient utilization and prospective risk score models for speech language pathology. ***Appendix Table 4-1*** shows the means and standard deviations for each of the explanatory variables in the SLP model.

Demographic Model

The SLP demographic model R^2 is 6.4 percent, almost double the explanatory power of the PT demographic model. The intercept term in the model represents a 65-69 year old female who did not have ESRD, Medicaid, aged originally entitled by disability, or LTI status in 2011. The other coefficients can be interpreted as the difference from beneficiaries with these characteristics. The age-sex coefficients show an inconsistent tendency for higher SLP expenditures with greater age. ESRD beneficiaries have a small, negative coefficient, but LTI beneficiaries have a large and significant coefficient. Holding all else constant, a beneficiary who is LTI during the year spends an additional $745 on speech-language therapy. Dually-eligible aged beneficiaries have higher physical therapy expenditures for both males ($320) and females ($290). The interaction of being dually-eligible and disabled is also positive and significant for males ($251) and females ($274). This interaction was not positive in any of the PT models.

Prospective HCC Model

When the prospective HCCs are added to the demographic characteristics, the explanatory power of the model increases from an R^2 of 6.4 percent to 8.4 percent. The highest HCC coefficients are for 1) Severe Head Injury ($572); 2) Hemiplegia/Hemiparesis ($377); 3) Coma, Brain Compression/Anoxic Damage ($346); 4) Schizophrenia ($327); and 5) Cerebral Hemorrhage ($314). Other HCCs of note include Ischemic or Unspecified Stroke, Artificial Openings for Feeding or Elimination, and Parkinson's and Huntington's Diseases. Each of these conditions, which occurred in the prior year, predicts more than $200 of additional annual SLP expenditures.

Concurrent DRG Model

When the concurrent DRGs are added to the demographic characteristics, the explanatory power of the model increases from an R^2 of 6.4 percent to 6.8 percent. The age/sex coefficients are similar to the demographic only model. The highest DRG bundle predictor of SLP expenditures is Stroke. A beneficiary who was hospitalized for a stroke during the year is predicted to spend an additional $408 on outpatient SLP therapy. This is by far the strongest predictor of SLP expenditures. Other positive predictors of SLP include Urinary Tract Infection, Pacemaker Device Replacement or Revision, Amputation, Hip and Femur Procedures Except Major Joint, Other Respiratory, Other DRGs, Sepsis, and Removal of Orthopedic Devices. There are many negative DRG bundle predictors of SLP expenditures, including many of the orthopedic DRGs that positively predict PT and OT expenditures. The reasons for these negative predictions are not clear, but could be because these procedures tend not to be performed on the older, frailer, and institutionalized beneficiaries who are more likely to receive SLP services.

Concurrent Inpatient Utilization and Prospective Risk Score Model

When the prior utilization variables are added to the demographic characteristics, the explanatory power of the model increases from an R^2 of 6.4 percent to 8.3 percent. The demographic coefficients are similar in magnitude and sign to the other models. The coefficients on facility type are incremental to beneficiaries who were not hospital inpatients during 2011. Facility type is a negative predictor or insignificant for almost all facility types, other factors constant. Psychiatric beds in a CAH and swing beds in a rehabilitation hospital had positive coefficients, but they had limited sample sizes. Stays in Inpatient Rehabilitation Facilities (IRF) predict a drop of $209 in outpatient SLP expenditures and Skilled Nursing Facilities (SNF) stays predict a drop of $128.

The regression also includes variables that indicate the level of inpatient charges for therapy, by PT, OT and SLP discipline. If a beneficiary receives speech language therapy in the inpatient setting, they have higher annual expenditures in the outpatient SLP environment, especially at higher levels of inpatient charges. This ranges from an increase of $123 in outpatient SLP expenditures for a beneficiary who has inpatient SLP charges of $.01-$1000 up to an additional $1,370 of outpatient SLP for a beneficiary who has more than $10,000 of inpatient SLP charges. PT inpatient charges have a relatively minor and generally negative impact on SLP outpatient expenditures. OT inpatient charges positively predict additional outpatient SLP expenditures, with impacts ranging from $20 to $230.

The prospective HCC risk score predicts an additional $97 of outpatient SLP expenditures per-unit increase in the risk score. For example, a beneficiary with a risk score of 5 (approximately the 99th percentile of risk scores) is predicted to have 5 X $97 = $485 in additional outpatient SLP expenditures.

4.5.4 Quantile Regression

Tables 4-8 to 4-10 show the results of the demographic OLS and quantile regression for physical therapy, occupational therapy and speech-language pathology. Quantile regression estimates the impact of the explanatory variables on specified percentiles of the therapy expenditures, as opposed to OLS which estimates the effect of factors on the overall *mean* expenditures.[31] Each discipline uses a slightly different percentile to simulate the 2011 therapy cap of $1,870 due to the difference in distributions between each discipline; the percentiles used ranged from the 77^{th} to 81^{st} percentiles of annual expenditures. Although the current cap applies to PT and SLP combined, and separately to OT, we estimated a cap applied separately to each therapy discipline. Quantile regression uses a linear programming estimation technique, which is more computationally intensive than the least squares algorithm used by OLS. In order to compute the R^2 for the quantile regressions, we took the square of the correlation between the

[31] Quantile regression is especially useful to minimize the effects of outliers, and to quantify the effects on certain subgroups (percentiles) within the data being analyzed. For example, if interest is on *median* expenditures within the distribution, then the resulting statistics for the model coefficients give the associated effects (and statistical significance) for expeditures falling at (or very near) the median value. Note, however, that the primary focus of the DOTPA quantile regressions, where the percentile was set to the value equal to the cap, was a comparative analysis of the predictive power in comparison to the OLS models discussed above.

fitted values and the dependent variable. The R^2 for the quantile regression is specific to the single-quantile equation we estimated (approximately the 80^{th} percentile), rather than a set of quantiles describing the entire distribution. Because the 100-percent therapy users sample sizes are very large, to limit the computational burden, we selected random samples of 5 percent, 20 percent, and 50 percent of PT, OT, and SLP therapy users, respectively, for the analysis of this section. Both the OLS and quantile regressions were estimated on these samples.

Physical Therapy

Overall the quantile and OLS PT regression results are fairly similar, but there are some significant differences (***Table 4-8***). The quantile intercept coefficient is much larger, which is not surprising since the quantile regression is in reference to the 81st percentile rather than mean PT expenditures. Long term institutional (LTI) status increases the therapy cap (81st percentile) much more than mean expenditures. Dual eligibility among the aged is associated with a substantially greater increase in the therapy cap (81st percentile) than in mean expenditures. Younger age has a larger negative impact on the cap, and older age a larger positive impact on the cap, than on mean expenditures. The OLS regression explains 4.0 percent and the quantile regression explains 3.7 percent of the overall variation in PT expenditures.

Occupational Therapy

The differences in the OT OLS and quantile regression results (***Table 4-9***) are similar to the differences observed for PT: a higher intercept, and greater positive impacts of LTI and dual eligibility among the aged and greater negative impacts of younger age and positive impacts of older age on the therapy cap than on mean expenditures. The OLS regression explains 7.0 percent and the quantile regression explains 6 percent of the overall variation in OT expenditures.

Speech-Language Therapy

SLP shows a similar comparison of OLS and quantile regression results to PT and OT (***Table 4-10***). The quantile intercept is higher. The quantile younger age coefficients are more negative (only for females) and the older age coefficients are more positive (for both females and males). LTI and dual eligibility among the aged have larger positive impacts. The OLS regression explains 6.5 percent and the quantile regression explains 5.2 percent of the overall variation in SLP expenditures.

4.6 Conclusions

This section investigated several sets of information that could be used to risk-adjust the annual therapy expenditures cap: demographics, prior year diagnoses (prospective HCCs), current-year hospitalizations (concurrent DRGs), and selected concurrent inpatient utilization variables (most notably inpatient therapy charges). A number of the individual demographic, diagnostic, procedure (surgical DRGs), and utilization variables predict significant variations in annual therapy expenditures in the expected direction. These factors could be used to risk-adjust the annual cap.

However, demographics, prior year diagnoses (prospective HCCs), current year hospitalizations (concurrent DRGs), and the current year inpatient utilization variables considered here explain little of the overall variation in annual outpatient therapy expenditures. The percentage of variation explained (R^2) is uniformly under 10 percent. Although combining the predictive factors in a single model would undoubtedly raise the percentage of expenditure variation explained, it would still be relatively low.

The low predictive power of these models raises the question of whether they would adequately risk-adjust the annual therapy expenditures cap. There may be factors not considered here that explain as much or more of the expenditure variation as do the factors we analyzed. Section 5 adds functional status and other patient survey/clinician assessment variables to the set of explanatory information. The models investigated in this section are exploratory, and further exploration and development could be profitable before any changes in policy are made. For example, concurrent instead of prospective HCCs, and HCCs not used for Medicare Advantage payment but possibly relevant to predicting therapy expenditures, could be investigated. However, this investigation would require considerable file construction as these HCCs—unlike the prospective Medicare-Advantage-payment HCCs—are not routinely calculated by CMS. In terms of utilization, we investigated only inpatient utilization and case-mix (DRG) variables. Further exploration could examine home health, SNF, and hospital outpatient utilization and case-mix variables to determine if they can predict outpatient therapy expenditures. Again, this would require significant file construction with Medicare claims.

As one step towards refining the OLS prediction models, we estimated quantile regressions. The quantile regressions investigate the effect of risk factors on the therapy cap (simulated as the 77th to 81st percentile of expenditures) rather than on mean expenditures. The quantile regression results show a greater impact of institutional status, dual eligibility among the elderly, and age on the therapy cap than on mean expenditures. This suggests that factors that tend to raise therapy expenditures—like institutionalization, Medicaid enrollment, and older age—have a greater effect on the higher tail of expenditure distribution than they do on average expenditures. That is, among groups such as the institutionalized, oldest old, and dual eligible, there are a higher proportion of very expensive individuals. In risk adjusting the therapy expenditures cap, the quantile regression suggests raising the cap more for these characteristics than is suggested by the standard ordinary least squares results.

We also simulated alternative non-risk-adjusted outpatient therapy annual expenditure cap policies. We compared equal discipline-specific caps and a single combined-discipline cap to the current policy of a combined PT/SLP cap and a separate OT cap. We found that a simulated 2011 budget neutral discipline-specific cap ($1,710) was lower than the actual 2011 therapy cap of $1,870, while a budget neutral combined cap ($2,485) was higher. Discipline-specific caps are most favorable to beneficiaries needing a lot of services from all three therapy disciplines while a combined cap is most favorable to beneficiaries needing a lot of services from only one discipline. As well as these caps for all beneficiaries, we also simulated budget neutral caps for community and institutional residents separately. The residence-specific caps follow the same general patterns as the all-beneficiary caps. But the numerical values are different, for example, the budget neutral single combined cap for institutional residents is $2,959 instead of $2,485.

Table 4-1a
Annual beneficiary characteristics, by therapy discipline—unique beneficiary mean age

	N	Mean
Total	4,087,723	74
PT	3,655,812	74
OT	858,189	77
SLP	423,922	78

NOTES:
1. PT = Physical Therapy, OT = Occupational Therapy, SLP = Speech-Language Pathology
2. N = Unique number of beneficiaries
3. Annual Period: January 1, 2011 - December 31, 2011.
4. Total = Sum of the three (3) disciplines.

SOURCE: RTI analysis of 2011-2012 MEDPAR Medicare Claims.

Program: PA016

Table 4-1b
Annual beneficiary characteristics, by therapy discipline—unique beneficiary characteristics (%)

	Total (N=4,087,723)		PT (N=3,655,812)		OT (N=858,189)		SLP (N=423,922)	
	N	Percent	N	Percent	N	Percent	N	Percent
Female	2,645,574	64.72	2,368,601	64.79	580,479	67.64	264,824	62.47
ESRD	41,695	1.02	36,924	1.01	14,503	1.69	5,469	1.29
Disabled	582,092	14.24	512,910	14.03	115,598	13.47	52,439	12.37
Medicaid	894,394	21.88	753,463	20.61	291,012	33.91	167,576	39.53
LTI	397,735	9.73	292,465	8.00	244,412	28.48	161,684	38.14

NOTES:
1. PT = Physical Therapy, OT = Occupational Therapy, SLP = Speech-Language Pathology, ESRD = End-Stage Renal Disease, LTI = Long Term Institutionalized
2. N = Unique number of beneficiaries
3. Annual Period: January 1, 2011 - December 31, 2011.
4. Total = Sum of the three (3) disciplines.
5. Percent = Percent of the total high-cost beneficiary in each discipline.
6. LTI - If the beneficiary had a 90-day MDS assessment at any point during 2011, then they were considered long-term institutionalized.

SOURCE: RTI analysis of 2011-2012 MEDPAR Medicare Claims.

Program: PA016

Table 4-1c
Annual beneficiary characteristics, by therapy discipline—unique high-cost beneficiary mean age

	N	Mean
Total	405,670	76
PT	329,205	75
OT	54,319	78
SLP	35,189	79

NOTES:

1. PT = Physical Therapy, OT = Occupational Therapy, SLP = Speech-Language Pathology
2. N = Unique number of beneficiaries
3. Annual Period: January 1, 2011 - December 31, 2011.
4. Total = Sum of the three (3) disciplines.
5. High-Cost Beneficiaries were beneficiaries with at least one (1) high-cost episode. A High-Cost Episode was defined as having an Episode-Allowed Charge amount greater than the 90th percentile of Total Episode Allowed Charges.

SOURCE: RTI analysis of 2011-2012 MEDPAR Medicare Claims.

Program: PA016

Table 4-1d
Annual beneficiary characteristics, by therapy discipline—unique high-cost beneficiary characteristics (%)

	Total (N=405,670)		PT (N=329,205)		OT (N=54,319)		SLP (N=35,189)	
	N	Percent	N	Percent	N	Percent	N	Percent
Female	265,268	65.39	213,094	64.73	37,839	69.66	22,074	62.73
ESRD	4,868	1.20	3,358	1.02	1,135	2.09	394	1.12
Disabled	48,072	11.85	38,418	11.67	6,730	12.39	4,448	12.64
Medicaid	127,827	31.51	84,737	25.74	26,383	48.57	19,382	55.08
LTI	95,170	23.46	48,591	14.76	26,720	49.19	21,518	61.15

NOTES:

1. PT = Physical Therapy, OT = Occupational Therapy, SLP = Speech-Language Pathology, ESRD = End-Stage Renal Disease, LTI = Long Term Institutionalized
3. Annual Period: January 1, 2011 - December 31, 2011.
3. Episode: Variable length episode with a 60-day terminating clean period.
4. Total = Sum of the three (3) disciplines.
5. Percent = Percent of the total high-cost beneficiary in each discipline.
6. LTI - If the beneficiary had a 90-day MDS assessment at any point during 2011, then they were considered long-term institutionalized.
7. High-Cost Beneficiaries were beneficiaries with at least one (1) high-cost episode. A High-Cost Episode was defined as having an Episode-Allowed Charge amount greater than the 90th percentile of Total Episode Allowed Charges.

SOURCE: RTI analysis of 2011-2012 MEDPAR Medicare Claims.

Program: PA016

Table 4-2
Characteristics of annual per capita outpatient therapy utilization, by therapy discipline, 2011

	Mean	SE	1st	25th	Median	75th	99th
Total (n = 4,937,923)							
Total Allowed Charge ($)	1,281	0.71	36	295	792	1,650	7,762
Total Medicare Payment ($)	1,015	0.57	15	228	625	1,309	6,190
Total Therapy Days (n)	14	0.01	1	4	9	18	75
Total Calendar Days (n)	68	0.04	1	13	34	83	352
Allowed Charges Per Therapy Day ($)	93	0.01	29	73	90	108	195
Payments per Therapy Day ($)	72	0.01	10	57	71	85	155
Therapy Days per Week	2.87	0.00	0.15	1.32	2.15	3.82	7.00
PT (n = 3,655,812)							
Total Allowed Charge ($)	1,258	0.78	35	340	814	1,619	7,414
Total Medicare Payment ($)	995	0.63	11	261	641	1,283	5,907
Total Therapy Days (n)	14	0.01	1	4	10	18	72
Total Calendar Days (n)	73	0.05	1	16	38	89	354
Allowed Charges Per Therapy Day ($)	89	0.02	26	72	87	105	168
Payments per Therapy Day ($)	70	0.01	9	56	69	83	133
Therapy Days per Week	2.56	0.00	0.16	1.24	2.00	3.00	7.00
OT (n = 858,189)							
Total Allowed Charge ($)	1,365	1.94	34	195	731	1,766	8,562
Total Medicare Payment ($)	1,086	1.55	23	152	579	1,407	6,840
Total Therapy Days (n)	15	0.02	1	2	9	20	85
Total Calendar Days (n)	58	0.09	1	6	28	66	345
Allowed Charges Per Therapy Day ($)	92	0.03	31	74	87	108	192
Payments per Therapy Day ($)	73	0.03	17	58	69	86	153
Therapy Days per Week	3.56	0.00	0.17	1.62	3.00	5.25	7.00
SLP (n = 423,922)							
Total Allowed Charge ($)	1,306	2.77	90	180	673	1,696	8,602
Total Medicare Payment ($)	1,040	2.21	53	138	536	1,350	6,875
Total Therapy Days (n)	12	0.03	1	1	6	17	79
Total Calendar Days (n)	49	0.12	1	1	19	56	334
Allowed Charges Per Therapy Day ($)	120	0.07	59	98	109	124	283
Payments per Therapy Day ($)	95	0.06	35	77	87	99	226
Therapy Days per Week	4.12	0.00	0.11	1.90	4.20	7.00	7.00

NOTES:
1. PT = Physical Therapy, OT = Occupational Therapy, SLP = Speech-Language Pathology
2. N = Number of Unique Episodes
3. SE = Standard error of the mean.
4. Annual Period: January 1, 2011 - December 31, 2011.
5. Total = Sum of the three (3) disciplines' episodes.
6. Therapy Days per Week = [(therapy days)/(calendar days)]*7
SOURCE: RTI analysis of 2011-2012 MEDPAR Medicare Claims.
Program: PA016

Table 4-3
Characteristics of high-cost annual per capita outpatient therapy utilization, by therapy discipline, 2011

	Mean	SE	1st	25th	Median	75th	99th
Total (n = 498,977)							
Total Allowed Charge ($)	4,957	3.23	2,956	3,446	4,207	5,654	13,676
Total Medicare Payment ($)	3,950	2.58	2,353	2,743	3,352	4,507	10,914
Total Therapy Days (n)	48	0.03	20	33	42	56	126
Total Calendar Days (n)	186	0.14	40	94	173	270	362
Allowed Charges Per Therapy Day ($)	107	0.05	60	91	105	119	194
Payments per Therapy Day ($)	86	0.04	48	73	83	95	155
Therapy Days per Week	2.30	0.00	0.60	1.29	1.93	2.97	5.16
PT (n = 366,994)							
Total Allowed Charge ($)	4,723	3.64	2,818	3,272	3,990	5,368	13,217
Total Medicare Payment ($)	3,760	2.91	2,231	2,603	3,175	4,275	10,548
Total Therapy Days (n)	46	0.03	20	32	40	53	122
Total Calendar Days (n)	194	0.16	43	103	184	280	362
Allowed Charges Per Therapy Day ($)	107	0.06	59	91	105	119	197
Payments per Therapy Day ($)	85	0.05	47	72	84	95	157
Therapy Days per Week	2.05	0.00	0.57	1.19	1.76	2.62	5.12
OT (n = 88,883)							
Total Allowed Charge ($)	5,574	7.81	3,413	3,978	4,830	6,366	14,343
Total Medicare Payment ($)	4,450	6.24	2,723	3,175	3,856	5,082	11,464
Total Therapy Days (n)	55	0.08	25	39	49	64	136
Total Calendar Days (n)	177	0.32	43	88	161	257	362
Allowed Charges Per Therapy Day ($)	105	0.08	60	90	105	118	165
Payments per Therapy Day ($)	84	0.07	48	72	83	94	131
Therapy Days per Week	2.75	0.00	0.73	1.56	2.45	4.01	5.19
SLP (n = 44,912)							
Total Allowed Charge ($)	5,397	12.18	3,184	3,710	4,547	6,151	15,194
Total Medicare Payment ($)	4,310	9.74	2,541	2,963	3,632	4,913	12,144
Total Therapy Days (n)	50	0.10	19	35	43	58	130
Total Calendar Days (n)	156	0.45	31	74	131	228	362
Allowed Charges Per Therapy Day ($)	112	0.14	72	94	102	123	203
Payments per Therapy Day ($)	90	0.11	57	75	82	99	162
Therapy Days per Week	2.90	0.01	0.67	1.60	2.72	4.34	5.19

NOTES:
1. PT = Physical Therapy; OT = Occupational Therapy; SLP = Speech-Language Pathology
2. N = Total number of high-cost annual expenditure episodes.
3. High-Cost annual expenditure episodes had total therapy allowed charges greater than the 90th percentile of the total annual allowed charges.
4. Total = Sum of the three (3) disciplines.
5. SE = Standard error of the mean.
6. Annual Period: January 1, 2011 - December 31, 2011.
7. Calendar days = days between the first and last therapy visits during the 12-month period.
8. Therapy Days per Week = [(therapy days)/(calendar days)]*7

SOURCE: RTI analysis of 2011-2012 MEDPAR Medicare Claims.
Program: PA016

Table 4-4a
Alternative budget neutral outpatient therapy annual expenditure caps, simulated for 2011

	Current cap policy	Equal discipline-specific caps	Single-combined cap
A. All Beneficiaries			
Physical Therapy (PT)	—	$1,710	—
Occupational Therapy (OT)	$1,870	$1,710	—
Speech-Language Pathology (SLP)	—	$1,710	—
PT/SLP Combined	$1,870	—	—
PT/OT/SLP Combined	—	—	$2,485
All Beneficiaries Cap Analysis			
Therapy users below cap (n)	3,881,320	3,769,004	4,130,042
Therapy users below cap (%)	79.23	76.94	84.31
Therapy users above cap (n)	1,017,369	1,129,685	768,647
Therapy users above cap (%)	20.77	23.06	15.69
Average amount cap exceeded ($)	2,211	1,991	2,926
B. Community Residents			
Physical Therapy (PT)	—	$1,752	—
Occupational Therapy (OT)	$1,870	$1,752	—
Speech/Language Pathology (SLP)	—	$1,752	—
PT/SLP Combined	$1,870	—	—
PT/OT/SLP Combined	—	—	$2,351
Community Residents Cap Analysis			
Therapy users below cap (n)	3,664,719	3,596,547	3,854,886
Therapy users below cap (%)	81.57	80.05	85.80
Therapy users above cap (n)	828,233	896,405	638,066
Therapy users above cap (%)	18.43	19.95	14.20
Average amount cap exceeded ($)	1,879	1,736	2,439
C. Institutional (Nursing Facility) Residents			
Physical Therapy (PT)	—	$1,574	—
Occupational Therapy (OT)	$1,870	$1,574	—
Speech/Language Pathology (SLP)	—	$1,574	—
PT/SLP Combined	$1,870	—	—
PT/OT/SLP Combined	—	—	$2,959

(continued)

Table 4-4a (continued)
Alternative budget neutral outpatient therapy annual expenditure caps, simulated for 2011

	Current cap policy	Equal discipline-specific caps	Single-combined cap
Institutional (Nursing Facility) Residents Cap Analysis			
Therapy users below cap (n)	274,412	253,305	308,688
Therapy users below cap (%)	58.80	54.28	66.15
Therapy users above cap (n)	192,236	213,343	157,960
Therapy users above cap (%)	41.20	45.72	33.85
Average amount cap exceeded ($)	8,095	7,295	9,852

NOTES:

1. Caps are Medicare allowed charges.
2. Budget neutral means that total Medicare allowed charges above and below the caps is equal for each cap policy.
3. Budget neutrality assumes no behavioral response by providers or beneficiaries to changes in the therapy caps.
4. The "average amount cap exceeded" is the total amount by which Medicare allowed charges exceeds all applicable therapy caps divided by the number of beneficiaries exceeding at least one cap (therapy users above cap).
5. n = count of therapy users; % = percent of therapy users

SOURCE: RTI simulation using 2011 Medicare claims and enrollment data.

Table 4-4b
Outpatient therapy annual expenditure maximums for beneficiaries needing various combinations of therapy disciplines

Disciplines of therapy needed	Current cap policy	Equal discipline-specific caps	Single combined cap
Physical Therapy (PT) Only	$1,870	$1,710	**$2,485**
Occupational Therapy (OT) Only	$1,870	$1,710	**$2,485**
Speech-Language Pathology (SLP) Only	$1,870	$1,710	**$2,485**
PT and OT	**$3,740**	$3,420	$2,485
PT and SLP	$1,870	**$3,420**	$2,485
OT and SLP	**$3,740**	$3,420	$2,485
PT and OT and SLP	$3,740	**$5,130**	$2,485

NOTES:

1. Table presents maximums under alternative budget neutral cap policies for all beneficiaries, simulated for 2011
2. Maximums are determined from the maximum amount allowed for each discipline or combination of disciplines from Table 4-4.
3. Current cap policy is a cap for PT/SLP combined of $1,870, and a separate cap of $1,870 for OT (caps are for 2011).
3. Maximums are Medicare allowed charges.
4. Budget neutral means that total Medicare allowed charges above and below the caps is equal for each cap policy.
5. Budget neutrality assumes no behavioral response by providers or beneficiaries to changes in the therapy caps.
6. Highest maximum for each combination of disciplines needed is bolded

SOURCE: RTI simulation using 2011 Medicare claims and enrollment data.

Table 4-4c
Alternative budget neutral outpatient therapy annual manual review caps, simulated for 2011

	Current cap policy	Equal discipline-specific caps	Single-combined cap
A. All Beneficiaries			
Physical Therapy (PT)	—	$3,275	—
Occupational Therapy (OT)	$3,700	$3,275	—
Speech-Language Pathology (SLP)	—	$3,275	—
PT/SLP Combined	$3,700	—	—
PT/OT/SLP Combined	—	—	$5,394
All Beneficiaries Cap Analysis			
Therapy users below cap (n)	4,557,546	4,512,306	4,652,515
Therapy users below cap (%)	93.04	92.11	94.97
Therapy users above cap (n)	341,143	386,383	246,174
Therapy users above cap (%)	6.96	7.89	5.03
Average amount cap exceeded ($)	2,871	2,535	3,978
B. Community Residents			
Physical Therapy (PT)	—	$3,375	—
Occupational Therapy (OT)	$3,700	$3,375	—
Speech/Language Pathology (SLP)	—	$3,375	—
PT/SLP Combined	$3,700	—	—
PT/OT/SLP Combined	—	—	$5,114
Community Residents Cap Analysis			
Therapy users below cap (n)	4,247,522	4,220,955	4,315,061
Therapy users below cap (%)	94.54	93.95	96.04
Therapy users above cap (n)	245,430	271,997	177,891
Therapy users above cap (%)	5.46	6.05	3.96
Average amount cap exceeded ($)	2,502	2,257	3,452
C. Institutional (Nursing Facility) Residents			
Physical Therapy (PT)	—	$3,059	—
Occupational Therapy (OT)	$3,700	$3,059	—
Speech/Language Pathology (SLP)	—	$3,059	—
PT/SLP Combined	$3,700	—	—
PT/OT/SLP Combined	—	—	$5,942

(continued)

Table 4-4c (continued)
Alternative budget neutral outpatient therapy annual manual review caps, simulated for 2011

	Current cap policy	Equal discipline-specific caps	Single-combined cap
Institutional (Nursing Facility) Residents Cap Analysis			
Therapy users below cap (n)	375,655	364,872	396,437
Therapy users below cap (%)	80.50	78.19	84.95
Therapy users above cap (n)	90,993	101,776	70,211
Therapy users above cap (%)	19.50	21.81	15.05
Average amount cap exceeded ($)	3,527	3,153	4,571

NOTES:

1. Caps are Medicare allowed charges.
2. Budget neutral means that total Medicare allowed charges above and below the caps is equal for each cap policy.
3. Budget neutrality assumes no behavioral response by providers or beneficiaries to changes in the therapy caps.
4. The "average amount cap exceeded" is the total amount by which Medicare allowed charges exceeds all applicable therapy caps divided by the number of beneficiaries exceeding at least one cap (therapy users above cap).
5. n = count of therapy users; % = percent of therapy users

SOURCE: RTI simulation using 2011 Medicare claims and enrollment data.

Table 4-4d
Frequency and mean annual therapy expenditures, by therapy user subgroup, 2011

Therapy user groups	Therapy users N	Therapy users %	Mean annual expenditures	Percentiles of annual expenditures 75th	90th	95th
Total	4,898,689	100.0	$1,523	1,748	3,454	5,410
Physical therapy (PT) users only	3,521,449	71.9	1,088	1,431	2,353	3,269
Occupational therapy (OT) users only	294,671	6.0	796	1,015	1,897	2,702
Speech-Language pathology (SLP) users only	206,539	4.2	739	906	1,873	2,754
PT and OT users	526,185	10.7	2,985	3,941	7,111	9,685
PT and OT users- PT	526,185	10.7	1,687	2,238	4,128	5,663
PT and OT users-OT	526,185	10.7	1,298	1,725	3,314	4,659
PT and SLP users	97,302	2.0	2,412	3,171	5,319	7,050
PT and SLP users- PT	97,302	2.0	1,367	1,800	3,207	4,430
PT and SLP users- SLP	97,302	2.0	1,044	1,359	2,539	3,695
OT and SLP users	44,893	0.9	2,854	3,759	6,090	7,971
OT and SLP users- OT	44,893	0.9	1,307	1,703	3,088	4,248
OT and SLP users- SLP	44,893	0.9	1,547	1,996	3,521	4,832
PT, OT, and SLP users	207,650	4.2	6,318	8,530	13,487	17,331
PT, OT, and SLP users- PT	207,650	4.2	2,382	3,267	5,528	7,246
PT, OT, and SLP users- OT	207,650	4.2	2,119	2,869	4,988	6,668
PT, OT, and SLP users- SLP	207,650	4.2	1,818	2,359	4,239	5,864

SOURCE: RTI simulation using 100% 2011 Medicare claims and enrollment data.

Program: Pami138

Table 4-4e

Frequency and mean annual therapy expenditures, by community resident therapy user subgroup, 2011

Therapy user groups	Therapy users: N	Therapy users: %	Mean annual expenditures	Percentiles of annual expenditures: 75th	90th	95th
Total	4,388,880	100.0	$1,307	1,577	2,894	4,341
Physical therapy (PT) users only	3,414,872	77.8	1,077	1,418	2,325	3,227
Occupational therapy (OT) users only	239,289	5.5	710	900	1,718	2,401
Speech-Language pathology (SLP) users only	144,796	3.3	548	571	1,407	2,116
PT and OT users	393,980	9.0	2,573	3,382	6,210	8,676
PT and OT users- PT	393,980	9.0	1,492	1,968	3,702	5,175
PT and OT users-OT	393,980	9.0	1,082	1,430	2,799	4,066
PT and SLP users	64,083	1.5	2,043	2,643	4,581	6,153
PT and SLP users- PT	64,083	1.5	1,240	1,647	2,904	4,052
PT and SLP users- SLP	64,083	1.5	803	984	2,003	2,993
OT and SLP users	17,814	0.4	2,456	3,285	5,482	7,250
OT and SLP users- OT	17,814	0.4	1,135	1,483	2,744	3,877
OT and SLP users- SLP	17,814	0.4	1,322	1,746	3,111	4,309
PT, OT, and SLP users	114,046	2.6	5,455	7,394	12,051	15,602
PT, OT, and SLP users- PT	114,046	2.6	2,106	2,872	4,967	6,590
PT, OT, and SLP users- OT	114,046	2.6	1,824	2,457	4,399	5,972
PT, OT, and SLP users- SLP	114,046	2.6	1,524	1,987	3,607	5,005

SOURCE: RTI simulation using 100% 2011 Medicare claims and enrollment data.

Program: Pami138

Table 4-4f

Frequency and mean annual therapy expenditures, by institutional resident therapy user subgroup, 2011

	Therapy users			Percentiles of annual expenditures		
Therapy user groups	N	%	Mean annual expenditures	75th	90th	95th
Total	509,809	100.0	$3,382	4,378	8,311	11,604
Physical therapy (PT) users only	106,577	20.9	1,419	1,842	3,231	4,421
Occupational therapy (OT) users only	55,382	10.9	1,166	1,524	2,645	3,717
Speech-Language pathology (SLP) users only	61,743	12.1	1,186	1,550	2,665	3,732
PT and OT users	132,205	25.9	4,213	5,603	9,131	11,962
PT and OT users- PT	132,205	25.9	2,269	3,042	5,135	6,805
PT and OT users-OT	132,205	25.9	1,944	2,587	4,445	5,934
PT and SLP users	33,219	6.5	3,123	4,105	6,449	8,311
PT and SLP users- PT	33,219	6.5	1,613	2,125	3,726	5,034
PT and SLP users- SLP	33,219	6.5	1,510	1,954	3,398	4,597
OT and SLP users	27,079	5.3	3,116	4,061	6,429	13,378
OT and SLP users- OT	27,079	5.3	1,420	1,818	3,278	4,463
OT and SLP users- SLP	27,079	5.3	1,696	2,166	3,781	5,115
PT, OT, and SLP users	93,604	18.4	7,371	9,769	14,991	19,029
PT, OT, and SLP users- PT	93,604	18.4	2,718	3,726	6,140	7,940
PT, OT, and SLP users- OT	93,604	18.4	2,478	3,355	5,617	7,363
PT, OT, and SLP users- SLP	93,604	18.4	2,175	2,846	4,959	6,730

SOURCE: RTI simulation using 100% 2011 Medicare claims and enrollment data.

Program: Pami138

Table 4-5
Regression models of annual physical therapy allowed charges, 2011

	Demographics only		Prospective HCCs (Prior year diagnoses)		Concurrent DRGs (Current year hospitalizations)		Concurrent inpatient utilization and prospective risk score	
Number of observations	3,655,812		3,655,812		3,655,812		3,655,812	
Mean dependent variable ($)	1,258		1,258		1,258		1,258	
R^2	0.0399		0.0551		0.0493		0.0537	
Adjusted R^2	0.0399		0.0551		0.0493		0.0537	
Variable	Count	Parameter	Count	Parameter	Count	Parameter	Count	Parameter
Intercept	—	1,148***	—	1,079***	—	1,089***	—	1,027***
Age/sex								
Male, age 0 to 34	12,555	-245***	12,555	-290***	12,555	-215***	12,555	-203***
Male, age 35 to 44	25,664	-266***	25,664	-309***	25,664	-242***	25,664	-248***
Male, age 45 to 54	59,543	-191***	59,543	-244***	59,543	-175***	59,543	-209***
Male, age 55 to 59	40,360	-77***	40,360	-149***	40,360	-68***	40,360	-126***
Male, age 60 to 64	47,421	-16**	47,421	-97***	47,421	-11	47,421	-90***
Male, age 65 to 69	238,506	-23***	238,506	-36***	238,506	-25***	238,506	-40***
Male, age 70 to 74	271,349	11***	271,349	-22***	271,349	8**	271,349	-32***
Male, age 75 to 79	235,090	31***	235,090	-25***	235,090	30***	235,090	-44***
Male, age 80 to 84	191,666	51***	191,666	-25***	191,666	59***	191,666	-48***
Male, age 85 to 89	116,226	82***	116,226	2	116,226	101***	116,226	-33***
Male, age 90 to 94	41,084	89***	41,084	22**	41,084	114***	41,084	-29***
Male, age 95+	7,914	83***	7,914	38*	7,914	111***	7,914	-24
Female, age 0 to 34	17,024	-241***	17,024	-296***	17,024	-203***	17,024	-202***
Female, age 35 to 44	38,109	-214***	38,109	-273***	38,109	-181***	38,109	-193***
Female, age 45 to 54	93,253	-135***	93,253	-199***	93,253	-115***	93,253	-149***
Female, age 55 to 59	69,298	-63***	69,298	-134***	69,298	-53***	69,298	-102***
Female, age 60 to 64	82,528	-2	82,528	-78***	82,528	3	82,528	-63***

(continued)

Table 4-5 (continued)
Regression models of annual physical therapy allowed charges, 2011

	Demographics only		Prospective HCCs (Prior year diagnoses)		Concurrent DRGs (Current year hospitalizations)		Concurrent inpatient utilization and prospective risk score	
Female, age 65 to 69	*414,653*	*Reference*	*414,653*	*Reference*	*414,653*	*Reference*	*414,653*	*Reference*
Female, age 70 to 74	463,223	23***	463,223	7**	463,223	19***	463,223	0
Female, age 75 to 79	407,267	25***	407,267	-11***	407,267	22***	407,267	-23***
Female, age 80 to 84	362,950	48***	362,950	-8**	362,950	52***	362,950	-22***
Female, age 85 to 89	264,509	104***	264,509	38***	264,509	117***	264,509	23***
Female, age 90 to 94	119,317	139***	119,317	82***	119,317	158***	119,317	61***
Female, age 95+	36,303	56***	36,303	16	36,303	78***	36,303	12
Other demographics								
Long term institutionalized	292,605	892***	292,605	739***	292,605	887***	292,605	821***
ESRD	36,958	0	36,958	-127***	36,958	-7	36,958	-59***
Originally disabled, male, aged	117,586	-65***	117,586	-128***	117,586	-66***	117,586	-137***
Originally disabled, female, aged	181,778	-87***	181,778	-146***	181,778	-90***	181,778	-161***
Medicaid, male, aged	137,956	267***	137,956	209***	137,956	295***	137,956	231***
Medicaid, female, aged	404,441	206***	404,441	155***	404,441	228***	404,441	180***
Medicaid, male, disabled	114,204	0	114,204	-66***	114,204	13*	114,204	-41***
Medicaid, female, disabled	195,170	-78***	195,170	-111***	195,170	-73***	195,170	-115***
Hierarchical condition categories								
HCC1 - HIV/AIDS	—	—	9,535	8	—	—	—	—
HCC2 - Septicemia/shock	—	—	80,381	94***	—	—	—	—
HCC5 - Opportunistic infections	—	—	14,422	9	—	—	—	—
HCC7 - Metastatic cancer and acute leukemia	—	—	39,717	-4	—	—	—	—
HCC8 - Lung, upper digestive tract, and other severe cancers	—	—	33,750	-13	—	—	—	—

(continued)

Table 4-5 (continued)
Regression models of annual physical therapy allowed charges, 2011

	Demographics only		Prospective HCCs (Prior year diagnoses)		Concurrent DRGs (Current year hospitalizations)		Concurrent inpatient utilization and prospective risk score	
HCC9 - Lymphatic, head and neck, brain, and other major cancers	—	—	72,501	40***	—	—	—	—
HCC10 - Breast, prostate, colorectal and other cancers and tumors	—	—	352,229	29***	—	—	—	—
HCC15 - Diabetes with renal or peripheral circulatory manifestation	—	—	196,046	79***	—	—	—	—
HCC16 - Diabetes with neurologic or other specified manifestation	—	—	182,368	28***	—	—	—	—
HCC17 - Diabetes with acute complications	—	—	6,066	90***	—	—	—	—
HCC18 - Diabetes with ophthalmologic or unspecified manifestation	—	—	70,549	57***	—	—	—	—
HCC19 - Diabetes without complication	—	—	618,062	12***	—	—	—	—
HCC21 - Protein-calorie malnutrition	—	—	70,397	117***	—	—	—	—
HCC25 - End-stage liver disease	—	—	11,581	-29*	—	—	—	—
HCC26 - Cirrhosis of liver	—	—	15,673	-33***	—	—	—	—
HCC27 - Chronic hepatitis	—	—	17,794	4	—	—	—	—
HCC31 - Intestinal obstruction/perforation	—	—	77,259	-6	—	—	—	—
HCC32 - Pancreatic disease	—	—	61,965	-5	—	—	—	—
HCC33 - Inflammatory bowel disease	—	—	42,288	25***	—	—	—	—
HCC37 - Bone/joint/muscle infections/necrosis	—	—	59,821	126***	—	—	—	—
HCC38 - Rheumatoid arthritis and inflammatory connective tissue disease	—	—	309,936	59***	—	—	—	—
HCC44 - Severe hematological disorders	—	—	39,237	-16*	—	—	—	—
HCC45 - Disorders of immunity	—	—	38,788	13*	—	—	—	—

(continued)

Table 4-5 (continued)
Regression models of annual physical therapy allowed charges, 2011

	Demographics only		Prospective HCCs (Prior year diagnoses)		Concurrent DRGs (Current year hospitalizations)		Concurrent inpatient utilization and prospective risk score	
HCC51 - Drug/alcohol psychosis	—	—	29,897	-80***	—	—	—	—
HCC52 - Drug/alcohol dependence	—	—	45,503	-164***	—	—	—	—
HCC54 - Schizophrenia	—	—	59,656	183***	—	—	—	—
HCC55 - Major depressive, bipolar, and paranoid disorders	—	—	306,378	131***	—	—	—	—
HCC67 - Quadriplegia, other extensive paralysis	—	—	17,962	352***	—	—	—	—
HCC68 - Paraplegia	—	—	13,674	331***	—	—	—	—
HCC69 - Spinal cord disorders/injuries	—	—	39,317	219***	—	—	—	—
HCC70 - Muscular dystrophy	—	—	3,616	44	—	—	—	—
HCC71 - Polyneuropathy	—	—	384,095	112***	—	—	—	—
HCC72 - Multiple sclerosis	—	—	33,265	241***	—	—	—	—
HCC73 - Parkinson’s and Huntington’s diseases	—	—	113,916	317***	—	—	—	—
HCC74 - Seizure disorders and convulsions	—	—	148,890	29***	—	—	—	—
HCC75 - Coma, brain compression/anoxic damage	—	—	10,703	110***	—	—	—	—
HCC77 - Respirator dependence/tracheostomy status	—	—	9,434	161***	—	—	—	—
HCC78 - Respiratory arrest	—	—	2,208	-13	—	—	—	—
HCC79 - Cardio-respiratory failure and shock	—	—	179,809	7	—	—	—	—
HCC80 - Congestive heart failure	—	—	557,770	46***	—	—	—	—
HCC81 - Acute myocardial infarction	—	—	43,388	-66***	—	—	—	—
HCC82 - Unstable angina and other acute ischemic heart disease	—	—	96,709	-21***	—	—	—	—

(continued)

Table 4-5 (continued)
Regression models of annual physical therapy allowed charges, 2011

	Demographics only		Prospective HCCs (Prior year diagnoses)		Concurrent DRGs (Current year hospitalizations)		Concurrent inpatient utilization and prospective risk score	
HCC83 - Angina pectoris/old myocardial infarction	—	—	224,097	-7**	—	—	—	—
HCC92 - Specified heart arrhythmias	—	—	613,740	9***	—	—	—	—
HCC95 - Cerebral hemorrhage	—	—	28,645	186***	—	—	—	—
HCC96 - Ischemic or unspecified stroke	—	—	206,558	131***	—	—	—	—
HCC100 - Hemiplegia/hemiparesis	—	—	84,290	372***	—	—	—	—
HCC101 - Cerebral palsy and other paralytic syndromes	—	—	16,613	219***	—	—	—	—
HCC104 - Vascular disease with complications	—	—	111,746	147***	—	—	—	—
HCC105 - Vascular disease	—	—	732,734	154***	—	—	—	—
HCC107 - Cystic fibrosis	—	—	884	42	—	—	—	—
HCC108 - Chronic obstructive pulmonary disease	—	—	559,824	-32***	—	—	—	—
HCC111 - Aspiration and specified bacterial pneumonias	—	—	46,376	36***	—	—	—	—
HCC112 - Pneumococcal pneumonia, emphysema, lung abscess	—	—	13,393	-27*	—	—	—	—
HCC119 - Proliferative diabetic retinopathy and vitreous hemorrhage	—	—	35,314	-22**	—	—	—	—
HCC130 - Dialysis status	—	—	27,476	-79***	—	—	—	—
HCC131 - Renal failure	—	—	429,399	-17***	—	—	—	—
HCC132 - Nephritis	—	—	8,572	-43***	—	—	—	—
HCC148 - Decubitus ulcer of skin	—	—	76,157	133***	—	—	—	—

(continued)

Table 4-5 (continued)
Regression models of annual physical therapy allowed charges, 2011

	Demographics only		Prospective HCCs (Prior year diagnoses)		Concurrent DRGs (Current year hospitalizations)		Concurrent inpatient utilization and prospective risk score	
HCC149 - Chronic ulcer of skin, except decubitus	—	—	129,913	113***	—	—	—	—
HCC150 - Extensive third-degree burns	—	—	201	-36	—	—	—	—
HCC154 - Severe head injury	—	—	1,217	296***	—	—	—	—
HCC155 - Major head injury	—	—	37,145	102***	—	—	—	—
HCC157 - Vertebral fractures without spinal cord injury	—	—	74,373	90***	—	—	—	—
HCC158 - Hip fracture/dislocation	—	—	94,106	320***	—	—	—	—
HCC161 - Traumatic amputation	—	—	7,967	300***	—	—	—	—
HCC164 - Major complications of medical care and trauma	—	—	187,456	84***	—	—	—	—
HCC174 - Major organ transplant status	—	—	8,013	-12	—	—	—	—
HCC176 - Artificial openings for feeding or elimination	—	—	34,966	-117***	—	—	—	—
HCC177 - Amputation status, lower limb/amputation complications	—	—	14,480	14	—	—	—	—
Diagnosis-related groups								
DRG Group 1 - Major joint upper extremity	—	—	—	—	20,436	725***	—	—
DRG Group 2 - Amputation	—	—	—	—	7,654	323***	—	—
DRG Group 3 - Urinary tract infection	—	—	—	—	59,706	100***	—	—
DRG Group 4 - Stroke	—	—	—	—	49,614	141***	—	—
DRG Group 5 - Chronic obstructive pulmonary disease, bronchitis/asthma	—	—	—	—	54,688	-75***	—	—
DRG Group 6 - Coronary artery bypass graft surgery	—	—	—	—	6,453	-168***	—	—

(continued)

Table 4-5 (continued)
Regression models of annual physical therapy allowed charges, 2011

	Demographics only		Prospective HCCs (Prior year diagnoses)		Concurrent DRGs (Current year hospitalizations)		Concurrent inpatient utilization and prospective risk score	
DRG Group 7 - Major joint replacement of the lower extremity	—	—	—	—	222,724	432***	—	—
DRG Group 8 - Percutaneous coronary intervention	—	—	—	—	23,694	-105***	—	—
DRG Group 9 - Pacemaker			—	—	13,062	-16	—	—
DRG Group 10 - Cardiac defibrillator	—	—	—	—	3,802	-16	—	—
DRG Group 11 - Pacemaker device replacement or revision	—	—	—	—	1,674	-18	—	—
DRG Group 12 - Automatic implantable cardiac defibrillator generator or lead	—	—	—	—	405	-104	—	—
DRG Group 13 - Congestive heart failure	—	—	—	—	54,983	4	—	—
DRG Group 14 - Acute myocardial infarction	—	—	—	—	16,580	-61***	—	—
DRG Group 15 - Cardiac arrhythmia	—	—	—	—	43,120	-41***	—	—
DRG Group 16 - Cardiac valve	—	—	—	—	6,625	-83***	—	—
DRG Group 17 - Other vascular surgery	—	—	—	—	13,904	2	—	—
DRG Group 18 - Major cardiovascular procedure	—	—	—	—	6,023	-51***	—	—
DRG Group 19 - Gastrointestinal hemorrhage	—	—	—	—	34,561	1	—	—
DRG Group 20 - Major bowel	—	—	—	—	13,135	-79***	—	—
DRG Group 21 - Fractures femur and hip/pelvis	—	—	—	—	21,720	73***	—	—
DRG Group 22 - Medical non-infectious orthopedic	—	—	—	—	128,919	101***	—	—
DRG Group 23 - Double joint replacement of the lower extremity	—	—	—	—	6,207	732***	—	—
DRG Group 24 - Revision of the hip or knee	—	—	—	—	19,702	477***	—	—

(continued)

Table 4-5 (continued)
Regression models of annual physical therapy allowed charges, 2011

	Demographics only		Prospective HCCs (Prior year diagnoses)		Concurrent DRGs (Current year hospitalizations)		Concurrent inpatient utilization and prospective risk score	
DRG Group 25 - Spinal fusion (non-cervical)	—	—	—	—	30,604	205***	—	—
DRG Group 26 - Hip and femur procedures except major joint	—	—	—	—	37,333	315***	—	—
DRG Group 27 - Cervical spinal fusion	—	—	—	—	14,979	132***	—	—
DRG Group 28 - Other knee procedures	—	—	—	—	5,582	433***	—	—
DRG Group 29 - Complex non-cervical spinal fusion	—	—	—	—	2,691	350***	—	—
DRG Group 30 - Combined anterior posterior spinal fusion	—	—	—	—	3,469	349***	—	—
DRG Group 31 - Back and neck except spinal fusion	—	—	—	—	23,206	167***	—	—
DRG Group 32 - Lower extremity and humerus procedure except hip, foot, femur	—	—	—	—	16,698	364***	—	—
DRG Group 33 - Removal of orthopedic devices	—	—	—	—	4,311	238***	—	—
DRG Group 34 - Sepsis	—	—	—	—	59,602	69***	—	—
DRG Group 35 - Diabetes	—	—	—	—	15,590	-13	—	—
DRG Group 36 - Simple pneumonia and respiratory infections	—	—	—	—	85,139	14**	—	—
DRG Group 37 - Other respiratory	—	—	—	—	33,116	30***	—	—
DRG Group 38 - Chest pain	—	—	—	—	21,334	-43***	—	—
DRG Group 39 - Medical peripheral vascular disorders	—	—	—	—	18,642	71***	—	—
DRG Group 40 - Atherosclerosis	—	—	—	—	9,473	-18	—	—
DRG Group 41 - Gastrointestinal obstruction	—	—	—	—	15,918	-47***	—	—
DRG Group 42 - Syncope and collapse	—	—	—	—	28,056	41***	—	—

(continued)

Table 4-5 (continued)
Regression models of annual physical therapy allowed charges, 2011

	Demographics only		Prospective HCCs (Prior year diagnoses)		Concurrent DRGs (Current year hospitalizations)		Concurrent inpatient utilization and prospective risk score	
DRG Group 43 - Renal failure	—	—	—	—	41,333	5	—	—
DRG Group 44 - Nutritional and metabolic disorders	—	—	—	—	36,100	-37***	—	—
DRG Group 45 - Cellulitis	—	—	—	—	30,152	20**	—	—
DRG Group 46 - Red blood cell disorders	—	—	—	—	16,516	23*	—	—
DRG Group 47 - Transient ischemia	—	—	—	—	18,030	73***	—	—
DRG Group 48 - Esophagitis, gastroenteritis and other digestive disorders	—	—	—	—	48,098	-61***	—	—
DRG Group 49 - Other DRG	—	—	—	—	220,778	25***	—	—
Inpatient facility type								
Cancer facility	—	—	—	—	—	—	2,022	-166***
Acute hospital	—	—	—	—	—	—	1,152,729	-87***
Critical access hospital	—	—	—	—	—	—	30,835	-129***
Long term care hospital	—	—	—	—	—	—	16,896	-206***
Inpatient rehabilitation facility	—	—	—	—	—	—	51,803	-223***
Children's hospital	—	—	—	—	—	—	126	-160
Psychiatric hospital	—	—	—	—	—	—	11,927	-112***
Skilled nursing facility	—	—	—	—	—	—	407,932	-151***
Inpatient rehabilitation facility unit	—	—	—	—	—	—	63,311	-181***
Psychiatric unit	—	—	—	—	—	—	32,353	-158***
Swing-bed short-term acute care hospital	—	—	—	—	—	—	4,943	-234***
Swing-bed long-term care hospital	—	—	—	—	—	—	20	165
Swing-bed rehabilitation hospital	—	—	—	—	—	—	†	†
Rehabilitation unit in critical access hospital	—	—	—	—	—	—	122	-480***

(continued)

Table 4-5 (continued)
Regression models of annual physical therapy allowed charges, 2011

	Demographics only		Prospective HCCs (Prior year diagnoses)		Concurrent DRGs (Current year hospitalizations)		Concurrent inpatient utilization and prospective risk score	
Swing-bed unit in critical access hospital	—	—	—	—	—	—	9,028	-221***
Psychiatric unit in critical access hospital	—	—	—	—	—	—	1,277	-66
Inpatient stay type								
Long stay	—	—	—	—	—	—	108,661	42
Skilled nursing facility stay	—	—	—	—	—	—	416,578	-128***
Short stay	—	—	—	—	—	—	1,171,102	130***
Hospital stay outlier payments								
Outlier payment is greater than $0	—	—	—	—	—	—	45,430	-123***
Inpatient therapy charges								
Physical therapy and occupational therapy and speech-language pathology charges equal to $0	—	—	—	—	—	—	287,822	-136***
Physical therapy charges greater than $0 and less than or equal to $1,000	—	—	—	—	—	—	281,735	69***
Physical therapy charges greater than $1,000 and less than or equal to $5,000	—	—	—	—	—	—	383,596	320***
Physical therapy charges greater than $5,000 and less than or equal to $10,000	—	—	—	—	—	—	155,079	531***
Physical therapy charges greater than $10,000	—	—	—	—	—	—	82,511	709***
Occupational therapy charges greater than $0 and less than or equal to $1,000	—	—	—	—	—	—	232,572	16***
Occupational therapy charges greater than $1,000 and less than or equal to $5,000	—	—	—	—	—	—	306,141	101***
Occupational therapy charges greater than $5,000 and less than or equal to $10,000	—	—	—	—	—	—	116,668	60***

(continued)

Table 4-5 (continued)
Regression models of annual physical therapy allowed charges, 2011

	Demographics only		Prospective HCCs (Prior year diagnoses)		Concurrent DRGs (Current year hospitalizations)		Concurrent inpatient utilization and prospective risk score	
Occupational therapy charges greater than $10,000	—	—	—	—	—	—	54,696	109***
Speech-language pathology charges greater than $0 and less than or equal to $1,000	—	—	—	—	—	—	103,848	-151***
Speech-language pathology charges greater than $1,000 and less than or equal to $5,000	—	—	—	—	—	—	118,973	-143***
Speech-language pathology charges greater than $5,000 and less than or equal to $10,000	—	—	—	—	—	—	31,653	-20*
Speech-language pathology charges greater than $10,000	—	—	—	—	—	—	12,509	125***
HCC prospective risk score								
HCC prospective risk score	—	—	—	—	—	—	3,655,812	114***

*** (p=<0.01), ** (p=<0.05), * (p=<0.10)

† = Fewer than 11 cases

NOTES:

1. ESRD (End-Stage Renal Disease) - The beneficiary had ESRD at any point during 2011.
2. Medicaid - The beneficiary had at least one month of Medicaid while receiving therapy.
3. Long Term Institutionalized - If the beneficiary had a 90-day MDS assessment at any point during 2011, then they were considered long-term institutionalized.
4. Originally Disabled - The beneficiary's original reason for entitlement was disability, among beneficiaries currently entitled by age.
5. Disabled - The beneficiary's current reason for entitlement is disability.
6. Annual Period: January 1, 2011 - December 31, 2011.
7. HCC = Hierarchical Condition Categories; DRG = Diagnosis-Related Groups

SOURCE: RTI analysis of 2011-2012 MEDPAR Medicare Claims.

Program: PA016

Table 4-6
Regression models of annual occupational therapy allowed charges, 2011

	Demographics only		Prospective HCCs (Prior year diagnoses)		Concurrent DRGs (Current year hospitalizations)		Concurrent inpatient utilization and prospective risk score	
Number of observations	858,189		858,189		858,189		858,189	
Mean dependent variable ($)	1,365		1,365		1,365		1,365	
R^2	0.0686		0.0865		0.0712		0.0843	
Adjusted R^2	0.0686		0.0865		0.0712		0.0843	
Variable	Count	Parameter	Count	Parameter	Count	Parameter	Count	Parameter
Intercept	—	901***	—	780***	—	878***	—	747***
Age/sex								
Male, age 0 to 34	3,458	-397***	3,458	-401***	3,458	-394***	3,458	-370***
Male, age 35 to 44	6,224	-340***	6,224	-362***	6,224	-341***	6,224	-334***
Male, age 45 to 54	15,186	-208***	15,186	-261***	15,186	-213***	15,186	-239***
Male, age 55 to 59	11,175	-27	11,175	-113***	11,175	-36*	11,175	-88***
Male, age 60 to 64	12,954	13	12,954	-88***	12,954	0	12,954	-67***
Male, age 65 to 69	37,928	-34***	37,928	-69***	37,928	-38***	37,928	-67***
Male, age 70 to 74	44,169	30***	44,169	-21**	44,169	23**	44,169	-25**
Male, age 75 to 79	44,224	22**	44,224	-38***	44,224	9	44,224	-57***
Male, age 80 to 84	45,284	62***	45,284	-2	45,284	45***	45,284	-29***
Male, age 85 to 89	36,156	136***	36,156	86***	36,156	116***	36,156	45***
Male, age 90 to 94	17,012	127***	17,012	101***	17,012	109***	17,012	45***
Male, age 95+	3,969	55*	3,969	64**	3,969	41	3,969	-1
Female, age 0 to 34	3,329	-417***	3,329	-421***	3,329	-409***	3,329	-394***
Female, age 35 to 44	6,972	-324***	6,972	-348***	6,972	-317***	6,972	-309***
Female, age 45 to 54	18,873	-218***	18,873	-262***	18,873	-214***	18,873	-234***
Female, age 55 to 59	15,127	-117***	15,127	-182***	15,127	-118***	15,127	-155***
Female, age 60 to 64	19,108	5	19,108	-74***	19,108	0	19,108	-55***

(continued)

Table 4-6 (continued)
Regression models of annual occupational therapy allowed charges, 2011

	Demographics only		Prospective HCCs (Prior year diagnoses)		Concurrent DRGs (Current year hospitalizations)		Concurrent inpatient utilization and prospective risk score	
Female, age 65 to 69	*61,653*	*Reference*	*61,653*	*Reference*	*61,653*	*Reference*	*61,653*	*Reference*
Female, age 70 to 74	74,458	66***	74,458	46***	74,458	61***	74,458	45***
Female, age 75 to 79	81,463	135***	81,463	97***	81,463	122***	81,463	93***
Female, age 80 to 84	102,708	244***	102,708	201***	102,708	225***	102,708	194***
Female, age 85 to 89	107,241	311***	107,241	276***	107,241	291***	107,241	266***
Female, age 90 to 94	65,691	313***	65,691	299***	65,691	295***	65,691	285***
Female, age 95+	23,827	172***	23,827	183***	23,827	161***	23,827	182***
Other demographics								
Long term institutionalized	244,453	742***	244,453	616***	244,453	723***	244,453	671***
ESRD	14,527	92***	14,527	-45*	14,527	20	14,527	103***
Originally disabled, male, aged	35,460	-48***	35,460	-107***	35,460	-56***	35,460	-107***
Originally disabled, female, aged	57,692	-46***	57,692	-108***	57,692	-59***	57,692	-115***
Medicaid, male, aged	66,572	483***	66,572	381***	66,572	487***	66,572	434***
Medicaid, female, aged	196,510	352***	196,510	256***	196,510	358***	196,510	322***
Medicaid, male, disabled	36,511	307***	36,511	177***	36,511	307***	36,511	244***
Medicaid, female, disabled	46,908	273***	46,908	164***	46,908	265***	46,908	209***
Hierarchical condition categories								
HCC1 - HIV/AIDS	—	—	2,236	-65*	—	—	—	—
HCC2 - Septicemia/shock	—	—	41,124	84***	—	—	—	—
HCC5 - Opportunistic infections	—	—	4,136	1	—	—	—	—
HCC7 - Metastatic cancer and acute leukemia	—	—	10,278	-47***	—	—	—	—
HCC8 - Lung, upper digestive tract, and other severe cancers	—	—	7,787	-94***	—	—	—	—

(continued)

Table 4-6 (continued)
Regression models of annual occupational therapy allowed charges, 2011

	Demographics only		Prospective HCCs (Prior year diagnoses)		Concurrent DRGs (Current year hospitalizations)		Concurrent inpatient utilization and prospective risk score	
HCC9 - Lymphatic, head and neck, brain, and other major cancers	—	—	16,114	-6	—	—	—	—
HCC10 - Breast, prostate, colorectal and other cancers and tumors	—	—	71,754	-17**	—	—	—	—
HCC15 - Diabetes with renal or peripheral circulatory manifestation	—	—	68,949	142***	—	—	—	—
HCC16 - Diabetes with neurologic or other specified manifestation	—	—	50,474	78***	—	—	—	—
HCC17 - Diabetes with acute complications	—	—	1,828	79*	—	—	—	—
HCC18 - Diabetes with ophthalmologic or unspecified manifestation	—	—	17,120	74***	—	—	—	—
HCC19 - Diabetes without complication	—	—	148,514	49***	—	—	—	—
HCC21 - Protein-calorie malnutrition	—	—	39,214	138***	—	—	—	—
HCC25 - End-stage liver disease	—	—	3,669	66**	—	—	—	—
HCC26 - Cirrhosis of liver	—	—	4,215	28	—	—	—	—
HCC27 - Chronic hepatitis	—	—	3,797	-36	—	—	—	—
HCC31 - Intestinal obstruction/perforation	—	—	26,630	-5	—	—	—	—
HCC32 - Pancreatic disease	—	—	15,531	-60***	—	—	—	—
HCC33 - Inflammatory bowel disease	—	—	9,088	-74***	—	—	—	—
HCC37 - Bone/joint/muscle infections/necrosis	—	—	18,630	37**	—	—	—	—
HCC38 - Rheumatoid arthritis and inflammatory connective tissue disease	—	—	63,747	-37***	—	—	—	—
HCC44 - Severe hematological disorders	—	—	11,872	-8	—	—	—	—
HCC45 - Disorders of immunity	—	—	8,732	-56***	—	—	—	—

(continued)

Table 4-6 (continued)
Regression models of annual occupational therapy allowed charges, 2011

	Demographics only		Prospective HCCs (Prior year diagnoses)		Concurrent DRGs (Current year hospitalizations)		Concurrent inpatient utilization and prospective risk score	
HCC51 - Drug/alcohol psychosis	—	—	11,104	-59***	—	—	—	—
HCC52 - Drug/alcohol dependence	—	—	11,325	-150***	—	—	—	—
HCC54 - Schizophrenia	—	—	27,979	357***	—	—	—	—
HCC55 - Major depressive, bipolar, and paranoid disorders	—	—	102,513	211***	—	—	—	—
HCC67 - Quadriplegia, other extensive paralysis	—	—	11,226	215***	—	—	—	—
HCC68 - Paraplegia	—	—	6,700	132***	—	—	—	—
HCC69 - Spinal cord disorders/injuries	—	—	11,452	128***	—	—	—	—
HCC70 - Muscular dystrophy	—	—	1,445	-57	—	—	—	—
HCC71 - Polyneuropathy	—	—	97,419	82***	—	—	—	—
HCC72 - Multiple sclerosis	—	—	12,544	149***	—	—	—	—
HCC73 - Parkinson's and Huntington's diseases	—	—	50,676	261***	—	—	—	—
HCC74 - Seizure disorders and convulsions	—	—	65,557	45***	—	—	—	—
HCC75 - Coma, brain compression/anoxic damage	—	—	6,315	174***	—	—	—	—
HCC77 - Respirator dependence/tracheostomy status	—	—	5,614	182***	—	—	—	—
HCC78 - Respiratory arrest	—	—	1,056	-2	—	—	—	—
HCC79 - Cardio-respiratory failure and shock	—	—	68,275	31***	—	—	—	—
HCC80 - Congestive heart failure	—	—	195,776	86***	—	—	—	—
HCC81 - Acute myocardial infarction	—	—	16,580	-26	—	—	—	—
HCC82 - Unstable angina and other acute ischemic heart disease	—	—	24,546	-59***	—	—	—	—

(continued)

Table 4-6 (continued)
Regression models of annual occupational therapy allowed charges, 2011

	Demographics only		Prospective HCCs (Prior year diagnoses)		Concurrent DRGs (Current year hospitalizations)		Concurrent inpatient utilization and prospective risk score	
HCC83 - Angina pectoris/old myocardial infarction	—	—	53,864	8	—	—	—	—
HCC92 - Specified heart arrhythmias	—	—	180,852	-1	—	—	—	—
HCC95 - Cerebral hemorrhage	—	—	14,234	215***	—	—	—	—
HCC96 - Ischemic or unspecified stroke	—	—	95,523	173***	—	—	—	—
HCC100 - Hemiplegia/hemiparesis	—	—	52,486	332***	—	—	—	—
HCC101 - Cerebral palsy and other paralytic syndromes	—	—	7,303	166***	—	—	—	—
HCC104 - Vascular disease with complications	—	—	37,126	159***	—	—	—	—
HCC105 - Vascular disease	—	—	254,561	167***	—	—	—	—
HCC107 - Cystic fibrosis	—	—	179	-221**	—	—	—	—
HCC108 - Chronic obstructive pulmonary disease	—	—	166,098	4	—	—	—	—
HCC111 - Aspiration and specified bacterial pneumonias	—	—	25,752	-11	—	—	—	—
HCC112 - Pneumococcal pneumonia, emphysema, lung abscess	—	—	4,683	-69**	—	—	—	—
HCC119 - Proliferative diabetic retinopathy and vitreous hemorrhage	—	—	10,309	-34*	—	—	—	—
HCC130 - Dialysis status	—	—	11,162	-44	—	—	—	—
HCC131 - Renal failure	—	—	145,122	18***	—	—	—	—
HCC132 - Nephritis	—	—	2,011	-102**	—	—	—	—
HCC148 - Decubitus ulcer of skin	—	—	47,382	87***	—	—	—	—

(continued)

Table 4-6 (continued)
Regression models of annual occupational therapy allowed charges, 2011

	Demographics only		Prospective HCCs (Prior year diagnoses)		Concurrent DRGs (Current year hospitalizations)		Concurrent inpatient utilization and prospective risk score	
HCC149 - Chronic ulcer of skin, except decubitus	—	—	41,154	73***	—	—	—	—
HCC150 - Extensive third-degree burns	—	—	107	132	—	—	—	—
HCC154 - Severe head injury	—	—	619	365***	—	—	—	—
HCC155 - Major head injury	—	—	16,472	103***	—	—	—	—
HCC157 - Vertebral fractures without spinal cord injury	—	—	23,066	84***	—	—	—	—
HCC158 - Hip fracture/dislocation	—	—	37,327	211***	—	—	—	—
HCC161 - Traumatic amputation	—	—	3,365	141***	—	—	—	—
HCC164 - Major complications of medical care and trauma	—	—	52,882	3	—	—	—	—
HCC174 - Major organ transplant status	—	—	1,559	-133***	—	—	—	—
HCC176 - Artificial openings for feeding or elimination	—	—	20,448	-99***	—	—	—	—
HCC177 - Amputation status, lower limb/amputation complications	—	—	6,558	-9	—	—	—	—
Diagnosis-related groups								
DRG Group 1 - Major joint upper extremity	—	—	—	—	3,945	372***	—	—
DRG Group 2 - Amputation	—	—	—	—	3,864	257***	—	—
DRG Group 3 - Urinary tract infection	—	—	—	—	35,021	153***	—	—
DRG Group 4 - Stroke	—	—	—	—	28,595	190***	—	—
DRG Group 5 - Chronic obstructive pulmonary disease, bronchitis/asthma	—	—	—	—	21,537	-1	—	—
DRG Group 6 - Coronary artery bypass graft surgery	—	—	—	—	1,250	-111***	—	—

(continued)

Table 4-6 (continued)
Regression models of annual occupational therapy allowed charges, 2011

	Demographics only		Prospective HCCs (Prior year diagnoses)		Concurrent DRGs (Current year hospitalizations)		Concurrent inpatient utilization and prospective risk score	
DRG Group 7 - Major joint replacement of the lower extremity	—	—	—	—	17,440	-125***	—	—
DRG Group 8 - Percutaneous coronary intervention	—	—	—	—	5,103	-145***	—	—
DRG Group 9 - Pacemaker	—	—	—	—	3,997	20	—	—
DRG Group 10 - Cardiac defibrillator	—	—	—	—	908	-81	—	—
DRG Group 11 - Pacemaker device replacement or revision	—	—	—	—	571	-36	—	—
DRG Group 12 - Automatic implantable cardiac defibrillator generator or lead	—	—	—	—	120	-107	—	—
DRG Group 13 - Congestive heart failure	—	—	—	—	25,408	91***	—	—
DRG Group 14 - Acute myocardial infarction	—	—	—	—	6,847	0	—	—
DRG Group 15 - Cardiac arrhythmia	—	—	—	—	14,582	-5	—	—
DRG Group 16 - Cardiac valve	—	—	—	—	1,415	-177***	—	—
DRG Group 17 - Other vascular surgery	—	—	—	—	5,227	80***	—	—
DRG Group 18 - Major cardiovascular procedure	—	—	—	—	1,492	-43	—	—
DRG Group 19 - Gastrointestinal hemorrhage	—	—	—	—	14,508	39**	—	—
DRG Group 20 - Major bowel	—	—	—	—	3,730	-39	—	—
DRG Group 21 - Fractures femur and hip/pelvis	—	—	—	—	9,618	118***	—	—
DRG Group 22 - Medical non-infectious orthopedic	—	—	—	—	42,010	93***	—	—
DRG Group 23 - Double joint replacement of the lower extremity	—	—	—	—	250	-228***	—	—
DRG Group 24 - Revision of the hip or knee	—	—	—	—	2,302	62*	—	—

(continued)

Table 4-6 (continued)
Regression models of annual occupational therapy allowed charges, 2011

	Demographics only		Prospective HCCs (Prior year diagnoses)		Concurrent DRGs (Current year hospitalizations)		Concurrent inpatient utilization and prospective risk score	
DRG Group 25 - Spinal fusion (non-cervical)	—	—	—	—	2,304	-311***	—	—
DRG Group 26 - Hip and femur procedures except major joint	—	—	—	—	13,773	190***	—	—
DRG Group 27 - Cervical spinal fusion	—	—	—	—	2,266	60*	—	—
DRG Group 28 - Other knee procedures	—	—	—	—	681	30	—	—
DRG Group 29 - Complex non-cervical spinal fusion	—	—	—	—	352	119	—	—
DRG Group 30 - Combined anterior posterior spinal fusion	—	—	—	—	378	-93	—	—
DRG Group 31 - Back and neck except spinal fusion	—	—	—	—	2,092	-194***	—	—
DRG Group 32 - Lower extremity and humerus procedure except hip, foot, femur	—	—	—	—	4,693	298***	—	—
DRG Group 33 - Removal of orthopedic devices	—	—	—	—	1,345	114**	—	—
DRG Group 34 - Sepsis	—	—	—	—	33,297	95***	—	—
DRG Group 35 - Diabetes	—	—	—	—	7,731	30	—	—
DRG Group 36 - Simple pneumonia and respiratory infections	—	—	—	—	43,405	56***	—	—
DRG Group 37 - Other respiratory	—	—	—	—	16,412	89***	—	—
DRG Group 38 - Chest pain	—	—	—	—	6,871	25	—	—
DRG Group 39 - Medical peripheral vascular disorders	—	—	—	—	7,862	92***	—	—
DRG Group 40 - Atherosclerosis	—	—	—	—	3,674	6	—	—
DRG Group 41 - Gastrointestinal obstruction	—	—	—	—	5,813	-13	—	—
DRG Group 42 - Syncope and collapse	—	—	—	—	10,341	39**	—	—

(continued)

Table 4-6 (continued)
Regression models of annual occupational therapy allowed charges, 2011

	Demographics only		Prospective HCCs (Prior year diagnoses)		Concurrent DRGs (Current year hospitalizations)		Concurrent inpatient utilization and prospective risk score	
DRG Group 43 - Renal failure	—	—	—	—	20,728	53***	—	—
DRG Group 44 - Nutritional and metabolic disorders	—	—	—	—	16,690	-16	—	—
DRG Group 45 - Cellulitis	—	—	—	—	12,847	22	—	—
DRG Group 46 - Red blood cell disorders	—	—	—	—	7,584	108***	—	—
DRG Group 47 - Transient ischemia	—	—	—	—	6,888	91***	—	—
DRG Group 48 - Esophagitis, gastroenteritis and other digestive disorders	—	—	—	—	17,239	-64***	—	—
DRG Group 49 - Other DRG	—	—	—	—	70,777	59***	—	—
Inpatient facility type								
Cancer facility	—	—	—	—	—	—	454	-169***
Acute hospital	—	—	—	—	—	—	337,285	-59**
Critical access hospital	—	—	—	—	—	—	14,683	-77
Long term care hospital	—	—	—	—	—	—	10,493	16
Inpatient rehabilitation facility	—	—	—	—	—	—	17,874	-375***
Children's hospital	—	—	—	—	—	—	62	-445***
Psychiatric hospital	—	—	—	—	—	—	5,011	36
Skilled nursing facility	—	—	—	—	—	—	186,530	-78*
Inpatient rehabilitation facility unit	—	—	—	—	—	—	21,077	-429***
Psychiatric unit	—	—	—	—	—	—	16,652	2
Swing-bed short-term acute care hospital	—	—	—	—	—	—	1,559	-151***
Swing-bed long-term care hospital	—	—	—	—	—	—	†	†
Swing-bed rehabilitation hospital	—	—	—	—	—	—	—	0
Rehabilitation unit in critical access hospital	—	—	—	—	—	—	29	-805***

(continued)

Table 4-6 (continued)
Regression models of annual occupational therapy allowed charges, 2011

	Demographics only		Prospective HCCs (Prior year diagnoses)		Concurrent DRGs (Current year hospitalizations)		Concurrent inpatient utilization and prospective risk score	
Swing-bed unit in critical access hospital	—	—	—	—	—	—	3,884	-65*
Psychiatric unit in critical access hospital	—	—	—	—	—	—	930	136**
Inpatient stay type								
Long stay	—	—	—	—	—	—	46,463	-28
Skilled nursing facility stay	—	—	—	—	—	—	188,633	-291***
Short stay	—	—	—	—	—	—	345,953	-3
Hospital stay outlier payments								
Outlier payment is greater than $0	—	—	—	—	—	—	18,649	-63***
Inpatient therapy charges								
Physical therapy and occupational therapy and speech-language pathology charges equal to $0	—	—	—	—	—	—	65,845	-6
Physical therapy charges greater than $0 and less than or equal to $1,000	—	—	—	—	—	—	72,523	101***
Physical therapy charges greater than $1,000 and less than or equal to $5,000	—	—	—	—	—	—	104,077	177***
Physical therapy charges greater than $5,000 and less than or equal to $10,000	—	—	—	—	—	—	65,210	236***
Physical therapy charges greater than $10,000	—	—	—	—	—	—	45,850	237***
Occupational therapy charges greater than $0 and less than or equal to $1,000	—	—	—	—	—	—	57,566	-103***
Occupational therapy charges greater than $1,000 and less than or equal to $5,000	—	—	—	—	—	—	101,467	86***
Occupational therapy charges greater than $5,000 and less than or equal to $10,000	—	—	—	—	—	—	60,931	346***

(continued)

Table 4-6 (continued)
Regression models of annual occupational therapy allowed charges, 2011

	Demographics only		Prospective HCCs (Prior year diagnoses)		Concurrent DRGs (Current year hospitalizations)		Concurrent inpatient utilization and prospective risk score	
Occupational therapy charges greater than $10,000	—	—	—	—	—	—	35,382	626***
Speech-language pathology charges greater than $0 and less than or equal to $1,000	—	—	—	—	—	—	49,699	52***
Speech-language pathology charges greater than $1,000 and less than or equal to $5,000	—	—	—	—	—	—	71,203	157***
Speech-language pathology charges greater than $5,000 and less than or equal to $10,000	—	—	—	—	—	—	23,038	291***
Speech-language pathology charges greater than $10,000	—	—	—	—	—	—	9,935	456***
HCC prospective risk score								
HCC prospective risk score	—	—	—	—	—	—	858,189	137***

*** (p=<0.01), ** (p=<0.05), * (p=<0.10)

† = Feweer than 11 cases.

NOTES:

1. ESRD (End-Stage Renal Disease) - The beneficiary had ESRD at any point during 2011.
2. Medicaid - The beneficiary had at least one month of Medicaid while receiving therapy.
3. Long Term Institutionalized - If the beneficiary had a 90-day MDS assessment at any point during 2011, then they were considered long-term institutionalized.
4. Originally Disabled - The beneficiary's original reason for entitlement was disability, among beneficiaries currently entitled by age.
5. Disabled - The beneficiary's current reason for entitlement is disability.
6. Annual Period: January 1, 2011 - December 31, 2011.
7. HCC = Hierarchical Condition Categories; DRG = Diagnosis-Related Groups

SOURCE: RTI analysis of 2011-2012 MEDPAR Medicare Claims.

Program: PA016

Table 4-7
Regression models of annual speech-language pathology allowed charges, 2011

	Demographics only		Prospective HCCs (Prior year diagnoses)		Concurrent DRGs (Current year hospitalizations)		Concurrent inpatient utilization and prospective risk score	
Number of observations	423,922		423,922		423,922		423,922	
Mean dependent variable ($)	1,306		1,306		1,306		1,306	
R^2	0.0641		0.0835		0.0681		0.0830	
Adjusted R^2	0.0641		0.0835		0.0681		0.0830	
Variable	Count	Parameter	Count	Parameter	Count	Parameter	Count	Parameter
Intercept	—	772***	—	650***	—	719***	—	593***
Age/sex								
Male, age 0 to 34	1,608	1	1,608	34	1,608	17	1,608	27
Male, age 35 to 44	2,843	-28	2,843	-12	2,843	-21	2,843	-18
Male, age 45 to 54	7,578	-48	7,578	-57*	7,578	-46	7,578	-65**
Male, age 55 to 59	6,042	62*	6,042	37	6,042	57*	6,042	23
Male, age 60 to 64	7,334	54**	7,334	23	7,334	51*	7,334	-4
Male, age 65 to 69	19,001	83***	19,001	67***	19,001	76***	19,001	40**
Male, age 70 to 74	23,978	64***	23,978	56***	23,978	58***	23,978	21
Male, age 75 to 79	26,644	67***	26,644	68***	26,644	60***	26,644	19
Male, age 80 to 84	28,528	95***	28,528	111***	28,528	89***	28,528	50***
Male, age 85 to 89	22,549	102***	22,549	138***	22,549	100***	22,549	70***
Male, age 90 to 94	10,380	95***	10,380	160***	10,380	98***	10,380	80***
Male, age 95+	2,599	-32	2,599	63*	2,599	-21	2,599	-16
Female, age 0 to 34	1,303	-230***	1,303	-196***	1,303	-204***	1,303	-174***
Female, age 35 to 44	2,706	-168***	2,706	-157***	2,706	-149***	2,706	-133***
Female, age 45 to 54	7,242	-176***	7,242	-174***	7,242	-158***	7,242	-163***
Female, age 55 to 59	5,923	-146***	5,923	-152***	5,923	-134***	5,923	-150***
Female, age 60 to 64	7,594	-36	7,594	-53**	7,594	-26	7,594	-51*

(continued)

Table 4-7 (continued)
Regression models of annual speech-language pathology allowed charges, 2011

	Demographics only		Prospective HCCs (Prior year diagnoses)		Concurrent DRGs (Current year hospitalizations)		Concurrent inpatient utilization and prospective risk score	
Female, age 65 to 69	*20,452*	*Reference*	*20,452*	*Reference*	*20,452*	*Reference*	*20,452*	*Reference*
Female, age 70 to 74	27,311	68***	27,311	69***	27,311	66***	27,311	58***
Female, age 75 to 79	35,669	140***	35,669	145***	35,669	135***	35,669	134***
Female, age 80 to 84	49,324	226***	49,324	246***	49,324	222***	49,324	229***
Female, age 85 to 89	55,500	264***	55,500	300***	55,500	262***	55,500	280***
Female, age 90 to 94	36,730	229***	36,730	292***	36,730	234***	36,730	267***
Female, age 95+	15,084	95***	15,084	184***	15,084	108***	15,084	167***
Other demographics								
Long term institutionalized	161,687	745***	161,687	648***	161,687	735***	161,687	698***
ESRD	5,464	-59**	5,464	-86**	5,464	-124***	5,464	-33
Originally disabled, male, aged	22,442	-28*	22,442	-44***	22,442	-24*	22,442	-52***
Originally disabled, female, aged	28,432	-67***	28,432	-85***	28,432	-69***	28,432	-98***
Medicaid, male, aged	44,462	320***	44,462	239***	44,462	333***	44,462	319***
Medicaid, female, aged	116,701	290***	116,701	228***	116,701	305***	116,701	293***
Medicaid, male, disabled	19,993	251***	19,993	146***	19,993	265***	19,993	246***
Medicaid, female, disabled	19,554	274***	19,554	192***	19,554	276***	19,554	252***
Hierarchical condition categories								
HCC1 - HIV/AIDS	—	—	895	-57	—	—	—	—
HCC2 - Septicemia/shock	—	—	24,429	10	—	—	—	—
HCC5 - Opportunistic infections	—	—	2,696	-105***	—	—	—	—
HCC7 - Metastatic cancer and acute leukemia	—	—	5,833	-107***	—	—	—	—
HCC8 - Lung, upper digestive tract, and other severe cancers	—	—	4,907	-208***	—	—	—	—

(continued)

Table 4-7 (continued)
Regression models of annual speech-language pathology allowed charges, 2011

	Demographics only		Prospective HCCs (Prior year diagnoses)		Concurrent DRGs (Current year hospitalizations)		Concurrent inpatient utilization and prospective risk score	
HCC9 - Lymphatic, head and neck, brain, and other major cancers	—	—	12,389	-119***	—	—	—	—
HCC10 - Breast, prostate, colorectal and other cancers and tumors	—	—	32,730	-65***	—	—	—	—
HCC15 - Diabetes with renal or peripheral circulatory manifestation	—	—	32,717	95***	—	—	—	—
HCC16 - Diabetes with neurologic or other specified manifestation	—	—	22,840	42***	—	—	—	—
HCC17 - Diabetes with acute complications	—	—	975	182**	—	—	—	—
HCC18 - Diabetes with ophthalmologic or unspecified manifestation	—	—	8,002	1	—	—	—	—
HCC19 - Diabetes without complication	—	—	73,391	24***	—	—	—	—
HCC21 - Protein-calorie malnutrition	—	—	26,133	161***	—	—	—	—
HCC25 - End-stage liver disease	—	—	1,813	-61	—	—	—	—
HCC26 - Cirrhosis of liver	—	—	1,921	6	—	—	—	—
HCC27 - Chronic hepatitis	—	—	1,473	-81*	—	—	—	—
HCC31 - Intestinal obstruction/perforation	—	—	14,533	-41**	—	—	—	—
HCC32 - Pancreatic disease	—	—	7,356	-77***	—	—	—	—
HCC33 - Inflammatory bowel disease	—	—	4,117	-130***	—	—	—	—
HCC37 - Bone/joint/muscle infections/necrosis	—	—	7,148	-49**	—	—	—	—
HCC38 - Rheumatoid arthritis and inflammatory connective tissue disease	—	—	23,551	-91***	—	—	—	—
HCC44 - Severe hematological disorders	—	—	5,925	-52**	—	—	—	—
HCC45 - Disorders of immunity	—	—	4,148	-81***	—	—	—	—

(continued)

Table 4-7 (continued)
Regression models of annual speech-language pathology allowed charges, 2011

	Demographics only		Prospective HCCs (Prior year diagnoses)		Concurrent DRGs (Current year hospitalizations)		Concurrent inpatient utilization and prospective risk score	
HCC51 - Drug/alcohol psychosis	—	—	5,604	37	—	—	—	—
HCC52 - Drug/alcohol dependence	—	—	4,612	-81***	—	—	—	—
HCC54 - Schizophrenia	—	—	17,013	327***	—	—	—	—
HCC55 - Major depressive, bipolar, and paranoid disorders	—	—	54,092	154***	—	—	—	—
HCC67 - Quadriplegia, other extensive paralysis	—	—	5,943	-4	—	—	—	—
HCC68 - Paraplegia	—	—	2,543	89**	—	—	—	—
HCC69 - Spinal cord disorders/injuries	—	—	6,125	29	—	—	—	—
HCC70 - Muscular dystrophy	—	—	787	70	—	—	—	—
HCC71 - Polyneuropathy	—	—	42,024	-28***	—	—	—	—
HCC72 - Multiple sclerosis	—	—	6,133	126***	—	—	—	—
HCC73 - Parkinson’s and Huntington’s diseases	—	—	38,758	212***	—	—	—	—
HCC74 - Seizure disorders and convulsions	—	—	41,755	39***	—	—	—	—
HCC75 - Coma, brain compression/anoxic damage	—	—	4,327	346***	—	—	—	—
HCC77 - Respirator dependence/tracheostomy status	—	—	5,734	79**	—	—	—	—
HCC78 - Respiratory arrest	—	—	609	71	—	—	—	—
HCC79 - Cardio-respiratory failure and shock	—	—	38,660	-31***	—	—	—	—
HCC80 - Congestive heart failure	—	—	102,222	17**	—	—	—	—
HCC81 - Acute myocardial infarction	—	—	8,870	9	—	—	—	—
HCC82 - Unstable angina and other acute ischemic heart disease	—	—	12,095	-70***	—	—	—	—

(continued)

Table 4-7 (continued)
Regression models of annual speech-language pathology allowed charges, 2011

	Demographics only		Prospective HCCs (Prior year diagnoses)		Concurrent DRGs (Current year hospitalizations)		Concurrent inpatient utilization and prospective risk score	
HCC83 - Angina pectoris/old myocardial infarction	—	—	25,883	-31***	—	—	—	—
HCC92 - Specified heart arrhythmias	—	—	97,014	4	—	—	—	—
HCC95 - Cerebral hemorrhage	—	—	9,966	314***	—	—	—	—
HCC96 - Ischemic or unspecified stroke	—	—	61,550	282***	—	—	—	—
HCC100 - Hemiplegia/hemiparesis	—	—	32,886	377***	—	—	—	—
HCC101 - Cerebral palsy and other paralytic syndromes	—	—	4,593	-1	—	—	—	—
HCC104 - Vascular disease with complications	—	—	17,536	54***	—	—	—	—
HCC105 - Vascular disease	—	—	138,529	67***	—	—	—	—
HCC107 - Cystic fibrosis	—	—	98	-138	—	—	—	—
HCC108 - Chronic obstructive pulmonary disease	—	—	92,614	-34***	—	—	—	—
HCC111 - Aspiration and specified bacterial pneumonias	—	—	21,372	99***	—	—	—	—
HCC112 - Pneumococcal pneumonia, emphysema, lung abscess	—	—	2,703	6	—	—	—	—
HCC119 - Proliferative diabetic retinopathy and vitreous hemorrhage	—	—	4,077	-1	—	—	—	—
HCC130 - Dialysis status	—	—	4,237	-57	—	—	—	—
HCC131 - Renal failure	—	—	75,516	12	—	—	—	—
HCC132 - Nephritis	—	—	918	80	—	—	—	—
HCC148 - Decubitus ulcer of skin	—	—	26,793	7	—	—	—	—

(continued)

Table 4-7 (continued)
Regression models of annual speech-language pathology allowed charges, 2011

	Demographics only		Prospective HCCs (Prior year diagnoses)		Concurrent DRGs (Current year hospitalizations)		Concurrent inpatient utilization and prospective risk score	
HCC149 - Chronic ulcer of skin, except decubitus	—	—	18,529	5	—	—	—	—
HCC150 - Extensive third-degree burns	—	—	23	142	—	—	—	—
HCC154 - Severe head injury	—	—	472	572***	—	—	—	—
HCC155 - Major head injury	—	—	10,267	108***	—	—	—	—
HCC157 - Vertebral fractures without spinal cord injury	—	—	11,176	2	—	—	—	—
HCC158 - Hip fracture/dislocation	—	—	19,106	130***	—	—	—	—
HCC161 - Traumatic amputation	—	—	1,274	-16	—	—	—	—
HCC164 - Major complications of medical care and trauma	—	—	25,154	-13	—	—	—	—
HCC174 - Major organ transplant status	—	—	701	-83	—	—	—	—
HCC176 - Artificial openings for feeding or elimination	—	—	15,874	212***	—	—	—	—
HCC177 - Amputation status, lower limb/amputation complications	—	—	2,660	14	—	—	—	—
Diagnosis-related groups								
DRG Group 1 - Major joint upper extremity	—	—	—	—	344	-238***	—	—
DRG Group 2 - Amputation	—	—	—	—	1,500	110**	—	—
DRG Group 3 - Urinary tract infection	—	—	—	—	20,776	156***	—	—
DRG Group 4 - Stroke	—	—	—	—	22,400	408***	—	—
DRG Group 5 - Chronic obstructive pulmonary disease, bronchitis/asthma	—	—	—	—	12,033	-96***	—	—
DRG Group 6 - Coronary artery bypass graft surgery	—	—	—	—	598	-81	—	—

(continued)

Table 4-7 (continued)
Regression models of annual occupational therapy allowed charges, 2011

	Demographics only		Prospective HCCs (Prior year diagnoses)		Concurrent DRGs (Current year hospitalizations)		Concurrent inpatient utilization and prospective risk score	
DRG Group 7 - Major joint replacement of the lower extremity	—	—	—	—	5,307	-5	—	—
DRG Group 8 - Percutaneous coronary intervention	—	—	—	—	2,143	-160***	—	—
DRG Group 9 - Pacemaker	—	—	—	—	1,857	-5	—	—
DRG Group 10 - Cardiac defibrillator	—	—	—	—	434	-77	—	—
DRG Group 11 - Pacemaker device replacement or revision	—	—	—	—	288	155	—	—
DRG Group 12 - Automatic implantable cardiac defibrillator generator or lead	—	—	—	—	42	-351*	—	—
DRG Group 13 - Congestive heart failure	—	—	—	—	11,809	14	—	—
DRG Group 14 - Acute myocardial infarction	—	—	—	—	3,564	5	—	—
DRG Group 15 - Cardiac arrhythmia	—	—	—	—	7,272	-18	—	—
DRG Group 16 - Cardiac valve	—	—	—	—	728	-150***	—	—
DRG Group 17 - Other vascular surgery	—	—	—	—	2,194	50	—	—
DRG Group 18 - Major cardiovascular procedure	—	—	—	—	689	-52	—	—
DRG Group 19 - Gastrointestinal hemorrhage	—	—	—	—	7,883	57***	—	—
DRG Group 20 - Major bowel	—	—	—	—	1,713	-120***	—	—
DRG Group 21 - Fractures femur and hip/pelvis	—	—	—	—	4,115	90***	—	—
DRG Group 22 - Medical non-infectious orthopedic	—	—	—	—	15,903	7	—	—
DRG Group 23 - Double joint replacement of the lower extremity	—	—	—	—	52	-468***	—	—
DRG Group 24 - Revision of the hip or knee	—	—	—	—	534	-3	—	—

(continued)

Table 4-7 (continued)
Regression models of annual occupational therapy allowed charges, 2011

	Demographics only		Prospective HCCs (Prior year diagnoses)		Concurrent DRGs (Current year hospitalizations)		Concurrent inpatient utilization and prospective risk score	
DRG Group 25 - Spinal fusion (non-cervical)	—	—	—	—	584	-303***	—	—
DRG Group 26 - Hip and femur procedures except major joint	—	—	—	—	6,058	121***	—	—
DRG Group 27 - Cervical spinal fusion	—	—	—	—	1,023	-225***	—	—
DRG Group 28 - Other knee procedures	—	—	—	—	181	-138	—	—
DRG Group 29 - Complex non-cervical spinal fusion	—	—	—	—	103	-20	—	—
DRG Group 30 - Combined anterior posterior spinal fusion	—	—	—	—	140	-57	—	—
DRG Group 31 - Back and neck except spinal fusion	—	—	—	—	553	-277***	—	—
DRG Group 32 - Lower extremity and humerus procedure except hip, foot, femur	—	—	—	—	962	-7	—	—
DRG Group 33 - Removal of orthopedic devices	—	—	—	—	327	72	—	—
DRG Group 34 - Sepsis	—	—	—	—	21,549	98***	—	—
DRG Group 35 - Diabetes	—	—	—	—	3,808	51	—	—
DRG Group 36 - Simple pneumonia and respiratory infections	—	—	—	—	31,847	68***	—	—
DRG Group 37 - Other respiratory	—	—	—	—	10,396	95***	—	—
DRG Group 38 - Chest pain	—	—	—	—	3,045	7	—	—
DRG Group 39 - Medical peripheral vascular disorders	—	—	—	—	3,536	13	—	—
DRG Group 40 - Atherosclerosis	—	—	—	—	1,691	-42	—	—
DRG Group 41 - Gastrointestinal obstruction	—	—	—	—	3,299	11	—	—
DRG Group 42 - Syncope and collapse	—	—	—	—	5,033	29	—	—

(continued)

Table 4-7 (continued)
Regression models of annual occupational therapy allowed charges, 2011

	Demographics only		Prospective HCCs (Prior year diagnoses)		Concurrent DRGs (Current year hospitalizations)		Concurrent inpatient utilization and prospective risk score	
DRG Group 43 - Renal failure	—	—	—	—	10,693	99***	—	—
DRG Group 44 - Nutritional and metabolic disorders	—	—	—	—	9,498	-13	—	—
DRG Group 45 - Cellulitis	—	—	—	—	4,542	-24	—	—
DRG Group 46 - Red blood cell disorders	—	—	—	—	3,906	60*	—	—
DRG Group 47 - Transient ischemia	—	—	—	—	4,144	62**	—	—
DRG Group 48 - Esophagitis, gastroenteritis and other digestive disorders	—	—	—	—	9,969	-47***	—	—
DRG Group 49 - Other DRG	—	—	—	—	36,068	103***	—	—
Inpatient facility type								
Cancer facility	—	—	—	—	—	—	444	-449***
Acute hospital	—	—	—	—	—	—	177,922	-171***
Critical access hospital	—	—	—	—	—	—	7,888	-167**
Long term care hospital	—	—	—	—	—	—	6,530	-34
Inpatient rehabilitation facility	—	—	—	—	—	—	8,361	-209***
Children's hospital	—	—	—	—	—	—	37	109
Psychiatric hospital	—	—	—	—	—	—	2,699	59
Skilled nursing facility	—	—	—	—	—	—	99,945	-128*
Inpatient rehabilitation facility unit	—	—	—	—	—	—	11,229	-210***
Psychiatric unit	—	—	—	—	—	—	9,699	94***
Swing-bed short-term acute care hospital	—	—	—	—	—	—	740	-175***
Swing-bed long-term care hospital	—	—	—	—	—	—	†	†
Swing-bed rehabilitation hospital	—	—	—	—	—	—	†	†
Rehabilitation unit in critical access hospital	—	—	—	—	—	—	16	-457

(continued)

INFORMATION NOT RELEASABLE TO THE PUBLIC UNLESS AUTHORIZED BY LAW: *This information has not been publicly disclosed and may be privileged and confidential. It is for internal government use only and must not be disseminated, distributed, or copied to persons not authorized to receive the information. Unauthorized disclosure may result in prosecution to the full extent of the law.*

Table 4-7 (continued)
Regression models of annual occupational therapy allowed charges, 2011

	Demographics only		Prospective HCCs (Prior year diagnoses)		Concurrent DRGs (Current Year Hospitalizations)		Concurrent inpatient utilization and prospective risk score	
Swing-bed unit in critical access hospital	—	—	—	—	—	—	1,849	-19
Psychiatric unit in critical access hospital	—	—	—	—	—	—	611	376***
Inpatient stay type								
Long stay	—	—	—	—	—	—	24,490	102
Skilled nursing facility stay	—	—	—	—	—	—	100,877	-191***
Short stay	—	—	—	—	—	—	182,859	69*
Hospital stay outlier payments								
Outlier payment is greater than $0	—	—	—	—	—	—	10,520	-129***
Inpatient therapy charges								
Physical therapy and occupational therapy and speech-language pathology charges equal to $0	—	—	—	—	—	—	33,301	11
Physical therapy charges greater than $0 and less than or equal to $1,000	—	—	—	—	—	—	38,830	43**
Physical therapy charges greater than $1,000 and less than or equal to $5,000	—	—	—	—	—	—	54,614	-8
Physical therapy charges greater than $5,000 and less than or equal to $10,000	—	—	—	—	—	—	33,193	-39
Physical therapy charges greater than $10,000	—	—	—	—	—	—	21,561	-139***
Occupational therapy charges greater than $0 and less than or equal to $1,000	—	—	—	—	—	—	29,688	20
Occupational therapy charges greater than $1,000 and less than or equal to $5,000	—	—	—	—	—	—	52,603	126***
Occupational therapy charges greater than $5,000 and less than or equal to $10,000	—	—	—	—	—	—	30,435	190***

(continued)

Table 4-7 (continued)
Regression models of annual occupational therapy allowed charges, 2011

	Demographics only		Prospective HCCs (Prior year diagnoses)		Concurrent DRGs (Current year hospitalizations)		Concurrent inpatient utilization and prospective risk score	
Occupational therapy charges greater than $10,000	—	—	—	—	—	—	16,447	230***
Speech-language pathology charges greater than $0 and less than or equal to $1,000	—	—	—	—	—	—	33,706	123***
Speech-language pathology charges greater than $1,000 and less than or equal to $5,000	—	—	—	—	—	—	53,883	377***
Speech-language pathology charges greater than $5,000 and less than or equal to $10,000	—	—	—	—	—	—	19,814	827***
Speech-language pathology charges greater than $10,000	—	—	—	—	—	—	9,619	1370***
HCC prospective risk score								
HCC prospective risk score	—	—	—	—	—	—	423,922	97***

*** (p=<0.01), ** (p=<0.05), * (p=<0.10)

† = Fewer than 11 cases.

NOTES:

1. ESRD (End-Stage Renal Disease) - The beneficiary had ESRD at any point during 2011.
2. Medicaid - The beneficiary had at least one month of Medicaid while receiving therapy.
3. Long Term Institutionalized - If the beneficiary had a 90-day MDS assessment at any point during 2011, then they were considered long-term institutionalized.
4. Originally Disabled - The beneficiary's original reason for entitlement was disability, among beneficiaries currently entitled by age.
5. Disabled - The beneficiary's current reason for entitlement is disability.
6. Annual Period: January 1, 2011 - December 31, 2011.
7. HCC = Hierarchical Condition Categories; DRG = Diagnosis-Related Groups

SOURCE: RTI analysis of 2011-2012 MEDPAR Medicare Claims.

Program: PA016

Table 4-8
Effect of demographic factors on mean annual physical therapy expenditures versus on the therapy cap (81st percentile of expenditures), 2011
(The 81st percentile is the closest percentile to the 2011 therapy cap of $1,870)

Demographic factors	Ordinary least squares: Effect on mean	Quantile regression: Effect on 81st percentile
Number of observations	217,501	217,501
Mean dependent variable ($)	1,227	1,921
R^2	0.040	0.037
Variable	Parameter	Parameter
Intercept	1,140***	1,767***
Female, age 0 to 34	-285***	-399***
Female, age 35 to 44	-293***	-441***
Female, age 45 to 54	-231***	-312***
Female, age 55 to 59	-106***	-160***
Female, age 60 to 64	-102***	-94***
Female, age 65 to 69	Reference	Reference
Female, age 70 to 74	21*	10
Female, age 75 to 79	41***	42**
Female, age 80 to 84	46***	61***
Female, age 85 to 89	74***	138***
Female, age 90 to 94	103***	255***
Female, age 95+	84***	312***
Male, age 0 to 34	-206***	-448***
Male, age 35 to 44	-259***	-416***
Male, age 45 to 54	-251***	-409***
Male, age 55 to 59	-139***	-199***
Male, age 60 to 64	-100***	-148***
Male, age 65 to 69	-29*	-35*
Male, age 70 to 74	9	6
Male, age 75 to 79	13	25
Male, age 80 to 84	31*	44
Male, age 85 to 89	42**	103***
Male, age 90 to 94	43	93*

(continued)

Table 4-8 (continued)
Effect of demographic factors on mean annual physical therapy expenditures versus on the therapy cap (81st percentile of expenditures), 2011
(The 81st percentile is the closest percentile to the 2011 therapy cap of $1,870)

Demographic factors	Ordinary least squares: Effect on mean	Quantile regression: Effect on 81st percentile
Male, age 95+	18	275*
Long term institutionalized	814***	1425***
ESRD	-19	-27
Originally disabled, female, aged	-101***	-77***
Originally disabled, male, aged	-90***	-116***
Medicaid, female, aged	203***	308***
Medicaid, male, aged	239***	340***
Medicaid, female, disabled	-7	-60**
Medicaid, male, disabled	29	16

*** (p=<0.01), ** (p=<0.05), * (p=<0.10)

NOTES:

1. ESRD (End-Stage Renal Disease) - The beneficiary had ESRD at any point during 2011.
2. Medicaid - The beneficiary had at least one month of Medicaid while receiving therapy.
3. Long Term Institutionalized - If the beneficiary had a 90-day MDS assessment at any point during 2011, then they were considered long-term institutionalized.
4. Originally Disabled - The beneficiary's original reason for entitlement was disability, among beneficiaries currently entitled by age.
5. Disabled - The beneficiary's current reason for entitlement is disability.
6. Annual Period: January 1, 2011 - December 31, 2011.
7. The 2011 therapy cap was $1,870 for physical therapy and speech-language pathology services combined. This table analyzes a discipline-specific cap of $1,870 for physical therapy (see text).
8. 5% of 2011 physical therapy users were analyzed because of limitations with the quantile regression software.

SOURCE: RTI analysis of a 5% sample of the 100% 2011 Outpatient Therapy Medicare Claims.

Program: PAMI110

Table 4-9
Effect of demographic factors on mean annual occupational therapy expenditures versus on the therapy cap (77th percentile of expenditures), 2011
(The 77th percentile is the closest percentile to the 2011 therapy cap of $1,870)

Demographic factors	Ordinary least squares: Effect on mean	Quantile regression: Effect on 77th percentile
Number of observations	214,598	214,598
Mean dependent variable ($)	1,320	1,845
R^2	0.070	0.060
Variable	Parameter	Parameter
Intercept	896***	1,200***
Female, age 0 to 34	-331***	-488***
Female, age 35 to 44	-327***	-453***
Female, age 45 to 54	-148***	-216***
Female, age 55 to 59	-22	-66
Female, age 60 to 64	-25	-14
Female, age 65 to 69	*Reference*	*Reference*
Female, age 70 to 74	61***	73**
Female, age 75 to 79	139***	172***
Female, age 80 to 84	229***	354***
Female, age 85 to 89	294***	509***
Female, age 90 to 94	274***	500***
Female, age 95+	54**	168***
Male, age 0 to 34	-219***	-341***
Male, age 35 to 44	-222***	-404***
Male, age 45 to 54	-186***	-287***
Male, age 55 to 59	17	9
Male, age 60 to 64	5	27
Male, age 65 to 69	26	-18
Male, age 70 to 74	46**	4
Male, age 75 to 79	45**	60*
Male, age 80 to 84	58***	87***
Male, age 85 to 89	128***	222***
Male, age 90 to 94	32	179***

(continued)

Table 4-9 (continued)
Effect of demographic factors on mean annual occupational therapy expenditures versus on the therapy cap (77th percentile of expenditures), 2011
(The 77th percentile is the closest percentile to the 2011 therapy cap of $1,870)

Demographic factors	Ordinary least squares: Effect on mean	Quantile regression: Effect on 77th percentile
Male, age 95+	-46	95
Long term institutionalized	683***	992***
ESRD	48*	78*
Originally disabled, female, aged	-30*	-42
Originally disabled, male, aged	-58***	-80**
Medicaid, female, aged	310***	499***
Medicaid, male, aged	406***	640***
Medicaid, female, disabled	251***	261***
Medicaid, male, disabled	214***	276***

*** (p=<0.01), ** (p=<0.05), * (p=<0.10)

NOTES:

1. ESRD (End-Stage Renal Disease) - The beneficiary had ESRD at any point during 2011.
2. Medicaid - The beneficiary had at least one month of Medicaid while receiving therapy.
3. Long Term Institutionalized - If the beneficiary had a 90-day MDS assessment at any point during 2011, then they were considered long-term institutionalized.
4. Originally Disabled - The beneficiary's original reason for entitlement was disability, among beneficiaries currently entitled by age.
5. Disabled - The beneficiary's current reason for entitlement is disability.
6. Annual Period: January 1, 2011 - December 31, 2011.
7. The 2011 therapy cap was $1,870 for occupational therapy. This table analyzes a discipline-specific cap of $1,870 for occupational therapy (see text).
8. 20% of 2011 occupational therapy users were analyzed because of limitations with the quantile regression software.

SOURCE: RTI analysis of a 20% sample of the 100% 2011 Outpatient Therapy Medicare Claims.

Program: PAMI110

Table 4-10
Effect of demographic factors on mean annual speech-language pathology expenditures versus on the therapy cap (79th percentile of expenditures), 2011
(The 79th percentile is the closest percentile to the 2011 therapy cap of $1,870)

Demographic factors	Ordinary least squares: Effect on mean	Quantile regression: Effect on 79th percentile
Number of observations	278,092	278,092
Mean dependent variable ($)	1,261	1,832
R^2	0.065	0.052
Variable	Parameter	Parameter
Intercept	812***	1066***
Female, age 0 to 34	-109*	-89
Female, age 35 to 44	-155***	-237***
Female, age 45 to 54	-140***	-295***
Female, age 55 to 59	-167***	-208***
Female, age 60 to 64	-46	-87*
Female, age 65 to 69	*Reference*	*Reference*
Female, age 70 to 74	48**	93***
Female, age 75 to 79	117***	280***
Female, age 80 to 84	183***	383***
Female, age 85 to 89	195***	465***
Female, age 90 to 94	148***	395***
Female, age 95+	-6	183***
Male, age 0 to 34	82	236**
Male, age 35 to 44	-56	-21
Male, age 45 to 54	6	39
Male, age 55 to 59	88**	174***
Male, age 60 to 64	29	110**
Male, age 65 to 69	73***	145***
Male, age 70 to 74	46**	115***
Male, age 75 to 79	29	122***
Male, age 80 to 84	53***	202***
Male, age 85 to 89	21	185***
Male, age 90 to 94	20	200***

(continued)

Table 4-10 (continued)
Effect of demographic factors on mean annual speech-language pathology expenditures versus on the therapy cap (79th percentile of expenditures), 2011
(The 79th percentile is the closest percentile to the 2011 therapy cap of $1,870)

	Ordinary least squares: Effect on mean	Quantile regression: Effect on 79th percentile
Male, age 95+	-134***	25
Long term institutionalized	664***	963***
ESRD	-90***	-133***
Originally disabled, female, aged	-56***	-103***
Originally disabled, male, aged	-45***	-74**
Medicaid, female, aged	253***	433***
Medicaid, male, aged	262***	377***
Medicaid, female, disabled	241***	278***
Medicaid, male, disabled	219***	200***

NOTES:
1. ESRD (End-Stage Renal Disease) - The beneficiary had ESRD at any point during 2011.
2. Medicaid - The beneficiary had at least one month of Medicaid while receiving therapy.
3. Long Term Institutionalized - If the beneficiary had a 90-day MDS assessment at any point during 2011, then they were considered long-term institutionalized.
4. Originally Disabled - The beneficiary's original reason for entitlement was disability, among beneficiaries currently entitled by age.
5. Disabled - The beneficiary's current reason for entitlement is disability.
6. Annual Period: January 1, 2011 - December 31, 2011.
7. The 2011 therapy cap was $1,870 for physical therapy and speech-language pathology services combined. This table analyzes a discipline-specific cap of $1,870 for speech-language pathology (see text).
8. 50% of 2011 speech-language pathology users were analyzed because of limitations with the quantile regression software.

SOURCE: RTI analysis of a 50% sample of the 100% 2011 Outpatient Therapy Medicare Claims.

Program: PAMI110

5. RISK ADJUSTMENT OF ANNUAL THERAPY EXPENDITURE CAP USING CLINICIAN ASSESSMENT AND PATIENT REPORT DATA

Medicare's cap on beneficiary therapy expenditures is based on annual time periods. In this section, we discuss multivariate regression results that predict annual therapy expenditures. The annual cap analysis is based on beneficiary characteristics that may be predictive of use of therapy services. Risk adjustment of the annual cap is accomplished using a regression model which relates patient characteristics to annual expenditures. Although these expenditures do not use a calendar year of data, they are analogous to the annual cap because they cover a 12-month period.

Motivation for this analysis is given in Section 5.1, followed by the analytic methods used for the evaluation (Section 5.2). Characteristics of the beneficiaries and associated expenditures within the 12-month period beginning March 1, 2011 are described in Section 5.3. Separate regression models are evaluated for physical therapy (Section 5.4.1), occupational therapy (Section 5.4.2), speech-language pathology (Section 5.4.3), and nursing facility residents (Section 5.4.4). Section 5.5 provides empirical results of a risk-adjusted cap. Key findings from the analyses are included in Section 5.6.

5.1 Motivation for the Analysis

Building on the risk-adjusted annual cap using only administrative data presented in Section 4, we augment the analysis with functional-status data from the patients in the DOTPA sample. The DOTPA CARE instruments provide data on patient function which may be useful in predicting beneficiary expenditures. The analysis includes a demographic-only model which is directly comparable to the administrative-claims model from Section 4. In addition to a demographic model, we explore a payment model that includes other variables describing the patient's condition as well as demographics. A third specification, the "comprehensive" model, includes additional covariates from the CARE assessment that may be predictive of expenditures, but not necessarily appropriate for a payment model due to their subjective nature. These variables are included for exploratory purposes, to understand non-payment factors that may drive expenditures.

5.2 Analytic Methods

The previous section used calendar year 2011 data to examine the possibility of risk adjusting the annual cap using administrative data. Section 5 uses a 12-month period beginning in March 2011, the starting point for DOTPA data collection. The time frames of the 100-percent and CARE-defined annual risk-adjustment files are not directly comparable and the sample size is significantly smaller for the CARE annual expenditure definition. However, both files cover 12-month periods. The data sources used for the annual file, the regression techniques employed for the analysis, and the specifications for discipline-specific model are described in the next three sections.

5.2.1 Sample and Data

The sample for the analyses is any beneficiary who had a CARE admission assessment between March 1, 2011 and February 29, 2012. Annual expenditure data for the discipline matching the assessment was obtained for this 12-month period for each sample beneficiary. Although most beneficiaries receiving therapy have only a single episode of (therapy) care in a 12-month period, a person with, for example, a PT assessment could have PT expenditures that occurred either before or after their assessment, as long as they fell in the 12-month time period. In the annual data, episodes of care may be either left-censored (the episode began before March 1, 2011), right-censored (the episode ended after February 29, 2012), or both left- and right-censored. The result of episode censoring is that not all episode expenditures fall within the 12-month analysis period. Only the portion of episode expenditures falling within the 12-month period are predicted, but expenditures from multiple therapy episodes may be included in the annual expenditure dependent variable.

For those beneficiaries who had multiple assessments within the same discipline, only one assessment was retained for analyses. This is done by keeping the assessment with the maximum number of non-missing Rasch scores. In the case where more than one assessment had the same number of non-missing Rasch scores, the assessment with the lowest aggregate Rasch score, indicating the most impaired status, is retained. Enrollment data, outpatient and carrier claims data were used to construct the administrative portion of the episodes and these were merged with the CARE assessment items to construct the final analytic data set used in this section.

5.2.2 Regression Specifications

Annual expenditures are predicted by demographic, payment and comprehensive models. In addition, we examine several variants of the payment model by stepping in selected blocks of explanatory variables for PT. We also run a forward stepwise regression for PT to identify the variables that contribute the greatest increase in explanatory power. The dependent variable is always the untransformed 12-month discipline-specific therapy expenditure. The coefficients represent the incremental change in annual therapy expenditures after controlling for the other variables in the model. All regression models were computed using a generalized least squares (GLS) model through PROC SURVEYREG in SAS, thereby adjusting the estimated standard errors to account for clustering at the provider/site level. This is done because standard errors are not likely to be independently distributed at the provider/site level due to correlated practice patterns. The practical effect is to increase standard errors and reduce reported statistical significance.

By predicting actual expenditures, we avoid the need for “retransformation” of the dependent variable that would be necessary with another standard approach, predicting the natural log of expenditures. However, predicting actual expenditures is more sensitive to expenditure outliers. GLS predicts the conditional mean of a response variable y as a linear function of k independent variables. We implicitly assume that the estimated relationship between the risk markers and mean expenditures is the same as the relationship between the risk markers and the expenditure cap.

5.2.3 Model Specification

Three different types of expenditure models are estimated in the CARE-C analyses: physical therapy (PT), occupational therapy (OT), and speech-language pathology (SLP). The rationale for separating the disciplines was to examine whether different factors were important in predicting the 3 different types of discipline expenditures. Within each discipline, three sets of models were analyzed: 1) Demographic Model; 2) Payment Model; and 3) Comprehensive Model. Each of these models contains the same basic covariates but adds additional items to build upon the previous models. The same models are used with each discipline and are described below. CARE-F nursing-resident analyses used equivalent models, but combined all disciplines together instead of producing discipline-specific models. The reason for this is that members of the clinical team felt that the discipline distinctions were less salient for nursing facility patients than for community residents.

Demographic Model

The demographic model is drawn solely from administrative data and estimates what can be predicted without information on a patient's diagnosis and functional status obtained from the CARE assessment. Due to sample size limitations, the age splits are broader than the splits in Section 4. The other models discussed in this section can be compared against the demographic model to understand the added predictive value of the CARE items.

The demographic model is defined as

$$C_{AD} = a_0 + a_1 Medicaid + a_2 ESRD + a_3 Disabled + a_4 AgeSex \tag{5.1}$$

where a_0 is the intercept and the remaining a-terms are the estimated model coefficients; *Medicaid* indicates if the beneficiary was ever enrolled in Medicaid during the 12 month period between March 1, 2011 and February 29, 2012 (i.e., dual-eligibility); *ESRD* indicates that the beneficiary had end-stage renal disease at any time in 2011 or 2012; *Disabled* indicates that the original reason for entitlement was disability; and *AgeSex* is categorized age of the beneficiary in 10-year intervals within sex of the beneficiary. In order to limit the number of covariates in the CARE-F model, we include a categorical variable for sex instead of including the age and sex interactions. In the CARE-F model, we also included a variable to indicate if the beneficiary was long-term institutionalized in the month that their episode initiated.

Payment Model

The payment model includes the demographic variables, and several additional variables from the admission CARE assessment. These variables were selected because they are measures of patient complexity that are expected to be associated with expenditures. Excluded from this model are items that may also be associated with expenditures but may be more discretionary and therefore, inappropriate for use in a payment model. Also, we excluded HCCs from this model because we relied on the diagnoses from the CARE assessment and the HCCs would be redundant to those diagnoses. This model is defined as

$$C_{AP} = a_0 + a_1 Medicaid + a_2 ESRD + a_3 Disabled + a_4 AgeSex \\ + a_5 DX1 + a_6 DX2 + a_7 Structure + a_8 BodyFunction + a_9 Activities \\ + a_{10} RaschFunction + a_{11} Surg + a_{12} SurgTime \quad (5.2)$$

where the first row of terms is defined for the demographic model (expression 5.1); *DX1* and *DX2* are the discipline-specific primary and secondary diagnostic groups, respectively; *Structure* is the clinician-reported, categorized reason for therapy as it relates to body structure; *Body Function* is the clinician-reported, categorized reason for therapy as it relates to body function groups; *Activities* is the clinician-reported, categorized reason for therapy as it relates to activities and participation; *Rasch Function* is a summary variable that includes multiple Rasch clinician and self-report admission functioning scales; and the indicators of the number of surgeries in the past for the current medical problem as well as the time frame of the most recent surgery, if applicable, are exhibited as *Surg* and *SurgTime*, respectively.

The CARE-F sample had a limited sample size which required a few deviations from the CARE-C model specified above. The payment model includes primary and secondary diagnosis groups, and structure, function and activities groups. However, these groups are not discipline specific in the CARE-F analysis. Also, the Rasch scores are not continuous because of the limitations on sample size due to dropping the assessments that did not have a complete set of non-missing Rasch scores. Instead, we explicitly include a binary variable that is a marker for missing data as well as various ranges of the Rasch scores. The categorical ranges include: (1) 0 ≤ Rasch < 30; (2) 30 ≤ Rasch < 60; (3) 60 ≤ Rasch < 90; and (4) Rasch ≥ 90. These differ from the CARE-C ranges (described below) due to the more impaired population in CARE-F. We also include a binary variable for surgery due to the limited number of patients who had surgery. We include a set of variables describing where the patient was admitted from before being admitted to the nursing home and if they used any hospital care in the past two months. These items were not available on the CARE-C assessment.

The payment model includes 21, 9, 4, and 8 diagnostic groups for PT, OT, SLP and CARE-F, respectively. SLP's 8 groups are composed of 4 primary impairment groups and 4 primary medical diagnosis groups. Secondary diagnosis groups are also broken into 23, 11, and 18 groups for PT, OT, and CARE-F, respectively; SLP secondary diagnoses are combined with the primary diagnostic groups. The payment model also includes 16, 7, 4, and 10 body-structure groups and 8, 7, 4, and 5 body-function groups for PT, OT, SLP and CARE-F, respectively. Activities and participation are broken into 4 groups for CARE-C and 5 groups for CARE-F; the activity groups are identical for PT and OT, while SLP activity groups differ. The Rasch scales, as explained in Section 3, are based on multiple items. Continuous Rasch function scales are included in each of the CARE-C regression models; they vary based on the discipline of the model. The Rasch function scales in the CARE-F model were classified into four groups in order to limit the number of missing data elements: (1) 0 ≤ Rasch < 30; (2) 30 ≤ Rasch < 60; (3) 60 ≤ Rasch < 90; and (4) Rasch ≥ 90. These ranges were specified to approximately break the Rasch scores into quartiles. Function scales are included in discipline specific models based on a combination of clinical reasoning and quantitative analysis which is discussed in detail in Section 3. The primary and secondary diagnostic groups as well as the body structure groups and body function groups are discussed in greater detail in Section 3.

For CARE-C PT beneficiaries, we explored the interaction of body structure (hip) and primary diagnosis (fracture and joint replacement) to assess if this predicted any additional costs above joint replacement or fracture alone. However, the interactions were not significant and were dropped from the final model. Additionally, we examined the interaction of the Joint Replacement and Stroke diagnosis groups with their respective Rasch scores in response to dissimilarities in the differential item functioning analysis in the *DOTPA Measurement Report*.[32] However, these interactions were not significant and were dropped from the final models.

In order to examine the impact of the various groups of regressors for the CARE-C PT payment model, we ran six separate models where additional variables are included in the model. They are as follows:

1. Demographics and the primary diagnosis groups;
2. Demographics, primary diagnosis groups and clinician-observed Rasch measures;
3. Demographics, primary diagnosis groups and self-reported Rasch measures;
4. Demographics, primary diagnosis groups and clinician-observed mobility categorical variables;
5. Demographics, primary diagnosis groups and all continuous Rasch measures (clinician-observed and self-reported); and
6. Demographics, primary diagnosis groups and a set of mutually exclusive categorical variables for different values of all of the Rasch measures.

The group with scores equal to or greater than 97 are excluded from the regressions as the reference category. ***Appendix Table 5-1*** shows the detailed distribution of the Rasch scores for each discipline. The categorical ranges include: (1) $0 \leq$ Rasch < 40; (2) $40 \leq$ Rasch < 70; (3) $70 \leq$ Rasch < 97; and (4) Rasch ≥ 97.

In addition to the 6 models specified above, we also examine a forward stepwise model of the PT payment variables. Forward stepwise models start with no variables in the model, test the addition of each variable and include the variable that improves the model explanatory power the most. This process is repeated until the addition of variables no longer improves the model. Because of concerns about possible collinearity, we employed this technique to examine the first 20 variables that were included in the model.

For the CARE-F sample, in addition to the payment model, we examined a "basic" payment model that only included primary diagnosis, four Rasch function measure categorical

[32] The DOTPA Measurement Report (Kline et al., 2013) found some slight differences in item difficulty between two diagnosis groups (Joint Replacement and Stroke) through the Rasch-based method of differential item functioning (DIF), which singly investigates each item in a subscale for potential interactions with characteristics of the beneficiaries sampled.

variables (defined above), if the patient had any diet modifications, severe cognitive impairments and if they could understand verbal content. This model intends to limit issues of collinearity among multiple related predictor variables while capturing the key predictive dimensions of primary diagnosis and physical, mental and functional impairments.

Comprehensive Model

The final model, *the comprehensive model*, is composed of the same items that are in the demographic and payment models, but includes additional variables from the CARE analysis that may be predictive of expenditures. These additional variables are not necessarily appropriate to be used in a payment model due to their more discretionary, or gameable nature. The comprehensive model is defined as

$$
\begin{aligned}
C_{AC} = {} & a_0 + a_1 Medicaid + a_2 ESRD + a_3 Disabled + a_4 AgeSex \\
& + a_5 DX1 + a_6 DX2 + a_7 Structure + a_8 BodyFunction + a_9 Activities \\
& + a_{10} RaschFunction + a_{11} Surg + a_{12} SurgTime \\
& + a_{13} Sad + a_{14} PainAct + a_{15} PainSleep + a_{16} PainSev + a_{17} MobDevice \\
& + a_{18} Memory + a_{19} Comm + a_{20} Swallow + a_{21} Length + a_{22} Division \\
& + a_{23} SiteType
\end{aligned}
\tag{5.3}
$$

where Sad indicates if the patient has been feeling sad at the time of the assessment; *PainAct* and *PainSleep* indicates if self-reported pain resulted in limited activity and limited sleep, respectively; *PainSev* indicates the self-reported severity of their pain; *MobDevice* indicates if they used a mobility device; *Memory*, *Comm*, and *Swallow* indicates if they had a memory impairment, communication impairment, or swallowing impairment, respectively; *Length* is the length of time the patient has had the health problem for which they were receiving therapy; *Division* is the census division in which the CARE assessment was administered; and *Site* is the facility type in which the CARE assessment was administered. The remaining variables are specified for expressions (5.1) and (5.2).

Swallowing impairment was excluded from the PT-only models and the SLP models. However, for SLP this variable was replaced by two variables that assessed the severity of the swallowing problem (1) if the patient had any diet modifications related to a swallowing disorder and (2) if they had any cueing or assistance needs related to a swallowing disorder.

The CARE-F model includes more detailed items that are not available on the CARE-C assessment. These include the patient's *prior self-care function before entering nursing care, prior ambulation function before entering nursing care, prior wheelchair use before entering nursing care, falls in the past year, moderate or severe cognitive impairment, evaluation or treatment for cognitive problems, respiratory impairment, endurance impairment, bladder/bowel impairment, understanding verbal content, expressing ideas/wants, inattention, disorganized thinking, and altered level of consciousness/alertness*.

With the addition of these variables, we examined a forward stepwise model of the covariates in the comprehensive model. We examine the first 20 variables that are included in the model, as judged by their improvement to the explanatory power of the model.

5.3 Descriptive Analysis of Beneficiary Characteristics and Annual Expenditure Distributions

The following section presents descriptive information for the beneficiaries and the episodes which fell into the 12-month period beginning March 1, 2011. A beneficiary could have multiple CARE-C or CARE-F assessments and therefore, the number of beneficiaries and the number of assessments would not match exactly. If a beneficiary had more than one CARE assessment within the same therapy type for CARE-C or overall for CARE-F, the admission CARE assessment with the greatest number of non-missing Rasch scores was retained. In the case that a beneficiary had multiple assessments with the same number of non-missing Rasch scores, the admission assessment with the highest level of impairment, defined by the Rasch functional scores, was used in order that the claims would be matched to one unique assessment.

5.3.1 Beneficiary Characteristics

When we limited the sample to beneficiaries who had any therapy claims in the related discipline during the 12-month period (March 1, 2011 through February 29, 2012), the final sample includes 4,856 CARE-C admission assessments. Overall, CARE-C had 4,842 unique beneficiaries and 4,856 assessments included in the 12-month time frame; 14 beneficiaries had assessments in multiple disciplines. Of the total assessments, 4,210 were PT assessments, 461 were OT assessments and 185 were SLP assessments. ***Table 5-1a*** shows the average age of the beneficiaries who received outpatient therapy. There was not a large difference in age between disciplines; the mean age ranged from 72 to 73 years old between the disciplines.

In addition to age, we also examined gender, ESRD status, current disability status, Medicaid status and LTI status of the beneficiaries across disciplines. ***Table 5-1b*** shows the percentages of these additional variables by discipline and overall. On average PT and OT patients were composed of a majority of females, while SLP patients were predominantly composed of males. All of the disciplines have between 0 and 1.08 percent ESRD patients. OT and SLP have higher percentages of patients who are currently disabled. This likely reflects the difference in overall patient population who go to PT versus those who go to OT or SLP. OT and SLP also have a higher share of dually-eligible beneficiaries (Medicaid) in comparison to PT. Finally, 90 percent of the beneficiaries were white, 7 percent were black and the remaining 3 percent were other race and ethnicity groups.

We also examined characteristics for those beneficiaries who were in the top 10 percent of annual expenditures (***Table 5-1c***). On average, a higher percentage of these beneficiaries were female in PT and OT and there are more males in SLP. PT has a higher percentage of ESRD patients, but OT and SLP did not have any ESRD among high-cost patients. The percentage of currently disabled beneficiaries is more prevalent in all three disciplines among the high-cost beneficiaries. Dual-eligible status was dramatically higher for OT; 40 percent of the OT patients were dually eligible.

CARE-F, on the other hand, had 519 assessments and 519 unique beneficiaries in the nursing facility population. Additionally, 169 beneficiaries had a unique assessment in the day rehabilitation population. ***Table 5-8a*** shows the average age of the beneficiaries by nursing and day rehabilitation samples. The average the nursing home patient was 80 years old while the average day rehabilitation patient was 73 years old.

We examined several other characteristics, which are described in ***Table 5-8b***. Nursing facility beneficiaries were composed of a much higher proportion of women (69%) than the day rehabilitation sample (49%). The nursing home sample had, on average, a higher proportion of ESRD (2.5%), Disabled (10%), Medicaid (62%) and long-term institutionalized (LTI) (71%) patients. Day rehab patients were composed of 1 percent ESRD, 10 percent disabled, 9 percent Medicaid, and no LTI patients. The nursing facility sample has a much higher composition of Medicaid and LTI patients. Day rehab patients were more likely to be white (91%) than nursing patients (86%) and 11 percent of nursing patients were black as compared to 2 percent of day rehab patients.

5.3.2 Annual Expenditure Characteristics

Of the 4,856 CARE-C admission assessments, PT is the most prevalent discipline in the CARE-C sample, representing 87 percent of the overall cases. OT represents 9 percent of the overall cases. SLP accounts for the remaining 4 percent of the cases.

Table 5-2 shows aggregated annual data for each discipline and overall in the CARE-C population. The table includes the total allowed charges, Medicare payments, therapy days, calendar days, allowed charges per therapy day, payments per therapy day, and therapy days per week. Allowed charges are the total provider payment allowed by Medicare, including both beneficiary and Medicare payments. Medicare payments represent the amount that Medicare paid and the remaining balance is the cost sharing responsibility of the beneficiary. Therapy days are the total number of days for which a beneficiary received therapy. Calendar days are a count of the total days between the first visit and the last visit during the 12-month period. Calendar days could represent a single complete episode of therapy care, multiple complete episodes, part of a censored episode, or combinations of partial, complete, and censored episodes.

For the CARE-C population, the average allowed charges for the 12-month period was $1,493 overall, $1,488 for PT, $1,461 for OT and $1,665 for SLP. The median allowed charges were $1,039, $1,040, $946, and $1,252 for total, PT, OT and SLP, respectively. In contrast to the 100-percent administrative data in Section 4 for community residents, the CARE-C population had close to $300 in additional mean annual expenditures overall and up to nearly $700 in SLP. The same trend existed for median expenditures. Medicare pays 80 percent of the allowed charge after the Part-B deductible; therefore, Medicare payments were approximately 20 percent below the allowed charge. Allowed charges per therapy day were highest for SLP ($109), followed by OT ($98) and PT ($94). This same trend was true for the population discussed in Section 4; but, SLP was slightly higher ($123), and OT ($94) and PT ($90) were slightly lower. Annual therapy allowed charges varied 87-fold, from $82 at the first percentile to $7,173 at the 99th percentile. Annual allowed charge variation was driven mostly by variation in therapy days (66 at the 99th percentile to 1 at the first percentile), rather than by variation in allowed charges per therapy day ($161 at the 99th percentile to $51 at the first percentile).

The average patient received 15 distinct days of therapy during the course of a 12-month period with a median value of 12 therapy days; this pattern also existed for all of the disciplines. Total calendar days averaged 95 days with a median of 52 days. The population discussed in Section 4 had lower average therapy days (12) and shorter durations in calendar days (66). OT and SLP appear to have more condensed and intense courses of therapy, averaging 76 and 80 calendar days, respectively, compared to 98 for PT. The increased intensity can be seen by the average number of therapy days per week which ranged from 1.86 for PT to 2.14 for SLP.

Table 5-9 shows aggregated annual data for day rehab and nursing beneficiaries in the CARE-F sample. The average allowed charges for the 12-month period were $5,390 for the nursing population and $4,521 for the day rehab population. The median allowed charges were $2,732 and $3,222 for nursing facility and day rehabilitation, respectively. Allowed charges per therapy day were highest for day rehabilitation patients ($147) and lower for nursing facility patients ($103). Annual therapy allowed charges varied 139-fold, from $230 at the first percentile to $31,952 at the 99th percentile for nursing patients and 47-fold for day rehab from $337 at the first percentile to $15,945 at the 99th percentile. For nursing facility patients, annual allowed charges were driven mostly by variation in therapy days (207 at the 99th percentile to 2 at the first percentile), rather than by variation in allowed charges per therapy day ($227 at the 99th percentile to $45 at the first percentile). Day rehabilitation beneficiaries used fewer therapy days at the extreme (97) and had higher overall charges per therapy day at the 99th percentile ($328).

The average nursing facility patient received 48 distinct days of therapy during the course of a 12-month period with a median value of 31 therapy days. Day rehabilitation patients received an average of 25 therapy days and a median value of 20 therapy days. Total calendar days averaged 152 days with a median of 142 days for nursing patients, and an average of 162 days with a median of 62 days for day rehabilitation patients. The average number of therapy days per week is higher for nursing facility patients (2.85) than for day rehabilitation patients (2.37).

5.4 Multivariate Regression Results

This section presents three different CARE-C multivariate regression models in order to further understand the determinants of expenditures for outpatient therapy. The three models are (1) demographic, (2) payment, and (3) comprehensive, as discussed in Section 5.2.3. Separate models are presented for PT, OT and SLP, respectively. This section also presents CARE-F multivariate regression models which are similar to CARE-C and a basic payment model which is discussed in greater detail in Section 5.2.3. The predicted expenditure from the models is the sum of the coefficients of the variables applicable to a beneficiary, including one of the age-sex cell coefficients for each beneficiary.

5.4.1 CARE-C Community Resident Physical Therapy

Table 5-3 shows the results of the demographic, payment and comprehensive models for CARE-C beneficiaries utilizing PT services. ***Appendix Table 5-2*** shows the means and standard deviations for each of the explanatory variables in the PT model.

Demographic Model

PT has the largest sample size, 4,210 beneficiaries, and therefore has the most statistically stable results. Demographics explain less than 1 percent of the variation in annual allowed charges. The variables in the demographic model are not statistically different from zero, with the exception of being an ESRD patient and the intercept. The reference group for this model is a 65-74 year old female who is not originally disabled, not dually-eligible and does not have ESRD.

Payment Model

The Base Model

When the payment variables, including clinical and functional data, are added to the demographic characteristics, the explanatory power of the model increases from an R^2 of 1 percent to 12 percent, or an adjusted R^2 of 9 percent.[33] The sample size decreases to 3,749 beneficiaries due to missing data in the Rasch functional scales. In the payment model, the age/sex coefficients decrease. The interpretation of these demographic coefficients is that expenditures for a patient who has a functional score of zero (lowest ability) on all the Rasch scales, thus being the most impaired. For example for a coefficient of -5.0 a patient with a functional score of 10 would be predicted to have $50 lower expenditures than a person with a functional score of 0. To accurately predict a patient's annual expenditure, each of the payment variables acts as an additive amount on top of the demographic coefficients to derive the total predicted annual expenditures. Several of the age bands are significant and none of the patient characteristics are significant in the payment model.

Of the 21 PT primary diagnostic groups that were added to the model, only *joint replacement* is positive and statistically significant in relation to osteoarthritis, adding an incremental $267 to predicted annual PT expenditures. Joint replacement may predict therapy including that which occurred before the medical event, because joint replacement surgery sometimes occurs after a failed conservative course of physical therapy for joint problems. *Sprain/Strain, Bursitis/Tendonitis, Pain, vertigo, genitourinary system, multiple etiologies, 1 major and multiple etiologies, no major* are all negative predictors of expenditures, with a vertigo diagnosis associated with the largest magnitude, $701 in decreased annual expenditures. *Stroke* was hypothesized to be an important diagnosis, but it is not statistically significant. This could be because other variables—such as the Rasch function scales—are capturing the impact of strokes and are thus, collinear. Collinearity occurs when two explanatory variables are highly correlated so that the independent contribution of each independent variable to the variation in the dependent variable cannot be determined. We explore this further in subsequent analyses in this subsection. *Progressive neurological* has a substantial positive coefficient, but does not attain statistical significance, perhaps because of limited sample size.

---

[33] The adjusted R^2 adjusts the conventional R^2 for the number of explanatory variables relative to the number of observations in the regression sample. Unlike the conventional R^2, the adjusted R^2 may decrease when more variables are added to a model.

The secondary diagnosis groups are intended to capture the patient's comorbidities which may affect the course of their recovery and impact the amount of therapy. *Generalized weakness* ($164) is the only positive predictor of annual PT expenditures. On the other hand, *mental health* ($245) is the only negative predictor of annual expenditures. The *proprioceptive and touch function* group is positive and significant, predicting an additional $328 in annual expenditures. The body structure group coefficients *unilateral hip/thigh*, *toes*, *shoulder/arm/elbow*, and *other body structures* are significant. Hip/thigh and other body structures are negative and toes and shoulder/arm/elbow are positive. Possibly the "toe" reason for therapy (sample size of only 42) is associated with toe amputations, which can occur among diabetics, and which could require physical therapy to regain mobility. The cognitive/communication activities group has a small number of observations, but is positive and significant. These groups are not mutually exclusive, therefore, a patient could be in multiple groups and there is not a reference group.

Four Rasch function scales are included for PT, including *clinician-observed mobility*, *self-reported everyday activities*, *self-reported mobility* and *self-reported participation*. The Rasch scales range from 0 for the most impaired patients to 100 for the highest-functioning patients. A one unit increase in the function scales is expected to have a negative coefficient because this reflects a shift from lower to higher functional ability. As expected, all four Rasch scales have negative coefficients, indicating that lower function predicts higher annual therapy expenditures. The self-reported mobility and participation measures are both significantly different from zero. Annual therapy expenditures are predicted to be higher by $401 for the participation measure and $290 for the self-reported mobility measure for a beneficiary who is at the lowest level of functioning (scale = 0) versus the highest level of functioning (scale = 100). The clinician-assessed mobility scale has the largest coefficient (in absolute value) of any of the function scales, but is not statistically significant. This may be due to potential multicollinearity with the self-report mobility item or other factors in the model given the large coefficient.

The last group of measures in the regression model includes individual items from the CARE assessment that indicate the *time frame* and the *number of previous surgeries* the patient had that were related to the problem for which they were receiving therapy. Patients who had surgery 1-3 months prior to therapy and 3 or more months prior to surgery significantly predict higher annual therapy expenditures.

Further Analysis of the Payment Variables

In order to analyze possible problems of explanatory-variable collinearity in the payment model, we compared the results from several different model specifications as described in Section 5.2.3. ***Table 5-4*** shows the 6 different models that were specified. The diagnosis groups added to the demographic model improve on the demographic model by increasing the adjusted R^2 from nearly 0 to 3.6 percent. *Fracture, joint replacement, stroke, miscellaneous neurological and multiple major etiologies* are all significant positive predictors of annual expenditures.

Adding clinician-observed mobility increases the adjusted R^2 further to 5.4 percent, indicating that mobility function adds explanatory power to diagnosis. The mobility scale predicts that the most impaired person (Rasch=0) would have an additional $1,251 in annual expenditures over the most functional person (Rasch=100). However, when we add in clinician-observed mobility to the model *fracture* ceases to be significant, suggesting it is important to know the Rasch function measure for these patients in order to predict their expenditures. Joint replacement is less affected by the addition of the clinician-observed mobility scale, suggesting that it is less important to split these patients by Rasch function.

The next step added the self-reported Rasch measures into the model and removed all clinician-observed measures. The self-reported measures jointly attained a slightly higher R^2 (5.7 percent) than the clinician-observed mobility scale. Thus, if only one set of items were to be collected, these DOTPA self-report measures explain slightly more expenditure variation than the clinician-observed measure (at the cost of collecting three measures rather than one). The participation measure has the largest coefficient and self-reported mobility is also significant. *Fracture* drops out of this model as well, suggesting collinearity with the mobility measure. *Joint replacement* does not appear to be collinear with the mobility scale in either the clinician-observed or self-reported iterations.

Next we added all of the continuous Rasch measures into the same model with demographics and diagnoses. The R^2 rises to 6.2 percent. This is greater than the R^2 of either the clinician-observed mobility scale or the self-report measures alone, which is a possible indication that the information in both cannot be obtained by collecting only one or the other. The full payment model (***Table 5-3***) achieves an adjusted R^2 of 9.3 percent. Thus, demographics, primary diagnosis group, and Rasch function scales explain about two-thirds of the expenditure variation of the full payment model (6.2 percent versus 9.3 percent R^2). In this model, the self-reported mobility measure is no longer significant when it is combined with the clinician-observed mobility measure. In addition, the self-reported participation measure is also significant. This may argue for collecting the clinician observed mobility measure and self-reported participation measure in order to limit the burden of data collection in future work on functional status.

In order to allow for non-linear Rasch scale effects, we examine the demographics and diagnosis groups with the clinician-observed mobility scale broken down into 5 categories including one for missing values. There seems to be a dichotomous split at the Rasch score of 70; beneficiaries below this level have much higher annual expenditures than those with the highest functional mobility level. The R^2 is slightly higher than with the continuous mobility scale. *Fracture* continues to be insignificant when the clinician-observed mobility scale is included.

The next model partitions the clinician-observed and self-reported Rasch scales into 5 categories to allow for non-linear Rasch scale effects, including one for missing values. The missing values are discussed in more detail in Section 5.2.3. This model improved the adjusted R^2 from 6.2 to 6.8 percent. In these groups, those beneficiaries with Rasch scores equal to or greater than 97 are the reference group. Those beneficiaries with lower Rasch scores have positive coefficients in almost all cases. The clinician-observed mobility scale seems to be dichotomous with the key split being above and below 70. It may be possible to use fewer questions on the CARE survey to adequately distinguish mobility for purposes of predicting expenditures in future work. But, the self-reported participation measure is positive and significant at all levels which may make it necessary to collect all of these items in future data collection.

Our final analysis looks at a forward stepwise regression model and the marginal improvement in R^2 as each variable is added to the model. ***Table 5-5*** shows the first 20 variables that are included in the model and their marginal improvement in R^2, as well as the absolute change in R^2 as the variables are added. Self-reported participation increases the R^2 by 3.16 percentage points, accounting for 27 percent of the overall R^2 in the PT payment model. The first three variables—self-reported participation, clinician-observed mobility and a diagnosis of joint replacement—account for 45 percent of the terminal R^2. ***Figure 5-1*** graphically shows the steep gain in R^2 with the first few variables which then flatten out as the number of covariates approaches 20. The timing of surgery has three variables entering between steps 5 and 10; together these account for close to a 1 percentage point marginal R^2 gain. This makes these the third most important variable set in the model, ahead of joint replacement. Stroke as a primary diagnosis enters the model at step 38 (not shown).

As a sensitivity analysis to examine the impact of outliers and skewness in the data, we examined three possibilities: 1) taking the natural logarithm of expenditures; 2) trimming the data at the 99th and 1st percentiles; and 3) the combination of the two. The PT payment model without any modifications had an explanatory power of 9.3 percent. The model using the natural logarithm of expenditures increased the explanatory power to 10.1 percent. When we trimmed the 99th and 1st percentiles of expenditures, the explanatory power fell to 8.9 percent. Finally, when we trimmed the top and bottom percentiles and took the natural logarithm of expenditures, the explanatory power was 9.5 percent. We conclude that the PT payment model R^2 is fairly insensitive to expenditure outliers and skewness in the expenditure data. Consequently, the relatively low explanatory power of the model is not an artifact of outliers or skewed data driving down the R^2 values.

Comprehensive Model

Returning to ***Table 5-3***, the comprehensive model adds variables on the patient feeling sad, pain affecting sleep or activities, pain severity, mobility devices, memory impairment, communication impairment, swallowing impairment, the duration of the related health problem, census division and facility type. The addition of these variables increased the explanatory power of the model to an R^2 of 19 percent and an adjusted R^2 of 16 percent. The payment model variables explain only 58 percent of the expenditure variation explained by the comprehensive model (adjusted R^2 of 9.3 percent versus 16.1 percent), indicating that factors that may not be suitable for payment are having a strong impact on therapy expenditures.

The results of the comprehensive model for primary and secondary diagnosis, and body function and structure are very similar to the payment model results. *Bursitis/tendonitis, pain, genitourinary system and multiple etiologies, 1 major* drop out of model significance in the diagnosis groups. The Rasch function scales do not predict therapy expenditures as strongly in the comprehensive model in comparison to the payment model; only one instead of two of the four is statistically significant—self-reported participation. *Surgery within 1-3 months* and *surgery greater than 3 months ago* have positive coefficients and are significant in the comprehensive model, but not the payment model.

Among the newly added variables, the *patient's level of sadness, pain affecting sleep,* and any type of *memory, communication* or *swallowing* impairment are not significant. *Pain severity* is positive and significant for those who were coded as missing; this is relative to patients reporting no pain in the last 7 days, who were skipped out of the pain severity questions. *Pain* *affecting activities* is also positive and significant. Among the mobility devices, a walker positively predicts expenditures and *being in a wheelchair/scooter full-time* substantially increases annual expenditures by $1,000, although *part-time wheelchair/scooter use* is not associated with higher therapy expenditures. The *duration* of the health problems that were related to the therapy are positive and significant relative to the beneficiaries who have had the problem for the shortest period of time. . The longer the patient had the problem, especially if it had persisted for 3 or more months, the higher the annual expenditures were.

Among facility types, assisted-living facilities are associated with substantially higher PT expenditures than private practices, the reference category. Nursing facilities has a significantly lower coefficient, but this group contains fewer than 11 observations. Among census divisions, Mid-Atlantic is associated with significantly higher expenditures and East South Central with lower expenditures, relative to the reference South Atlantic.

5.4.2 CARE-C Community Resident Occupational Therapy

Table 5-6 shows the results of the demographic, payment and comprehensive models for CARE-C beneficiaries utilizing OT services. OT episodes comprised nine percent of the total sample or 461 annual episodes. The OT regressions have only about one-tenth of the sample size of the PT regressions, meaning that the OT results are considerably less stable statistically, more subject to overfitting and the influence of outliers. The OT results, therefore, should be interpreted with caution. ***Appendix Table 5-3*** shows the means and standard deviations for each of the explanatory variables in the OT model.

Demographic Model

The OT demographics model explains 12 percent (10 percent adjusted) of the variation in the dependent variable—annual OT allowed charges. This is much better than the PT model which only explains less than 1 percent of the overall variation. In contrast to annual PT expenditures, which show little age gradient, annual OT expenditures appear to be lower for the disabled and higher for the oldest elderly females (age 85+) than for younger elderly females. Unlike for PT, being a dual-eligible beneficiary is associated with a very large increase in OT expenditures, more than $1,551. ESRD and *originally disabled* are not significant.

Payment Model

When the payment variables are added to the demographics, the explanatory power of the model increases from an R^2 of 12 percentage points to 34 percent or an adjusted R^2 of 10 percentage points to 22 percent. The payment variables add substantial explanatory power. Additionally, the sample size decreases to 384 episodes due to missing data on the Rasch functional scales. In the payment model, *Medicaid* continues to be large and significant.

Of the 9 mutually exclusive primary diagnostic groups that are added to the model, none of them are positive predictors of annual OT expenditures in reference to major musculoskeletal. Unlike the PT models, *Joint replacement* is not significant in the OT models. Contrary to expectations, *stroke* is not significant in either PT or OT models even though stroke is hypothesized to be an important group for OT and it predicts an additional $377 of annual expenditures holding all else equal. It is likely that the small sample size and multicollinearity makes it difficult to detect a significant difference.

The secondary diagnosis groups are not mutually exclusive and are intended to capture the patient's comorbidities which may also affect the amount of therapy provided. *Minor musculoskeletal* and *pain* are both negative and significant predictors of annual expenditures, while *generalized weakness* is a positive predictor of annual expenditures. The large positive effect of *generalized weakness* as a secondary diagnosis (it is not significant as a primary diagnosis) may indicate that beneficiary frailty is strongly predictive of annual OT expenditures. A secondary diagnosis of generalized weakness is also positively predictive of PT annual expenditures, but the effect is much larger for OT.

*Mental function*s ($1,828) and *other body functions* ($465) were positive and significant among the function groups. This may indicate that patients with cognitive impairments due to stroke or dementia utilize significantly more OT services. Of the structure groups, *unilateral wrist/hand/fingers* and *bilateral upper extremity* were positive and significant for OT patients. None of the activities groups were significant.

The four Rasch function scales that are included for OT are clinician-observed self-care, self-reported everyday activities self-reported participation, and self-reported life skills. All of the coefficients are negative except for self-reported life skills. It is expected that the coefficients will be negative due to the structure of the Rasch scales; they range from 0 for the most impaired patients to 100 for the most functional patients. Therefore, a higher function score is expected to be associated with a negative coefficient because the patient with a higher functional ability at admission is likely to have lower therapy expenditures. In the case of the self-reported life skills measure, it is not clear why it has such a large and positive coefficient (13.63), implying that a person with the highest functional ability (score=100) would have annual expenditures that were $1,363 higher than a person with the lowest functional ability. Scales that ask patients to report cognitive problems are not reliable and should not be included in a payment model. In addition, 63 percent of the items in this scale were recoded as full ability due to skip patterns. The descriptive mean expenditures by range of life skills score shown in ***Appendix Table 5-3*** do not indicate a strong positive relationship of life skills score with expenditures. Possibly multicollinearity with other explanatory variables is causing this variable to be positive.

The finding that higher Self-Report Life Skills scores were associated with greater expenditures is clinically unexpected and indicates that the Life Skills scale should not be used in a payment model. One possible explanation for this finding is that 63.4 percent of Self-Report Life Skills scores were recoded to 100 (indicating highest ability) because of negative responses to the gateway question; this large ceiling effect could potentially have influenced the performance of this scale in our model. The large proportion of negative gateway responses also suggests limited utility of the Life Skills scale for OT payment. Additionally, in the CARE-C SLP sample, we found only small to moderate correlations between Self-Report Life Skills scores and Clinician-Observed Problem Solving, Memory, Attention, and Language scores (0.36-0.56), suggesting a difference between beneficiary and clinician rating of these constructs. Psychometric testing of the Activity Measure Post-Acute Care, from which the self-report items were adapted, has also demonstrated lower patient-proxy rating consistency for applied cognitive items compared with mobility and daily activities items (Andres et al., 2003; Haley et al., 2006).

The descriptive mean expenditures by range of life skills score shown in ***Appendix Table 5-3*** do not indicate a strong positive relationship of life skills score with expenditures.

The last group of measures include other individual items from the CARE assessment that indicate the *time frame* and the *number of previous surgeries* the patient had that are related to the problem for which they are receiving therapy. Surgery and the time frame of the surgery are not significantly predictive of OT therapy utilization.

Comprehensive Model

The comprehensive model includes additional variables measuring the patient feeling sad, pain affecting sleep or activities, pain severity, mobility devices, memory impairment, communication impairment, swallowing impairment, the duration of the related health problem, census division, and facility type. The addition of these variables increases the explanatory power of the model to an R^2 of 47 percent and to an adjusted R^2 of 30 percent. As measured by the increase in adjusted R^2 (22 to 30 percent), the extra explanatory power (versus the payment variables) of the comprehensive model variables is large.

In the comprehensive model, *stroke* ($806) becomes significant in the primary diagnosis groups. Of the s secondary diagnostic groups, only *major musculoskeletal* remains significant. The function, structure and activities groups remain largely unchanged. The *number of surgeries,* the *time frame of the surgery,* and the Rasch function scales remain similar in sign and significance to the payment model.

Of the variables added to the model, *pain having effect on activities, pain having an effect on sleep, pain severity, any type of memory, communication* or *swallowing* impairment, and the *duration of the related health problem* are not significant. The patient's *level of sadness* being at the highest level predicts a decline of annual expenditures by $481. Patients who had a *cane/crutch* or *full-time wheelchair* both positively predicted annual expenditures. Being in a *wheelchair/scooter full-time* significantly increases annual expenditures by $1,023. The West South Central census division and assisted living facilities both positively predicted annual expenditures of $1,920 and $1,846 respectively. The census division is in reference to the South Atlantic and the facility type is in reference to private practice.

5.4.3 CARE-C Community Resident Speech Language Therapy Model

Table 5-7 shows the results of the demographic, payment, and comprehensive models for CARE-C beneficiaries using SLP services. SLP episodes comprised 4 percent of the total sample or 185 episodes. The demographic SLP model has less than half of the sample size of the demographic OT model, and the SLP payment and comprehensive models less than one-third the sample size of the corresponding OT models. Because of their very small sample sizes, the SLP models are highly subject to overfitting and outlier influence. The SLP model results must be interpreted with great caution. ***Appendix Table 5-4*** shows the means and standard deviations for each of the explanatory variables in the SLP model.

Demographic Model

Demographics alone explain 3 percent (-3 percent adjusted) of the variation in the dependent variable—annual SLP allowed charges. There does not appear to be a strong age gradient in SLP annual expenditures, nor does *dual-eligibility* appear to be a significant predictor. However, these results are not supported by sufficient sample sizes, which are required to draw any definitive conclusions.

Payment Model

When the payment variables are added to the demographics, the explanatory power of the model increases from an R^2 of 3 percent to 43 percent or to an adjusted R^2 of 11 percent. The low adjusted R^2 is due to the small size of the sample; the sample decreases to 124 episodes due to missing data on the Rasch functional scales. The high unadjusted R^2 is misleading; it is due to overfitting, that is, a large number of explanatory variables relative to the sample size. In the payment model, both female and males aged 75 to 84 are significant positive predictors of annual expenditures. None of the SLP primary impairment groups are significant predictors of expenditures. *Stroke* ($702) is the only significant and positive predictor among the medical diagnoses groups for SLP. SLP does not have any secondary diagnosis groups as they are pooled with the primary diagnoses as discussed in Section 3.

Of the 4 function groups in the model, only *voice and speech functions* ($746) are significant. Of the four structure groups for SLP, *voice*, *speech and swallowing* is negative and significant and *central nervous system ($1,144)* is positive and significant. The *voice, speech and swallowing* group predicts a decrease in expenditures of $797, holding all else constant. We had hypothesized that patients with speech and swallowing problems would require more intense therapy (and hence resources to pay for more care) than patient who did not have speech and swallowing problems. However, these patients may be getting less care in the outpatient environment than expected, or this result may arise due to collinearity between the function and structure groups. The similarity between the positive and negative coefficients for speech related issues in the function and structure groups may be caused by multicollinearity. This occurs when the predictor variables are highly correlated which may lead to erratic changes in the coefficients. The activities groups were not significant.

The Rasch function scales included for the SLP model are *self-reported life skills*, *clinician-reported problem solving*, *clinician-reported memory*, *clinician-reported attention*, *clinician-reported functional voice*, *clinician-reported speech*, *clinician-reported language expression*, and *clinician-reported language comprehension measures*. *Functional voice, memory* and *language expression* have positive, but insignificant coefficients, which is contrary to the expected sign of the function measures. The remaining measures all have negative coefficients, but are also insignificant. These coefficients are negative due to the structure of the Rasch scales; they range from 0 for the most impaired patients to 100 for the most functional patients. Therefore, a higher score on the function scale at admission is expected to have a negative coefficient because a person with higher functional ability is expected to have lower therapy expenditures.

The last group of measures includes other individual items from the CARE assessment that indicate the *time frame* and the *number of previous surgeries* the patient had that are related to the problem for which they are receiving therapy. The number of surgeries and the timeframe of the most recent surgery both include a category for those beneficiaries who did not fill out these questions. Both of these predictors are significant but both are have fewer than 11 observations. These results are not conclusive and should be considered very cautiously.

Comprehensive Model

The comprehensive model includes additional variables measuring the patient feeling sad, pain affecting sleep or activities, pain severity, mobility devices, diet modification, cueing or assistance related to swallowing, and the duration of the related health problem. The addition of these variables increases the explanatory power of the model to an R^2 to 64 percent and to an adjusted R^2 of 4 percent. The high unadjusted R^2 is misleading; it is due to overfitting, that is, a large number of explanatory variables relative to the sample size. The comprehensive model must be interpreted with extreme caution.

In the comprehensive model, the stroke group is no longer significant and the neurological group ($1,396) is now significant. The voice and speech function group and the voice and speech structure groups are no longer significant. Central nervous system retains a positive and significant coefficient. The *number of surgeries* and the *time frame of the surgery* do not change from the payment model. All of the Rasch function scales remain insignificant.

Of the variables added to the model, pain severity of 8-10 is strongly significant and predicts an additional $1,876 of annual expenditures relative to no pain; however, this is based on an extremely limited sample size and should be interpreted with caution. The census divisions and facility types did not significantly predict annual expenditures for SLP patients.

5.4.4 CARE-F Nursing Facility Resident Models

Table 5-10 shows the results of the demographic, basic payment, payment, and comprehensive models for CARE-F beneficiaries. Because of the small sample size, the CARE-F models are subject to overfitting and outlier influence. Results should be interpreted with caution. ***Appendix Table 5-5*** shows the distribution of the Rasch function estimates and ***Appendix Table 5-6*** shows the means and standard deviations for each of the explanatory variables in the CARE-F model.

Demographic Model

Demographics alone explain 4 percent (2 percent adjusted) of the variation in the dependent variable—the annual Medicare therapy allowed charges of nursing facility residents. It appears that older patients have higher annual expenditures than the reference group, 65-74 year olds. Being originally disabled, a dual eligible or having ESRD are not significant in the model.

Basic Payment Model

When the basic payment variables are added to the demographics, the explanatory power of the model increases from an R^2 of 4 percent to 14 percent or to an adjusted R^2 of 8 percent. The basic payment model includes demographics, primary diagnosis groups, Rasch clinician-observed mobility and self-care categorical variables and indicators for diet modification, severe memory impairment and verbal ability. This limited set of variables is intended to reduce the collinearity that is present in the full payment model due to the overlap between diagnosis, function, structure and activities groups. In the basic payment model, the primary diagnosis groups are insignificant other than the group that included no primary diagnosis coded; this group only included 20 patients. The Rasch mobility and self-care items were not significant, however, the self-care items increase monotonically moving from the most functional to the least functional, which is as expected. The additional indicators are not significant.

Payment Model

When the additional payment variables are added to the model, the explanatory power increases from an R^2 of 14 percent to 36 percent or to an adjusted R^2 of 25 percent. In this model, the only Rasch function scale that is significant is the self-reported mobility scale. For the range from 30-60, annual therapy expenditures increase by $1,664, and for the range 60-90, by $2,216, versus those with the highest scores (90 or higher, the most functional). This is opposite of expectation because one would expect the beneficiaries with the lowest functional status to have the highest therapy expenditures. Annual expenditures are not impacted by prior hospitalization in the past two months. Secondary diagnoses of *osteoporosis* or *hypertension* are important predictors of expenditures. In addition, *mental functions* and *motor functions* are important functional predictors of expenditures and *shoulder/arm/elbow* and *knee* are important positive predictors based on the body structure involved.

The payment model has a negative intercept; however, it should not be interpreted as the level of expenditures for the reference group. The negative intercept does not indicate that an "omitted" group of beneficiaries has negative therapy expenditures (which is impossible), but rather provides the best statistical fit of the predictor variables (many of which are not mutually exclusive variables) to the expenditure data.

An additional analysis uses a forward stepwise regression model and shows the marginal improvement in R^2 as each variable is added to the model. ***Table 5-11*** shows the first 20 variables that are included in the model and their marginal improvement in R^2, as well as the absolute change in R^2 as the variables are added. The daily ICF activities group "Daily activities" increases the R^2 by 7.66 percentage points, accounting for 23 percent of the overall R^2 in the PT payment model. The first three variables—daily activities, mobility, and other body functions—account for 41 percent of the terminal R^2. Many of the variables that increased the R^2 were poorly defined groups, such as *no primary diagnosis*, *activities not reported* or *general/no specific body structure*. These may be indicators of beneficiary frailty, but it cannot be determined why these are important predictors of therapy expenditures without more specificity in data collection.

Comprehensive Model

The comprehensive model includes additional variables as described in Section 5.2.3. The addition of these variables increases the explanatory power of the model to an R^2 to 51 percent and to an adjusted R^2 of 37 percent. Of the additional variables added to the model, the patient's prior function in self-care being limited, having memory difficulty and pain affecting activities were all strongly significant positive predictors of expenditures. On the other hand, *prior wheelchair function being limited* and *rarely expressing ideas* were strong negative predictors of expenditures for the CARE-F patient population.

5.5 Risk-Adjusted Cap Analysis: Physical Therapy

This section presents the results of a risk-adjusted cap using the 4,210 CARE-C beneficiaries who were administered PT assessments. In order to calculate a risk-adjusted cap, we first ran a multivariate regression model including demographics, patient diagnoses and indicators for different values of the clinician-observed mobility measure (0-50, 50.01-70, 70.01+ and missing). For each individual, we predicted their annual expenditures using their demographic and CARE assessment information multiplied by the regression coefficients. We used the assumption that the predicted value would deviate from the sample mean in the same dollar amount as it would for the PT-specific cap. Therefore, we calculated the sample mean annual expenditures and subtracted them from the individual predicted expenditures. We assume that the deviation from the mean will be comparable to the deviation from the cap; therefore, this difference was then added to the PT specific cap of $1,710, as we calculated in Section 4.4. For example, Person A has predicted expenditures of $2,000 and the sample mean is $1,500. Therefore, this person's risk-adjusted cap would be calculated as follows:

1) $2,000 – $1,500 = $500 predicted above the sample mean.

2) $1,710 + $500 = $2,210 risk adjusted PT cap for person A.

Conversely, if Person B has predicted expenditures of $1,000, their risk-adjusted cap is lower, at $1,710 – ($1,500 – $1,000) = $1,210. We calculated the risk-adjusted cap for each of the 4,210 CARE-C PT beneficiaries and then examined the actual annual PT spending. This approach will produce a large number of cap values to be administered in an actual payment system. We also compared their actual annual PT spending to the non risk-adjusted cap ($1,710). Table 5-12 presents the number of beneficiaries falling above and below both the risk-adjusted and non risk-adjusted caps. Results are presented overall, by each diagnostic group and by Rasch functional score ranges.

Results show that the percentage of beneficiaries exceeding the cap in diagnosis groups with the highest percentage of beneficiaries exceeding the non risk-adjusted cap—Parkinson's and Other Progressive Neurological, Multiple Major Etiologies, Joint Replacement, Unspecified and Miscellaneous Neurological, and Stroke—is reduced by approximately 25 to 30 percent under the risk-adjusted cap. On the other hand, for the five diagnosis groups with the lowest percentage of beneficiaries exceeding the cap—Vertigo, Pain, Genitourinary Disorders, Multiple Etiologies, No Major and Sprain/Strain—the percentage of beneficiaries exceeding the risk-adjusted cap increases by 160 to 450 percent. This is due to the fact that these beneficiaries have a lower cap after risk adjustment than before risk adjustment. The results presented in this example use GLS regression models which predict the mean for all patients. This contrasts with the quantile regressions which estimate the explanatory variable impacts on a specified quantile of expenditures, such as the quantile where the cap is exceeded. Policy makers might consider specifying a specific quantile instead of using mean predictions in GLS.

The beneficiaries with the lowest functional scores exceeded the cap less frequently under the risk-adjusted cap. Those beneficiaries with the highest functional scores tended to exceed the cap more frequently under the risk-adjusted cap. The percent of cap exceeders in the highest functioning group increased from 63 percent of all cap exceeders to 72 percent under the risk-adjusted cap.

Manual review policies based on the annual cap could be targeted at those high cost beneficiaries who are not predicted to have high costs, using the characteristics measured in the risk-adjustment model (e.g., primary diagnosis, Rasch mobility measure, and other characteristics used in the risk-adjustment model). This would allow manual review to be more targeted, focusing on those cases that have unexpectedly high costs.

5.6 Conclusions

Payment models for the prediction of therapy resources have relatively poor levels of explanatory power as measured by the adjusted R^2. Of the CARE-C models, the OT payment model has the greatest explanatory power at an adjusted R^2 of 22 percent versus 9 percent for PT and 11 percent for SLP. A substantial fraction of the explanatory power of the OT model relates to demographics, which alone achieve an adjusted R^2 of 10 percent for OT expenditures. Demographics explain almost none of the PT and SLP expenditure variation in these samples. The payment variables do add substantial explanatory power to demographics for all three therapy disciplines. But even with the payment factors, only a small proportion of variation in annual therapy expenditures is explained. The additional factors in the comprehensive model add a substantial amount of explanatory power to the payment model, but these variables may not be appropriate for a payment model.

For PT annual expenditures, we find that primary diagnosis explains some variation in expenditures (adjusted R^2 of 3.6 percent). Even though demographic variables were included in all models, they explain almost no variation in PT expenditure. Clinician-observed mobility adds explanatory power, increasing to an adjusted R^2 of 5.4 percent (or 5.5 percent in ranges). Adding all four Rasch function scales (clinician-observed mobility and three self-report scales) raises the percentage of variation explained to 6.2 percent (continuous scales) or 6.8 percent (categories). The clinician-observed and self-report Rasch function scales each add explanatory power to the model, but not at the same level as when all four scales are included simultaneously. Demographics, primary diagnosis group, and four Rasch function scales explain about two-thirds of the expenditure variation that the full payment model explains (6.2 percent versus 9.3 percent adjusted R^2). Demographics, primary diagnosis, and clinician-observed mobility have about three-fifths of the explanatory power of the full payment model (5.4 percent versus 9.3 percent adjusted R^2)

The Rasch function scales almost always predict that higher function is associated with lower therapy expenditures, other factors equal. This is as expected. But the individual Rasch function scales are not statistically significant predictors of annual OT or SLP expenditures except for one anomalously-signed OT coefficient. Two of the four Rasch function scales included in the PT model—*self-reported participation* and *self-reported mobility*—are statistically significant predictors of annual PT expenditures. Their regression coefficients indicate that the difference between the highest ability (score = 100) to lowest ability (score = 0) is associated with a \$290 to \$401 increase in expenditures for each scale individually.

The self-reported participation Rasch scale is the single payment variable that explains the most PT expenditure variation according to a stepwise regression, followed by clinician-observed mobility and a diagnosis of joint replacement. These three variables together account for over half of the explanatory power of the PT payment model (5.2 percentage points of 9.3 percent adjusted R^2). All of the payment model variables explain only 58 percent of the expenditure variation explained by the comprehensive model (adjusted R^2 of 9.3 percent versus 16.1 percent), indicating that factors that may not be suitable for payment have a strong impact on therapy expenditures.

A primary medical diagnosis of *joint replacement* for PT is a positive and statistically significant predictor of annual therapy expenditures. However, as discussed above, *joint replacement* may be capturing expenditures from prior to the procedure as well as after the procedure. Primary diagnoses of *vertigo* and *pain* are negative predictors of PT expenditures. A primary diagnosis of *stroke* is a positive predictor of OT expenditures in the comprehensive model, but not in the payment model. Several secondary diagnoses and reason for therapy body structures and functions are positive and negative predictors of PT and OT expenditures.

Using a *wheelchair/scooter full time* is a strong predictor of both PT and OT expenditures, but is probably not an appropriate payment variable because providers may encourage increased wheelchair use due to payment incentives. Using a *wheelchair/scooter part-time* is not associated with either PT or OT expenditures. Using a *walker* predicts PT expenditures, and using a *cane/crutch* predicts OT expenditures.

The SLP models are highly problematic because of small sample size—only 124 observations were available for the payment and comprehensive models. It is difficult to draw any conclusions from the SLP models because of the high likelihood of significant overfitting, multicollinearity, and outlier influence.

The CARE-F payment and comprehensive models have multiple, highly-correlated indicators for many of the predictors included in the regression models. The basic payment model seeks to avoid this problem by including only a few key predictors, including demographics, primary diagnoses, clinician-observed functional status and several indicators of mental status. However, the basic payment model only explains 14 percent of the variation in annual expenditures (8 percent adjusted). Many of the variables that were identified in the payment and comprehensive models as significant predictors of annual expenditures were poorly defined groups, such as no primary diagnosis, no ICF activity group not reported, or general/no specific body locations. These may be indicative of general frailty that is difficult to categorize using the current version of the CARE-F assessment.

Table 5-1a
CARE-C annual beneficiary characteristics, by therapy discipline – beneficiary mean age

	N	Mean
Total	4,842	73
PT	4,197	73
OT	461	72
SLP	184	72

NOTES:
1. PT = Physical Therapy, OT = Occupational Therapy, SLP = Speech-Language Pathology
2. N = Unique number of beneficiaries
3. Annual Period: March 2011 - February 2012.
4. Total = Sum of the three (3) disciplines.

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims and CARE data.
Program: PA022

Table 5-1b
CARE-C annual beneficiary characteristics, by therapy discipline – unique beneficiary characteristics (%)

	Total (N=4,842)		PT (N=4,197)		OT (N=461)		SLP (N=184)	
	N	Percent	N	Percent	N	Percent	N	Percent
Female	3,089	63.80	2,709	64.55	301	65.29	79	42.93
ESRD	40	0.83	34	0.81	†	†	†	†
Disabled	609	12.58	483	11.51	92	19.96	34	18.48
Medicaid	492	10.16	388	9.24	70	15.18	34	18.48

NOTES:
† = Fewer than 11 cases.
1. PT = Physical Therapy, OT = Occupational Therapy, SLP = Speech-Language Pathology, ESRD = End-Stage Renal Disease
2. N = Unique number of beneficiaries
3. Annual Period: March 2011 - February 2012.
4. Total = Sum of the three (3) disciplines.
5. Percent = Percent of the total high-cost beneficiary in each discipline.

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims and CARE data.
Program: PA022

Table 5-1c
CARE-C annual beneficiary characteristics, by therapy discipline – unique high-cost beneficiary mean age

	N	Mean
Total	486	74
PT	414	74
OT	47	73
SLP	25	68

NOTES:
1. PT = Physical Therapy, OT = Occupational Therapy, SLP = Speech-Language Pathology
2. N = Unique number of beneficiaries
3. Annual Period: March 2011 - February 2012.
4. Total = Sum of the three (3) disciplines.
5. High-Cost Beneficiaries were beneficiaries with at least one (1) high-cost episode. A High-Cost Episode was defined as having an Episode-Allowed Charge amount greater than the 90th percentile of Total Episode Allowed Charges.

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims and CARE data.
Program: PA022

Table 5-1d
CARE-C annual beneficiary characteristics, by therapy discipline – unique high-cost beneficiary characteristics (%)

	Total (N=486)		PT (N=414)		OT (N=47)		SLP (N=25)	
	N	Percent	N	Percent	N	Percent	N	Percent
Female	314	64.54	268	64.73	35	73.91	11	44.00
ESRD	†	†	†	†	—	—	—	—
Disabled	69	14.23	52	12.56	††	††	†	†
Medicaid	68	14.02	43	10.39	††	††	†	†

NOTES:
† = Fewer than 11 cases. †† = Count suppressed to maintain confidentiality of cells with fewer than 11 cases.
1. PT = Physical Therapy, OT = Occupational Therapy, SLP = Speech-Language Pathology, ESRD = End-Stage Renal Disease
2. N = Unique number of beneficiaries
3. Annual Period: March 2011 - February 2012.
4. Total = Sum of the three (3) disciplines.
5. Percent = Percent of the total high-cost beneficiary in each discipline.
6. High-Cost Beneficiaries were beneficiaries with at least one (1) high-cost episode. A High-Cost Episode was defined as having an Episode-Allowed Charge amount greater than the 90th percentile of Total Episode Allowed Charges.

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims and CARE data.

Program: PA022

Table 5-2
CARE-C Annual therapy utilization characteristics, by therapy discipline

	Mean	SE	1st	25th	Median	75th	99th
CARE-C - Total (n = 4,856)							
Total Allowed Charge ($)	1,493	21.43	82	534	1,039	1,917	7,173
Total Medicare Payment ($)	1,176	17.06	62	416	806	1,511	5,671
Total Therapy Days (n)	15	0.20	1	6	12	20	66
Total Calendar Days (n)	95	1.41	1	25	52	139	364
Allowed Charges Per Therapy Day ($)	95	0.35	51	79	91	109	161
Payments per Therapy Day ($)	74	0.29	36	61	72	86	128
Therapy Days per Week	1.89	0.02	0.20	0.97	1.69	2.33	7.00
CARE-C - PT (n = 4,210)							
Total Allowed Charge ($)	1,488	22.67	95	541	1,040	1,907	7,070
Total Medicare Payment ($)	1,172	18.02	61	422	807	1,505	5,656
Total Therapy Days (n)	15	0.21	1	6	12	20	64
Total Calendar Days (n)	97	1.55	1	26	52	148	364
Allowed Charges Per Therapy Day ($)	94	0.37	52	79	90	107	152
Payments per Therapy Day ($)	74	0.30	36	61	71	84	121
Therapy Days per Week	1.86	0.02	0.20	0.95	1.67	2.33	7.00
CARE-C - OT (n = 461)							
Total Allowed Charge ($)	1,461	79.01	78	451	946	1,867	9,234
Total Medicare Payment ($)	1,161	63.16	62	353	749	1,476	7,387
Total Therapy Days (n)	15	0.71	1	5	10	19	89
Total Calendar Days (n)	75	3.83	1	22	42	92	359
Allowed Charges Per Therapy Day ($)	98	1.14	47	80	97	115	157
Payments per Therapy Day ($)	77	0.92	32	62	77	91	123
Therapy Days per Week	2.03	0.07	0.16	1.18	1.84	2.47	7.00
CARE-C - SLP (n = 185)							
Total Allowed Charge ($)	1,665	107.71	83	571	1,252	2,167	6,902
Total Medicare Payment ($)	1,325	85.96	66	457	1,001	1,710	5,522
Total Therapy Days (n)	16	1.12	1	6	12	22	74
Total Calendar Days (n)	80	5.22	1	29	63	107	296
Allowed Charges Per Therapy Day ($)	109	2.18	73	91	101	113	204
Payments per Therapy Day ($)	87	1.76	57	72	81	90	163
Therapy Days per Week	2.14	0.13	0.23	1.06	1.71	2.57	7.00

NOTES:
1. PT = Physical Therapy, OT = Occupational Therapy, SLP = Speech-Language Pathology
2. N = Number of Unique Episodes
3. SE = Standard error of the mean.
4. Annual Period: March 2011 - February 2012.
5. CARE-C Total = Sum of the three (3) disciplines' episodes.
6. Therapy Days per Week = [(therapy days)/(calendar days)]*7

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims and CARE data.

Program: PA022

Table 5-3
CARE-C physical therapy demographic, payment, and comprehensive models of annual allowed charges

CARE-C PT annual models	Demographic		Payment		Comprehensive	
Number of observations		4,210		3,749		3,749
Mean dependent variable ($)		1,488		1,524		1,524
R^2		0.0058		0.1155		0.1893
Adjusted R^2		0.0032		0.0930		0.1611
Variable	Count	Parameter	Count	Parameter	Count	Parameter
Intercept	—	1,485***	—	2,282***	—	1,447***
Demographics						
Male, age 0 to 64	132	-164	112	-395**	112	-405**
Male, age 65-74	673	-90	603	-79	603	-77
Male, age 75-84	554	35	503	-59	503	-75
Male, age 85+	133	-29	119	-220*	119	-301**
Female, age 0 to 64	314	-91	279	-257*	279	-224*
Female, age 65-74	*1,246*	*Reference*	*1,123*	*Reference*	*1,123*	*Reference*
Female, age 75-84	888	-36	779	-156**	779	-181***
Female, age 85+	270	317	231	90	231	-164
Originally disabled	261	64	238	-159	238	-128
Medicaid in 2010–2012	390	45	338	80	338	66
ESRD in 2010–2012	34	657*	29	514	29	332
Primary diagnosis groups						
Fracture	—	—	191	-60	191	-34
Joint Replacement	—	—	432	267*	432	282*
Osteoarthritis	—	—	*566*	*Reference*	*566*	*Reference*
Spinal Stenosis	—	—	222	-21	222	-58
Herniated Disc and Other Major Musculoskeletal	—	—	370	-140	370	-78
Sprain/Strain	—	—	250	-256**	250	-207*
Bursitis/Tendonitis	—	—	228	-181*	228	-104
Unspecified and Miscellaneous Musculoskeletal	—	—	457	-23	457	3
Circulatory (including Lymphatic) and Pulmonary/ Respiratory	—	—	56	-54	56	-9
Stroke	—	—	66	256	66	326
Parkinson's and Other Progressive Neurological	—	—	59	382	59	368
Peripheral Nervous System and Other Major Neurological Disorders	—	—	59	-211	59	-220
Unspecified and Miscellaneous Neurological	—	—	47	377	47	263
Pain	—	—	39	-313*	39	-288
Vertigo	—	—	57	-701**	57	-638**

(continued)

Table 5-3 (continued)
CARE-C physical therapy demographic, payment, and comprehensive models of annual allowed charges

CARE-C PT annual models	Demographic		Payment		Comprehensive	
Genitourinary Disorders	—	—	23	-406*	23	-277
Unspecified and Miscellaneous Diagnoses	—	—	109	-65	109	-150
Multiple Major Etiologies	—	—	216	148	216	211*
Multiple Etiologies, One Major	—	—	213	-199*	213	-92
Multiple Etiologies, No Major	—	—	56	-413***	56	-352**
No Primary Diagnosis	—	—	33	126	33	162
Secondary diagnosis groups						
Osteoarthritis	—	—	1,187	68	1,187	59
Joint replacement	—	—	172	98	172	174
Spinal Stenosis, Herniated Disc, and Other Major Musculoskeletal	—	—	642	119	642	128
Osteoporosis, Sprain/Strain, and Other Minor Musculoskeletal	—	—	581	115	581	123
Unspecified musculoskeletal	—	—	255	113	255	129
Circulatory (including lymphatic system)	—	—	609	29	609	-26
Hypertension	—	—	1,068	-141	1,068	-127*
Pulmonary/respiratory system	—	—	373	-108	373	-100
Stroke	—	—	87	155	87	198
Peripheral Nervous System and Other Major Neurological Disorders	—	—	136	188	136	147
Unspecified and Miscellaneous Neurological	—	—	144	251	144	242*
Gait or balance disorder	—	—	849	113	849	112
Pain	—	—	1,654	-131	1,654	-125
Vertigo	—	—	63	61	63	79
Generalized weakness	—	—	1,118	164*	1,118	91
Communication and cognition disorders	—	—	172	9	172	19
Mental health	—	—	305	-245***	305	-223**
Cancer and other neoplasms	—	—	303	-33	303	-42
Obesity	—	—	122	14	122	45
Vision impairment	—	—	133	50	133	88
Diabetes mellitus	—	—	449	-44	449	5
Unspecified and Miscellaneous Diagnoses	—	—	543	97	543	85
No secondary diagnoses	—	—	333	50	333	58

(continued)

Table 5-3 (continued)
CARE-C physical therapy demographic, payment, and comprehensive models of annual allowed charges

CARE-C PT annual models	Demographic		Payment		Comprehensive	
ICF function groups (reason for therapy)						
Motor functions	—	—	3,397	24	3,397	7
Pain	—	—	2,132	113	2,132	99
Proprioceptive and touch functions	—	—	238	328**	238	326**
Vestibular functions	—	—	222	1	222	80
Cardiovascular and respiratory	—	—	110	271	110	359
Genitourinary functions	—	—	22	22	22	106
Other body functions	—	—	118	209	118	139
Body functions not reported	—	—	104	1	104	14
ICF structure groups (reason for therapy)						
Unilateral hip/thigh	—	—	654	-152**	654	-144**
Unilateral knee	—	—	728	-56	728	-9
Unilateral calf/foot/ankle	—	—	352	-2	352	-33
Unilateral toes	—	—	42	532*	42	551**
Unilateral shoulder/arm/elbow	—	—	589	216**	589	214**
Unilateral wrist/hand/fingers	—	—	93	-172	93	-168
Upper spine	—	—	583	21	583	47
Lower spine	—	—	1,210	-32	1,210	2
General/no specific body location	—	—	324	180	324	99
Bilateral lower extreme	—	—	604	-97	604	-92
Bilateral upper extreme	—	—	149	199	149	147
Peripheral nervous system	—	—	117	-82	117	-1
Central nervous system	—	—	99	-277	99	-213
Ear	—	—	56	58	56	169
Other body structures	—	—	98	-407**	98	-486***
Body structures not reported	—	—	284	20	284	-4
ICF activity groups (reason for therapy)						
Cognitive/communication	—	—	71	504*	71	521*
Mobility	—	—	2,838	35	2,838	11
Daily activities	—	—	2,320	-32	2,320	29
Activities not reported	—	—	350	-91	350	-42
Rasch function estimates (0 = low ability; 100 = high ability)						
Clinician-observed mobility	—	—	3,749	-4.18	3,749	0.95
Self-reported everyday activities	—	—	3,749	-1.20	3,749	-1.24
Self-reported mobility	—	—	3,749	-2.90*	3,749	-1.84
Self-reported participation	—	—	3,749	-4.01***	3,749	-2.84**

(continued)

Table 5-3 (continued)
CARE-C physical therapy demographic, payment, and comprehensive models of annual allowed charges

CARE-C PT annual models	Demographic		Payment		Comprehensive	
CARE-C individual items						
Number of related surgeries = 0	—	—	*2,453*	*Reference*	*2,453*	*Reference*
Number of related surgeries = 1	—	—	722	39	722	-17
Number of related surgeries = 2+	—	—	458	120	458	56
Number of related surgeries - missing	—	—	116	-135	116	-162
Time of most recent related surgery—none	—	—	*2,296*	*Reference*	*2,296*	*Reference*
Time of most recent related surgery—within 1 month	—	—	473	199	473	241*
Time of most recent related surgery—within 1–3 months	—	—	281	447***	281	470***
Time of most recent related surgery—3+ months	—	—	573	257**	573	263**
Time of most recent related surgery - missing	—	—	126	130	126	91
Patient feels sad (never, rarely, sometimes, I do not know)	—	—	—	—	*2,282*	*Reference*
Patient feels sad (often)	—	—	—	—	1,040	-4
Patient feels sad (always)	—	—	—	—	328	115
Patient feels sad - missing	—	—	—	—	99	-55
Pain has effect on activities	—	—	—	—	2,153	123*
Pain has effect on sleep	—	—	—	—	1,576	1
Pain severity (0–2)	—	—	—	—	*631*	*Reference*
Pain severity (3–7)	—	—	—	—	2,001	-71
Pain severity (8–10)	—	—	—	—	881	-88
Pain severity - missing	—	—	—	—	236	-199*
Duration of related health problem—0-1 months	—	—	—	—	*689*	*Reference*
Duration of related health problem—1-3 months	—	—	—	—	783	20
Duration of related health problem—3+ months	—	—	—	—	2,201	104**
Duration of related health problem - missing	—	—	—	—	76	448**
Mobility device—none	—	—	—	—	*2,180*	*Reference*
Mobility device—cane/crutch	—	—	—	—	892	26
Mobility device—walker	—	—	—	—	670	249**
Mobility device—orthotics/prosthetic	—	—	—	—	53	307
Mobility device—wheelchair/scooter full-time	—	—	—	—	70	1000**

(continued)

Table 5-3 (continued)
CARE-C physical therapy demographic, payment, and comprehensive models of annual allowed charges

CARE-C PT annual models	Demographic		Payment		Comprehensive	
Mobility device—wheelchair/scooter part-time	—	—	—	—	120	-10
Mobility device—mechanical lift	—	—	—	—	†	†
Mobility device—other	—	—	—	—	97	207
Mobility device - missing	—	—	—	—	144	111
Patient has memory difficulty	—	—	—	—	239	-12
Patient has communication problem	—	—	—	—	87	209
Facility type						
Private practice	—	—	—	—	*2,116*	*Reference*
Assisted living facility	—	—	—	—	116	1478***
Hospital outpatient department	—	—	—	—	898	-137
Comprehensive\outpatient rehabilitation facility	—	—	—	—	610	-108
Nursing facility	—	—	—	—	†	†
Census division						
South Atlantic	—	—	—	—	*1,242*	*Reference*
New England	—	—	—	—	233	-206
Mid-Atlantic	—	—	—	—	876	461**
East North Central	—	—	—	—	593	-94
West North Central	—	—	—	—	214	207
East South Central	—	—	—	—	159	-306*
West South Central	—	—	—	—	153	249
Mountain	—	—	—	—	48	-133
Pacific	—	—	—	—	230	-12

*** (p=<0.01), ** (p=<0.05), * (p=<0.10)

† = Fewer than 11 cases.

NOTES:

1. ESRD in 2010-2012 - The beneficiary had ESRD any time in 2010, 2011, or 2012.
2. Medicaid in 2010-2012 - The beneficiary had at least one month of Medicaid eligibility during their therapy episode.
3. The count column refers to the number of beneficiaries where that variable = 1. If it is an ordinal/continuous variable, then it refers to the number of people where that variable > 0.
4. ICF is International Classification of Function.
5. Annual Period: March 2011 - February 2012.
6. Facility type as identified by CARE providers on the CARE assessment.

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims and CARE data.

Programs: PA022

Table 5-4
CARE-C physical therapy models of annual allowed charges using Rasch estimate range sets

	Base		Base and continuous Rasch CO mobility estimate		Base and continuous Rasch SR estimates[3]		Base and continuous Rasch estimates[4]		Base and Rasch CO mobility estimate range sets		Base and Rasch estimates[4] range sets	
Number of observations	—	4,210	—	4,165	—	3,787	—	3,749	—	4,210	—	4,210
Mean dependent variable ($)	—	1,488	—	1,493	—	1,520	—	1,524	—	1,488	—	1,488
R^2	—	0.0430	—	0.0608	—	0.0652	—	0.0710	—	0.0627	—	0.0781
Adjusted R^2	—	0.0358	—	0.0535	—	0.0567	—	0.0622	—	0.0548	—	0.0677
Variable	Count	Parameter	Count	Parameter	Count	Parameter	Count	Parameter	Count	Parameter	Count	Parameter
INTERCEPT	—	1,407***	—	2,504***	—	2,429***	—	2,893***	—	1,363***	—	1,235***
Demographics												
Male, age 0 to 64	132	-217	131	-258	113	-309*	112	-305*	132	-236	132	-290*
Male, age 65-74	673	-92	669	-83	606	-68	603	-68	673	-91	673	-75
Male, age 75-84	554	-34	546	-59	511	-27	503	-37	554	-49	554	-42
Male, age 85+	133	-34	132	-152	120	-116	119	-167	133	-142	133	-166
Female, age 0 to 64	314	-93	310	-116	281	-268**	279	-246*	314	-107	314	-200*
Female, age 65-74	*1,246*	*Reference*	*1,237*	*Reference*	*1,130*	*Reference*	*1,123*	*Reference*	*1,246*	*Reference*	*1,246*	*Reference*
Female, age 75-84	888	-59	871	-105	794	-109	779	-125*	888	-80	888	-95
Female, age 85+	270	318	269	148	232	230	231	155	270	187	270	164
Originally disabled	261	21	261	-42	238	-128	238	-140	261	-26	261	-92
Medicaid in 2010–2012	390	56	388	18	340	14	338	6	390	24	390	2
ESRD in 2010–2012	34	685**	33	609*	30	638*	29	617*	34	638**	34	592*
Primary diagnosis groups												
Fracture	206	191*	206	99	191	93	191	53	206	130	206	82
Joint Replacement	470	566***	468	505***	434	435***	432	424***	470	519***	470	461***
Osteoarthritis	*634*	*Reference*	*629*	*Reference*	*569*	*Reference*	*566*	*Reference*	*634*	*Reference*	*634*	*Reference*
Spinal Stenosis	253	102	252	81	223	22	222	17	253	88	253	77
Herniated Disc and Other Major Musculoskeletal	414	20	412	21	372	-35	370	-29	414	13	414	-8

(continued)

Table 5-4 (continued)
CARE-C physical therapy models of annual allowed charges using Rasch estimate range sets

	Base		Base and continuous Rasch CO mobility estimate		Base and continuous Rasch SR estimates[3]		Base and continuous Rasch estimates[4]		Base and Rasch CO mobility estimate range sets		Base and Rasch estimates[4] range sets	
Sprain/Strain	286	-278***	282	-225**	254	-254**	250	-227**	286	-235**	286	-208**
Bursitis/Tendonitis	260	-238***	260	-198**	228	-151	228	-145	260	-211**	260	-156*
Unspecified and Miscellaneous Musculoskeletal	529	50	523	48	463	19	457	13	529	50	529	61
Circulatory (including Lymphatic) and Pulmonary/Respiratory	62	223	61	141	57	153	56	127	62	130	62	108
Stroke	71	782***	71	536**	66	521*	66	416	71	558**	71	463*
Parkinson's and Other Progressive Neurological	64	711*	64	505	59	589	59	491	64	528	64	459
Peripheral Nervous System and Other Major Neurological Disorders	67	9	65	-53	60	-78	59	-99	67	-72	67	-56
Unspecified and Miscellaneous Neurological	52	623**	52	482*	47	575*	47	514*	52	479*	52	441*
Pain	49	-370**	47	-342**	40	-306*	39	-282	49	-326**	49	-301*
Vertigo	70	-586***	70	-685***	57	-508**	57	-589***	70	-669***	70	-562***
Genitourinary Disorders	26	-523***	26	-535***	23	-480***	23	-522***	26	-508***	26	-426***
Unspecified and Miscellaneous Diagnoses	118	218	118	90	109	124	109	54	118	130	118	92
Multiple Major Etiologies	229	376**	229	282**	216	251*	216	215	229	284**	229	241*
Multiple Etiologies, One Major	231	14	231	-51	213	-62	213	-99	231	-39	231	-55
Multiple Etiologies, No Major	60	-299**	60	-300**	56	-312**	56	-324**	60	-310**	60	-307**
No Primary Diagnosis	59	111	39	231	50	57	33	165	59	184	59	198

(continued)

Table 5-4 (continued)
CARE-C physical therapy models of annual allowed charges using Rasch estimate range sets

	Base		Base and continuous Rasch CO mobility estimate		Base and continuous Rasch SR estimates[3]		Base and continuous Rasch estimates[4]		base and rasch co mobility estimate range sets		Base and Rasch estimates[4] range sets	
Rasch function estimates (0 = low ability; 100 = high ability)												
Clinician-observed mobility	—	—	4,165	-12.51***	—	—	3,749	-7.99***	—	—	—	—
Self-reported everyday activities	—	—	—	—	3,787	-2.50	3,749	-2.15	—	—	—	—
Self-reported mobility	—	—	—	—	3,787	-3.11**	3,749	-1.98	—	—	—	—
Self-reported participation	—	—	—	—	3,787	-6.9***	3,749	-5.34***	—	—	—	—
Rasch function estimates range sets												
Clinician-observed mobility												
Rasch estimate - missing	—	—	—	—	—	—	—	—	45	-354**	45	-429**
0 < Rasch estimate ≤ 40	—	—	—	—	—	—	—	—	46	720*	46	304
40 < Rasch estimate ≤ 70	—	—	—	—	—	—	—	—	1,040	443***	1,040	286**
70 < Rasch estimate ≤ 97	—	—	—	—	—	—	—	—	1,916	-39	1,916	-87
Rasch estimate > 97	—	—	—	—	—	—	—	—	*1,163*	*Reference*	*1,163*	*Reference*
Self-reported everyday activities												
Rasch estimate - missing	—	—	—	—	—	—	—	—	—	—	208	-245*
0 < Rasch estimate ≤ 40	—	—	—	—	—	—	—	—	—	—	106	336*
40 < Rasch estimate ≤ 70	—	—	—	—	—	—	—	—	—	—	1,731	109*
70 < Rasch estimate ≤ 97	—	—	—	—	—	—	—	—	—	—	473	-89
Rasch estimate > 97	—	—	—	—	—	—	—	—	—	—	*1,692*	*Reference*
Self-reported mobility												
Rasch estimate - missing	—	—	—	—	—	—	—	—	—	—	200	210*
0 < Rasch estimate ≤ 40	—	—	—	—	—	—	—	—	—	—	181	325*

(continued)

Table 5-4 (continued)
CARE-C physical therapy models of annual allowed charges using Rasch estimate range sets

	Base		Base and continuous Rasch CO mobility estimate		Base and continuous Rasch SR estimates[3]		Base and continuous Rasch estimates[4]		Base and Rasch CO mobility estimate range sets		Base and Rasch estimates[4] range sets	
40 < Rasch estimate ≤ 70	—	—	—	—	—	—	—	—	—	—	2,028	103
70 < Rasch estimate ≤ 97	—	—	—	—	—	—	—	—	—	—	220	129
Rasch estimate > 97	—	—	—	—	—	—	—	—	—	—	*1,581*	*Reference*
Self-reported participation												
Rasch estimate - missing	—	—	—	—	—	—	—	—	—	—	379	-61
0 < Rasch estimate ≤ 40	—	—	—	—	—	—	—	—	—	—	400	278***
40 < Rasch estimate ≤ 70	—	—	—	—	—	—	—	—	—	—	1,373	190***
70 < Rasch estimate ≤ 97	—	—	—	—	—	—	—	—	—	—	1,233	92*
Rasch estimate > 97	—	—	—	—	—	—	—	—	—	—	*825*	*Reference*

*** (p=<0.01), ** (p=<0.05), * (p=<0.10)

NOTES:

1. CO - Clinician-Observed Rasch Estimate; SR - Self-Reported Rasch Estimate
2. The Base model includes only demographic and primary diagnosis group variables.
3. The Rasch SR estimates include the Self-reported everyday activities, Self-reported mobility, and Self-reported participation
4. The Rasch estimate include the Clinician-observed mobility, Self-reported everyday activities, Self-reported mobility, and Self-reported participation
5. ESRD in 2010-2012 - The beneficiary had ESRD any time in 2010, 2011, or 2012.
6. Medicaid in 2010-2012 - The beneficiary had at least one month of Medicaid eligibility during their therapy episode.
7. The count column refers to the number of beneficiaries where that variable = 1. If it is an ordinal/continuous variable, then it refers to the number of people where that variable > 0.
8. Annual Period: March 2011 - February 2012

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims and CARE data.

Programs: PA022

Table 5-5
CARE-C physical therapy stepwise-payment model of annual allowed charges

Step	Variable	Cumulative R^2	Absolute increase in R^2	Percent increase in R^2	F Value	Pr > F
1	Rasch function estimate - Self-reported participation	0.0316	0.0316	—	122.21	<.0001
2	Rasch function estimate - Clinician-observed mobility	0.0435	0.0119	37.6582	46.64	<.0001
3	Primary Diagnosis Group - 2. Joint Replacement	0.0520	0.0085	19.5402	33.42	<.0001
4	Body Function Group (ICF) - 3. Proprioceptive and touch functions	0.0591	0.0071	13.6538	28.26	<.0001
5	Time of most recent related surgery—within 1–3 months	0.0634	0.0043	7.2758	17.55	<.0001
6	Time of most recent related surgery—3+ months	0.0682	0.0048	7.5710	18.92	<.0001
7	Body Structure Group (ICF) - 9. General/no specific body location	0.0719	0.0037	5.4252	15.10	0.0001
8	Primary Diagnosis Group - 15. Vertigo	0.0753	0.0034	4.7288	13.68	0.0002
9	Secondary Diagnosis Group - 15. Generalized weakness	0.0774	0.0021	2.7888	8.37	0.0038
10	Time of most recent related surgery—within 1 month	0.0796	0.0022	2.8424	9.18	0.0025
11	Secondary Diagnosis Group - 17. Mental health	0.0816	0.0020	2.5126	7.99	0.0047
12	Body Structure Group (ICF) - 4. Unilateral toes	0.0831	0.0015	1.8382	6.26	0.0124
13	Body Structure Group (ICF) - 5. Unilateral shoulder/arm/elbow	0.0846	0.0015	1.8051	6.23	0.0126
14	Rasch function estimate - Self-reported mobility	0.0861	0.0015	1.7730	5.88	0.0153
15	Activities and Participation Group (ICF) - 1. Cognitive/communication	0.0875	0.0014	1.6260	5.67	0.0173
16	Secondary Diagnosis Group - 3. Other major musculoskeletal	0.0888	0.0013	1.4857	5.48	0.0193
17	Body Structure Group (ICF) - 15. Other body structures	0.0901	0.0013	1.4640	5.30	0.0213
18	Body Structure Group (ICF) - 1. Unilateral hip/thigh	0.0913	0.0012	1.3319	5.10	0.0239
19	Secondary Diagnosis Group - 7. Hypertension	0.0924	0.0011	1.2048	4.48	0.0343
20	Secondary Diagnosis Group - 11. Minor neurological	0.0936	0.0012	1.2987	4.85	0.0277

NOTES:

1. ESRD in 2010-2012 - The beneficiary had ESRD any time in 2010, 2011, or 2012.
2. Medicaid in 2010-2012 - The beneficiary had at least one month of Medicaid eligibility during their therapy episode.
3. ICF is International Classification of Function.
4. Annual Period: March 2011 - February 2012

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims and CARE data.

Programs: PA022

Table 5-6
CARE-C occupational therapy demographic, payment, and comprehensive models of annual allowed charges

CARE-C OT annual models	Demographic		Payment		Comprehensive	
Number of observations	—	461	—	384	—	384
Mean dependent variable ($)	—	1,461	—	1,552	—	1,552
R^2	—	0.1237	—	0.3419	—	0.4730
Adjusted R^2	—	0.1022	—	0.2221	—	0.3040
Variable	Count	Parameter	Count	Parameter	Count	Parameter
Intercept	—	1,379***	—	-273	—	-28
Demographics						
Male, age 0 to 64	35	-837	30	-1,120**	30	-1,252***
Male, age 65-74	64	-328	50	-408	50	-398
Male, age 75-84	47	-173	38	-354	38	-604
Male, age 85+	14	2	12	-167	12	-507
Female, age 0 to 64	47	-768**	35	-1,095***	35	-1,195***
Female, age 65-74	*110*	*Reference*	*92*	*Reference*	*92*	*Reference*
Female, age 75-84	90	-162	80	-346	80	-366
Female, age 85+	54	845*	47	859*	47	128
Originally disabled	32	-234	22	-545	22	-757**
Medicaid in 2010–2012	70	1,551*	58	1,725**	58	1,611**
ESRD in 2010–2012	†	†	†	†	†	†
Primary Diagnosis Groups						
Fracture and Joint Replacement	—	—	68	218	68	297
Major Musculoskeletal, excluding Fracture and Joint Replacement	—	—	*67*	*Reference*	*67*	*Reference*
Minor, Unspecified, and Miscellaneous Musculoskeletal	—	—	63	276	63	208
Stroke	—	—	42	377	42	806**
Neurological, excluding Stroke			52	-115	52	151
Circulatory (including Lymphatic) and Pulmonary/ Respiratory	—	—	37	-27	37	269
Unspecified and Miscellaneous Diagnoses	—	—	27	-653	27	-806
Multiple Etiologies	—	—	22	-484	22	-188
No Primary Diagnosis	—	—	†	†	†	†
Secondary Diagnosis Groups						
Osteoarthritis and Other Major Musculoskeletal	—	—	156	-480**	156	-471**
Osteoporosis, Unspecified, and Miscellaneous Musculoskeletal	—	—	76	71	76	-104
Circulatory (including lymphatic) and pulmonary/respiratory	—	—	90	60	90	266

(continued)

Table 5-6 (continued)
CARE-C occupational therapy demographic, payment, and comprehensive models of annual allowed charges

CARE-C OT annual models	Demographic		Payment		Comprehensive	
Peripheral Nervous System and Other Neurological Disorders	—	—	70	342	70	281
Pain	—	—	92	-403*	92	-343
Generalized weakness	—	—	114	471**	114	137
Cognitive, communication, and mental health disorders	—	—	75	-14	75	-36
Unspecified and Miscellaneous Diagnoses	—	—	152	78	152	74
Hypertension	—	—	112	-191	112	-223
Diabetes mellitus	—	—	50	-171	50	-96
No secondary diagnosis	—	—	38	-390	38	-395
ICF function groups (reason for therapy)						
Motor functions	—	—	325	10	325	-380
Pain	—	—	129	-20	129	192
Mental functions	—	—	47	1,828***	47	1,276**
Proprioceptive and touch functions	—	—	46	-5	46	34
Sensory functions	—	—	21	-153	21	-262
Other body functions	—	—	69	482*	69	28
Body functions not reported	—	—	15	-304	15	-541
ICF structure groups (reason for therapy)						
Lower extremity and spine	—	—	56	156	56	207
Unilateral shoulder/arm/elbow	—	—	104	128	104	100
Unilateral wrist/hand/fingers	—	—	155	465*	155	637**
General/no specific body location	—	—	41	-114	41	-250
Bilateral upper extremity	—	—	86	680*	86	478
Other body structures	—	—	54	284	54	492*
Body structures not reported	—	—	49	342	49	469
ICF activity groups (reason for therapy)						
Cognitive/communication	—	—	60	-620	60	-868
Mobility	—	—	124	342	124	3
Daily activities	—	—	335	618	335	334
Activities not reported	—	—	36	1,832	36	989
Rasch function estimates (0 = low ability; 100 = high ability)						
Clinician-observed self-care	—	—	384	-1.21	384	-0.87

(continued)

Table 5-6 (continued)
CARE-C occupational therapy demographic, payment, and comprehensive models of annual allowed charges

CARE-C OT annual models	Demographic		Payment		Comprehensive	
Self-reported everyday activities	—	—	384	-4.61	384	-3.68
Self-reported participation	—	—	384	-5.88	384	-1.85
Self-reported life skills	—	—	384	13.63**	384	11.48*
CARE-C individual items						
Number of related surgeries = 0	—	—	*218*	*Reference*	*218*	*Reference*
Number of related surgeries = 1	—	—	97	439	97	231
Number of related surgeries = 2+	—	—	50	391	50	114
Number of related surgeries - missing	—	—	19	-153	19	263
Time of most recent related surgery—none	—	—	*201*	*Reference*	*201*	*Reference*
Time of most recent related surgery—within 1 month	—	—	53	-178	53	8
Time of most recent related surgery—within 1–3 months	—	—	40	-154	40	75
Time of most recent related surgery—3+ months	—	—	73	-144	73	-196
Time of most recent related surgery - missing	—	—	17	-628	17	-562
Patient feels sad (never, rarely, sometimes, I do not know)	—	—	—	—	*203*	*Reference*
Patient feels sad (often)	—	—	—	—	126	125
Patient feels sad (always)	—	—	—	—	48	-481*
Patient feels sad — missing	—	—	—	—	†	†
Pain has effect on activities	—	—	—	—	169	157
Pain has effect on sleep	—	—	—	—	99	-120
Pain severity (0–2)	—	—	—	—	*121*	*Reference*
Pain severity (3–7)	—	—	—	—	161	88
Pain severity (8–10)	—	—	—	—	63	-127
Pain severity — missing	—	—	—	—	39	142
Duration of related health problem—0-1 months	—	—	—	—	*73*	*Reference*
Duration of related health problem—1-3 months	—	—	—	—	70	-111
Duration of related health problem—3+ months	—	—	—	—	237	14
Duration of related health problem—missing	—	—	—	—	†	†
Mobility device—none	—	—	—	—	*179*	*Reference*

(continued)

Table 5-6 (continued)
CARE-C occupational therapy demographic, payment, and comprehensive models of annual allowed charges

CARE-C OT annual models	Demographic		Payment		Comprehensive	
Mobility device—cane/crutch	—	—	—	—	67	409*
Mobility device—walker	—	—	—	—	105	169
Mobility device—orthotics/prosthetic	—	—	—	—	†	†
Mobility device—wheelchair/scooter full-time	—	—	—	—	43	1023*
Mobility device—wheelchair/scooter part-time	—	—	—	—	48	-26
Mobility device—mechanical lift	—	—	—	—	†	†
Mobility device—other	—	—	—	—	†	†
Mobility device—missing	—	—	—	—	24	26
Patient has memory difficulty	—	—	—	—	79	196
Patient has communication problem	—	—	—	—	20	-241
Patient has swallowing problem	—	—	—	—	†	†
Facility type						
Private practice	—	—	—	—	*119*	*Reference*
Assisted living facility	—	—	—	—	54	1,846**
Hospital outpatient department	—	—	—	—	160	-53
Comprehensive\outpatient rehabilitation facility	—	—	—	—	51	53
Nursing facility					0	0
Census division						
South Atlantic	—	—	—	—	*105*	*Reference*
New England	—	—	—	—	30	-175
Mid-Atlantic	—	—	—	—	87	424
East North Central	—	—	—	—	118	-347
West North Central	—	—	—	—	23	-405
East South Central	—	—	—	—	†	†
West South Central	—	—	—	—	13	1920***
Mountain	—	—	—	—	†	†
Pacific	—	—	—	—	†	†

*** (p=<0.01), ** (p=<0.05), * (p=<0.10)

NOTES:

† = Fewer than 11 cases.

1. ESRD in 2010-2012 - The beneficiary had ESRD any time in 2010, 2011, or 2012.
2. Medicaid in 2010-2012 - The beneficiary had at least one month of Medicaid eligibility during their therapy episode.
3. The count column refers to the number of beneficiaries where that variable = 1. If it is an ordinal/continuous variable, then it refers to the number of people where that variable > 0.
4. ICF is International Classification of Function.
5. Annual Period: March 2011 - February 2012.
6. Facility type as identified by CARE providers on the CARE assessment.

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims and CARE data.

Programs: PA022

Table 5-7
CARE-C speech-language pathology demographic, payment, and comprehensive models of annual allowed charges

CARE-C SLP annual models	Demographic		Payment		Comprehensive	
Number of observations	—	185	—	124	—	124
Mean dependent variable	—	1,665	—	1,598	—	1,598
R^2	—	0.0284	—	0.4288	—	0.6403
Adjusted R^2	—	-0.0334	—	0.1107	—	0.0382
Variable	Count	Parameter	Count	Parameter	Count	Parameter
Intercept	—	1,565***	—	-733	—	-1,844
Demographics						
Male, age 0 to 64	20	58	12	160	12	-473
Male, age 65-74	42	182	29	428	29	394
Male, age 75-84	32	272	16	590**	16	637
Male, age 85+	12	-558	†	†	†	†
Female, age 0 to 64	14	-283	13	-559	13	-1,152
Female, age 65-74	*30*	*Reference*	*19*	*Reference*	*19*	*Reference*
Female, age 75-84	23	338	17	775*	17	701
Female, age 85+	12	-145	†	†	†	†
Originally disabled	14	-112	†	†	†	†
Medicaid in 2010–2012	34	237	31	610	31	214
ESRD in 2010–2012	†	†	†	†	†	†
Primary impairment diagnosis Groups						
Cognitive communication disorders only	—	—	*77*	*Reference*	*77*	*Reference*
Swallowing disorders only	—	—	11	137	11	348
Cognitive, communication, and swallowing disorders only	—	—	19	35	19	214
No impairment diagnosis	—	—	17	-498	17	-342
Primary medical diagnosis groups						
Stroke	—	—	57	702*	57	1025
Neurological, excluding stroke	—	—	42	782	42	1,396**
Miscellaneous diagnosis	—	—	20	208	20	877
No medical diagnosis	—	—	†	*Reference*	†	*Reference*
ICF function groups (reason for therapy)						
Mental functions	—	—	84	467	84	591
Voice and speech functions	—	—	47	746**	47	450
Other body functions	—	—	23	-373	23	-236
Body functions not reported	—	—	13	726	13	961

(continued)

Table 5-7 (continued)
CARE-C speech-language pathology demographic, payment, and comprehensive models of annual allowed charges

CARE-C SLP annual models	Demographic		Payment		Comprehensive	
ICF structure groups (reason for therapy)						
Voice, speech, and swallowing	—	—	52	-797**	52	-336
Central nervous system	—	—	21	1,144**	21	1,294**
Other body structures	—	—	40	324	40	518
Body structures not reported	—	—	37	208	37	290
ICF activity groups (reason for therapy)						
Cognitive	—	—	82	221	82	102
Communication	—	—	77	183	77	178
Mobility and daily activities	—	—	50	335	50	456
Activities not reported	—	—	18	363	18	196
Rasch function estimates (0 = low ability; 100 = high ability)						
Clinician-observed problem solving	—	—	124	-4.74	124	-9.05
Clinician-observed memory	—	—	124	17.92	124	33.48
Clinician-observed attention	—	—	124	-10.94	124	-10.16
Clinician-observed function voice	—	—	124	7.67	124	16.13*
Clinician-observed speech	—	—	124	-9.44	124	-14.59*
Clinician-observed language expression	—	—	124	6.68	124	6.31
Clinician-observed language comprehension	—	—	124	-3.38	124	-11.07
Self-reported life skills			124	-0.87	124	-2.67
CARE-C individual items						
Number of related surgeries = 0	—	—	73	*Reference*	*73*	*Reference*
Number of related surgeries = 1	—	—	25	-288	25	497
Number of related surgeries = 2+	—	—	18	109	18	929
Number of related surgeries - missing	—	—	†	†	†	†
Time of most recent related surgery—none	—	—	69	*Reference*	*69*	*Reference*
Time of most recent related surgery—within 1 month	—	—	†	†	†	†
Time of most recent related surgery—within 1–3 months	—	—	11	294	11	-482

(continued)

Table 5-7 (continued)
CARE-C speech-language pathology demographic, payment, and comprehensive models of annual allowed charges

CARE-C SLP annual models	Demographic		Payment		Comprehensive	
Time of most recent related surgery—3+ months	—	—	32	179	32	-512
Time of most recent related surgery - missing	—	—	†	†	†	†
Patient feels sad (never, rarely, sometimes, I do not know)	—	—	—	—	*61*	*Reference*
Patient feels sad (often)	—	—	—	—	40	294
Patient feels sad (always)	—	—	—	—	17	678
Patient feels sad - missing	—	—	—	—	†	†
Pain has effect on activities	—	—	—	—	22	-695
Pain has effect on sleep	—	—	—	—	13	189
Pain severity (0–2)	—	—	—	—	*70*	*Reference*
Pain severity (3–7)	—	—	—	—	29	280
Pain severity (8–10)	—	—	—	—	†	†
Pain severity - missing	—	—	—	—	17	-167
Duration of related health problem—0-1 months	—	—	—	—	*16*	*Reference*
Duration of related health problem—1-3 months	—	—	—	—	31	179
Duration of related health problem—3+ months	—	—	—	—	72	-175
Duration of related health problem - missing	—	—	—	—	†	†
Mobility device—none	—	—	—	—	*51*	*Reference*
Mobility device—cane/crutch	—	—	—	—	15	-675**
Mobility device—walker	—	—	—	—	25	255
Mobility device—orthotics/prosthetic	—	—	—	—	—	—
Mobility device—wheelchair/scooter full-time	—	—	—	—	14	607
Mobility device—wheelchair/scooter part-time	—	—	—	—	12	-502
Mobility device—mechanical lift	—	—	—	—	—	—
Mobility device—other	—	—	—	—	†	†
Mobility device - missing	—	—	—	—	13	1,145**
Patient has diet modification	—	—	—	—	24	-404
Patient has swallowing assistance	—	—	—	—	29	305

(continued)

Table 5-7 (continued)
CARE-C speech-language pathology demographic, payment, and comprehensive models of annual allowed charges

CARE-C SLP annual models	Demographic		Payment		Comprehensive	
Facility type						
Hospital outpatient department	—	—	—	—	*86*	*Reference*
Assisted living facility	—	—	—	—	13	421
Private practice	—	—	—	—	86	-387
Comprehensive\outpatient rehabilitation facility	—	—	—	—	23	445
Nursing facility	—	—	—	—	—	—
Census division						
South Atlantic	—	—	—	—	*28*	*Reference*
New England	—	—	—	—	38	270
Mid-Atlantic	—	—	—	—	†	†
East North Central	—	—	—	—	30	-613
West North Central	—	—	—	—	†	†
East South Central	—	—	—	—	—	—
West South Central	—	—	—	—	†	†
Mountain	—	—	—	—	†	†
Pacific	—	—	—	—	†	†

*** (p=<0.01), ** (p=<0.05), * (p=<0.10)
NOTES:
† = Fewer than 11 cases.
1. ESRD in 2010-2012 - The beneficiary had ESRD any time in 2010, 2011, or 2012.
2. Medicaid in 2010-2012 - The beneficiary had at least one month of Medicaid eligibility during their therapy episode.
3. The count column refers to the number of beneficiaries where that variable = 1. If it is an ordinal/continuous variable, then it refers to the number of people where that variable > 0.
4. ICF is International Classification of Function.
5. Annual Period: March 2011 - February 2012.
6. Facility type as identified by CARE providers on the CARE assessment.

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims and CARE data.
Programs: PA022

Table 5-8a
CARE-F annual beneficiary characteristics, by therapy discipline—Unique beneficiary mean age

	N	Mean age
Nursing Facility	519	80
Day Rehabilitation Facility	169	73

NOTES:
1. N = Unique number of beneficiaries
2. Annual Period: March 2011 - February 2012

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims and CARE data.
Program: PA022

Table 5-8b
CARE-F annual beneficiary characteristics, by therapy discipline—Unique beneficiary characteristics (%)

	Nursing facility (N= 519)		Day rehabilitation facility (N= 169)	
	N	Percent	N	Percent
Female	360	69.36	83	49.11
ESRD	13	2.50	†	†
Disabled	53	10.21	17	10.06
Medicaid	322	62.04	16	9.47
LTI	371	71.48	—	0.00

NOTES:
† = Fewer than 11 cases.
1. N = Unique number of beneficiaries
2. Annual Period: March 2011 - February 2012
3. Percent = Percent of the total high-cost beneficiary in each discipline.
4. LTI - If the beneficiary had a 90-day MDS assessment at any point during 2011, then they were considered long-term institutionalized.

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims and CARE data.
Program: PA022

Table 5-9
CARE-F Annual therapy utilization characteristics

	Mean	SE	1st	25th	Median	75th	99th
CARE-F - Nursing Facility (n =519)							
Total Allowed Charge ($)	5,390	279.22	231	1,266	2,732	7,345	31,952
Total Medicare Payment ($)	4,302	223.10	185	1,003	2,186	5,818	25,560
Total Therapy Days (n)	48	2.03	2	14	31	65	207
Total Calendar Days (n)	152	5.00	3	42	142	247	366
Allowed Charges Per Therapy Day ($)	103	1.67	45	76	96	122	227
Payments per Therapy Day ($)	82	1.34	36	61	76	98	181
Therapy Days per Week	2.85	0.08	0.25	1.30	2.63	4.43	7.00
CARE-F - Day Rehabilitation Facility (n =169)							
Total Allowed Charge ($)	4,521	284.97	337	2,024	3,222	5,767	15,945
Total Medicare Payment ($)	3,605	228.19	270	1,620	2,526	4,598	12,756
Total Therapy Days (n)	25	1.33	2	15	20	29	96
Total Calendar Days (n)	102	7.09	3	38	62	141	358
Allowed Charges Per Therapy Day ($)	184	5.13	74	132	179	236	328
Payments per Therapy Day ($)	147	4.12	59	105	142	189	262
Therapy Days per Week	2.37	0.09	0.27	1.70	2.42	2.93	7.00

NOTES:

1. N = Number of Unique Episodes
2. SE = Standard error of the mean.
3. Annual Period: March 2011 - February 2012
4. Therapy Days per Week = [(therapy days)/(calendar days)]*7

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims and CARE data.

Program: PA022

Table 5-10
CARE-F nursing facility demographic, basic payment, payment, and comprehensive models of annual allowed charges

	Demographic		Basic payment		Payment		Comprehensive	
Number of observations	519		519		519		519	
Mean dependent variable	5,390		5,390		5,390		5,390	
R^2	0.0343		0.1284		0.3559		0.5075	
Adjusted R^2	0.0172		0.0767		0.2434		0.3716	
Variable	Count	Parameter	Count	Parameter	Count	Parameter	Count	Parameter
INTERCEPT	—	3,633**	—	847	—	-5,405	—	-4,075
Demographics								
Age 0 to 64	50	3,537*	50	3,848*	50	3,005*	50	2,867**
Age 65 to 74 (reference group)	*99*	*Reference*	*99*	*Reference*	*99*	*Reference*	*99*	*Reference*
Age 75 to 84	144	1,959*	144	1,992*	144	1,775*	144	1,522*
Age 85+	226	1,122	226	726	226	323	226	394
Male	159	556	159	487	159	-171	159	-593
Originally disabled	85	897	85	1,411*	85	1,787**	85	1,579
Medicaid in 2010–2012	322	356	322	-215	322	-723	322	-522
ESRD in 2010–2012	12	3,413*	12	1,921	12	2,493	12	2,198
Long term institutionalized	372	-325	372	-352	372	-117	372	-723
Primary diagnosis groups								
Musculoskeletal (reference group)	—	—	*79*	*Reference*	*79*	*Reference*	*79*	*Reference*
Circulatory (including lymphatic) and pulmonary/respiratory	—	—	71	-76	71	-126	71	-573
Stroke	—	—	52	-6	52	-512	52	-399
Parkinson's, other neurological, and swallowing disorders	—	—	68	-1,284	68	-593	68	-790
Dementia/Alzheimer's disease	—	—	109	341	109	118	109	-636
Unspecified and miscellaneous diagnoses	—	—	78	642	78	-6	78	-271

(continued)

Table 5-10 (continued)
CARE-F nursing facility demographic, basic payment, payment, and comprehensive models of annual allowed charges

	Demographic		Basic payment		Payment		Comprehensive	
Multiple etiologies	—	—	42	560	42	356	42	36
No primary diagnosis	—	—	20	4,571*	20	5,676**	20	4,898*
Individual function items								
Diet modifications needed	—	—	203	169	—	—	203	1,297*
Rarely/never/sometimes understands verbal content	—	—	178	-847	—	—	178	1,003
Cognitive function mildly impaired, not impaired, or not reported (reference group)	—	—	*275*	*Reference*	—	—	*275*	*Reference*
Cognitive function severely impaired	—	—	147	968	—	—	147	839
Cognitive function moderately impaired	—	—	—	—	—	—	97	-47
Rasch functional ability estimates (0 = low ability; 100 = high ability)								
Clinician-observed mobility								
0 < Rasch estimate ≤ 30	—	—	96	691	96	-1,808	96	-1,309
30 < Rasch estimate ≤ 60	—	—	211	2,269	211	-749	211	39
60 < Rasch estimate ≤ 90	—	—	93	1,977	93	-655	93	-372
Rasch estimate > 90 (reference group)	—	—	*12*	*Reference*	*12*	*Reference*	*12*	*Reference*
Rasch estimate - missing	—	—	42	1,467	42	116	42	679
Rasch estimate - not assessed	—	—	65	-407	65	-600	65	580
Clinician-observed self-care								
0 < Rasch estimate ≤ 30	—	—	109	2,212	109	2,332	109	1,016
30 < Rasch estimate ≤ 60	—	—	222	2,183	222	1,225	222	341
60 < Rasch estimate ≤ 90	—	—	64	1,186	64	787	64	1,477
Rasch estimate > 90 (reference group)	—	—	†	†	†	†	†	†
Rasch estimate - missing	—	—	44	913	44	946	44	-499
Rasch estimate - not assessed	—	—	73	-640	73	96	73	-107

(continued)

Table 5-10 (continued)
CARE-F nursing facility demographic, basic payment, payment, and comprehensive models of annual allowed charges

	Demographic		Basic payment		Payment		Comprehensive	
Self-reported mobility								
0 < Rasch estimate ≤ 30	—	—	—	—	179	1,344	179	309
30 < Rasch estimate ≤ 60	—	—	—	—	158	1,664***	158	803
60 < Rasch estimate ≤ 90	—	—	—	—	83	2,216*	83	796
Rasch estimate > 90	—	—	—	—	*78*	*Reference*	*78*	*Reference*
Rasch estimate - missing	—	—	—	—	21	571	21	696
Self-reported wheelchair function								
Patient does not use a wheel chair	—	—	—	—	101	-451	101	-1,575
0 < Rasch estimate ≤ 30	—	—	—	—	141	59	141	-317
30 < Rasch estimate ≤ 60	—	—	—	—	139	1,213	139	780
60 < Rasch estimate ≤ 90	—	—	—	—	91	-266	91	-608
Rasch estimate > 90	—	—	—	—	*17*	*Reference*	*17*	*Reference*
Rasch estimate - missing	—	—	—	—	30	915	30	-556
Secondary diagnosis groups								
Osteoarthritis	—	—	—	—	136	1,357***	136	1,041**
Osteoporosis, unspecified, and miscellaneous musculoskeletal	—	—	—	—	202	-686*	202	-433
Circulatory (including lymphatic)	—	—	—	—	249	-134	249	-297
Hypertension	—	—	—	—	292	1,240**	292	833
Diabetes mellitus	—	—	—	—	131	-964	131	-796
Pulmonary/respiratory	—	—	—	—	150	-264	150	-230
Stroke	—	—	—	—	44	88	44	112
Parkinson's, peripheral nervous system, and other neurological disorders	—	—	—	—	116	336	116	-134
Dementia/Alzheimer's and other cognitive disorders	—	—	—	—	92	363	92	598

(continued)

Table 5-10 (continued)
CARE-F nursing facility demographic, basic payment, payment, and comprehensive models of annual allowed charges

	Demographic		Basic payment		Payment		Comprehensive	
Mental health	—	—	—	—	299	-524	299	-800
Communication, voice, or speech disorders	—	—	—	—	129	808	129	1,049
Swallowing disorders	—	—	—	—	138	-1,103*	138	-305
Gait or balance disorder	—	—	—	—	143	-1,318	143	-18
Pain	—	—	—	—	95	-1,437	95	-976
Generalized weakness	—	—	—	—	166	386	166	524
Vision impairment	—	—	—	—	83	-214	83	-277
Unspecified and miscellaneous diagnoses	—	—	—	—	336	-23	336	-183
No secondary diagnosis	—	—	—	—	20	-3,303*	20	-1,844
ICF body function groups (primary reason for therapy)								
Motor functions					414	2,920*	414	3,021*
Mental functions	—	—	—	—	63	3,000**	63	2,201*
Pain	—	—	—	—	81	1,355*	81	923*
Other body functions	—	—	—	—	102	2,821**	102	2,734**
Body functions not reported	—	—	—	—	47	2,784	47	3,697*
ICF body structure groups (primary reason for therapy)								
General/no specific body location	—	—	—	—	169	2,463***	169	2,132***
Spine	—	—	—	—	57	660	57	1,559*
Hip and thigh	—	—	—	—	106	-2	106	323
Knee	—	—	—	—	115	1,908**	115	1,574*
Calf/foot/ankle/toes	—	—	—	—	91	-1,805	91	-1,677*
Shoulder/arm/elbow	—	—	—	—	111	1,086*	111	618
Wrist/hand/fingers	—	—	—	—	102	-576	102	-275

(continued)

Table 5-10 (continued)
CARE-F nursing facility demographic, basic payment, payment, and comprehensive models of annual allowed charges

	Demographic		Basic payment		Payment		Comprehensive	
Voice, speech, and swallowing	—	—	—	—	113	803	113	616
Other body structures	—	—	—	—	48	1,240	48	703
Body structures not reported	—	—	—	—	33	2,284	33	1,723*
ICF activity groups (primary reason for therapy)								
Cognitive	—	—	—	—	87	1,029	87	913
Communication	—	—	—	—	26	33	26	-568
Mobility	—	—	—	—	338	2,403**	338	1,312
Daily activities	—	—	—	—	255	2,301***	255	1,374**
Activities not reported	—	—	—	—	56	2,494*	56	1,067
CARE-F individual items								
Admitted from skilled nursing facility (reference group)	—	—	—	—	232	*Reference*	232	*Reference*
Admitted from long term nursing facility	—	—	—	—	212	808	212	1,224
Admitted from other facility	—	—	—	—	75	-1,530*	75	-875
Acute care hospital use in the past 2 months	—	—	—	—	46	-279	46	-377
History of surgery for the presenting condition	—	—	—	—	25	964	25	647
Onset of presenting condition within past 3 months	—	—	—	—	—	—	179	487
Prior self-care function needed assistance	—	—	—	—	—	—	433	1,928***
Prior mobility function impaired	—	—	—	—	—	—	254	141
Wheelchair use prior to presenting condition	—	—	—	—	—	—	368	-1,213**
Two or more falls in the past year	—	—	—	—	—	—	149	-1,066
Expression of ideas/wants (rarely/never, frequently/some difficulty)	—	—	—	—	—	—	178	-1,925***
Inattention	—	—	—	—	—	—	161	761

(continued)

Table 5-10 (continued)
CARE-F nursing facility demographic, basic payment, payment, and comprehensive models of annual allowed charges

	Demographic		Basic payment		Payment		Comprehensive	
Disorganized thinking	—	—	—	—	—	—	127	-106
Altered level of consciousness/alertness	—	—	—	—	—	—	103	-1,387
Cues for swallowing	—	—	—	—	—	—	191	-230
Cognitive problems present	—	—	—	—	—	—	76	2,218***
Respiratory impairments present	—	—	—	—	—	—	101	-175
Endurance impairments present	—	—	—	—	—	—	350	952
Bladder/bowel impairments present	—	—	—	—	—	—	307	-383
Felt sad in past two weeks (never, rarely, sometimes, unable to respond) (reference group)	—	—	—	—	—	—	*373*	*Reference*
Felt sad in past two weeks often	—	—	—	—	—	—	56	485
Felt sad in past two weeks always	—	—	—	—	—	—	24	946
Felt sad in past two weeks missing	—	—	—	—	—	—	66	1,914**
Pain affects sleep	—	—	—	—	—	—	83	-892
Pain affects activities	—	—	—	—	—	—	105	2,237**
Mobility device—walker	—	—	—	—	—	—	141	309
Mobility device—wheelchair/scooter full-time	—	—	—	—	—	—	201	-94
Mobility device—wheelchair/scooter part-time	—	—	—	—	—	—	80	-156
Mobility device—other	—	—	—	—	—	—	64	-981
Census division								
South Atlantic (reference group)	—	—	—	—	—	—	*79*	*Reference*
New England	—	—	—	—	—	—	44	4,412
Mid-Atlantic	—	—	—	—	—	—	148	-2,338
East North Central	—	—	—	—	—	—	60	259

(continued)

Table 5-10 (continued)
CARE-F nursing facility demographic, basic payment, payment, and comprehensive models of annual allowed charges

	Demographic		Basic payment		Payment		Comprehensive	
West North Central	—	—	—	—	—	—	35	-2,409*
East South Central	—	—	—	—	—	—	119	1,448
West South Central	—	—	—	—	—	—	†	†
Mountain	—	—	—	—	—	—	19	-2,219*
Pacific	—	—	—	—	—	—	14	2,233

*** (p=<0.01), ** (p=<0.05), * (p=<0.10)

NOTES:

† = Fewer than 11 cases.

1. Originally Disabled - The beneficiary's original reason for entitlement was disability, among beneficiaries currently entitled by age.
2. Medicaid in 2010-2012 - The beneficiary had at least one month of Medicaid eligibility during their therapy episode.
3. ESRD in 2010-2012 - The beneficiary had ESRD any time in 2010, 2011, or 2012.
4. Long Term Institutionalized - If the beneficiary had a 90-day MDS assessment at any point during 2011, then they were considered long-term institutionalized.
5. The count column refers to the number of beneficiaries where that variable = 1. If it is an ordinal/continuous variable, then it refers to the number of people where that variable > 0.
6. ICF is International Classification of Function.
7. The reference group (Admitted from skilled nursing facility) includes 218 beneficiaries admitted from a skilled nursing facility and 14 beneficiaries with missing admitted from facilities.

8. Annual Period: March 2011 - February 2012

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims and CARE data.

Programs: PA022

Table 5-11
CARE-F nursing facility stepwise-payment model of annual allowed charges

Step	Variable	Cumulative R^2	Absolute increase in R^2	Percent increase in R^2	F Value	Pr > F
1	Activity group (ICF) - 4. Daily activities	0.0766	—	—	42.66	<.0001
2	Activity group (ICF) - 3. Mobility	0.1041	0.0275	35.9008	15.74	<.0001
3	Body function group (ICF) - 4. Other body functions	0.1351	0.0310	29.7791	18.32	<.0001
4	Primary diagnosis group - 8. No primary diagnosis	0.1575	0.0224	16.5803	13.64	0.0002
5	Rasch function estimate -Clinician-observed self-care: not assessed	0.1777	0.0202	12.8254	12.49	0.0004
6	Body function group (ICF) - 2. Mental functions	0.1952	0.0175	9.8481	11.09	0.0009
7	Secondary diagnosis group - 1. Osteoarthritis	0.2077	0.0125	6.4037	8.03	0.0048
8	Activity group (ICF) - 5. Activities not reported	0.2190	0.0113	5.4405	7.29	0.0072
9	Rasch function estimate - Self-reported wheelchair: 30 < Rasch estimate ≤ 60	0.2292	0.0102	4.6575	6.74	0.0097
10	Body structure group (ICF) - 1. General/no specific body location	0.2389	0.0097	4.2321	6.42	0.0116
11	Secondary diagnosis group - 13. Gait or balance disorder	0.2471	0.0082	3.4324	5.50	0.0194
12	Body structure group (ICF) - 10. Body structures not reported	0.2554	0.0083	3.3590	5.57	0.0186
13	Body function group (ICF) - 1. Motor functions	0.2644	0.0090	3.5239	6.14	0.0135
14	Admitted from other facility	0.2721	0.0077	2.9123	5.29	0.0218
15	Secondary diagnosis group - 18. No secondary diagnosis	0.2764	0.0043	1.5803	3.01	0.0835
16	Secondary diagnosis group - 12. Swallowing disorders	0.2803	0.0039	1.4110	2.71	0.1004
17	Rasch function estimate -Clinician-observed mobility: missing	0.2843	0.0040	1.4270	2.73	0.0991
18	Secondary diagnosis group - 14. Pain	0.2875	0.0032	1.1256	2.29	0.1307
19	Body function group (ICF) - 3. Pain	0.2904	0.0029	1.0087	1.97	0.1608
20	Body function group (ICF) - 5. Body functions not reported	0.2940	0.0036	1.2397	2.55	0.1107

NOTES:

1 ICF is International Classification of Function.

2. Annual Period: March 2011 - February 2012

3. The other 36 variables were not included.

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims and CARE data.

Programs: PA022

Table 5-12
CARE-C physical therapy payment model, risk adjusted and non risk-adjusted cap

	Risk-adjusted cap				Non risk-adjusted cap			
	Below		Above		Below		Above	
	N	RowPctN	N	RowPctN	N	RowPctN	N	RowPctN
Total	2,946	69.98	1,264	30.02	2,957	70.24	1,253	29.76
Primary diagnosis group								
Vertigo	52	74.29	18	25.71	66	94.29	†	†
Pain	35	71.43	14	28.57	42	85.71	†	†
Genitourinary Disorders	18	69.23	†	†	22	84.62	†	†
Multiple Etiologies, No Major	38	63.33	22	36.67	50	83.33	†	†
Sprain/Strain	210	73.43	76	26.57	238	83.22	48	16.78
Bursitis/Tendonitis	186	71.54	74	28.46	210	80.77	50	19.23
Peripheral Nervous System and Other Major Neurological Disorders	49	73.13	18	26.87	48	71.64	19	28.36
Osteoarthritis	443	69.87	191	30.13	453	71.45	181	28.55
Herniated Disc and Other Major Musculoskeletal	286	69.08	128	30.92	294	71.01	120	28.99
Unspecified and Miscellaneous Musculoskeletal	365	69.00	164	31.00	371	70.13	158	29.87
Spinal Stenosis	178	70.36	75	29.64	177	69.96	76	30.04
Multiple Etiologies, One Major	152	65.80	79	34.20	161	69.70	70	30.30
Unspecified and Miscellaneous Diagnoses	83	70.34	35	29.66	82	69.49	36	30.51
Fracture	150	72.82	56	27.18	143	69.42	63	30.58
Circulatory (including Lymphatic) and Pulmonary/Respiratory	43	69.35	19	30.65	41	66.13	21	33.87
No Primary Diagnosis	40	67.80	19	32.20	39	66.10	20	33.90
Parkinson's and Other Progressive Neurological	45	70.31	19	29.69	39	60.94	25	39.06
Multiple Major Etiologies	157	68.56	72	31.44	137	59.83	92	40.17
Joint Replacement	334	71.06	136	28.94	277	58.94	193	41.06

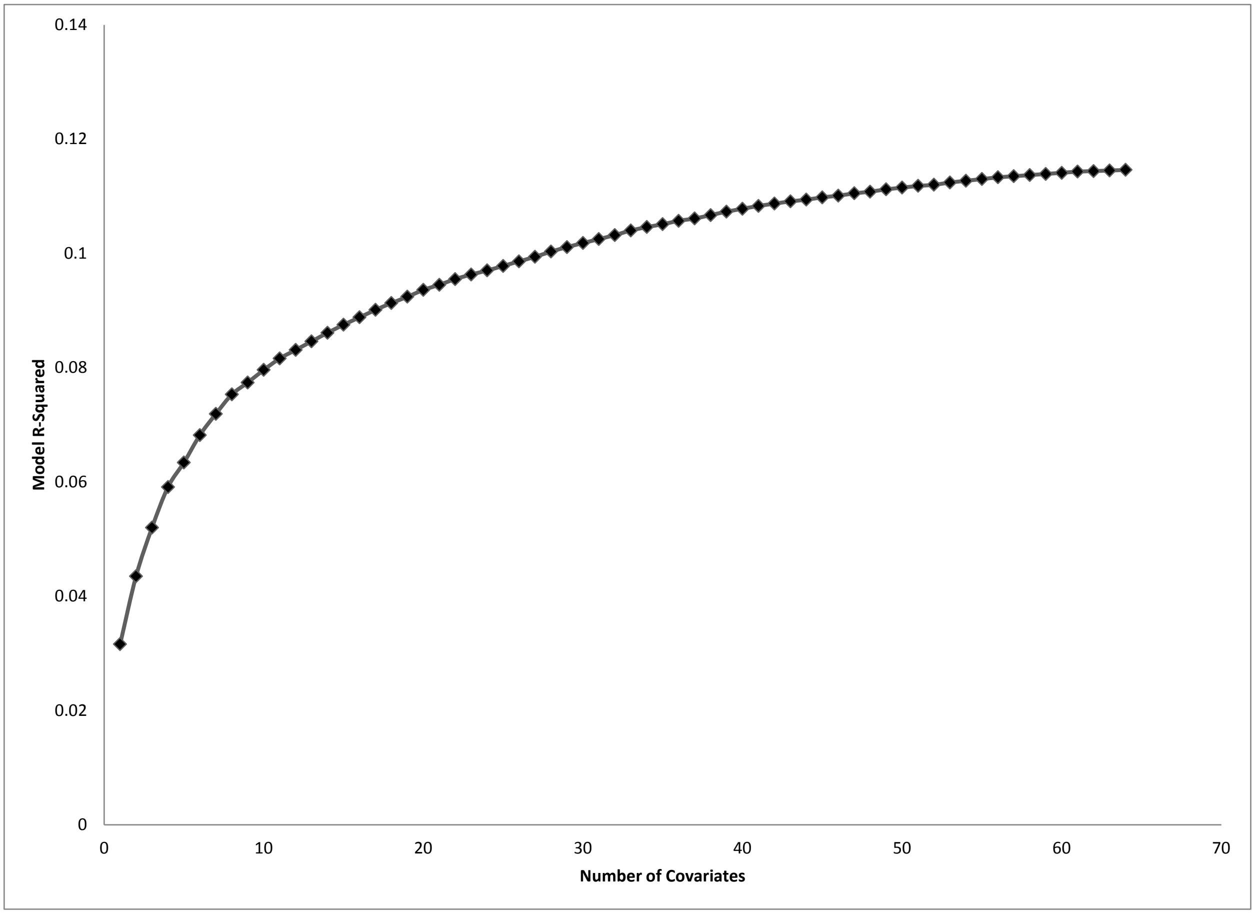
(continued)

Table 5-12 (continued)
CARE-C physical therapy payment model, risk adjusted and non risk-adjusted cap

	Risk-adjusted cap				Non risk-adjusted cap			
	Below		Above		Below		Above	
	N	RowPctN	N	RowPctN	N	RowPctN	N	RowPctN
Unspecified and Miscellaneous Neurological	36	69.23	16	30.77	30	57.69	22	42.31
Stroke	46	64.79	25	35.21	37	52.11	34	47.89
Rasch functional ability estimates (0 = low ability; 100 = high ability)								
Clinician-observed mobility								
0 < Rasch estimate ≤ 50	153	71.16	62	28.84	119	55.35	96	44.65
50 < Rasch estimate ≤ 70	588	67.51	283	32.49	509	58.44	362	41.56
Rasch estimate > 70	2,175	70.64	904	29.36	2,293	74.47	786	25.53
Rasch estimate - missing	30	66.67	15	33.33	36	80.00	†	†
Self-reported everyday activities								
0 < Rasch estimate ≤ 50	272	62.82	161	37.18	257	59.35	176	40.65
50 < Rasch estimate ≤ 70	927	66.03	477	33.97	915	65.17	489	34.83
Rasch estimate > 70	1,576	72.79	589	27.21	1,613	74.50	552	25.50
Rasch estimate - missing	171	82.21	37	17.79	172	82.69	36	17.31
Self-reported mobility								
0 < Rasch estimate ≤ 50	531	70.15	226	29.85	478	63.14	279	36.86
50 < Rasch estimate ≤ 70	954	65.70	498	34.30	948	65.29	504	34.71
Rasch estimate > 70	1,307	72.57	494	27.43	1,371	76.12	430	23.88
Rasch estimate - missing	154	77.00	46	23.00	160	80.00	40	20.00
Self-reported participation								
0 < Rasch estimate ≤ 50	536	64.81	291	35.19	495	59.85	332	40.15
50 < Rasch estimate ≤ 70	641	67.76	305	32.24	637	67.34	309	32.66
Rasch estimate > 70	1,471	71.48	587	28.52	1,529	74.30	529	25.70
Rasch estimate - missing	298	78.63	81	21.37	296	78.10	83	21.90

NOTES:
† = Fewer than 11 cases.
Row percents add to 100% within the risk-adjusted-cap analysis and within the non-risk-adjusted-cap analysis Annual Period: March 2011 - February 2012.
SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims and CARE data.
Programs: PA030

Figure 5-1
CARE-C physical therapy increase in stepwise payment model R^2 with the addition of explanatory variables



NOTES:

1. ESRD in 2010-2012 - The beneficiary had ESRD any time in 2010, 2011, or 2012.
2. Medicaid in 2010-2012 - The beneficiary had at least one month of Medicaid eligibility during their therapy episode.
3. ICF is International Classification of Function.
4. Annual Period: March 2011 - February 2012

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims and CARE data.

Programs: PA022

6. EPISODES DEFINED USING ADMINISTRATIVE DATA: DESCRIPTIVE ANALYSIS AND PAYMENT SIMULATIONS

In this section, we describe the characteristics of outpatient therapy episodes of care using Medicare administrative data for all episodes. Separate episodes are evaluated for physical therapy (PT), occupational therapy (OT), and speech-language pathology (SLP). We also use the episode data to conduct an exploratory simulation of non-risk-adjusted episode payment for initial fixed-length episodes of PT treatment during a year. The simulations range from full episode payment to various blends of fee-for-service (FFS) and lump-sum episode payment ("mixed payment"—see discussion of mixed payment in Section 2.3.2). The episode payment simulations are not intended to represent results from a fully-developed episode payment system. Many additional elements—including risk adjustment (discussed in other Sections of this report)—would need to be incorporated into a complete payment system. Rather, the simulations provide an exploratory look at the implications of full episode payment and blends of FFS and episode payment versus current FFS payment for initial episodes of PT treatment.

We discuss the motivation for our analyses in Section 6.1, Section 6.2 describes the episode definition, sample, and data for the descriptive analysis. Section 6.3 presents the results of the descriptive analysis. Section 6.4 describes the methods for the payment simulation analysis followed by a discussion of the payment simulation results in Section 6.5 and a conclusion section in Section 6.6.

6.1 Motivation for the Analysis

The goal of this section is to gain a better understanding of outpatient therapy episodes of care and associated payment implications. In addition to average (mean) characteristics of episodes, our goal is to better understand the distribution of episode expenditures, length, therapy days, expenditures per therapy day, and the implications of the variability of therapy episodes for episode payment. A basic understanding of therapy episodes of care is useful in designing and evaluating alternative payment systems for outpatient therapy, including episode-based payment alternatives. For example, one alternative payment system is based on 60-day renewable fixed periods, such as is used in Medicare home health payment (see Section 2). As part of evaluating this approach for outpatient therapy payment, we would like to know what proportion of outpatient therapy episodes end within 60 days of their initiation. Our episode payment simulations show the change in payments (from current FFS payment) across dimensions of 30/60/90 fixed episode lengths and percentage blend of lump sum and FFS payment. Changes in payment indicate the level of financial risk providers would experience under episode payment, and the magnitude of incentives providers would have to: (1) shorten episodes, (2) avoid patients needing longer episodes of treatment, and (3) increase frequency of episodes (e.g., one-visit episodes).

This section differs from Section 4 in that it analyzes episodes of outpatient therapy care, rather than annual expenditures for outpatient therapy. This section differs from Section 7 in that it utilizes 100-percent sample Medicare administrative data, rather than the much smaller systematic sample from the providers who agreed to participate in DOTPA. The CARE patient report and clinician assessment data were collected from these providers. Also, the episodes analyzed in this section have a uniform 12 month run-out period while the episodes analyzed in

Section 7 have a variable run-out period with a minimum duration of six months. Since the episode definition used in this section is similar to the definition utilized in Section 7, this section's results serve as a benchmark for the representativeness of the episodes of therapy care analyzed in Section 7. The analysis in this section is descriptive/simulation only. We do not attempt to explain or predict episode expenditures using multivariate regression models in this section; that is left for Section 7.

6.2 Descriptive Episode Definition, Sample, and Data

To descriptively analyze episodes of therapy care, we rely on a “variable length” episode definition. A variable-length episode definition does not pre-specify the length of episodes, but organizes services into episodes based on the time pattern of therapy service utilization. Variable-length episodes rely on “clean periods” of no therapy utilization to define the beginning and end of the episode. We use 60-day initiating and terminating clean-periods for our analysis. A new episode begins with a therapy service that is preceded by at least 60 days without any therapy claims in a discipline. An episode ends with a service that is followed by 60 days with no discipline-specific therapy service use.

We analyze all episodes of Medicare outpatient therapy care that began in calendar year (CY) 2010. To ensure a 60-day clean period prior to the start of 2010 episodes, we examined therapy claims starting in November 2009. We allow a 12-month run-out period for each episode from its start. If there is not a 60-day clean period by 12 months from the start of the episode, we censor (end) the episode at a 12-month length. Thus, our episodes may have lengths from one day to one year (12 months). Less than one-tenth of one percent of episodes is censored in Section 6. To allow the 12-month run-out for all episodes beginning in CY 2010, we examine claims through the end of 2011.

Episodes beginning in CY 2010, our analysis sample, include all therapy claims in 2010, and may include therapy claims in 2011. Episodes that began in 2009 and extend into 2010 are not included in our analysis file. For example, 2010 therapy services that are part of an episode that began in December 2009 and lasted until March 2010 are not included in our analysis sample. Therapy services that are part of episodes that began in 2010 and extended into 2011 are included in our analysis sample. For example, 2011 therapy services that are part of an episode beginning in November 2010 and lasting until July 2011 are included in our analysis file.

Episodes are specific to each of the three therapy disciplines. A beneficiary may have only one episode in a given discipline at a time, but may have multiple and overlapping concurrent episodes across multiple therapy disciplines. A beneficiary may have multiple sample episodes in a single therapy discipline, so long as the episodes are separated by a 60-day clean period specific to that discipline. Episode services include outpatient therapy services in all settings, including those billed through both carrier claims and outpatient facility claims. For an episode to be included in the analysis file, the beneficiary must have been continually enrolled in Medicare Part B fee-for-service, and Medicare must have been the primary payer for all months covered by the episode. Episodes are constructed based on 100-percent Medicare claims and enrollment data within the specified time period, and thus include the universe of episodes satisfying the sample restrictions.

6.3 Descriptive Results

Results of our 100-percent sample, 60-day variable-length episode analysis are contained in ***Tables 6-1, 6-2, and 6-3***. ***Table 6-1*** shows characteristics of beneficiaries with episodes beginning in 2010. The average age of beneficiaries with outpatient therapy episodes is 74, with the average PT age being slightly younger, and the average OT and SLP ages slightly older (***Table 6-1a***). Beneficiaries with therapy episodes are nearly two-thirds female, approximately 1 percent entitled by end-stage renal disease (ESRD), and slightly more than 14 percent currently entitled by disability (***Table 6-1b***). Twenty percent of therapy episode users are Medicaid dual eligibles, ranging from 17 percent of PT users to 34 percent of SLP users. Ten percent of therapy episode users reside in institutions, ranging from 6 percent of PT users to 31 percent of SLP users. Beneficiaries with at least one high-cost episode are slightly older than the general population and close to the same proportion female, ESRD, disabled, and Medicaid as all users, but nearly double the proportion of beneficiaries with a high-cost episode resided in a nursing facility compared to beneficiaries with any therapy episode (***Table 6-1d***).

Table 6-2 shows characteristics of outpatient therapy episodes beginning in 2010. Outpatient therapy episodes have a mean allowed charge of $1,206. The mean allowed charge is similar for therapy discipline-specific episodes of PT, OT, and SLP. For all episodes, the distribution of episode total allowed charges ranges from $29 at the first percentile to $7,351 at the 99th percentile. The discipline-specific episodes show a similar range in total allowed charges. The mean and distribution of Medicare payments is about 20 percent lower than for allowed charges, because Medicare pays 80 percent of the allowed charge above the Part B deductible.

On average, episodes of outpatient therapy last 42 calendar days, with a range from 1 day at the first percentile to 253 days at the 99th percentile (we censored episodes at a length of 12 months or 365 days).[34] PT episodes last the longest, averaging 46 days; OT episodes are shorter on average, lasting an average of 35 days; and SLP are the shortest, lasting an average of 27 days. At least 25 percent of SLP episodes last only one day. Median episode lengths are considerably shorter than mean lengths, indicating an episode-length distribution that is skewed to the right, i.e., most episodes are shorter than the average. A 60-day, fixed-length payment episode period would encompass about three-quarters of all PT episodes, well over three-quarters of all OT episodes, and well over three-quarters of all SLP episodes. A 30-day, fixed-length payment episode period would encompass about half of all PT episodes, over half of OT episodes, and nearly three-quarters of SLP episodes.

Therapy days per outpatient therapy episode average 11 to 13, with a median of 9 (total, PT, and OT) or 5 (SLP). Allowed charges per therapy day are highest for SLP episodes, at $124, and average $97 for OT and $93 for PT. For all episodes, allowed charges per therapy-day range from $24 at the first percentile to $206 at the 99th percentile, with a median of $93. Intensity of therapy, measured as therapy days per week, is highest for SLP (4.54), intermediate for OT (3.88), and lowest for PT (2.91).

---

[34] The following percentages of episodes lasted longer than 365 days and therefore were right-censored: 0.08 percent (OT); 0.17 percent (PT); and 0.08 percent (SLP).

Table 6-3 shows characteristics of high-cost outpatient therapy episodes beginning in 2010, for combined disciplines. A high-cost episode is defined as an episode with allowed charges greater than the 90th percentile of the episode allowed-charge distribution. The mean allowed charge for high-cost episodes is $4,656 (***Table 6-3***), compared to $1,206 for all episodes (***Table 6-2***). The greater expenditures of high-cost episodes are mostly due to their greater length. Average allowed charges per therapy-day are somewhat higher for high-cost episodes, $114 versus $96 for all episodes. But, episode length in calendar days is triple for high-cost episodes, 125 versus 42. Similarly, high-cost episodes average 43 therapy days versus 12 therapy days for all episodes. Therapy intensity—therapy days per week—is slightly lower for high-cost episodes than all episodes, 2.86 versus 3.22.

6.4 Episode Payment Simulation Methods

In addition to descriptive analysis, we use the 100 percent claims episode file to simulate episode and mixed payment approaches, and compare them to current FFS payment for episodes.

6.4.1 Sample and Definition of Episodes

Our sample and definition of episodes for the simulation analysis differ from the descriptive analysis in several ways. We limit the sample of beneficiaries to community residents receiving PT, beginning in 2010. We simulate episode payments only for a beneficiary's *initial* PT episode beginning in 2010; a beneficiary cannot renew their episode in this simulation. The start date of a beneficiary's initial episode is defined by a 60-day prior clean period, the same definition used for the descriptive analysis. But unlike the descriptive analysis, the episode's end date is not determined by a subsequent 60-day clean period. Instead, the episode is defined by a fixed period of 30, 60, or 90 calendar days from the start date. Qualifying therapy services falling within this time window are assigned to the episode. For this simulation, no subsequent episodes are defined or analyzed; only a beneficiary's initial episode beginning in 2010 is analyzed. In payment terms, the simulation is of episode payment for an initial fixed length episode without renewal. We do not analyze treatment subsequent to the initial fixed-length period. Our simulation is thus limited in scope, but it explores the implications of episode payment for a sample of episodes that includes most community-resident PT episodes beginning during a year.

6.4.2 Simulating Episode Payments

We simulate three types of episode payment: FFS (the current system), pure episode payment, and mixed (blended) FFS and episode payment. FFS payment for each episode is determined by summing the paid amounts on the Medicare claims for each therapy service assigned to an episode. Payments are generally 20 percent less than allowed charges due to beneficiary cost sharing. Pure (flat lump-sum) episode payment is simulated as the mean of FFS payments for all qualifying episodes. When the mean FFS payment is paid for each episode, the total Medicare episode payment is the same as under FFS payment (budget neutrality of episode to FFS payment).

The “Mixed” payment is a blend of lump-sum payment per episode and a reduced percentage of FFS payment. Mixed payment is simulated according to the following formula:

$$\text{Mixed Payment} = LumpSum + \left(FFSpct/100\right) \times FFStotal \tag{6.1}$$

with *LumpSum* is a flat payment amount that is the same for every episode; *FFSpct* is the percentage of the FFS Medicare payments for services provided during the episode that is paid (e.g., 90 percent); and *FFStotal* is the total of undiscounted Medicare FFS payments for a specific episode, aggregated across all services provided during the episode (e.g., $500). Note that a FFS payment is specific to a single episode and the level of payment can vary from episode to episode.

The episode lump-sum payment can be specified if we require the mixed payment to be budget neutral with respect to current FFS payment, assuming no behavioral response on the part of providers or patients to the payment changes. Budget neutrality means that

$$MIXEDmean = FFSmean \tag{6.2}$$

where *MIXEDmean* is the average mixed payment amount and *FFSmean* is the average FFS payment, both calculated across all episodes. If we take the mean of each side of equation (6.1) and substitute expression (6.2), we have

$$FFSmean = LumpSum + \left(FFSpct/100\right) \times FFSmean \tag{6.3}$$

Solving equation (6.3) for the lump-sum payment (*LumpSum*), we have

$$\begin{aligned} LumpSum &= FFSmean - \left(FFSpct/100\right) \times FFSmean \\ &= \left[1 - \left(FFSpct/100\right)\right] \times FFSmean \end{aligned} \tag{6.4}$$

Substituting equation (6.4) into equation (6.1), we have

$$\text{Mixed Payment} = \left[1 - \left(FFSpct/100\right)\right] \times FFSmean + \left(FFSpct/100\right) \times FFStotal \tag{6.5}$$

In words, mixed payment for an episode is simulated as the mean FFS episode payment (across all episodes) multiplied by one minus the percentage of FFS payment, plus the episode-specific FFS payment multiplied by the percentage FFS payment. For example, if the percentage of FFS payment is 90 percent, then the mixed payment is (1 – 0.90)*(mean FFS) + 0.90*FFS. Hypothetically, if the mean FFS payment across all episodes is currently $500, then the mixed payment is 0.10*500 + 0.90*FFS or $50 + 0.90*FFS.

Note that the lump sum payment ($50 in the example) is the same for all episodes. But, the FFS payment varies depending on the services actually provided during the episode. For example, let us assume that a therapist provides services during an episode that Medicare would pay $100 for at the full FFS-payment rates. Then the mixed payment for this episode is $140 (=$50 + 0.90 × $100). But, if the therapist provides services that Medicare would pay $700 for at the full FFS-payment rates, then the mixed payment for this second episode is \$680 (=\$50 + 0.90 × \$700).

Mixed payments were simulated for each sample episode. The percentage of FFS payments (*FFSpct*) of 90, 80, 70, 60, and 50 percent were the alternatives implemented in each simulation. Note that mixed payment with complete reimbursement (100 percent) of the FFS payment is pure FFS payment, and mixed payment with no reimbursement (0 percent) of the FFS payment is pure flat-rate episode payment. Thus, FFS and episode payment are special cases of mixed payment at the extremes of percentage of FFS payment.

6.4.3 Simulating Changes in Payment

We compare the simulated episode payments to the current (total) FFS payment by episode. Using equation (6.5) for mixed payment, which subsumes pure episode and pure FFS payment as special cases, the difference between simulated episode payments and current FFS episode payment is

$$\begin{aligned} Episode - FFStotal &= \left[1 - \left(FFSpct/100\right)\right] \times FFSmean \\ &\quad + \left(FFSpct/100\right) \times FFStotal - FFStotal \end{aligned} \tag{6.6}$$

or, simplifying the right hand side of equation (6.6),

$$Episode - FFStotal = \left[1 - \left(FFSpct/100\right)\right] \times \left[FFSmean - FFStotal\right] \tag{6.7}$$

Summarily, the difference between episode and FFS payment for an episode equals the difference between mean FFS payment across episodes and the FFS payment for a particular episode, multiplied by one minus the FFS percentage of payment. For example, if mean FFS payment across episodes is \$500, the percentage of FFS payment is 70 percent, and the total FFS payment for a specific episode is \$300, the simulated difference between episode and FFS payment is, by equation (6.7), \$60 or (1 – 0.70) × (\$500 – \$300) = 0.30*(\$200) = \$60. In other words, payment under mixed episode payment, \$360 or 0.30 × \$500 + 0.70 × \$300 by equation (6.5), exceeds the \$300 total episode payment under FFS by \$60.

In the special case of pure FFS payment, the percentage of FFS payment is one, and by equation (6.7), the difference of episode and FFS payment is zero for all episodes. In the special case of pure episode payment, the percentage of FFS payment is zero, and by equation (6.7), the difference of episode and FFS payment equals the difference of the mean of FFS payments across episodes and the FFS payment for the particular episode.

6.4.4 Limitations of Payment Simulations

The payment simulations in this section have several limitations. The sample of beneficiaries and episodes on which the simulations are performed is limited. Only 2010 initial fixed length episodes of 30, 60, and 90 days are simulated. Subsequent episodes, renewable episodes, and therapy provided outside the initial fixed period are not included in the simulations. Episode payments are not risk adjusted. Risk adjustment should have the effect of reducing the simulated changes from FFS to episode payment; although, if only a limited amount of expenditure variation is explained by the risk adjustment variables (see Section 7), the result could be that risk adjustment would not have a large effect on the results. The simulated episode payments do not have any adjustments or policies for short- or long-stay outlier episodes. No behavioral response to payment changes is modeled. Under episode payment, it is likely that therapists would reduce the number of services provided in long episodes and perhaps create more short episodes. These changes would affect Medicare episode payments, which we do not model. We also do not account for how policies addressing multiple providers participating in episodes would affect Medicare episode payments.

We do not model beneficiary cost sharing, such as deductibles, under episode payment. FFS payment for an episode can be zero because the beneficiary may be below the Medicare Part B deductible. We incorporate this zero FFS payment in our simulations, but our episode payment is always greater than zero because of its lump sum component. We include all qualifying episodes in our analysis; we do not conduct a "content analysis" of episodes, and exclude certain episodes such as non-treatment episodes or one-day episodes.

6.5 Episode Payment Simulation Results

Table 6-4 shows the distribution of duration of therapy in calendar days within the simulation sample of initial fixed length PT episodes beginning in 2010 as described in the preceding Section. Duration of therapy is defined as the number of calendar days from the start of the episode (first day of therapy) through the last therapy day within the fixed episode length. Duration includes both the first and last therapy days. For example, if a beneficiary received therapy on days 1, 5, and 31 of a 30-day fixed length episode, the duration of therapy for this episode is 5 days (day 31 is not considered since it is outside the 30-day episode window). Three fixed length initial PT episodes are defined: 30 days, 60 days, and 90 days.

Each of the three fixed length episode samples consists of 3.4 million initial episodes beginning in 2010, which includes 91 percent of all PT episodes for community residents beginning in 2010.[35] Mean therapy duration for the 30 day fixed episodes is 20 days, with at least half of episodes having 25 days or more of therapy duration. The 30 day fixed episode length is truncating many variable length episodes before the course of therapy is completed (***Table 6-4***). The services assigned to the 30 day fixed length initial episodes account for 40 percent of total Medicare payments[36] of all PT variable length episodes with a 60-day clean period beginning in 2010 without renewability. The percentage of payments accounted for by the 30 day fixed length initial episodes is much smaller than the percentage of episodes. The majority of payments for episodes beginning in 2010 occur after the 30 day initial period, or for subsequent episodes.

[35] The remaining nine percent of episodes are subsequent to the initial 2010 episodes and are not included in this analysis.

[36] In Table 6-4 and all subsequent tables, "payments" refers to the Medicare program payment to providers, excluding beneficiary cost sharing such as deductibles and coinsurance. Payments are less than allowed charges.

The mean duration of therapy for 60 day and 90 day fixed length episodes is 31 and 38 calendar days, respectively. These longer fixed windows are truncating fewer of the variable length episodes (***Table 6-4***). Still, only 55 and 63 percent, respectively, of payments for all PT episodes beginning in 2010 occur within the 60 and 90 day fixed windows of initial episodes. A substantial minority of payments for therapy services occur beyond the fixed 60 or 90 day windows of initial episodes, or in subsequent episodes. In other words, a substantial portion of expenditures for PT variable-length episodes with a 60-day clean period beginning in 2010 without renewability occurs in very long episodes or in multiple episodes for one beneficiary. Sixty and 90 day fixed length initial episodes subject more of total outpatient PT payments to episode payment incentives than 30 day episodes do.

Table 6-5 shows the mean and distribution of FFS PT initial episode payments by fixed length of episode (30, 60, or 90 days). We simulate pure (flat lump sum) initial episode payment by the mean FFS payment per episode. The simulated flat-rate episode payment (mean FFS payment) is $491, $684, and $775 for 30, 60, and 90 day fixed length initial PT episodes, respectively.

The distribution of FFS episode payments ("percentiles of payment" in ***Table 6-5***) show considerable variation. Even with a shorter, fixed episode length of 30 days, the 10th to the 90th percentile of FFS payments ranges from $79 to $986. This means that lump sum episode payments for 10 percent of episodes would exceed FFS payment by $412 (= $491 - $79) or more, and 10 percent would be lower by $495 (= $986 - $491) or more. The effects on payments would be even larger under 60 or 90 day fixed episode lengths. Therapists providing less expensive episodes under FFS would see a large increase in their Medicare payments under episode payment, and therapists providing more expensive episodes under FFS would see a large decline in their Medicare payments. Under episode payment, therapists would face larger risk (variation) to their revenue depending on whether their patients needed more or less therapy than average. Therapists would also face strong incentives to cut back the amount of therapy provided (since under pure episode payment reducing services cuts costs but not revenues), and to generate more short episodes (which have lower costs but are paid at mean FFS revenues).

An alternative to pure episode payment is "mixed" payment, which is a blend of lump sum payment per episode and a reduced percentage of FFS payment as explained in the preceding Section. ***Tables 6-6 and 6-7*** show the fixed lump sum and average reduced FFS payment per therapy day components, respectively, of mixed payment, by fixed episode length (30/60/90 days) and reduced percentage of FFS payment (100, 90,80, 70, 60, 50). When the percentage of FFS payment is 100 percent, the episode lump sum payment (***Table 6-6***) is zero (pure FFS payment), and the payment per therapy day averages $76 for all episode lengths. When the percentage of FFS payment is 90 percent (i.e., payment for each service is reduced by 10 percent), the episode lump sum payment is $49 for 30 day fixed length episodes, $68 for 60 day episodes, and $77 for 90 day episodes. The average payment per therapy day falls to $68 or $69. When episode services are paid at 70 percent of full FFS rates, the episode lump sum payment is $147, $205, and $232, for 30, 60, and 90 day episodes, respectively. The average reduced FFS payment per therapy day is $53.

Table 6-8 shows the distribution of change in Medicare payments under episode payment compared to FFS payment. The change in payments is reported in dollars, in table cells defined by rows of the percentage of FFS payment (100% = pure FFS payment 0% = pure episode lump sum payment) and columns of the mean, standard deviation, and percentiles of the change in payments. Consecutive panels of the table show this information for 30, 60, and 90 day fixed length PT initial 2010 episodes. By design, the mean change in payment is always zero. In other words, episode payment is always budget-neutral on average with respect to current FFS payment, assuming no behavioral responses.

The standard deviation of the change in payment rises as the percentage FFS payment falls. This shows that there are larger gains and losses across individual episodes—a greater variation in payment changes—as payment becomes less tied to the services provided in particular episodes. These larger gains and losses with a lower proportion of FFS payment are also shown in the percentiles. The median change in payment is slightly positive (episode payment is larger than FFS payment) and becomes larger as payment moves towards pure episode payment. Not surprisingly, ***Table 6-8*** shows that a higher FFS percentage of payment limits the changes from episode payment, ***Table 6-8*** also shows that a shorter fixed episode length (30 days rather than 60 or 90 days) also limits the changes from episode payment for initial episodes.

Table 6-9 shows the mean change in payment by percentage of FFS payment and duration of episode therapy. Separate panels are shown for 30, 60, and 90 day fixed initial PT episode lengths. Not surprisingly, one day episodes experience the largest increase in payments under episode payment (versus current FFS payment). The increase in payment rises as the percentage of FFS payment falls. For example, with a 60 day fixed initial episode length, on average payment increases by $61.33 for one day episodes with 90 percent FFS payment. From ***Table 6-7***, the average full FFS payment for a therapy day is $76. The $61.33 increase in payment for one day episodes therefore represents slightly less than an average one therapy day increase in payment. In other words, the payment for a single therapy day episode rises from one day’s FFS payment to slightly less than two day’s FFS payment. With only 70 percent FFS payment, average payment for one-day episodes rises by $183.99. This represents an increase in episode payment of about 2.4 FFS therapy days for a one-day episode ($183.99/$76). These increases in payment create incentives for therapists to provide more short-duration episodes. Also, they benefit therapists treating a case-mix that needs only short episodes of care.

Conversely, long episodes experience the largest decline in payment when FFS transitions to episode payment. For example, with the 60-fixed initial PT episode length and 90-percent FFS payment, the average payment for episodes of 51-60 days duration falls by $52.16, or about two-thirds of an average FFS therapy day payment ($52.16/$76). With only 70 percent FFS payment, the average episode payment falls by $156.49, or about two average FFS therapy days payment ($156.49/$76). Declines in payment for long episodes create an incentive under episode payment for therapists to shorten episodes of care and to avoid patients requiring long episodes of care. These incentives can be limited by paying a higher FFS percentage of payments and/or choosing a shorter fixed initial episode length, for example, 30 days rather than 60 or 90 days.

6.6 Conclusions

This section has presented characteristics of all Medicare-covered, variable-length outpatient therapy episodes beginning in 2010. These statistics provide useful basic information in developing patient alternatives. Outpatient therapy episodes last 42 days on average, cost $1,206 in allowed charges, have 12 days with therapy services, $96 in allowed charges per therapy day, and 3.22 therapy days per week.

Importantly, there is tremendous variation in the length and cost of outpatient therapy episodes, and to a lesser extent in cost-per-therapy day that is mostly not explained by type of therapy discipline involved. Total episode allowed charges vary from $29 at the first percentile to $7,351 at the 99th percentile, a ratio of 253 to 1. Explaining this huge cost variation, even with detailed beneficiary and clinical factors, is a difficult challenge. Given that a sizeable portion of cost variation is unlikely to be explained by available beneficiary and clinical factors, the implications of this variation for alternative payment systems need to be carefully considered. A desirable payment system will establish incentives to reduce any inefficiencies that may be reflected in this variation, but would also need to ensure access to beneficiaries in the extreme part of the distribution that need high levels of service.

In this section we conducted exploratory simulations of several non-risk-adjusted episode payment variations for initial PT fixed-length episodes beginning in 2010. The bundling or averaging inherent in episode payments means that some episodes are going to be paid less than current FFS payments and some episodes will be paid more. Long-duration, higher-cost episodes will be paid less and short, lower-cost episodes will be paid more under episode payment. Given the substantial variation in therapy episode expenditures, pure lump sum episode payment will result in substantial changes in payment for many episodes.

We examined two parameters of episode payment that could be used to lessen the changes from implementing episode payment. One parameter of fixed-length episode payment is the length of the episode. A shorter episode length—30 days rather than 60 or 90 days—will result in less change from the current FFS payment. Another parameter of episode payment is the proportion of FFS versus lump sum episode payment. "Mixed" episode payment, that is a combination of FFS and flat-rate payment, can achieve any blend from pure FFS payment to pure lump-sum episode payment. Higher blends of FFS payment result in less payment change from FFS. As discussed in Section 2, choosing the best blend of FFS and flat-rate episode payment involves trading off the strength of incentives for efficiency and cost control (better with higher blends of flat-rate payment) against lower incentives to avoid or undertreat beneficiaries needing more therapy, lower incentives to create more episodes, and less financial risk for therapy providers (better with higher blends of FFS payment).

Table 6-1a
Episode beneficiary characteristics, by therapy discipline—unique beneficiary mean age

	N	Mean
Total	4,128,810	74
PT	3,280,430	73
OT	576,916	76
SLP	271,464	78

NOTES:
1. PT = Physical Therapy, OT = Occupational Therapy, SLP = Speech-Language Pathology
2. N = Unique number of beneficiaries
3. Episode: Variable length episode beginning in 2010 with 60-day initiating and terminating clean periods and censoring after 12-month run-out.
4. Total = Sum of the three (3) disciplines.

SOURCE: RTI analysis of 2011-2012 MEDPAR Medicare Claims.
Program: PA014

Table 6-1b
Episode beneficiary characteristics, by therapy discipline—unique beneficiary characteristics (%)

	Total (N=4,128,810)		PT (N=3,280,430)		OT (N=576,916)		SLP (N=271,464)	
	N	Percent	N	Percent	N	Percent	N	Percent
Female	2,678,359	64.87	2,124,735	64.77	387,284	67.13	166,272	61.25
ESRD	38,398	0.93	27,228	0.83	8,365	1.45	3,040	1.12
Disabled	606,935	14.70	486,160	14.82	84,807	14.70	35,942	13.24
Medicaid	815,027	19.74	558,985	17.04	164,594	28.53	91,456	33.69
LTI	412,881	10.00	191,905	5.85	136,037	23.58	84,833	31.25

NOTES:
1. PT = Physical Therapy, OT = Occupational Therapy, SLP = Speech-Language Pathology, ESRD = End-Stage Renal Disease, LTI = Long Term Institutionalized
2. N = Unique number of beneficiaries
3. Episode: Variable length episode beginning in 2010 with 60-day initiating and terminating clean periods and censoring after 12-month run-out
4. Total = Sum of the three (3) disciplines.
5. Percent = Percent of the total beneficiary count in each discipline.
6. LTI - If the beneficiary had a 90-day MDS assessment at any point during 2011, then they were considered long-term institutionalized.

SOURCE: RTI analysis of 2011-2012 MEDPAR Medicare Claims.
Program: PA014

Table 6-1c
Episode beneficiary characteristics, by therapy discipline—unique high-cost beneficiary mean age

	N	Mean
Total	449,342	76
PT	396,957	76
OT	95,210	79
SLP	47,290	79

NOTES:

1. PT = Physical Therapy, OT = Occupational Therapy, SLP = Speech-Language Pathology
2. N = Unique number of beneficiaries
3. Episode: Variable length episode beginning in 2010 with 60-day initiating and terminating clean periods and censoring after 12-month run-out
4. Total = Sum of the three (3) disciplines.
5. High-Cost Beneficiaries were beneficiaries with at least one (1) high-cost episode. A High-Cost Episode was defined as having an Episode-Allowed Charge amount greater than the 90th percentile of Total Episode Allowed Charges.

SOURCE: RTI analysis of 2011-2012 MEDPAR Medicare Claims.

Program: PA014

Table 6-1d
Episode beneficiary characteristics, by therapy discipline—unique high-cost beneficiary characteristics (%)

	Total (N=449,342)		PT (N=396,957)		OT (N=95,210)		SLP (N=47,290)	
	N	Percent	N	Percent	N	Percent	N	Percent
Female	290,949	64.75	254,648	64.15	65,247	68.53	29,509	62.40
ESRD	4,493	1.00	3,374	0.85	1532.88	1.61	572.21	1.21
Disabled	54,146	12.05	47,516	11.97	11,930	12.53	5,684	12.02
Medicaid	90,497	20.14	64,347	16.21	30,905	32.46	18,793	39.74
LTI	85,330	18.99	46,920	11.82	40,217	42.24	25,537	54.00

NOTES:

1. PT = Physical Therapy, OT = Occupational Therapy, SLP = Speech-Language Pathology, ESRD = End-Stage Renal Disease, LTI = Long Term Institutionalized
2. N = Unique number of beneficiaries
3. Episode: Variable length episode beginning in 2010 with 60-day initiating and terminating clean periods and censoring after 12-month run-out
4. Total = Sum of the three (3) disciplines.
5. Percent = Percent of the total high-cost beneficiary count in each discipline.
6. LTI - If the beneficiary had a 90-day MDS assessment at any point during 2011, then they were considered long-term institutionalized.
7. High-Cost Beneficiaries were beneficiaries with at least one (1) high-cost episode. A High-Cost Episode was defined as having an Episode-Allowed Charge amount greater than the 90th percentile of Total Episode Allowed Charges.

SOURCE: RTI analysis of 2011-2012 MEDPAR Medicare Claims.

Program: PA014

Table 6-2
Outpatient therapy utilization characteristics for episodes beginning in 2010, by therapy discipline

Episode statistics	Mean	SE	1st	25th	Median	75th	99th
Total (n = 5,598,356)							
Total Allowed Charge ($)	1,206	0.64	29	269	760	1,566	7,351
Total Medicare Payment ($)	956	0.51	18	209	599	1,242	5,857
Total Therapy Days (n)	12	0.01	1	3	9	16	68
Total Calendar Days (n)	42	0.02	1	10	29	57	253
Allowed Charges Per Therapy Day ($)	96	0.02	24	74	93	114	206
Payments per Therapy Day ($)	76	0.01	14	59	73	91	164
Therapy Days per Week	3.22	0.00	0.43	1.68	2.47	4.67	7.00
PT (n = 4,122,671)							
Total Allowed Charge ($)	1,194	0.72	26	311	780	1,543	7,106
Total Medicare Payment ($)	945	0.57	16	242	615	1,221	5,654
Total Therapy Days (n)	12	0.01	1	4	9	16	66
Total Calendar Days (n)	46	0.03	1	14	31	59	269
Allowed Charges Per Therapy Day ($)	93	0.02	21	73	91	111	181
Payments per Therapy Day ($)	73	0.01	12	57	72	88	144
Therapy Days per Week	2.91	0.00	0.43	1.58	2.21	3.35	7.00
OT (n = 988,580)							
Total Allowed Charge ($)	1,298	1.71	32	195	735	1,748	8,120
Total Medicare Payment ($)	1,033	1.36	24	152	582	1,391	6,482
Total Therapy Days (n)	13	0.02	1	2	9	18	75
Total Calendar Days (n)	35	0.04	1	5	24	49	204
Allowed Charges Per Therapy Day ($)	97	0.04	31	76	91	115	205
Payments per Therapy Day ($)	77	0.03	22	60	72	91	163
Therapy Days per Week	3.88	0.00	0.46	2.07	3.41	5.47	7.00
SLP (n = 487,105)							
Total Allowed Charge ($)	1,123	2.29	73	154	588	1,439	7,586
Total Medicare Payment ($)	893	1.83	50	122	465	1,146	6,061
Total Therapy Days (n)	11	0.02	1	1	5	14	70
Total Calendar Days (n)	27	0.06	1	1	14	34	196
Allowed Charges Per Therapy Day ($)	124	0.07	55	102	117	134	289
Payments per Therapy Day ($)	98	0.06	35	80	93	106	230
Therapy Days per Week	4.54	0.00	0.38	2.80	4.67	7.00	7.00

NOTES:

PT = Physical Therapy; OT = Occupational Therapy; SLP = Speech-Language Pathology; SE = Standard error of the mean

1. Episode: Variable length episode beginning in 2010 with 60-day initiating and terminating clean periods and censoring after 12-month run-out.
2. N = Number of Unique Episodes
3. Total = Sum of the three (3) disciplines.
4. Therapy Days per Week = [(therapy days)/(calendar days)]*7

SOURCE: RTI analysis of 2009-2011 Outpatient Therapy Medicare Claims data.

Program: PA014

Table 6-3
Characteristics of high-cost outpatient therapy episodes beginning in 2010

Episode statistics	Mean	SE	1st	25th	Median	75th	99th
Total (n = 559,511) Total Allowed Charge ($)	4,656	3.13	2,737	3,178	3,879	5,231	13,926
Total Medicare Payment ($)	3,705	2.50	2,161	2,527	3,086	4,165	11,109
Total Therapy Days (n)	43	0.03	18	29	37	49	123
Total Calendar Days (n)	125	0.10	31	68	101	156	365
Allowed Charges Per Therapy Day ($)	114	0.05	62	96	111	127	208
Payments per Therapy Day ($)	91	0.04	49	76	89	101	166
Therapy Days per Week	2.86	0.00	0.82	1.84	2.64	3.90	5.22

NOTES:

PT = Physical Therapy; OT = Occupational Therapy; SLP = Speech-Language Pathology; SE = Standard error of the mean

1. Episode: Variable length episode beginning in 2010 with 60-day initiating and terminating clean periods and censoring after 12-month run-out.
2. N = Number of Unique Episodes
3. A High-Cost Episode was defined as having an Episode-Allowed Charge amount greater than the 90th percentile of Total Episode Allowed Charges.
4. Therapy Days per Week = [(therapy days)/(calendar days)]*7

SOURCE: RTI analysis of 2009-2011 Outpatient Therapy Medicare Claims data.

Program: PA014

Table 6-4
Mean and distribution of duration of therapy (in Calendar Days) within fixed episode lengths, 2010

	Fixed length of episode in calendar days		
Episode characteristics	30 days	60 days	90 days
Number of Episodes	3,404,458	3,404,458	3,404,458
Mean Duration of Therapy	20	31	38
Mean Therapy Days	6	9	10
Percent of all episodes	91%	91%	91%
Percent of all payments	40%	55%	63%
Percent of all therapy days	41%	57%	64%
Percentiles of duration (calendar days)			
Minimum	1	1	1
10th	1	1	1
25th	11	14	15
Median	25	30	32
75th	29	52	60
90th	30	58	85
Maximum	30	60	90

NOTES:

1. This analysis was for initial physical therapy episodes among community residents
2. This analysis was for episodes beginning in 2010, defined by a 60-day preceding period without qualifying services
3. Duration of therapy is the number of calendar days from and including the start of the episode to the last therapy day within the fixed episode length.
4. Percent of all episodes is the percentage of episodes that initiate in the 30/60/90 day fixed length period divided by the total number of episodes that initiated in 2010
5. Percent of all payments is the percentage of payments for those episodes that initiate in the 30/60/90 day fixed length period divided by the total payments for all episodes that initiated in 2010
6. Percent of all therapy days is the percentage of therapy days for those episodes that initiate in the 30/60/90 day fixed length period divided by the total therapy days for all episodes that initiated in 2010

Table 6-5
Episode Payment: Mean and distribution of physical therapy episode payment by fixed episode length, 2010

Episode characteristics	Fixed length of episode in calendar days: 30 days	60 days	90 days
Number of episodes	3,404,458	3,404,458	3,404,458
Mean FFS Payment ($)	491	684	775
Percentiles of payment			
Minimum	0	0	0
10th	79	82	83
25th	194	224	239
Median	430	542	580
75th	695	975	1,084
90th	986	1,475	1,674
Maximum	8,067	14,575	18,651

NOTES:

1. This analysis was for initial physical therapy episodes among community residents
2. This analysis was for episodes beginning in 2010, defined by a 60-day preceding period without qualifying services
3. FFS = fee-for-service
4. Payments exclude beneficiary cost sharing, i.e., they are not allowed charges.

SOURCE: RTI analysis of 2010-2012 100% Medicare FFS claims data.

Table 6-6
Mixed FFS/Episode payment: Simulated physical therapy episode lump sum payment ($), by episode length and percentage FFS payment, 2010

	Fixed length of episode in calendar days		
Percent FFS payment	30 days	60 days	90 days
100	0	0	0
90	49	68	77
80	98	137	155
70	147	205	232
60	196	274	310
50	246	342	387

NOTES:

1. This analysis was for initial physical therapy episodes among community residents
2. This analysis was for episodes beginning in 2010, defined by a 60-day preceding period without qualifying services
3. FFS = fee-for-service
4. Payments exclude beneficiary cost sharing, i.e., they are not allowed charges.

SOURCE: RTI analysis of 2010-2012 100% Medicare FFS claims data.

Table 6-7
Mixed FFS/Episode payment: Simulated Physical therapy average total payment per therapy day ($), by episode length and percentage FFS payment, 2010

	Fixed length of episode in calendar days		
Percent FFS payment	30 days	60 days	90 days
100	76	76	76
90	68	68	69
80	61	61	61
70	53	53	53
60	45	46	46
50	38	38	38

NOTES:

1. This analysis was for episodes beginning in 2010, defined by a 60-day preceding period without qualifying services
2. FFS = fee-for-service
3. Mixed FFS/episode payment pays an episode lump sum payment plus a reduced FFS payment for each service.
4. Lump sum payments are not risk-adjusted.
5. Only a beneficiary's first episode beginning in 2010 is included.
6. Payments exclude beneficiary cost sharing, i.e., they are not allowed charges.

SOURCE: RTI analysis of 2010-2012 100% Medicare FFS claims data.

Table 6-8
Distribution of episode change in Physical Therapy payments ($) under alternative payment regimes and fixed episode lengths

Percent FFS payment	Payment type	Mean	Standard deviation	1st	10th	25th	Median	75th	90th	99th
Fixed episode length 30 days										
100	FFS payment	0	0	0	0	0	0	0	0	0
90	Mixed	0	37.13	(114.35)	(49.51)	(20.42)	6.16	29.77	41.26	47.66
80	Mixed	0	74.26	(228.69)	(99.02)	(40.84)	12.31	59.53	82.52	95.33
70	Mixed	0	111.39	(343.04)	(148.52)	(61.27)	18.47	89.30	123.78	142.99
60	Mixed	0	148.53	(457.39)	(198.03)	(81.69)	24.63	119.07	165.04	190.66
50	Mixed	0	185.66	(571.74)	(247.54)	(102.11)	30.78	148.83	206.30	238.32
0	Full Episode payment	0	371.31	(1,143.47)	(495.08)	(204.22)	61.57	297.66	412.59	476.64
Fixed episode length 60 days										
100	FFS payment	0	0	0	0	0	0	0	0	0
90	Mixed	0	59.61	(199.30)	(79.09)	(29.10)	14.24	46.00	60.27	66.81
80	Mixed	0	119.23	(398.60)	(158.18)	(58.19)	28.48	91.99	120.53	133.62
70	Mixed	0	178.84	(597.90)	(237.27)	(87.29)	42.73	137.99	180.80	200.43
60	Mixed	0	238.46	(797.21)	(316.36)	(116.39)	56.97	183.98	241.06	267.25
50	Mixed	0	298.07	(996.51)	(395.45)	(145.49)	71.21	229.98	301.33	334.06
0	Full Episode payment	0	596.14	(1,993.02)	(790.91)	(290.97)	142.42	459.95	602.66	668.11
Fixed episode length 90 days										
100	FFS payment	0	0	0	0	0	0	0	0	0
90	Mixed	0	73.11	(262.81)	(89.94)	(30.95)	19.51	53.57	69.20	75.64
80	Mixed	0	146.23	(525.63)	(179.88)	(61.91)	39.02	107.14	138.41	151.28
70	Mixed	0	219.34	(788.44)	(269.82)	(92.86)	58.53	160.71	207.61	226.92
60	Mixed	0	292.45	(1,051.25)	(359.76)	(123.82)	78.03	214.28	276.81	302.56
50	Mixed	0	365.57	(1,314.07)	(449.70)	(154.77)	97.54	267.85	346.01	378.19
0	Full Episode payment	0	731.13	(2,628.13)	(899.41)	(309.54)	195.08	535.69	692.03	756.39

NOTES:

1. This analysis was for episodes beginning in 2010, defined by a 60-day preceding period without qualifying services
2. This analysis was for initial physical therapy episodes among community residents
3. FFS = fee-for-service
4. Payments exclude beneficiary cost sharing, i.e., they are not allowed charges

SOURCE: RTI analysis of 2010-2012 100% Medicare FFS claims data.

Table 6-9a
Mean episode change in Physical Therapy payment ($) by duration of therapy under alternative payment regimes and a fixed episode length of 30 calendar days

Number of Episodes (N)			509,069	126,983	207,345	227,735	239,740	490,002	1,603,584
Percent FFS Payment	Payment Type	All Episodes	1 day	2-5 days	6-10 days	11-15 days	16-20 days	21-25 days	26-30 days
100	FFS payment	0	0	0	0	0	0	0	0
90	Mixed	0	42.02	32.64	25.74	16.42	6.58	(2.54)	(21.79)
80	Mixed	0	84.04	65.29	51.48	32.84	13.17	(5.08)	(43.59)
70	Mixed	0	126.06	97.93	77.22	49.27	19.75	(7.62)	(65.38)
60	Mixed	0	168.09	130.58	102.96	65.69	26.34	(10.16)	(87.17)
50	Mixed	0	210.11	163.22	128.70	82.11	32.92	(12.70)	(108.97)
0	Full Episode payment	0	420.21	326.44	257.40	164.22	65.85	(25.40)	(217.94)

NOTES:

1. FFS = fee-for-service
2. Change in payment is from current FFS payment to episode payment. Payments exclude beneficiary cost sharing, i.e., they are not allowed charges.
3. Duration of therapy is the number of calendar days from and including the start of the episode to the last therapy day within the fixed episode length.

SOURCE: RTI analysis of 2010-2012 100% Medicare FFS claims data.

Table 6-9b
Mean episode change in Physical Therapy payment ($) by duration of therapy under alternative payment regimes and a fixed episode length of 60 calendar days

Number of episodes (N)			459,146	114,672	181,041	189,331	184,053	284,370	315,695	392,273	377,350	906,527
Percent FFS payment	Payment type	All episodes	1 day	2-5 days	6-10 days	11-15 days	16-20 days	21-25 days	26-30 days	31-40 days	41-50 days	51-60 days
100	FFS payment	0	0	0	0	0	0	0	0	0	0	0
90	Mixed	0	61.33	52.05	45.11	35.45	25.19	15.19	2.20	(7.51)	(22.32)	(52.16)
80	Mixed	0	122.66	104.09	90.23	70.90	50.38	30.37	4.40	(15.02)	(44.64)	(104.32)
70	Mixed	0	183.99	156.14	135.34	106.35	75.58	45.56	6.60	(22.53)	(66.97)	(156.49)
60	Mixed	0	245.32	208.19	180.45	141.80	100.77	60.74	8.80	(30.04)	(89.29)	(208.65)
50	Mixed	0	306.65	260.23	225.57	177.25	125.96	75.93	11.00	(37.55)	(111.61)	(260.81)
0	Full Episode payment	0	613.29	520.46	451.13	354.50	251.92	151.85	21.99	(75.09)	(223.22)	(521.62)

NOTES:

1. FFS = fee-for-service

2. Change in payment is from current FFS payment to episode payment. Payments exclude beneficiary cost sharing, i.e., they are not allowed charges.

3. Duration of therapy is the number of calendar days from and including the start of the episode to the last therapy day within the fixed episode length.

SOURCE: RTI analysis of 2010-2012 100% Medicare FFS claims data.

Table 6-9c

Mean episode change in Physical Therapy payment ($) by duration of therapy under alternative payment regimes and a fixed episode length of 90 calendar days

Number of episodes (N)			431,383	108,844	171,119	178,631	173,784	268,838	296,504	358,116	303,792	274,966	182,617	191,492	464,372
Percent FFS payment	Payment type	All episodes	1 day	2-5 days	6-10 days	11-15 days	16-20 days	21-25 days	26-30 days	31-40 days	41-50 days	51-60 days	61-70 days	71-80 days	81-90 days
100	FFS payment	0	0	0	0	0	0	0	0	0	0	0	0	0	0
90	Mixed	0	70.35	61.16	54.22	44.57	34.36	24.22	11.09	1.05	(15.84)	(39.27)	(41.39)	(50.63)	(80.81)
80	Mixed	0	140.71	122.32	108.45	89.13	68.71	48.43	22.17	2.11	(31.68)	(78.55)	(82.77)	(101.26)	(161.62)
70	Mixed	0	211.06	183.48	162.67	133.70	103.07	72.65	33.26	3.16	(47.52)	(117.82)	(124.16)	(151.90)	(242.44)
60	Mixed	0	281.42	244.64	216.89	178.27	137.42	96.86	44.35	4.22	(63.36)	(157.10)	(165.55)	(202.53)	(323.25)
50	Mixed	0	351.77	305.81	271.12	222.83	171.78	121.08	55.44	5.27	(79.20)	(196.37)	(206.93)	(253.16)	(404.06)
0	Full Episode payment	0	703.54	611.61	542.23	445.67	343.56	242.16	110.87	10.54	(158.40)	(392.75)	(413.86)	(506.32)	(808.12)

NOTES:

1. FFS = fee-for-service

2. Change in payment is from current FFS payment to episode payment. Payments exclude beneficiary cost sharing, i.e., they are not allowed charges.

3. Duration of therapy is the number of calendar days from and including the start of the episode to the last therapy day within the fixed episode length.

SOURCE: RTI analysis of 2010-2012 100% Medicare FFS claims data.

[This page intentionally left blank.]

7. RISK ADJUSTMENT OF EPISODE PAYMENTS USING CLINICIAN-OBSERVED AND PATIENT SELF-REPORT DATA

Episode-based payment is a possible alternative payment system for outpatient therapy. In this section, we discuss multivariate regression results that predict episode-based therapy expenditures. The episode analysis is based on beneficiary characteristics that may be predictive of use of therapy services. Risk adjustment of episode-based payments is accomplished using a regression model which relates patient characteristics to episode expenditures.

Motivation for this analysis is given in Section 7.1, followed by the analytic methods used for the evaluation (Section 7.2). Characteristics of the beneficiaries, associated episodes within the 12-month period beginning March 1, 2011, and a simulation of the risk to providers based on patient panel size are described in Section 7.3. Separate models are evaluated for physical therapy (Section 7.4.1), occupational therapy (Section 7.4.2), speech-language pathology (Section 7.4.3), and nursing facility residents (Section 7.4.4). The results from the episode-based analysis presented in Section 7 are compared with those from the annual model (Section 5) in Section 7.5. Conclusions are discussed in the final section (Section 7.6).

7.1 Motivation for the Analysis

The descriptive episode analysis in Section 6 used only administrative data. Section 7 uses functional and other clinician-assessment and patient self-report data on the 6,171 patients in the episode CARE sample merged with claims data, including 5,476 in CARE-C and 695 beneficiaries in the CARE-F sample to estimate multivariate regression models to predict therapy episode expenditures. The CARE instrument provides data on patient function that may be useful in predicting beneficiary expenditures. The CARE-C analyses include a demographic-only model. In addition to the demographic model, we explore a payment model that includes demographics as well as variables that may be relevant to a payment model. The "comprehensive" model includes additional covariates from the CARE assessment that may be predictive of expenditures, but not necessarily appropriate for a payment model due to their discretionary nature. CARE-F analyses used equivalent models, but combined all discipline together instead of discipline specific models. The reason for this is that members of the clinical team felt that the discipline distinctions were less salient for nursing facility patients than for community residents.

7.2 Analytic Methods

Section 6 used an episode definition with 60-day initiating and terminating clean periods. This section uses a CARE defined initiating period between March 2011 and June 2012 and is terminated with a 60-day clean period. The time frames of the 100-percent and CARE episode-based risk-adjustment files are not directly comparable and the sample sizes are significantly smaller for the CARE-defined episodes. The data sources used for the episode file, the regression techniques employed for the analysis, and the specifications for discipline-specific model are described in the next three sections.

7.2.1 Sample and Data

The sample for the analyses is any beneficiary who had a CARE-C or CARE-F admission assessment between March 1, 2011 and June 30, 2012, which comprises the full set of CARE-C and CARE-F admission assessments. Expenditure data for the discipline matching the assessment were obtained from the date of the CARE-C assessment until a 60-day period with no claims in that discipline; all expenditures were combined for CARE-F beneficiaries. Episodes were initiated by a CARE assessment; therefore, we only examined the episode associated with the CARE assessment and did not explore subsequent episodes. A beneficiary could have their episode right-censored if they did not have a 60-day clean period by the end of December 31, 2012. Only the portion of episode expenditures falling on or before December, 31, 2012 is predicted. All CARE episodes have at least a 6-month run out (June 30 to December 31, 2012) from their admission assessment, and most have a considerably longer run out. Three-tenths of one percent of the overall episodes is censored with no noticeable variation by discipline. Enrollment data, outpatient and carrier claims data were used to construct the administrative portion of the episodes and these were merged with the CARE assessment items to construct the final analytic data set that is used for this analysis. The CARE episode analysis of this section contrasts with the CARE annual (12-month) analysis of Section 5 that is based on the subset of CARE admission assessments and claims for the period March 2011 through February 2012. Unlike those in Section 5, only the claims associated with the CARE-initiated episode are included in the analysis.

7.2.2 Regression Specifications

Episode expenditures are predicted by demographics and items on the CARE assessment. The dependent variable is the untransformed discipline-specific therapy expenditure. The coefficients represent the incremental change in episode-therapy expenditures after controlling for the other variables in the model. All regression models were computed using a generalized least squares (GLS) model through PROC SURVEYREG in SAS, thereby adjusting the estimated standard errors to account for clustering at the provider/site level. This is done because standard errors are not likely to be independently distributed at the provider/site level due to correlated practice patterns. The practical effect is to increase standard errors and reduce reported statistical significance.

By predicting actual expenditures, we avoid the need for “retransformation” of the dependent variable that would be necessary with another standard approach, predicting the natural log of expenditures. However, predicting actual expenditures is more sensitive to expenditure outliers. GLS predicts the conditional mean of a response variable y as a linear function of k independent variables.

Three different types of expenditure models are estimated in the analyses: physical therapy (PT), occupational therapy (OT), and speech-language pathology (SLP). The rationale for separating the disciplines is difference in patient needs and reasons for therapy among the different disciplines and patient populations. Within each discipline, three models are analyzed: 1) Demographic Model; 2) Payment Model; and 3) Comprehensive Model. Each of these models includes an expanded set of covariates incorporating the variables included in the previous models; these are identical to the models in Section 5. These models are described below.

For the CARE-F sample, in addition to the payment model, we examined a “basic” payment model that only included primary diagnosis, four Rasch function measure categorical variables (defined in Section), if the patient had any diet modifications, severe cognitive impairments and if they could understand verbal content. This model intends to limit issues of collinearity among multiple related predictor variables while capturing the key predictive dimensions of primary diagnosis and physical, mental and functional impairments.

Demographic Model

The demographic model is drawn solely from administrative data and estimates what can be predicted without information on a patient’s functional status obtained from the CARE assessment; this is identical to the demographic model in Section 5. The other models discussed in this section can be compared against the demographic model to understand the added predictive value of the CARE items.

The demographic model is defined as

$$C_{AD} = a_0 + a_1 Medicaid + a_2 ESRD + a_3 Disabled + a_4 AgeSex \tag{7.1}$$

where a_0 is the intercept and the remaining *a*-terms are the estimated model coefficients; *Medicaid* indicates if the beneficiary was ever enrolled in Medicaid during the 12 month period between March 1, 2011 and February 29, 2012 (i.e., dual-eligibility); *ESRD* indicates that the beneficiary had end-stage renal disease at any time in 2011 or 2012; *Disabled* indicates that the original reason for entitlement was disability at any time in 2011 or 2012; and *AgeSex* is categorized age of the beneficiary in 10-year intervals within sex of the beneficiary. In order to limit the number of covariates in the CARE-F model, we include a categorical variable for sex instead of including the age and sex interactions. In the CARE-F model, we also included a variable to indicate if the beneficiary was long-term institutionalized in the month that their episode initiated.

Payment Model

The payment model includes the demographic variables, and several additional variables from the CARE assessment. These variables were selected because they are measures of patient complexity that are expected to be associated with expenditures. Excluded from this model are items that may also be associated with expenditures, but may be more discretionary and therefore, inappropriate for use in a payment model. This model is defined as

$$\begin{aligned} C_{AP} = {} & a_0 + a_1 Medicaid + a_2 ESRD + a_3 Disabled + a_4 AgeSex \\ & + a_5 DX1 + a_6 DX2 + a_7 Structure + a_8 BodyFunction + a_9 Activities \\ & + a_{10} RaschFunction + a_{11} Surg + a_{12} SurgTime \end{aligned} \tag{7.2}$$

where the first set of terms is defined for the demographic model (expression 5.1); *DX1* and *DX2* are the discipline-specific primary and secondary diagnostic groups, respectively; *Structure* is the clinician-reported, categorized reason for therapy as it relates to body structure; *Body Function* is the clinician-reported, categorized reason for therapy as it relates to body function groups; *Activities* is the clinician reported, categorized reason for therapy as it relates to activities ; *Rasch Function* is a summary variable that includes multiple Rasch clinician and self-report functioning scales; and the indicators of the number of surgeries in the past for the current medical problem as well as the time frame of the most recent surgery, if applicable, are exhibited as *Surg* and *SurgTime*, respectively. The detailed distributions of the Rasch function measures for each discipline can be seen in ***Appendix Table 7-1***.

The CARE-F sample had a limited sample size which required a few deviations from the CARE-C model, specified above. The payment model includes primary and secondary diagnosis groups, and structure, function and activities groups. However, these groups are not discipline specific in the CARE-F analysis. Also, the Rasch scores are not continuous because of the limitations on sample size due to dropping the assessments that did not have a complete set of non-missing Rasch scores. Instead we explicitly include a binary variable that is a marker for missing data as well as various ranges of the Rasch scores. We also include a binary variable for surgery due the limited number of patients who had surgery. We include a set of variables describing where the patient was admitted from before being admitted to the nursing home and if they used any hospital care in the past two months. These items were not available on the CARE-C assessment.

The payment model includes 21, nine (9), four (4), and eight (8) diagnostic groups for PT, OT, SLP and CARE-F, respectively. SLP's 8 groups are composed of 4 primary impairment groups and 4 primary medical diagnosis groups. Secondary diagnosis groups are also broken into 23, 11, and 18 groups for PT, OT, and CARE-F respectively; SLP secondary diagnoses are combined with the primary diagnostic groups. The payment model also includes 16, 7, 4, and 10 body structure groups for PT, OT, SLP, and CARE-F, respectively. Body functions are broken into 8, 7, 4, and 5 groups for PT, OT, SLP, and CARE-F, respectively. Activities and participation are broken into 4 groups for CARE-C and 5 groups for CARE-F; the activity groups are identical for PT and OT, while SLP activity groups differ. The Rasch scales, as explained in Section 3, are based on multiple items. Continuous Rasch function scales are included in each of the CARE-C regression models; the specific function scales employed vary based on the discipline of the model. Each of the Rasch function scales in the CARE-F model were broken down into categorical variables in order to limit the number of missing data elements. The categorical ranges include: (1) $0 \leq$ Rasch < 30; (2) $30 \leq$ Rasch < 60; (3) $60 \leq$ Rasch < 90; and (4) Rasch ≥ 90. These ranges were specified to approximately break the Rasch scores into quartiles. Function scales are included in discipline specific models based on a combination of clinical input and quantitative analysis which is discussed in detail in Section 3. The primary and secondary diagnostic groups as well as the body structure groups and body function groups are discussed in more detail in Section 3.

For CARE-C PT beneficiaries, we explored the interaction of body structure (hip) and primary diagnosis (fracture and joint replacement) to assess if this predicted any additional costs above joint replacement or fracture alone. However, the interactions were not significant and were dropped from the final model. We also explored the interaction of the Joint Replacement and Stroke diagnosis groups with their respective Rasch scores in response to dissimilarities in the differential item functioning analysis in the *DOTPA Measurement Report*.[37] However, these interactions were not significant and were dropped from the final models.

Comprehensive Model

The final model, the comprehensive model, is composed of the same items that are in the demographic and payment models, but includes additional variables from the CARE analysis that may be predictive of expenditures. These additional variables are not necessarily appropriate to be used in a payment model due to their discretionary, subjective, or gameable nature. The comprehensive model is defined as

$$\begin{aligned} C_{AC} = {} & a_0 + a_1 Medicaid + a_2 ESRD + a_3 Disabled + a_4 AgeSex \\ & + a_5 DX1 + a_6 DX2 + a_7 Structure + a_8 BodyFunction + a_9 Activities \\ & + a_{10} RaschFunction + a_{11} Surg + a_{12} SurgTime \\ & + a_{13} Sad + a_{14} PainAct + a_{15} PainSleep + a_{16} PainSev + a_{17} MobDevice \\ & + a_{18} Memory + a_{19} Comm + a_{20} Swallow + a_{21} Length + a_{22} Division \\ & + a_{23} SiteType \end{aligned} \tag{7.3}$$

where *Sad* indicates if the patient has been feeling sad at the time of the assessment; *PainAct* and *PainSleep* indicates if pain resulted in limited activity and limited sleep, respectively; *PainSev* indicates the severity of their pain; *MobDevice* indicates if they used a mobility device; *Memory*, *Comm*, and *Swallow* indicates if they had a memory impairment, communication impairment, or swallowing impairment, respectively; and *Length* is the length of time the patient has had the health problem for which they were receiving therapy; *Division* is the census division in which the CARE assessment was administered; and *Site* is the facility type in which the CARE assessment was administered. The remaining variables are specified for expressions (7.1) and (7.2).

Swallowing impairment was excluded from the PT-only models and was also excluded for SLP models. However, for SLP, it was replaced by two additional variables which asked if the patient had any diet modifications related to a swallowing disorder and if they had any cueing or assistance needs related to a swallowing disorder.

The CARE-F model includes more detailed items which are not available on the CARE-C assessment. These include the patient's *prior self-care function before entering nursing care, prior ambulation function before entering nursing care, prior wheelchair use before entering nursing care, falls in the past year, moderate or severe cognitive impairment, treatment for cognitive problems, respiratory impairment, endurance impairment, bladder/bowel impairment, understanding verbal content, expressing ideas/wants, inattention, disorganized thinking, and altered level of consciousness/alertness*.

---

[37] The Measurement Report found some slight differences in item difficulty between two (Joint Replacement and Stroke) diagnosis groups through the Rasch-based method of differential item functioning (DIF), which singly investigates each item in a subscale for potential interactions with characteristics of the beneficiaries sampled.

With the addition of these variables, we examined a forward stepwise model of the covariates in the comprehensive model. We examine the first 20 variables that are included in the model, as judged by their improvement to the explanatory power of the model.

7.3 Descriptive Analysis of Beneficiary Characteristics and Episode Distributions

The following section presents descriptive information about the beneficiaries and the episodes that initiated between March, 1 2011 and June 30, 2012. A beneficiary may have multiple CARE-C or CARE-F admission assessments and therefore, the number of beneficiaries and the number of assessments do not match exactly. Beneficiaries were allowed to have more than one episode if they had multiple assessments in either CARE-C or CARE-F.

7.3.1 Beneficiary Characteristics

Overall, the CARE-C episode definition had 5,476 unique beneficiaries and 5,545 admission assessments included in the episode definition. Of these, 4,825 had PT assessments, 533 had OT assessments and 187 received SLP assessments. ***Table 7-1a*** shows the average age of the unduplicated beneficiaries who received outpatient therapy. There was not a large difference in age between disciplines; the mean age ranged from 71 to 73 years old.

In addition to age, we also examined gender, ESRD status, originally disabled status, and Medicaid status of the beneficiaries across disciplines. ***Table 7-1b*** shows the percentages of these additional variables by discipline and overall. On average the majority of PT and OT assessments were conducted on females while SLP was composed of a majority of males. PT and SLP had less than 1 percent ESRD patients and ESRD beneficiaries slightly exceeded 1 percent of the total beneficiaries receiving OT. OT and SLP had higher percentages of beneficiaries who entered Medicare as disabled than PT. OT and SLP also have a higher share of dually-eligible beneficiaries (Medicaid) in comparison with PT. Lastly, 91 percent of the beneficiaries were white, 7 percent were black and the remaining 2 percent were other races. OT and SLP had slightly more black beneficiaries.

We also examined characteristics for those beneficiaries who are in the top 10 percent of episode expenditures. ***Tables 7-1c*** and ***7-1d*** show that on average, a higher percent of these beneficiaries are female across all disciplines. PT and OT had a higher percentage of ESRD patients among high-cost episodes, but SLP had none. Being disabled prior to receiving Medicare was more similar among the high-cost beneficiaries and the total sample. Dual-eligible status is over 30 percent for both OT and SLP, while PT was lower at 12 percent of total high cost beneficiaries.

CARE-F, on the other hand, had 591 assessments and 518 unique beneficiaries in the nursing facility population. Additionally, 182 beneficiaries and 177 unique beneficiaries are in the day rehabilitation population. ***Table 7-2a*** shows the average age of the beneficiaries by nursing and day rehabilitation population. The average nursing home patient was 80 years old while the average day rehabilitation patient was 74 years old.

We examined several other characteristics, which are described in ***Table 7-2b***. Nursing beneficiaries were composed of a much higher proportion of women (71%) than the day rehabilitation population (50%). The nursing home population had, on average, a higher proportion of ESRD (2.1%), disabled (11%), Medicaid (61%) and long-term institutionalized (LTI) (80%) patients. Day rehab patients were composed of 1 percent ESRD, 10 percent disabled, 8 percent Medicaid, and no LTI patients. The nursing population has a much higher composition of Medicaid and LTI patients. Day rehab patients were more likely to be white (90%) than nursing patients (87%) and 10 percent of nursing patients were black as compared to 3 percent of day rehab patients.

Episode Expenditure Characteristics

When we limit the sample to beneficiaries who had CARE-C assessments between March 1, 2011 and June 30, 2012, the final sample of assessments with claims that fall within 30 days of the CARE-C admission assessment includes 5,545 records. PT is the most prevalent discipline in the CARE-C sample, representing 87 percent of the overall cases. OT represents 10 percent of the overall cases. SLP accounts for the remaining 3 percent of the cases.

Table 7-3 shows aggregated episode data, overall and by discipline, in the CARE-C population. The table includes the total allowed charges, Medicare payments, therapy days, calendar days, allowed charges per therapy day, payments per therapy day, and therapy days per week. Allowed charges are the total provider payment allowed by Medicare, including both beneficiary and Medicare payments. Medicare payments represent the amount that Medicare paid and the remaining balance is the cost sharing responsibility of the beneficiary. Therapy days are the total number of days on which a beneficiary received therapy. Calendar days are a count of the total days between the first visit and the last visit of the episode.

For the CARE-C population, the average allowed charges for the episode were $1,350 overall, $1,335 for PT, $1,320 for OT and $1,825 for SLP. The median charges were $952, $950, $922, and $1,305 for the total, PT, OT and SLP, respectively. Medicare pays 80 percent of the allowed charge after the Part-B deductible; therefore, Medicare payments were approximately 20 percent below the allowed charge. Allowed charges per therapy day were highest for SLP ($107) and lower for PT ($94) and OT ($98). Episode therapy allowed charges varied 78-fold, from $85 at the first percentile to $6,701 at the 99th percentile. Episode allowed-charge variation was driven mostly by variation in therapy days (60 at the 99th percentile to 1 at the first percentile), rather than by variation in allowed charges per therapy day ($160 at the 99th percentile to $51 at the first percentile).

The average patient received therapy on 14 distinct days during the course of an episode with a median of 11 therapy days. Total calendar days averaged 55 days with a median of 41 days. PT and OT appear to have more condensed courses of therapy, averaging 54 and 50 calendar days, respectively, compared to 71 for SLP. The frequency of weekly visits, measured by the average number of therapy days per week, does not vary much between the disciplines.

Table 7-4 shows episode level data for day rehab and nursing beneficiaries in the CARE-F population. The average allowed charges for the episode were $1,832 for the nursing population and $3,175 for the day rehab population. The median allowed charges were $2,732 and $3,222 for nursing and day rehabilitation respectively. Allowed charges per therapy day were highest for day rehabilitation patients ($187) and lower for nursing patients ($102). Episode allowed charges varied 139-fold, from $184 at the first percentile to $25,530 at the 99th percentile for nursing patients and 47-fold for day rehab from $391 at the first percentile to $18,293 at the 99th percentile. For nursing patients, episode allowed charges were driven mostly by variation in therapy days (207 at the 99th percentile to 2 at the first percentile), rather than by variation in allowed charges per therapy day ($359 at the 99th percentile to $39 at the first percentile). Day rehabilitation users used fewer therapy days at the extreme (98) and had higher overall charges per therapy day at the 99th percentile ($330).

The average nursing patient received 32 distinct days of therapy during the course of an episode, with a median value of 20 therapy days. Day rehabilitation patients received an average of 24 therapy days and a median value of 19 therapy days. Total calendar days averaged 60 days with a median of 36 days for nursing patients, and an average of 68 days with a median of 52 days for day rehabilitation patients. The average number of therapy days per week is higher for nursing patients (4.02) than for day rehabilitation patients (2.37).

Patient Panel Size Simulation

To simulate the potential risk of episode-based payment for providers, we evaluated the possible revenue variation (the average actual expenditures during the episode) based on the number of PT patients for various provider groups with various patient volumes. We grouped the diagnostic groups into three broad categories based on mean expenditures—high, medium and low cost—in order to present some possible variation the case-mix providers may face. Then, we took 50 random samples of the episode expenditures (sampling with replacement) for each of seven possible patient panel sizes—1, 10, 25, 50, 100, 500, and 1,000—within each broad category. We took the mean expenditure for each of the 50 draws and then selected the minimum, median and maximum mean expenditure for each group, based on patient panel size. The results of this simulation are shown in ***Table 7-5***. There is a very wide range between the minimum and maximum mean expenditures for those patient panel sizes up to 25 patients. Patient panel sizes of 50 or 100 have less variability, but still exhibit wide ranges of variation. This level of variation is an indicator of the risk that providers will be exposed to if they have low levels of PT patients in their practice. Patient panel sizes of 500 and 1,000 have the lowest levels of variation and are likely the types of practices that could accept the unsystematic risk of episode based payments. Providers with large panel sizes are exposed to much smaller potential gains and losses under episode payment than providers with small panel sizes. Note that large patient panel size does NOT reduce the risk of a practice treating a systematically more expensive population, for example, stroke rather than sprain/strain patients. Only risk/case-mix adjustment can mitigate systematic risk.

7.4 Multivariate Regression Results

This section presents three multivariate regression models by therapy discipline to further understand the determinants of episode expenditures for outpatient therapy. (1) The *demographic model* includes only demographic predictors. (2) The *payment model* includes items from the CARE assessment in addition to the demographic covariates used in the first model. (3) The comprehensive model includes additional CARE assessment items that are less appropriate for a payment model, along with covariates used in the second model. Separate models are presented for PT, OT and SLP in the sections below. The predicted expenditure from the models is the sum of the coefficients of the variables applicable to a beneficiary, including the appropriate age-sex cell coefficients for each beneficiary.

7.4.1 CARE-C Community Resident Physical Therapy

Table 7-6 shows the results of the demographic, payment and comprehensive models for CARE-C beneficiaries utilizing PT services. ***Appendix Table 7-2*** shows the means and standard deviations for each of the explanatory variables in the PT model.

Demographic Model

PT has the largest sample size, 4,825 episodes, and therefore has the most statistically stable results among the three disciplines. Demographic characteristics explain less than 1 percent of the variation in annual allowed charges. This is consistent with Section 5 which shows that demographics provide little explanatory power for PT beneficiaries. Other than the intercept, only ESRD is significantly different from zero. The reference group for this model is a 65-74 year old female who is not originally disabled, not dually-eligible and does not have ESRD.

Payment Model

When the additional payment variables, including clinical and functional data, are added to the demographic model, the explanatory power of the model increases from an R^2 of 1 percent to 11 percent, or an adjusted R^2 of 8 percent. The sample size decreases to 4,268 episodes due to missing data in the Rasch function scales. In the payment model, the age/sex coefficients decrease for all ages. The interpretation of these coefficients is expenditures for a patient who has function scores of zero on all the Rasch scales, thus being the most impaired. To accurately predict a patient's episode expenditures, each of the payment variables acts as an additive amount on top of the demographic coefficients to get the total predicted episode expenditures. Beneficiaries who are originally disabled negatively predict episode expenditures in the payment model. ESRD is no longer significant, but there are only 35 patients who have ESRD.

Primary diagnosis groups are interpreted in relation to *osteoarthritis*, which is the excluded diagnosis group. Of the 21 PT primary diagnostic groups that are added to the model, only five are significant; these include *fracture, joint replacement, miscellaneous neurological, vertigo and multiple etiologies, no major* groups. *Fracture, joint replacement and miscellaneous neurological* predict positive episode expenditures and *vertigo and multiple etiologies, no major* predict negative episode expenditures, relative to osteoarthritis. *Stroke* was hypothesized to be an important diagnosis, but is not statistically significant. This could be because other variables—such as the Rasch function scales—are capturing the severity of the stroke or because the sample size of 67 stroke patients is not sufficient to detect the difference. *Circulatory and pulmonary/respiratory, progressive neurological and no primary diagnosis* have substantial positive coefficients, but do not attain statistical significance, perhaps because of limited sample sizes.

The secondary diagnosis groups are not mutually exclusive and can be interpreted as the additive episode expenditures for a person in each of the groups. A patient could be in multiple groups and there is not a reference group. They are intended to capture the patient's comorbidities, which may also affect the intensity of their therapy. Only two of the 23 secondary diagnosis groups are significant. *Mental Health* predicts a decrease of $254 and *generalized weakness* predicts an increase of $119. *Vertigo, minor neurological and stroke* all are large positive predictors, but none of them are significant. Though not significant, the higher expenditure associated with the Vertigo secondary diagnosis group is in contrast to the significantly lower expenditures associated with the Vertigo primary diagnosis group. While they may appear contradictory, these results are not surprising and indicate that Vertigo, as a primary diagnosis, is less expensive compared with other primary diagnosis groups. However, when present as a co-existing condition or comorbidity, in addition to other primary diagnoses, Vertigo may increase the expenditures associated with therapy.

The function groups that are significant are *motor function* and *proprioceptive and touch* which are both positive and significant. The structure groups are significant for *shoulder/arm/elbow, general/no specific body location, bilateral upper extremity, ear* and *other body structures*. All of these have large positive coefficients with the exception of *other body structures*. This seems to indicate that PT patients with arm problems are more expensive than those with leg problems, other things equal. The *cognitive/communication* group had a significantly positive coefficient ($358), but a small sample of 75. These groups are not mutually exclusive; therefore, a patient could be in multiple groups and the reference group is a beneficiary who did not have an ICF structure, function or activities group. The Rasch function scales that are included for PT are *clinician-observed mobility, self-reported everyday activities, self-reported mobility* and *self-reported participation*. These coefficients are negative due to the structure of the Rasch scales; they range from 0 for the most impaired patients to 100 for the most functional patients. Therefore, a one-unit increase in the function scales is expected to have a negative coefficient because this reflects a shift from lower to higher functional ability. One would expect that those with higher functional ability would need less physical therapy and thus have lower total spending. *Self-reported participation* and *self-reported mobility* were both negative and statistically significant. The difference in predicted episode expenditures between a patient with the lowest level of function and the highest level of function is $477 for the *self-reported participation* measure and $248 for the *self-reported mobility* measure.

The last group of measures includes other individual items from the CARE assessment that indicate the *time frame* and the *number of previous surgeries* the patient had that were related to the problem for which they were receiving therapy. Patients who had surgery are not significantly more costly than those who did not have surgery. However, the time frame of the surgery, 0-1 month ($301) or 1-3 months ($472), are significant and positive predictors of episode expenditures. *Surgery more than 3 months prior* and *no surgery* are both insignificant. Having surgery and within a recent time frame is likely a marker for a patient who has more intense therapy needs.

Comprehensive Model

The comprehensive model includes variables in addition to those used in the payment model that measure patient feeling sad, pain affecting sleep or activities, pain severity, mobility devices, memory impairment, communication impairment, swallowing impairment, duration of the related health problem, census division and facility type. The addition of these variables increases the explanatory power of the model to an R^2 of 17 percent and an adjusted R^2 of 14 percent. On an adjusted R^2 basis, the payment model has about three-fifths of the explanatory power of the comprehensive model (8.7/14.2), a result similar to that of Section 5.

In this model, stroke becomes significant and multiple etiologies, one major drops out of significance. In the secondary groups, generalized weakness is no longer significant. The function and structure groups did not change signs or significance in the comprehensive model. Cognitive/communication does not retain significance in the comprehensive model from the activities group.

The self-reported participation measure is the only Rasch measure that remains significant in the comprehensive model. The time frame of the most recent surgery is similar in sign and magnitude to the payment model.

Of the variables that are added to the model, all variables related to pain, pain having effect on activity or sleep, pain severity, and any type of memory or communication impairment are not significant. The patient feeling sad when missing was a significant negative predictor of PT episode expenditures. Two of the mobility devices positively predict episode expenditures; beneficiaries who have a walker positively predict episode expenditures and being in a wheelchair/scooter full-time significantly increases expenditures by $988. Assisted living facilities predicted an additional $1,165 of PT episode expenditures while hospital outpatient departments predicted $252 in declines of PT episode expenditures, in relation to private practices. The mid-Atlantic and West South-Central census divisions were $416 and $496 more expensive than the South Atlantic division.

7.4.2 CARE-C Community Resident Occupational Therapy

Table 7-7 shows the results of the demographic, payment, and comprehensive models for patient utilizing OT services. OT episodes comprise 10 percent of the total sample or 533 episodes. The OT regressions have only about one-tenth of the sample size of the PT regressions, meaning that the OT results are considerably less stable statistically, and more subject to overfitting and influence of outliers. The OT results therefore should be interpreted with caution. ***Appendix Table 7-3*** shows the means and standard deviations for each of the explanatory variables in the OT model.

Demographic Model

The OT demographic model explains 7 percent (5 percent adjusted) of the variation in the dependent variable—episode allowed charges. This is much better than the PT model which explains less than one percent of the overall variation. OT episode expenditures show a similar age gradient to PT episode expenditures and appear to be higher for the oldest elderly females (age 85+) than for the young male and female elderly. Beneficiaries who were *originally disabled* or were *dually-eligible* are not statistically significant in the OT demographic model. There are a very limited number of ESRD patients in the sample.

Payment Model

When the additional payment variables are included along with the demographic covariates, the explanatory power of the model increases from an R^2 of 7 percent to 22 percent or a change in adjusted R^2 from 4 percent to 10 percent. Additionally, the sample size decreases to 435 episodes due to missing data on the Rasch functional scales. In the payment model, the age/sex coefficients decrease, especially for those ages 75 and older. Originally disabled and being a dually eligible beneficiary remain insignificant along with having ESRD.

Of the 9 OT primary diagnostic groups that were added to the model, *multiple etiologies* is the only negative, significant predictor of expenditures in relation to *major musculoskeletal excluding fracture and joint replacement*. *Stroke* was hypothesized to be an important group for OT and it predicts a decline of $133 in episode expenditures holding all else equal, but it is not significant.

The secondary diagnosis groups are intended to capture the patient's comorbidities which may also affect the intensity of their therapy. There are not any significant secondary diagnosis predictors of OT episode expenditures. *Neurological* and *generalized weakness* have large positive signs, but are not significant in the episode model. The only significant function group is *mental function*; this positively predicts an additional $1,148 of expenditures, holding all else equal; this finding is not surprising as the mental functions group is likely to be largely representing beneficiaries who have cognitive problems. Of the structures or activity groups, only *bilateral upper extremity* is significant in the payment model.

The Rasch function scales that are used in the OT payment model include *clinician-observed self-care*, *self-reported everyday activities*, *self-reported participation and self-reported life skills*. *Clinician-reported self-care* and *self-reported life skills* are both significant. The self-care measure captures the beneficiaries' ability to do everyday tasks such as grooming and personal hygiene. The self-care coefficient implies that beneficiaries with the lowest self-care function (most impaired; Rasch ability estimate of zero) have $533 higher episode expenditures than beneficiaries with the highest self-care function (least impaired; Rasch ability estimate of 100). *Self-reported life skills* went in the opposite direction predicting that the most able patients would have expenditures $920 higher than the most impaired patients. The finding that higher Self-Report Life Skills scores were associated with greater expenditures is clinically unexpected, and indicates that the Life Skills scale should not be used in a payment model. One possible explanation for this finding is that 63.4 percent of Self-Report Life Skills scores were recoded to 100 (indicating highest ability) because of negative responses to the gateway question; this large ceiling effect could potentially have influenced the performance of this scale in our model. The large proportion of negative gateway responses also suggests limited utility of the Life Skills scale for OT payment. Additionally, in the CARE-C SLP sample, we found only small to moderate correlations between Self-Report Life Skills scores and Clinician-Observed Problem Solving, Memory, Attention, and Language scores (0.36-0.56) suggesting a difference between beneficiary and clinician rating of these constructs. Psychometric testing of the Activity Measure Post-Acute Care, from which the self-report items were adapted, has also demonstrated lower patient-proxy rating consistency for applied cognitive items compared with mobility and daily activities items (Andres et al., 2003; Haley et al., 2006).

The last group of measures includes other individual items from the CARE assessment that indicate the *time frame* and the *number of previous surgeries* the patient had that are related to the problem for which they are receiving therapy. Neither variable is significantly predictive of OT therapy utilization. Unlike the PT payment model in which time frame of surgery was a significant predictor of expenditures, the lack of significance of this variable in the OT model may be related to inadequate data and considerably smaller sample sizes. This may be evidenced by the fact that the coefficient for beneficiaries who had surgery within 0-1 month is very similar in the PT and OT models; however, this variable failed to reach significance in the OT model which had a sample size of 60.

Comprehensive Model

The comprehensive model includes additional variables on the patient feeling sad, pain affecting sleep or activities, pain severity, mobility devices, memory impairment, communication impairment, swallowing impairment, and the duration of the related health problem. The addition of these variables increases the explanatory power of the model to an R^2 of 40 percent and to an adjusted R^2 of 23 percent. As measured by the increase in adjusted R^2 (10 to 23 percent), the extra explanatory power of the comprehensive model variables is significant.

In this model, the statistical significance of the primary and secondary diagnostic groups, remain unchanged except that the primary diagnosis group for stroke is positive and significant ($505). The unilateral wrist/hand/fingers structure group becomes positive and significant in the comprehensive model. The Rasch measures continue the same sign and significance as the payment model.

Of the additional variables that are added to the model, the patient's level of sadness (always sad) negatively predicts episode expenditures. Pain having effect on sleep or activities, any type of memory, and communication or swallowing impairment, are not significant. Pain severity of 3-7 positively predicts episode expenditures, but pain severity of 8-10 negatively predicts episode expenditures. Having a *cane/crutch* or *being in a wheelchair full-time* are both positive and significant predictors of episode expenditures. Of the mobility devices, being in a wheelchair/scooter full-time significantly increases annual expenditures by $1,158. Patients who had orthotics/prosthetic or other mobility devices negatively predicted expenditures. Much like PT, assisted living facilities predict much higher episode expenditures than private practices ($1,716). Expenditures for beneficiaries in the West South-Central census division are $1,117 higher than in the South Atlantic division, but this result is based on only 12 observations.

7.4.3 CARE-C Community Resident Speech-Language Therapy Model

Table 7-8 shows the results of the demographic, payment, and comprehensive models for beneficiaries utilizing SLP services. SLP episodes comprise 3 percent of the total sample or 187 episodes of care. The demographic SLP model has less than half of the sample size of the demographic OT model and the SLP payment and comprehensive models less than one-third the sample size of the corresponding OT models. Because of their very small sample sizes, the SLP models are highly subject to overfitting, multicollinearity, and outlier influence. The SLP model results must be interpreted with great caution. ***Appendix Table 7-4*** shows the means and standard deviations for each of the explanatory variables in the SLP model.

Demographic Model

Demographic covariates alone explain 3 percent (-3 percent adjusted R^2) of the variation in the dependent variable—SLP episode allowed charges. Sample sizes are extremely small and it is difficult to draw any conclusions, but there does not appear to be a strong age gradient in SLP annual expenditures. If anything, it appears that there is a reverse age gradient with the younger beneficiaries having higher expenditures than the oldest beneficiaries.

Payment Model

When the payment variables are added along with the demographic variables, the explanatory power of the model increases from an R^2 of 3 percent to 43 percent and from an adjusted R^2 of -3 percent to 12 percent. The sample size decreases to 125 episodes due to missing data on the Rasch function scales. The high unadjusted R^2 is misleading; it is due to overfitting, that is, a large number of explanatory variables (44) relative to the sample size (125). In the payment model, none of the demographic variables are statistically significant.

None of the primary medical or impairment diagnostic groups are significant predictors of expenditures. *Cognitive, Communication and Swallowing, Stroke* and *Neurological excluding stroke* all predict more than $500 of additional expenditures, but none of them are statistically significant. This is due to the small sample sizes of 17, 56 and 44 respectively. *Cognitive, Communication and Swallowing* is interpreted in reference to those who only had a cognitive or communication problem, but not a swallowing problem. *Stroke* and *Neurological excluding stroke* are interpreted in reference to those patients who did not have a medical diagnosis. SLP does not have any secondary diagnosis groups as they are pooled with the primary diagnoses as discussed in Section 3.

Of the four function groups included in the model, one of them is significant. *Voice and speech functions* predicts an increase in episode expenditures of $1,241. Of the four structure groups for SLP, one is significant—*voice, speech and swallowing.* This predicts a decline in episode expenditures of $1,627. This may be collinear with *voice and speech functions* in the function groups. Of the structure groups, only *central nervous system* is a positive predictor, but it is not significant. None of the activity groups are significant.

The Rasch function scales that are included for SLP are *self-reported life skills, clinician-reported problem solving, clinician-reported memory, clinician-reported attention, clinician-reported functional voice, clinician-reported speech, clinician-reported language expression* and *clinician-reported language comprehension*. The *memory, attention, functional voice and speech* measures all have positive, but insignificant coefficients; this is contrary to the expected sign of the function measures. The remaining measures have negative coefficients and are insignificant. These coefficients are negative due to the structure of the Rasch scales; they range from 0 for the most impaired patients to 100 for the most functional patients. Therefore, a one-unit increase in the function scales is expected to have a negative coefficient because this reflects a shift from less to more functional ability.

The last group of measures includes other individual items from the CARE assessment which indicate the *time frame* and the *number of previous surgeries* the patient have which are related to the problem for which they are receiving therapy. The *number of surgeries* (ranging from 0, 1, or 2 or more) is not a significant predictor of episode-based expenditures. The *timeframe* of the most recent surgery is not a significant positive predictor of episode-based expenditures. Unlike the PT payment model in which time frame of surgery was a significant predictor of expenditures, the lack of significance of this variable in the SLP model is likely related to considerably smaller sample sizes; while they had very large positive coefficients, the 0-1 month and 1-3 month time frame of surgery variables only had sample sizes of 4 and 12 beneficiaries in the SLP model.

Comprehensive Model

The comprehensive model includes additional variables on the patient feeling sad, pain affecting sleep or activities, pain severity, mobility devices, diet modification, cueing or assistance related to swallowing, the duration of the related health problem, census division and facility type. The addition of these variables increases the explanatory power of the model R^2 to 66 percent and the adjusted R^2 to 13 percent. The adjusted R^2 is low relative to the conventional R^2, indicating that the model is suffering from substantial overfitting—76 explanatory variables and only 125 observations. Results must be interpreted with extreme caution.

In this model, the *cognitive* communication *and swallowing* impairment group is positive and significant ($1,862). The medical groups are not significant. *Mental function and voice and speech functions* are both positive and significant. None of the structure or activity groups are significant. The Rasch scales are also insignificant. The *number of surgeries* and the *time frame of the surgery* completely drop out of significance in the comprehensive model.

Of the variables added to the model, only the patient always feeling sad is significantly predictive of additional episode expenditures ($1,054). However, these results are unreliable and further research and sample size are needed.

7.4.4 CARE-F Nursing Facility Resident Models

Table 7-9 shows the results of the demographic, basic payment, payment, and comprehensive models for CARE-F beneficiaries. Because of the small sample size, the CARE-F models are subject to overfitting and outlier influence. Results should be interpreted with caution. ***Appendix Table 7-5*** shows the distribution of the Rasch function estimates and ***Appendix Table 7-6*** shows the means and standard deviations for each of the explanatory variables in the CARE-F model.

Demographic Model

Demographics alone explain 4 percent (2 percent adjusted) of the variation in the dependent variable—the Medicare episode allowed charges for nursing facility residents. It appears that 75-84 year old patients have higher episode expenditures than the reference group, 65-74 year olds. Being originally disabled, a dual eligible or having ESRD are not significant in the model. However, LTI patients negatively and significantly predict episode expenditures.

Basic Payment Model

When the basic payment variables are added to the demographics, the explanatory power of the model increases from an R^2 of 4 percent to 11 percent or to an adjusted R^2 of 6 percent. The basic payment model includes demographics, primary diagnosis groups, Rasch clinician-observed mobility and self-care categorical variables, and indicators for diet modification, severe memory impairment and verbal ability. This limited set of variables is intended to reduce the collinearity that is present in the full payment model due to the overlap between diagnosis, function, structure and activities groups. In the basic payment model, those beneficiaries under 65 years old have significantly higher expenditures than the 65-74 year old reference population. The primary diagnosis groups are insignificant aside from *stroke*, which negatively predicts episode expenditures. The Rasch *self-care* items were positive and significant; the lower the functional score, the higher the predicted episode expenditures. The additional indicators are not significant.

Payment Model

When the additional payment variables are added to the model, the explanatory power increases from an R^2 of 11 percent to 32 percent or to an adjusted R^2 of 21 percent. In this model, none of the Rasch function scales are significant. Episode expenditures were not impacted by prior hospitalization in the past two months. Secondary diagnoses of *osteoporosis* or *hypertension* are important predictors of expenditures, as was also found in the annual models. *Mental functions* and *motor functions* are important functional predictors of expenditures and *shoulder/arm/elbow* and *knee* are important positive predictors based on the body structure involved. *General/no specific body location and body structures not reported* are both significant.

The payment model has a negative intercept; however, it should not be interpreted as the level of expenditures for the reference group. The negative intercept does not indicate that an "omitted" group of beneficiaries has negative therapy expenditures (which is impossible), but rather provides the best statistical fit of the predictor variables (many of which are not mutually exclusive variables) to the expenditure data.

Comprehensive Model

The comprehensive model includes additional variables as described in Section 5.2.3. The addition of these variables increases the explanatory power of the model to an R^2 to 43 percent and to an adjusted R^2 of 30 percent. Of the additional variables added to the model, having memory difficulty is positive and significant, and having trouble expressing ideas is a negative and significant predictor of episode expenditures. Unlike the annual model, prior function on self-care being limited was not significant.

7.5 Conclusions

Payment models for the prediction of therapy resources have low levels of explanatory power as measured by the adjusted R^2. The PT payment model has an adjusted R^2 of 9 percent versus 10 percent for OT and 12 percent for SLP. The payment variables add substantial explanatory power to demographics for all three therapy disciplines. But even with the payment factors, only a small proportion of variation in episode therapy expenditures is explained. The additional factors in the comprehensive model add a significant amount of explanatory power to the payment model as measured by the adjusted R^2, but items such as pain and facility type are probably not appropriate for a payment model.

Many of the Rasch function scales predict that higher function is associated with lower therapy expenditures, other factors equal. However, few of the individual Rasch function scales are statistically significant predictors of episode SLP expenditures. Two of the four Rasch function scales included in the PT payment model—*self-reported participation* and *clinician-observed mobility*—are statistically significant predictors of episode-PT expenditures. Their regression coefficients indicate that a decline from highest ability (score = 100) to lowest ability (score = 0) is associated with a $477and $248 increase in expenditures, respectively. The Rasch *clinician-reported self-care* and *self-reported life skills* measures are significant predictors of OT episode expenditures. Moving from the highest ability to the lowest ability is associated with a $5335 increase in OT expenditures for *self-care*. However, the opposite direction of was found for *life skills*, with episode expenditures decreasing as patients were more impaired.

Primary diagnoses of *vertigo* and *multiple etiologies, 1 major* are negative predictors of PT expenditures, while a primary diagnosis of *joint replacement*, *fracture*, and *miscellaneous neurological* are positive predictors of PT expenditures. *Mental health* is a consistent negative predictor of PT expenditures while *mental function* is a consistent negative predictor for OT expenditures.

Using a *wheelchair/scooter full time* is a strong predictor of both PT and OT expenditures, but is probably not an appropriate payment variable because providers may encourage increased wheelchair use in their patients due to payment incentives. *Using a wheelchair/scooter part-time* is not associated with either PT or OT expenditures. *Using a walker* predicts PT expenditures, and *using a cane/crutch* predicts OT expenditures.

The SLP models are highly problematic because of small sample size—only 125 observations for the payment and comprehensive models. It is difficult to draw any conclusions from the SLP models because of the high likelihood of significant overfitting, multicollinearity, and outlier influence.

The CARE-F payment and comprehensive models have multiple, highly-correlated indicators for many of the predictors included in the regression models. The basic payment model seeks to avoid this problem by including only a few key predictors, including demographics, primary diagnoses, clinician-observed functional status and several indicators of mental status. However, the basic payment model only explains 11percent of the variation in annual expenditures (6 percent adjusted). Many of the variables that were identified in the payment and comprehensive models as significant predictors of annual expenditures were poorly defined groups, such as no clinician-identified primary diagnosis, no clinician-identified activity or general/no specific body locations. This is similar to what was found in the annual model and again may point to an indicator of general frailty. The models suffer from small sample sizes, especially the payment and comprehensive models, which include 77 and 116 covariates in the models. These models are subject to overfitting and should be interpreted with caution.

7.6 CARE-C Community Resident Episode versus Annual Model Results

Section 7 presents models of therapy episode expenditures, whereas Section 5 presents models of annual therapy expenditures. The models are identical in form and explanatory variables, but differ in the episode versus annual unit of observation for the dependent expenditures variable. Annual expenditures may comprise multiple episodes or only parts of one or more episodes, and explanatory variables may explain expenditures prior to or after the initiation of therapy, depending on when assessment information is collected relative to when service utilization occurs. In contrast, the episode models in this section always "predict" rather than “postdict,” because the assessment date is defined as the start of an episode. ***Table 7-10*** compares the coefficients of the PT payment model between the episode and annual models.

In addition to unit of observation, the annual (Section 5) and episode (this section) models also differ in their samples and run-out periods. The annual models in Section 5 include only the subset of CARE admission assessments occurring during the 12-month period March 2011 through February 2012, while the episode models include all CARE-C admission assessments, March 2011 through June 2012. For PT, the annual definition has 3,749 observations and the episode definition has 4,268 observations. The annual model includes expenditures with date of service March 2011 through February 2012, so the run-out period following the CARE-assessment is at most a year and could be zero days (if the CARE assessment occurred on February 29, 2012). The episode models include all episode services from the admission assessment through the episode-terminating 60-day clean period, or the episode-censoring date of December 31, 2012. Thus, the episode analysis includes a run-out period until the 60-day terminating clean period, or a minimum 6-month run out period (June 30, 2012 to December 31, 2012) following the CARE-assessment if the episode is censored.

These differences in unit of observation, sample, and run-out periods result in non-trivial differences in the annual model and episode model results. The mean expenditures in the annual model are higher, $1,524, than in the episode model ($1,365). This is expected due to the difference in time period covered by the different expenditure definitions, i.e., the annual model can include expenditures from multiple episodes for one beneficiary. The adjusted R^2 is also slightly higher in the annual model (.093) than the episode model (.087). Risk-adjusted episodes employing a point-in-time assessment are very similar to predicting annual utilization. This is likely due to the fact that annual utilization is often contained in one variable-length episode.

The demographic coefficients are similar between the models with some small differences in significance, but similar magnitude of the coefficients. Among the primary diagnosis groups, *fracture* is positive and significant in the episode model, but it is negative and insignificant in the annual model. *Joint replacement,* on the other hand, has similar expenditure ramifications in both the episode ($280) and annual ($267) expenditure definition. A primary diagnosis of *stroke* is not significant in either of the PT models. *Miscellaneous neurological* is positive and significant in the episode model ($782), but is not significant in the annual model ($377).

The secondary diagnosis groups are largely insignificant in both models; only *generalized weakness* and *mental health* are significant. Both models have similar magnitudes for *mental health,* -$254 in the episode and -$245 in the annual. The *proprioceptive and touch* function groups are both positive and significant, $313 in the episode and $328 in the annual. *Unilateral shoulder/arm/elbow* is positive and significant in the episode ($263) and annual ($216) models. *Ear,* on the other hand is positive and significant in the episode model ($359), but insignificant and small in the annual model ($58). The *cognitive/communication* activity group is positive and significant in both models.

The Rasch function estimates are negative in both of the models for all four Rasch scales. *Clinician-observed mobility* and *self-reported everyday activities* are negative and insignificant in both models. *Self-reported mobility* and *self-reported participation* are negative and significant in both the episode and annual models. The magnitude of the coefficients is also similar for mobility (-2.48 vs. -2.9) and participation (-4.77 and -4.01), for episode and annual expenditures respectively.

Finally, the *timeframe of the most recent surgery* was significant for 0-1 month and 1-3 months for the episode model and for 1-3 months and 3 or more months in the annual model. These were significantly different from the reference group—those who did not have surgery.

In order to evaluate the explanatory power of the models when provider-specific effects are captured, we included 126 provider-specific identifiers as independent variables in the payment and comprehensive models. Therefore, the models account for all unobserved variation that is correlated with the different providers such as practice pattern or patient acuity. “Provider” here may be a private therapy practice, a hospital outpatient department, etc. that contributed data to the DOTPA primary data collection effort. “Provider” does not necessarily mean an individual therapist. We examined both the annual and episode based models and compared the adjusted R^2s to determine any increase in explanatory power. ***Table 7-11*** shows the adjusted R^2s for the payment and comprehensive models with and without the provider identifier included in the models. The addition of provider identifiers significantly increases the explanatory power of the models. The annual payment model R^2s increase from 9 to 32 percent and the comprehensive increases from 16 to 33 percent. Similar changes are observed in the episode models. The sizable increase in R^2 may be due to provider practice patterns, unmeasured case-mix or some other unobserved factors that are correlated with the provider. The comprehensive model holds provider type (e.g. Private Practice) constant; thus the effect is not due to provider type in the comprehensive model and may be due to individual provider practice.

Table 7-1a
CARE-C episode beneficiary characteristics, therapy discipline—unique beneficiary mean age

	N	Mean
Total	5,476	73
PT	4,769	73
OT	522	72
SLP	185	71

NOTES:

1. PT = Physical Therapy, OT = Occupational Therapy, SLP = Speech-Language Pathology
2. N = Unique number of beneficiaries
3. Episode: Variable length episode with a 60-day terminating clean period.
4. Total = Sum of the three (3) disciplines.

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims and CARE data.

Program: PA021

Table 7-1b
CARE-C episode beneficiary characteristics, therapy discipline—unique beneficiary characteristics (%)

	Total (N=5,476)		PT (N=4,769)		OT (N=522)		SLP (N=185)	
	N	Percent	N	Percent	N	Percent	N	Percent
Female	3,511	64.12	3,089	64.77	343	65.71	79	42.70
ESRD	41	0.75	34	0.71	†	†	†	†
Disabled	713	13.02	576	12.08	101	19.35	36	19.46
Medicaid	570	10.41	463	9.71	73	13.98	34	18.38

NOTES:

† = Fewer than 11 cases.

1. PT = Physical Therapy, OT = Occupational Therapy, SLP = Speech-Language Pathology, ESRD = End-Stage Renal Disease
2. N = Unique number of beneficiaries
3. Episode: Variable length episode with a 60-day terminating clean period.
4. Total = Sum of the three (3) disciplines.
5. Percent = Percent of the total high-cost beneficiary in each discipline.

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims and CARE data.

Program: PA021

Table 7-1c
CARE-C episode beneficiary characteristics, therapy discipline—unique high-cost beneficiary mean age

	N	Mean
Total	591	74
PT	518	74
OT	46	74
SLP	36	74

NOTES:
1. PT = Physical Therapy, OT = Occupational Therapy, SLP = Speech-Language Pathology
2. N = Unique number of beneficiaries
3. Episode: Variable length episode with a 60-day terminating clean period.
4. Total = Sum of the three (3) disciplines.
5. High-Cost Beneficiaries were beneficiaries with at least one (1) high-cost episode. A High-Cost Episode was defined as having an Episode-Allowed Charge amount greater than the 90th percentile of Total Episode Allowed Charges.

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims and CARE data.
Program: PA021

Table 7-1d
CARE-C episode beneficiary characteristics, therapy discipline—unique high-cost beneficiary characteristics (%)

	Total(N=591)		PT(N=518)		OT(N=46)		SLP(N=36)	
	N	Percent	N	Percent	N	Percent	N	Percent
Female	379	64.07	337	65.12	31	67.86	22	60.00
ESRD	†	†	†	†	†	†	—	—
Disabled	83	13.98	66	12.80	†	†	†	†
Medicaid	117	19.82	63	12.14	19	40.48	12	32.00

NOTES:
† = Fewer than 11 cases.
1. PT = Physical Therapy, OT = Occupational Therapy, SLP = Speech-Language Pathology, ESRD = End-Stage Renal Disease
2. N = Unique number of beneficiaries
3. Episode: Variable length episode with a 60-day terminating clean period.
4. Total = Sum of the three (3) disciplines.
5. Percent = Percent of the total high-cost beneficiary in each discipline.
6. High-Cost Beneficiaries were beneficiaries with at least one (1) high-cost episode. A High-Cost Episode was defined as having an Episode-Allowed Charge amount greater than the 90th percentile of Total Episode Allowed Charges.

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims and CARE data.
Program: PA021

Table 7-2a
CARE-F episode beneficiary characteristics—Unique beneficiary mean age

	N	Mean
Nursing facility	518	80
Day rehabilitation facility	177	74

NOTES:

1. N = Unique number of beneficiaries
2. Episode: Variable length episode with a 60-day terminating clean period.

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims and CARE data.

Program: PA021

Table 7-2b
CARE-F episode beneficiary characteristics—Unique beneficiary characteristics (%)

	Nursing facility (N= 518)		Day rehabilitation facility (N= 177)	
	N	Percent	N	Percent
Female	370	71.43	89	50.28
ESRD	11	2.12	†	†
Disabled	57	11.00	18	10.17
Medicaid	315	60.81	15	8.47
LTI	412	79.54	—	0.00

NOTES:

1. N = Unique number of beneficiaries
2. Episode: Variable length episode with a 60-day terminating clean period.
3. Percent = Percent of the total high-cost beneficiary in each discipline.
4. LTI - If the beneficiary had a 90-day MDS assessment at any point during 2011, then they were considered long-term institutionalized.

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims and CARE data.

Program: PA021

Table 7-3
CARE-C episode therapy utilization characteristics, by therapy discipline

	Mean	SE	1st	25th	Median	75th	99th
CARE-C - Total (n = 5,545)							
Total Allowed Charge ($)	1,350	19.30	85	524	952	1,697	6,701
Total Medicare Payment ($)	1,066	15.37	65	406	750	1,344	5,303
Total Therapy Days (n)	14	0.17	1	6	11	18	60
Total Calendar Days (n)	55	0.67	1	24	41	70	251
Allowed Charges Per Therapy Day ($)	95	0.33	51	79	91	108	160
Payments per Therapy Day ($)	75	0.27	36	62	72	86	127
Therapy Days per Week	2.14	0.02	0.54	1.47	1.94	2.50	7.00
CARE-C - PT (n = 4,825)							
Total Allowed Charge ($)	1,335	20.34	97	528	950	1,687	6,362
Total Medicare Payment ($)	1,053	16.19	66	411	748	1,328	5,023
Total Therapy Days (n)	14	0.17	1	6	11	18	57
Total Calendar Days (n)	54	0.72	1	24	41	69	253
Allowed Charges Per Therapy Day ($)	94	0.35	51	79	90	107	152
Payments per Therapy Day ($)	74	0.29	36	61	71	85	122
Therapy Days per Week	2.14	0.02	0.56	1.48	1.95	2.51	7.00
CARE-C - OT (n = 533)							
Total Allowed Charge ($)	1,320	64.29	78	456	922	1,627	7,818
Total Medicare Payment ($)	1,049	51.39	62	357	727	1,299	6,254
Total Therapy Days (n)	13	0.57	1	5	9	17	74
Total Calendar Days (n)	50	1.79	1	22	39	66	217
Allowed Charges Per Therapy Day ($)	98	1.08	47	79	98	118	154
Payments per Therapy Day ($)	78	0.87	32	62	77	93	124
Therapy Days per Week	2.13	0.05	0.47	1.40	1.91	2.43	7.00
CARE-C - SLP (n = 187)							
Total Allowed Charge ($)	1,825	131.32	83	654	1,305	2,333	9,691
Total Medicare Payment ($)	1,453	104.84	66	512	1,044	1,788	7,753
Total Therapy Days (n)	19	1.42	1	6	12	24	113
Total Calendar Days (n)	71	4.44	1	29	57	89	294
Allowed Charges Per Therapy Day ($)	107	2.21	72	88	100	112	223
Payments per Therapy Day ($)	85	1.78	58	70	80	89	179
Therapy Days per Week	2.21	0.11	0.26	1.27	1.84	2.48	7.00

NOTES:
1. PT = Physical Therapy, OT = Occupational Therapy, SLP = Speech-Language Pathology
2. N = Number of Unique Episodes
3. SE = Standard error of the mean.
4. Episode: Variable length episode with a 60-day terminating clean period.
5. CARE-C Total = Sum of the three (3) disciplines' episodes.
6. Therapy Days per Week = [(therapy days)/(calendar days)]*7

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims and CARE data.
Program: PA021

Table 7-4
CARE-F episode therapy utilization characteristics

	Mean	SE	1st	25th	Median	75th	99th
CARE-F - Nursing Facility (n =591)							
Total Allowed Charge ($)	3,647	204.48	184	858	1,833	4,307	25,530
Total Medicare Payment ($)	2,913	163.44	148	686	1,466	3,420	20,423
Total Therapy Days (n)	33	1.53	2	10	20	42	207
Total Calendar Days (n)	60	2.68	4	21	36	74	359
Allowed Charges Per Therapy Day ($)	102	1.76	39	73	94	122	259
Payments per Therapy Day ($)	82	1.40	31	58	75	98	207
Therapy Days per Week	4.02	0.05	0.77	3.07	4.20	5.03	7.00
CARE-F - Day Rehabilitation Facility (n =182)							
Total Allowed Charge ($)	4,339	282.19	391	1,990	3,175	4,995	18,293
Total Medicare Payment ($)	3,462	225.98	313	1,569	2,486	3,994	14,634
Total Therapy Days (n)	24	1.35	2	13	19	27	98
Total Calendar Days (n)	68	4.26	7	33	52	75	311
Allowed Charges Per Therapy Day ($)	187	5.12	72	126	186	241	330
Payments per Therapy Day ($)	149	4.12	54	101	148	190	264
Therapy Days per Week	2.63	0.05	1.18	2.23	2.67	3.06	4.17

NOTES:

1. N = Number of Unique Episodes
2. SE = Standard error of the mean.
3. Episode: Variable length episode with a 60-day terminating clean period.
4. Therapy Days per Week = [(therapy days)/(calendar days)]*7

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims and CARE data.

Program:PA021

Table 7-5
CARE-C physical therapy patient panel size simulation

	High cost (n = 1,059)			Medium cost (n = 2,901)			Low cost (n = 865)		
Patient panel size/random sample size	Minimum	Median	Maximum	Minimum	Median	Maximum	Minimum	Median	Maximum
1	69.55	1,035.10	6,494.90	214.50	936.50	5,843.48	96.60	615.42	2,230.93
10	740.99	1,625.52	3,622.16	689.25	1,272.18	1,948.27	499.90	926.80	1,739.25
25	1,025.41	1,714.23	2,346.07	845.00	1,206.63	2,584.25	676.91	923.57	1,496.84
50	1,201.37	1,707.72	2,110.95	984.71	1,244.28	1,875.92	738.10	909.75	1,277.96
100	1,355.84	1,697.29	2,126.78	1,071.98	1,288.82	1,641.57	813.59	942.48	1,136.42
500	1,551.54	1,733.63	1,934.90	1,141.77	1,312.64	1,565.35	843.16	948.09	1,028.77
1000	1,632.10	1,742.33	1,839.55	1,202.00	1,309.24	1,415.78	—	—	—

NOTES

1. The minimum, median, and maximum refers to the minimum, median, and maximum of mean cost of each of the 50 random samples for each number of patients/diagnosis group combination.

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims and CARE data.

Programs: PA030

INFORMATION NOT RELEASABLE TO THE PUBLIC UNLESS AUTHORIZED BY LAW: *This information has not been publicly disclosed and may be privileged and confidential. It is for internal government use only and must not be disseminated, distributed, or copied to persons not authorized to receive the information. Unauthorized disclosure may result in prosecution to the full extent of the law.*

Table 7-6
CARE-C physical therapy demographic, payment, and comprehensive models of episode allowed charges

CARE-C PT episode models	Demographic		Payment		Comprehensive	
Number of observations		4,825		4,268		4,268
Mean dependent variable ($)		1,335		1,365		1,365
R^2		0.0029		0.1070		0.1672
Adjusted R^2		0.0006		0.0871		0.1419
Variable	Count	Parameter	Count	Parameter	Count	Parameter
Intercept	—	1,331***	—	1,927***	—	1,347***
Demographics						
Male, age 0 to 64	159	-161	136	-309*	136	-266
Male, age 65-74	757	23	668	41	668	39
Male, age 75-84	626	21	567	-55	567	-95
Male, age 85+	156	-88	135	-197*	135	-256**
Female, age 0 to 64	369	-82	325	-149	325	-105
Female, age 65-74	*1,419*	*Reference*	*1,279*	*Reference*	*1,279*	*Reference*
Female, age 75-84	1024	2	894	-112*	894	-137**
Female, age 85+	315	177	264	11	264	-194
Originally disabled	316	-34	288	-182*	288	-151
Medicaid in 2010–2012	503	-13	434	-50	434	-48
ESRD in 2010–2012	35	530*	30	389	30	262
Primary diagnosis groups						
Fracture	—	—	202	240**	202	212**
Joint replacement	—	—	517	280*	517	271*
Osteoarthritis	—	—	*648*	*Reference*	*648*	*Reference*
Spinal stenosis	—	—	250	184	250	137
Herniated disc and other major musculoskeletal	—	—	429	65	429	94
Sprain/strain	—	—	281	-129	281	-119
Bursitis/tendonitis	—	—	262	-27	262	34
Unspecified and Miscellaneous Musculoskeletal	—	—	514	94	514	123
Circulatory (including lymphatic) and pulmonary/respiratory	—	—	61	256	61	304
Stroke	—	—	69	396	69	498**
Parkinson's and Other Progressive Neurological	—	—	66	222	66	239
Peripheral Nervous System and Other Major Neurological Disorders	—	—	67	-119	67	-43
Unspecified and Miscellaneous Neurological	—	—	53	782**	53	655**
Pain	—	—	49	-46	49	0

(continued)

Table 7-6 (continued)
CARE-C physical therapy demographic, payment, and comprehensive models of episode allowed charges

CARE-C PT episode models	Demographic		Payment		Comprehensive	
Vertigo	—	—	71	-466**	71	-426**
Genitourinary Disorders	—	—	24	-69	24	14
Unspecified and Miscellaneous Diagnoses	—	—	122	113	122	84
Multiple major etiologies	—	—	244	96	244	155
Multiple etiologies, one major	—	—	241	-5	241	87
Multiple etiologies, no major	—	—	62	-225*	62	-197
No primary diagnosis	—	—	36	279	36	324
Secondary diagnosis groups						
Osteoarthritis	—	—	1,393	-56	1,393	-65
Joint replacement	—	—	201	38	201	92
Spinal Stenosis, Herniated Disc, and Other Major Musculoskeletal	—	—	752	152	752	156
Osteoporosis, Sprain/Strain, and Other Minor Musculoskeletal	—	—	681	58	681	68
Unspecified Musculoskeletal	—	—	290	-26	290	-8
Circulatory (including lymphatic system)	—	—	690	117	690	88
Hypertension	—	—	1,218	-72	1,218	-56
Pulmonary/respiratory system	—	—	422	-40	422	-29
Stroke	—	—	102	80	102	108
Peripheral Nervous System and Other Major Neurological Disorders	—	—	150	74	150	67
Unspecified and Miscellaneous Neurological	—	—	160	178	160	190
Gait or balance disorder	—	—	944	29	944	33
Pain	—	—	1,917	-79	1,917	-65
Vertigo	—	—	76	153	76	219
Generalized weakness	—	—	1,249	119*	1,249	53
Communication and cognition disorders	—	—	193	-35	193	-42
Mental health	—	—	350	-254***	350	-209**
Cancer and other neoplasms	—	—	334	-90	334	-98
Obesity	—	—	140	-105	140	-110
Vision impairment	—	—	151	65	151	48
Diabetes mellitus	—	—	510	-12	510	5
Unspecified and Miscellaneous Diagnoses	—	—	612	31	612	15
No secondary diagnoses	—	—	376	61	376	79

(continued)

Table 7-6 (continued)
CARE-C physical therapy demographic, payment, and comprehensive models of episode allowed charges

CARE-C PT episode models	Demographic		Payment		Comprehensive	
ICF function groups (reason for therapy)						
Motor functions	—	—	3,872	127*	3,872	119*
Pain	—	—	2,423	72	2,423	58
Proprioceptive and touch functions	—	—	270	313**	270	279**
Vestibular functions	—	—	244	-112	244	-64
Cardiovascular and respiratory	—	—	119	163	119	254
Genitourinary functions	—	—	23	-203	23	-69
Other body functions	—	—	129	248	129	193
Body functions not reported	—	—	114	-95	114	-70
ICF structure groups (reason for therapy)						
Unilateral hip/thigh	—	—	727	-96	727	-91
Unilateral knee	—	—	854	26	854	63
Unilateral calf/foot/ankle	—	—	391	14	391	-21
Unilateral toes	—	—	47	102	47	118
Unilateral shoulder/arm/elbow	—	—	658	263***	658	288***
Unilateral wrist/hand/fingers	—	—	104	-167	104	-178
Upper spine	—	—	665	67	665	95*
Lower spine	—	—	1,365	12	1,365	59
General/no specific body location	—	—	378	287**	378	235**
Bilateral lower extreme	—	—	638	-39	638	-44
Bilateral upper extreme	—	—	167	250*	167	250**
Peripheral nervous system	—	—	139	-111	139	-46
Central nervous system	—	—	113	-264	113	-159
Ear	—	—	66	359**	66	416***
Other body structures	—	—	107	-327*	107	-427**
Body structures not reported	—	—	333	164	333	137
ICF activity groups (reason for therapy)						
Cognitive/communication	—	—	75	358*	75	350
Mobility	—	—	3265	37	3265	17
Daily activities	—	—	2669	-1	2669	32
Activities not reported	—	—	370	-50	370	-27
Rasch function estimates (0 = low ability; 100 = high ability)						
Clinician-observed mobility	—	—	4,268	-4.62	4,268	0.27
Self-reported everyday activities	—	—	4,268	-1.14	4,268	-1.5
Self-reported mobility	—	—	4,268	-2.48*	4,268	-2.02
Self-reported participation	—	—	4,268	-4.77***	4,268	-4.32***

(continued)

Table 7-6 (continued)
CARE-C physical therapy demographic, payment, and comprehensive models of episode allowed charges

CARE-C PT episode models	Demographic		Payment		Comprehensive	
CARE-C individual items						
Number of related surgeries = 0	—	—	*2,765*	*Reference*	*2,765*	*Reference*
Number of related surgeries = 1	—	—	843	84	843	22
Number of related surgeries = 2+	—	—	537	110	537	49
Number of related surgeries - missing	—	—	123	-144	123	-171
Time of most recent related surgery—none	—	—	*2,599*	*Reference*	*2,599*	*Reference*
Time of most recent related surgery—within 1 month	—	—	541	301***	541	323***
Time of most recent related surgery—within 1–3 months	—	—	328	472***	328	498***
Time of most recent related surgery—3+ months	—	—	660	70	660	90
Time of most recent related surgery - missing	—	—	140	-40	140	-63
Patient feels sad (never, rarely, sometimes, I do not know)	—	—	—	—	*2,599*	*Reference*
Patient feels sad (often)	—	—	—	—	1,162	-13
Patient feels sad (always)	—	—	—	—	397	-75
Patient feels sad - missing	—	—	—	—	110	-201*
Pain has effect on activities	—	—	—	—	2,468	65
Pain has effect on sleep	—	—	—	—	1,805	-22
Pain severity (0–2)	—	—	—	—	*722*	*Reference*
Pain severity (3–7)	—	—	—	—	2,278	-78
Pain severity (8–10)	—	—	—	—	1,005	-120
Pain severity - missing	—	—	—	—	263	-143
Duration of related health problem—0-1 months	—	—	—	—	*799*	*Reference*
Duration of related health problem—1-3 months	—	—	—	—	876	33
Duration of related health problem—3+ months	—	—	—	—	2,509	46
Duration of related health problem - missing	—	—	—	—	84	258
Mobility device—none	—	—	—	—	*2,503*	*Reference*
Mobility device—cane/crutch	—	—	—	—	999	-31
Mobility device—walker	—	—	—	—	760	393***
Mobility device—orthotics/prosthetic	—	—	—	—	57	301
Mobility device—wheelchair/scooter full-time	—	—	—	—	78	988*

(continued)

Table 7-6 (continued)
CARE-C physical therapy demographic, payment, and comprehensive models of episode allowed charges

CARE-C PT episode models	Demographic		Payment		Comprehensive	
Mobility device—wheelchair/scooter part-time	—	—	—	—	127	-155
Mobility device—mechanical lift	—	—	—	—	†	†
Mobility device—other	—	—	—	—	107	19
Mobility device - missing	—	—	—	—	155	62
Patient has memory difficulty	—	—	—	—	261	-61
Patient has communication problem	—	—	—	—	91	79
Facility type						
Private practice	—	—	—	—	*2,432*	*Reference*
Assisted living facility	—	—	—	—	118	1165**
Hospital outpatient department	—	—	—	—	895	-252**
Comprehensive\outpatient rehabilitation facility	—	—	—	—	795	13
Nursing facility	—	—	—	—	28	441***
Census division						
South Atlantic	—	—	—	—	*1,368*	*Reference*
New England	—	—	—	—	243	14
Mid-Atlantic	—	—	—	—	965	416**
East North Central	—	—	—	—	659	-100
West North Central	—	—	—	—	248	56
East South Central	—	—	—	—	243	-135
West South Central	—	—	—	—	182	496***
Mountain	—	—	—	—	67	102
Pacific	—	—	—	—	293	60

*** (p=<0.01), ** (p=<0.05), * (p=<0.10)

NOTES:

† = Fewer than 11 cases.

1. ESRD in 2010-2012 - The beneficiary had ESRD any time in 2010, 2011, or 2012.
2. Medicaid in 2010-2012 - The beneficiary had at least one month of Medicaid eligibility during their therapy episode.
3. The count column refers to the number of beneficiaries where that variable = 1. If it is an ordinal/continuous variable, then it refers to the number of people where that variable > 0.
4. ICF is International Classification of Function.
5. Episode: Variable Length Episode with a 60-day terminating clean period.
6. Facility type as identified by CARE providers on the CARE assessment.

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims and CARE data.

Programs: PA021

Table 7-7
CARE-C occupational therapy demographic, payment, and comprehensive models of episode allowed charges

CARE-C OT episode models	Demographic		Payment		Comprehensive	
Number of observations	—	533	—	435	—	435
Mean dependent variable ($)	—	1,320	—	1,353	—	1,353
R^2	—	0.0747	—	0.2227	—	0.3968
Adjusted R^2	—	0.0551	—	0.1004	—	0.2323
Variable	Count	Parameter	Count	Parameter	Count	Parameter
Intercept	—	1,241***	—	984	—	684
Demographics						
Male, age 0 to 64	38	-146	32	-307	32	-389
Male, age 65-74	73	-308	57	-253	57	-276
Male, age 75-84	55	-214	43	-397**	43	-381
Male, age 85+	19	164	16	155	16	1
Female, age 0 to 64	54	-590*	38	-668**	38	-746**
Female, age 65-74	*130*	*Reference*	*108*	*Reference*	*108*	*Reference*
Female, age 75-84	105	-103	92	-248	92	-151
Female, age 85+	59	766*	49	677	49	348
Originally disabled	39	187	28	-185	28	-392
Medicaid in 2010–2012	84	810	67	1,073	67	1,050*
ESRD in 2010–2012	†	†	†	†	†	†
Primary diagnosis groups						
Fracture and joint replacement	—	—	78	174	78	141
Major musculoskeletal, excluding fracture and joint replacement	—	—	*75*	*Reference*	*75*	*Reference*
Minor, unspecified, and miscellaneous musculoskeletal	—	—	71	-80	71	-272
Stroke	—	—	47	-133	47	505*
Neurological, excluding stroke	—	—	55	-311	55	48
Circulatory (including lymphatic) and pulmonary/respiratory	—	—	42	-174	42	136
Unspecified and Miscellaneous Diagnoses	—	—	39	-611	39	-708
Multiple etiologies	—	—	22	-707*	22	-452
No primary diagnosis	—	—	†	†	†	†
Secondary diagnosis groups						
Osteoarthritis and Other Major Musculoskeletal	—	—	185	-293	185	-279
Osteoporosis, Unspecified, and Miscellaneous Musculoskeletal	—	—	81	23	81	-140
Circulatory (including lymphatic) and pulmonary/respiratory	—	—	100	140	100	210

(continued)

Table 7-7 (continued)
CARE-C occupational therapy demographic, payment, and comprehensive models of episode allowed charges

CARE-C OT Episode Models	Demographic		Payment		Comprehensive	
Peripheral Nervous System and Other Neurological Disorders	—	—	79	190	79	156
Pain	—	—	119	-257	119	-307
Generalized weakness	—	—	120	238	120	128
Cognitive, communication, and mental health disorders	—	—	80	74	80	177
Unspecified and Miscellaneous Diagnoses	—	—	170	6	170	-19
Hypertension	—	—	119	-42	119	87
Diabetes mellitus	—	—	58	-118	58	2
No secondary diagnosis	—	—	46	-345	46	-275
ICF function groups (reason for therapy)						
Motor functions	—	—	363	-282	363	-424
Pain	—	—	153	2	153	266
Mental functions	—	—	51	1148***	51	734**
Proprioceptive and touch functions	—	—	51	221	51	199
Sensory functions	—	—	30	40	30	29
Other body functions	—	—	79	119	79	-187
Body functions not reported	—	—	14	-41	14	142
ICF structure groups (reason for therapy)						
Lower extremity and spine	—	—	63	218	63	179
Unilateral shoulder/arm/elbow	—	—	115	182	115	156
Unilateral wrist/hand/fingers	—	—	172	298	172	366*
General/no specific body location	—	—	52	39	52	63
Bilateral upper extremity	—	—	86	581**	86	430*
Other body structures	—	—	67	-19	67	313
Body structures not reported	—	—	59	418	59	666
ICF activity groups (reason for therapy)						
Cognitive/communication	—	—	75	-192	75	-300
Mobility	—	—	145	119	145	-258
Daily activities	—	—	383	92	383	-108
Activities not reported	—	—	37	500	37	-135
Rasch function estimates (0 = low ability; 100 = high ability)						
Clinician-observed self-care	—	—	435	-5.33*	435	-5.56**
Self-reported everyday activities	—	—	435	-2.98	435	-1.32
Self-reported participation	—	—	435	-1.58	435	1.01
Self-reported life skills	—	—	435	9.20**	435	7.92*

(continued)

Table 7-7 (continued)
CARE-C occupational therapy demographic, payment, and comprehensive models of episode allowed charges

CARE-C OT Episode Models	Demographic		Payment		Comprehensive	
CARE-C individual items						
Number of related surgeries = 0	—	—	*250*	*Reference*	*250*	*Reference*
Number of related surgeries = 1	—	—	103	83	103	87
Number of related surgeries = 2+	—	—	64	-52	64	39
Number of related surgeries - missing	—	—	18	-403	18	253
Time of most recent related surgery—none	—	—	*232*	*Reference*	*232*	*Reference*
Time of most recent related surgery—within 1 month	—	—	60	293	60	397
Time of most recent related surgery—within 1–3 months	—	—	45	-3	45	76
Time of most recent related surgery—3+ months	—	—	79	62	79	-115
Time of most recent related surgery - missing	—	—	19	-232	19	-615
Patient feels sad (never, rarely, sometimes, I do not know)	—	—	—	—	*233*	*Reference*
Patient feels sad (often)	—	—	—	—	141	-30
Patient feels sad (always)	—	—	—	—	54	-673***
Patient feels sad — missing	—	—	—	—	†	†
Pain has effect on activities	—	—	—	—	192	218
Pain has effect on sleep	—	—	—	—	118	134
Pain severity (0–2)	—	—	—	—	*136*	*Reference*
Pain severity (3–7)	—	—	—	—	188	370**
Pain severity (8–10)	—	—	—	—	71	-74
Pain severity — missing	—	—	—	—	40	162
Duration of related health problem—0-1 months	—	—	—	—	*84*	*Reference*
Duration of related health problem—1-3 months	—	—	—	—	80	81
Duration of related health problem—3+ months	—	—	—	—	264	0
Duration of related health problem—missing	—	—	—	—	†	†
Mobility device—none	—	—	—	—	*212*	*Reference*
Mobility device—cane/crutch	—	—	—	—	81	493**
Mobility device—walker	—	—	—	—	109	-312
Mobility device—orthotics/prosthetic	—	—	—	—	†	†

(continued)

Table 7-7 (continued)
CARE-C occupational therapy demographic, payment, and comprehensive models of episode allowed charges

CARE-C OT Episode Models	Demographic		Payment		Comprehensive	
Mobility device—wheelchair/scooter full-time	—	—	—	—	44	1,158**
Mobility device—wheelchair/scooter part-time	—	—	—	—	54	316*
Mobility device—mechanical lift	—	—	—	—	†	†
Mobility device—other	—	—	—	—	15	-555*
Mobility device—missing	—	—	—	—	21	-233
Patient has memory difficulty	—	—	—	—	91	106
Patient has communication problem	—	—	—	—	24	106
Patient has swallowing problem	—	—	—	—	†	†
Facility type						
Private practice	—	—	—	—	*160*	*Reference*
Assisted living facility	—	—	—	—	49	1,716**
Hospital outpatient department	—	—	—	—	162	-175
Comprehensive\outpatient rehabilitation facility	—	—	—	—	64	157
Nursing facility	—	—	—	—	—	—
Census division						
South Atlantic	—	—	—	—	*116*	*Reference*
New England	—	—	—	—	31	-10
Mid-Atlantic	—	—	—	—	110	379
East North Central	—	—	—	—	122	-457
West North Central	—	—	—	—	23	-376
East South Central	—	—	—	—	†	†
West South Central	—	—	—	—	12	1,117***
Mountain	—	—	—	—	†	†
Pacific	—	—	—	—	†	†

*** (p=<0.01), ** (p=<0.05), * (p=<0.10)

NOTES:

† = Fewer than 11 cases.

1. ESRD in 2010-2012 - The beneficiary had ESRD any time in 2010, 2011, or 2012.
2. Medicaid in 2010-2012 - The beneficiary had at least one month of Medicaid eligibility during their therapy episode.
3. The count column refers to the number of beneficiaries where that variable = 1. If it is an ordinal/continuous variable, then it refers to the number of people where that variable > 0.
4. ICF is International Classification of Function.
5. Episode: Variable Length Episode with a 60-day terminating clean period.
6. Facility type as identified by CARE providers on the CARE assessment.

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims and CARE data.

Programs: PA021

Table 7-8
CARE-C speech-language pathology demographic, payment, and comprehensive models of episode allowed charges

CARE-C SLP episode models	Demographic		Payment		Comprehensive	
Number of observations	—	187	—	125	—	125
Mean dependent variable ($)	—	1,825	—	1,863	—	1,863
R^2	—	0.0320	—	0.4055	—	0.6454
Adjusted R^2	—	-0.0289	—	0.1224	—	0.1704
Variable	Count	Parameter	Count	Parameter	Count	Parameter
Intercept	—	1,637***	—	-146	—	-238
Demographics						
Male, age 0 to 64	22	509	13	821	13	-125
Male, age 65-74	39	431	25	485	25	-40
Male, age 75-84	35	222	19	430	19	69
Male, age 85+	11	-623*	†	†	†	†
Female, age 0 to 64	13	25	12	333	12	-378
Female, age 65-74	*33*	*Reference*	*21*	*Reference*	*21*	*Reference*
Female, age 75-84	23	549	17	683	17	354
Female, age 85+	11	-125	†	†	†	†
Originally disabled	14	-375	†	†	†	†
Medicaid in 2010–2012	39	21	33	229	33	-109
ESRD in 2010–2012	†	†	†	†	†	†
Primary impairment diagnosis groups						
Cognitive communication disorders only	—	—	*81*	*Reference*	*81*	*Reference*
Swallowing disorders only	—	—	†	†	†	†
Cognitive, communication, and swallowing disorders only	—	—	17	673	17	1,862**
No impairment diagnosis	—	—	17	-562	17	-452
Primary medical diagnosis groups						
Stroke	—	—	56	804	56	324
Neurological, excluding stroke	—	—	44	502	44	713
Miscellaneous diagnosis	—	—	19	447	19	794
No medical diagnosis	—	—	†	*Reference*	†	*Reference*
ICF function groups (reason for therapy)						
Mental functions	—	—	88	319	88	1,691**
Voice and speech functions	—	—	45	1,241**	45	1,067*
Other body functions	—	—	23	-558	23	-216
Body functions not reported	—	—	12	579	12	1,106

(continued)

Table 7-8 (continued)
CARE-C speech-language pathology demographic, payment, and comprehensive models of episode allowed charge

CARE-C SLP episode models	Demographic		Payment		Comprehensive	
ICF structure groups (reason for therapy)						
Voice, speech, and swallowing	—	—	52	-1,628**	52	-896
Central nervous system	—	—	26	507	26	-20
Other body structures	—	—	37	-334	37	-272
Body structures not reported	—	—	35	-673	35	-147
ICF activity groups (reason for therapy)						
Cognitive	—	—	83	381	83	514
Communication	—	—	79	266	79	74
Mobility and daily activities	—	—	50	726	50	645
Activities not reported	—	—	18	298	18	247
Rasch function estimates (0 = low ability; 100 = high ability)						
Self-reported life skills	—	—	125	-2.95	125	-5.01
Clinician-observed problem solving	—	—	125	-27.28	125	-28.41
Clinician-observed memory	—	—	125	16.25	125	34.53
Clinician-observed attention	—	—	125	5.26	125	-3.11
Clinician-observed function voice	—	—	125	1.61	125	-0.62
Clinician-observed speech	—	—	125	12.57	125	5.07
Clinician-observed language expression	—	—	125	-2.79	125	1.88
Clinician-observed language comprehension	—	—	125	-2.49	125	-6.26
CARE-C individual items						
Number of related surgeries = 0	—	—	*73*	*Reference*	*73*	*Reference*
Number of related surgeries = 1	—	—	22	-44	22	-184
Number of related surgeries = 2+	—	—	22	-397	22	-885
Number of related surgeries - missing	—	—	†	†	†	†
Time of most recent related surgery—none	—	—	*69*	*Reference*	*69*	*Reference*
Time of most recent related surgery—within 1 month	—	—	†	†	†	†
Time of most recent related surgery—within 1–3 months	—	—	12	1,303	12	1,531

(continued)

Table 7-8 (continued)
CARE-C speech-language pathology demographic, payment, and comprehensive models of episode allowed charge

CARE-C SLP episode models	Demographic		Payment		Comprehensive	
Time of most recent related surgery—3+ months	—	—	34	36	34	755
Time of most recent related surgery - missing	—	—	†	†	†	†
Patient feels sad (never, rarely, sometimes, I do not know)	—	—	—	—	*63*	*Reference*
Patient feels sad (often)	—	—	—	—	39	58
Patient feels sad (always)	—	—	—	—	17	1,054**
Patient feels sad - missing	—	—	—	—	†	†
Pain has effect on activities	—	—	—	—	22	-1,125
Pain has effect on sleep	—	—	—	—	12	436
Pain severity (0–2)	—	—	—	—	*70*	*Reference*
Pain severity (3–7)	—	—	—	—	28	712
Pain severity (8–10)	—	—	—	—	†	†
Pain severity - missing	—	—	—	—	20	19
Duration of related health problem—0-1 months	—	—	—	—	*15*	*Reference*
Duration of related health problem—1-3 months	—	—	—	—	30	-700
Duration of related health problem—3+ months	—	—	—	—	74	-1,057
Duration of related health problem - missing	—	—	—	—	†	†
Mobility device—none	—	—	—	—	*53*	*Reference*
Mobility device—cane/crutch	—	—	—	—	18	-279
Mobility device—walker	—	—	—	—	23	-316
Mobility device—orthotics/prosthetic	—	—	—	—	—	—
Mobility device—wheelchair/scooter full-time	—	—	—	—	13	-333
Mobility device—wheelchair/scooter part-time	—	—	—	—	12	-111
Mobility device—mechanical lift	—	—	—	—	—	—
Mobility device—other	—	—	—	—	†	†
Mobility device - missing	—	—	—	—	12	-26
Patient has diet modification	—	—	—	—	22	-1,118
Patient has swallowing assistance	—	—	—	—	26	578

(continued)

Table 7-8 (continued)
CARE-C speech-language pathology demographic, payment, and comprehensive models of episode allowed charge

CARE-C SLP episode models	Demographic		Payment		Comprehensive	
Facility type						
Hospital outpatient department	—	—	—	—	*81*	*Reference*
Assisted living facility	—	—	—	—	†	†
Comprehensive\outpatient rehabilitation facility	—	—	—	—	30	812
Private practice	—	—	—	—	†	†
Census division						
South Atlantic	—	—	—	—	*27*	*Reference*
New England	—	—	—	—	43	778
Mid-Atlantic	—	—	—	—	†	†
East North Central	—	—	—	—	25	-1128
West North Central	—	—	—	—	†	†
East South Central	—	—	—	—	†	†
West South Central	—	—	—	—	†	†
Mountain	—	—	—	—	†	†
Pacific	—	—	—	—	†	†

*** (p=<0.01), ** (p=<0.05), * (p=<0.10)

NOTES:

† = Fewer than 11 cases.

1. ESRD in 2010-2012 - The beneficiary had ESRD any time in 2010, 2011, or 2012.
2. Medicaid in 2010-2012 - The beneficiary had at least one month of Medicaid eligibility during their therapy episode.
3. The count column refers to the number of beneficiaries where that variable = 1. If it is an ordinal/continuous variable, then it refers to the number of people where that variable > 0.
4. ICF is International Classification of Function.
5. Episode: Variable Length Episode with a 60-day terminating clean period.
6. Facility type as identified by CARE providers on the CARE assessment.

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims and CARE data.

Programs: PA021

Table 7-9
CARE-F nursing facility demographic, basic payment, payment, and comprehensive models of episode allowed charges

	Demographic		Basic payment		Payment		Comprehensive	
Number of observations	591		591		591		591	
Mean dependent variable	3,647		3,647		3,647		3,647	
R^2	0.0361		0.1075		0.3126		0.4317	
Adjusted R^2	0.0211		0.0614		0.2126		0.2977	
Variable	Count	Parameter	Count	Parameter	Count	Parameter	Count	Parameter
INTERCEPT	—	3,240***	—	1,270	—	-3,271	—	-3,082
Demographics								
Age 0 to 64	61	2,538	61	2,787*	61	1,564**	61	1,344**
Age 65 to 74 (reference group)	*103*	*Reference*	*103*	*Reference*	*103*	*Reference*	*103*	*Reference*
Age 75 to 84	171	1,406*	171	1,279	171	1,079	171	775
Age 85+	256	428	256	17	256	-615	256	-717
Male	162	445	162	474	162	-200	162	-364
Originally disabled	92	405	92	750	92	799	92	552
Medicaid in 2010–2012	361	-260	361	-554	361	-869	361	-772*
ESRD in 2010–2012	15	1,506	15	438	15	997	15	766
Long term institutionalized	412	-735**	412	-814**	412	-262	412	-443
Primary diagnosis groups								
Musculoskeletal (reference group)	—	—	*94*	*Reference*	*94*	*Reference*	*94*	*Reference*
Circulatory (including lymphatic) and pulmonary/respiratory	—	—	75	70	75	-229	75	-76
Stroke	—	—	63	-1,537**	63	-1,771**	63	-1,072**
Parkinson's, other neurological, and swallowing disorders	—	—	79	-1,339*	79	-1,025	79	-594
Dementia/Alzheimer's disease	—	—	118	147	118	-273	118	-61
Unspecified and miscellaneous diagnoses	—	—	100	-132	100	-478	100	-246

(continued)

Table 7-9 (continued)
CARE-F nursing facility demographic, basic payment, payment, and comprehensive models of episode allowed charges

	Demographic		Basic payment		Payment		Comprehensive	
Multiple etiologies	—	—	40	1,474	40	1,377	40	1,269
No primary diagnosis	—	—	22	1,366	22	2,059	22	1,824
Individual function items								
Diet modifications needed	—	—	217	119	—	—	217	496
Rarely/never/sometimes understands verbal content	—	—	200	-294	—	—	200	776
Cognitive function mildly impaired, not impaired, or not reported (reference group)	—	—	*324*	*Reference*	—	—	*324*	*Reference*
Cognitive function severely impaired	—	—	150	5	—	—	150	-91
Cognitive function moderately impaired	—	—	—	—	—	—	117	-415
Rasch functional ability estimates (0 = low ability; 100 = high ability)								
Clinician-observed mobility								
0 < Rasch estimate ≤ 30	—	—	104	295	104	-1,853	104	-1,291
30 < Rasch estimate ≤ 60	—	—	251	1,212	251	-921	251	-514
60 < Rasch estimate ≤ 90	—	—	106	1,222	106	-661	106	-934
Rasch estimate > 90 (reference group)	—	—	*12*	*Reference*	*12*	*Reference*	*12*	*Reference*
Rasch estimate - missing	—	—	44	1,418	44	251	44	852
Rasch estimate - not assessed	—	—	74	-544	74	-1,267	74	-312
Clinician-observed self-care								
0 < Rasch estimate ≤ 30	—	—	113	2,443*	113	1,833	113	2,059
30 < Rasch estimate ≤ 60	—	—	261	2,263*	261	1,137	261	1,297
60 < Rasch estimate ≤ 90	—	—	74	1,385	74	622	74	1,694
Rasch estimate > 90 (reference group)	—	—	†	†	†	†	†	†
Rasch estimate - missing	—	—	48	1,090	48	456	48	262
Rasch estimate - not assessed	—	—	87	268	87	567	87	1,343

(continued)

Table 7-9 (continued)
CARE-F nursing facility demographic, basic payment, payment, and comprehensive models of episode allowed charges

	Demographic		Basic payment		Payment		Comprehensive	
Self-reported mobility								
0 < Rasch estimate ≤ 30	—	—	—	—	188	737	188	244
30 < Rasch estimate ≤ 60	—	—	—	—	186	118	186	-415
60 < Rasch estimate ≤ 90	—	—	—	—	98	607	98	-43
Rasch estimate > 90	—	—	—	—	*96*	*Reference*	*96*	*Reference*
Rasch estimate - missing	—	—	—	—	23	-394	23	-68
Self-reported wheelchair function								
Patient does not use a wheel chair	—	—	—	—	117	63	117	-1,197
0 < Rasch estimate ≤ 30	—	—	—	—	146	170	146	-321
30 < Rasch estimate ≤ 60	—	—	—	—	169	1,209	169	620
60 < Rasch estimate ≤ 90	—	—	—	—	102	1,195	102	584
Rasch estimate > 90	—	—	—	—	*22*	*Reference*	*22*	*Reference*
Rasch estimate - missing	—	—	—	—	35	678	35	-528
Secondary diagnosis groups								
Osteoarthritis	—	—	—	—	171	1,068***	171	836**
Osteoporosis, unspecified, and miscellaneous musculoskeletal	—	—	—	—	233	-172	233	95
Circulatory (including lymphatic)	—	—	—	—	284	-1	284	-33
Hypertension	—	—	—	—	333	985**	333	710
Diabetes mellitus	—	—	—	—	146	-899	146	-770
Pulmonary/respiratory	—	—	—	—	165	-183	165	-413
Stroke	—	—	—	—	47	-727	47	-471
Parkinson's, peripheral nervous system, and other neurological disorders	—	—	—	—	141	-112	141	-497
Dementia/Alzheimer's and other cognitive disorders	—	—	—	—	102	-120	102	281

(continued)

Table 7-9 (continued)
CARE-F nursing facility demographic, basic payment, payment, and comprehensive models of episode allowed charges

	Demographic		Basic payment		Payment		Comprehensive	
Mental health	—	—	—	—	325	-332	325	-516
Communication, voice, or speech disorders	—	—	—	—	139	581	139	740
Swallowing disorders	—	—	—	—	149	-372	149	157
Gait or balance disorder	—	—	—	—	169	-1,578*	169	-789
Pain	—	—	—	—	108	-812	108	-698
Generalized weakness	—	—	—	—	197	573	197	758
Vision impairment	—	—	—	—	89	209	89	-69
Unspecified and miscellaneous diagnoses	—	—	—	—	377	-185	377	-139
No secondary diagnosis	—	—	—	—	24	-2,865*	24	-1,337
ICF body function groups (primary reason for therapy)								
Motor functions	—	—	—	—	472	2,548*	472	2,706*
Mental functions	—	—	—	—	80	1,791*	80	1,215
Pain	—	—	—	—	96	141	96	-198
Other body functions	—	—	—	—	111	2,103*	111	2,008*
Body functions not reported	—	—	—	—	46	3,112*	46	3,767**
ICF body structure groups (primary reason for therapy)								
General/no specific body location	—	—	—	—	206	1,316**	206	1,212***
Spine	—	—	—	—	60	876	60	1,397*
Hip and thigh	—	—	—	—	122	-1,157	122	-1,005
Knee	—	—	—	—	132	1,577**	132	1,442**
Calf/foot/ankle/toes	—	—	—	—	105	-788	105	-844
Shoulder/arm/elbow	—	—	—	—	124	1,165*	124	686
Wrist/hand/fingers	—	—	—	—	113	-433	113	-196

(continued)

Table 7-9 (continued)
CARE-F nursing facility demographic, basic payment, payment, and comprehensive models of episode allowed charges

	Demographic		Basic payment		Payment		Comprehensive	
Voice, speech, and swallowing	—	—	—	—	112	1,057	112	933
Other body structures	—	—	—	—	58	2,055	58	1,645
Body structures not reported	—	—	—	—	36	2,560*	36	2,268*
ICF activity groups (primary reason for therapy)								
Cognitive	—	—	—	—	100	1,045	100	902
Communication	—	—	—	—	28	-925	28	-1,351
Mobility	—	—	—	—	386	1,849**	386	1,269
Daily activities	—	—	—	—	294	1,727***	294	1,091**
Activities not reported	—	—	—	—	56	1494	56	539
CARE-F individual items								
Admitted from skilled nursing facility (reference group)	—	—	—	—	*257*	*Reference*	*257*	*Reference*
Admitted from long term nursing facility	—	—	—	—	250	731	250	1,051*
Admitted from other facility	—	—	—	—	84	-151	84	155
Acute care hospital use in the past 2 months	—	—	—	—	50	897	50	627
History of surgery for the presenting condition	—	—	—	—	28	460	28	632
Onset of presenting condition within past 3 months	—	—	—	—	—	—	209	557
Prior self-care function needed assistance	—	—	—	—	—	—	489	1,315
Prior mobility function impaired	—	—	—	—	—	—	307	599
Wheelchair use prior to presenting condition	—	—	—	—	—	—	418	-1,687
Two or more falls in the past year	—	—	—	—	—	—	176	-735
Expression of ideas/wants (rarely/never, frequently/some difficulty)	—	—	—	—	—	—	201	-988**
Inattention	—	—	—	—	—	—	184	520

(continued)

Table 7-9 (continued)
CARE-F nursing facility demographic, basic payment, payment, and comprehensive models of episode allowed charges

	Demographic		Basic payment		Payment		Comprehensive	
Disorganized thinking	—	—	—	—	—	—	148	-105
Altered level of consciousness/alertness	—	—	—	—	—	—	124	-585
Cues for swallowing	—	—	—	—	—	—	216	-204
Cognitive problems present	—	—	—	—	—	—	90	1,436**
Respiratory impairments present	—	—	—	—	—	—	113	585
Endurance impairments present	—	—	—	—	—	—	393	297
Bladder/bowel impairments present	—	—	—	—	—	—	355	-363
Felt sad in past two weeks (never, rarely, sometimes, unable to respond) (reference group)	—	—	—	—	—	—	*433*	*Reference*
Felt sad in past two weeks often	—	—	—	—	—	—	60	708
Felt sad in past two weeks always	—	—	—	—	—	—	27	808
Felt sad in past two weeks missing	—	—	—	—	—	—	71	1,043
Pain affects sleep	—	—	—	—	—	—	93	258
Pain affects activities	—	—	—	—	—	—	125	838
Mobility device—walker	—	—	—	—	—	—	158	747
Mobility device—wheelchair/scooter full-time	—	—	—	—	—	—	235	-108
Mobility device—wheelchair/scooter part-time	—	—	—	—	—	—	93	153
Mobility device—other	—	—	—	—	—	—	73	-625
Census division								
South Atlantic (reference group)	—	—	—	—	—	—	*76*	*Reference*
New England	—	—	—	—	—	—	49	2,742
Mid-Atlantic	—	—	—	—	—	—	163	-1,936**
East North Central	—	—	—	—	—	—	102	241

(continued)

Table 7-9 (continued)
CARE-F nursing facility demographic, basic payment, payment, and comprehensive models of episode allowed charges

	Demographic		Basic payment		Payment		Comprehensive	
West North Central	—	—	—	—	—	—	35	-1,404
East South Central	—	—	—	—	—	—	132	790
West South Central	—	—	—	—	—	—	†	†
Mountain	—	—	—	—	—	—	19	-1,198
Pacific	—	—	—	—	—	—	14	1,624

*** (p=<0.01), ** (p=<0.05), * (p=<0.10)

NOTES:

† = Fewer than 11 cases.

1. Originally Disabled - The beneficiary's original reason for entitlement was disability, among beneficiaries currently entitled by age.
2. Medicaid in 2010-2012 - The beneficiary had at least one month of Medicaid eligibility during their therapy episode.
3. ESRD in 2010-2012 - The beneficiary had ESRD any time in 2010, 2011, or 2012.
4. Long Term Institutionalized - If the beneficiary had a 90-day MDS assessment at any point during 2011, then they were considered long-term institutionalized.
5. The count column refers to the number of beneficiaries where that variable = 1. If it is an ordinal/continuous variable, then it refers to the number of people where that variable > 0.
6. ICF is International Classification of Function.
7. The reference group (Admitted from skilled nursing facility) includes 242 beneficiaries admitted from a skilled nursing facility and 15 beneficiaries with missing admitted from facilities.
8. Episode: Variable Length Episode with a 60-day terminating clean period.

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims and CARE data.

Programs: PA021

Table 7-10
CARE-C physical therapy comparison of the episode and annual payment models of episode allowed charges

	Episode - Payment	Annual - Payment
Number of observations	4,268	3,749
Mean dependent variable ($)	1,365	1,524
R^2	0.1070	0.1155
Adjusted R^2	0.0871	0.0930
Variables	Parameter	Parameter
Intercept	1,927***	2,282***
Demographics		
Male, age 0–64	-309*	-395**
Male, age 65–74	41	-79
Male, age 75–84	-55	-59
Male, age 85+	-197*	-220*
Female, age 0–64	-149	-257*
Female, age 65–74	*(reference group)*	*(reference group)*
Female, age 75–84	-112*	-156**
Female, age 85+	11	90
Originally disabled	-182*	-159
Medicaid in 2010–2012	-50	80
ESRD in 2010–2012	389	514
Primary diagnosis groups		
Fracture	240**	-60
Joint replacement	280*	267*
Osteoarthritis	*(reference group)*	*(reference group)*
Spinal stenosis	184	-21
Herniated disc and other major musculoskeletal	65	-140
Sprain/strain	-129	-256**
Bursitis/tendonitis	-27	-181*
Unspecified and Miscellaneous Musculoskeletal	94	-23
Circulatory (including lymphatic) and pulmonary/respiratory	256	-54
Stroke	396	256
Parkinson's and Other Progressive Neurological	222	382

(continued)

Table 7-10 (continued)
CARE-C physical therapy comparison of the episode and annual payment models of episode allowed charges

Variables	Parameter	Parameter
Peripheral Nervous System and Other Major Neurological Disorders	-119	-211
Unspecified and Miscellaneous Neurological	782**	377
Pain	-46	-313*
Vertigo	-466**	-701**
Genitourinary disorders	-69	-406*
Unspecified and miscellaneous diagnoses	113	-65
Multiple major etiologies	96	148
Multiple etiologies, one major	-5	-199*
Multiple etiologies, no major	-225*	-413***
No primary diagnosis	279	126
Secondary diagnosis groups		
Osteoarthritis	-56	68
Joint replacement	38	98
Spinal Stenosis, Herniated Disc, and Other Major Musculoskeletal	152	119
Osteoporosis, Sprain/Strain, and Other Minor Musculoskeletal	58	115
Unspecified musculoskeletal	-26	113
Circulatory (including lymphatic system)	117	29
Hypertension	-72	-141
Pulmonary/respiratory system	-40	-108
Stroke	80	155
Peripheral Nervous System and Other Major Neurological Disorders	74	188
Unspecified and Miscellaneous Neurological	178	251
Gait or balance disorder	29	113
Pain	-79	-131
Vertigo	153	61
Generalized weakness	119*	164*
Communication and cognition disorders	-35	9
Mental health	-254***	-245***
Cancer and other neoplasms	-90	-33

(continued)

Table 7-10 (continued)
CARE-C physical therapy comparison of the episode and annual payment models of episode allowed charges

Variables	Parameter	Parameter
Obesity	-105	14
Vision impairment	65	50
Diabetes mellitus	-12	-44
Unspecified and miscellaneous diagnoses	31	97
No secondary diagnoses	61	50
ICF function groups (reason for therapy)		
Motor functions	127*	24
Pain	72	113
Proprioceptive and touch functions	313**	328**
Vestibular functions	-112	1
Cardiovascular and respiratory	163	271
Genitourinary functions	-203	22
Other body functions	248	209
Body functions not reported	-95	1
ICF structure groups (reason for therapy)		
Unilateral hip/thigh	-96	-152**
Unilateral knee	26	-56
Unilateral calf/foot/ankle	14	-2
Unilateral toes	102	532*
Unilateral shoulder/arm/elbow	263***	216**
Unilateral wrist/hand/fingers	-167	-172
Upper spine	67	21
Lower spine	12	-32
General/no specific body location	287**	180
Bilateral lower extreme	-39	-97
Bilateral upper extreme	250*	199
Peripheral nervous system	-111	-82
Central nervous system	-264	-277
Ear	359**	58
Other body structures	-327*	-407**
Body structures not reported	164	20
ICF activity groups (reason for therapy)		
Cognitive/communication	358*	504*
Mobility	37	35

(continued)

Table 7-10 (continued)
CARE-C physical therapy comparison of the episode and annual payment models of episode allowed charges

Variables	Parameter	Parameter
Daily activities	-1	-32
Activities not reported	-50	-91
Rasch function estimates (0 = low ability; 100 = high ability)		
Clinician-observed mobility	-4.62	-4.18
Self-reported everyday activities	-1.14	-1.2
Self-reported mobility	-2.48*	-2.90*
Self-reported participation	-4.77***	-4.01***
CARE-C individual items		
Number of related surgeries = 0	*(reference group)*	*(reference group)*
Number of related surgeries = 1	84	39
Number of related surgeries = 2+	110	120
Number of related surgeries – NA	-144	-135
Time of most recent related surgery—none	*(reference group)*	*(reference group)*
Time of most recent related surgery—within 1 month	301***	199
Time of most recent related surgery—within 1–3 months	472***	447***
Time of most recent related surgery—3+ months	70	257**
Time of most recent related surgery - NA	-40	130

NOTES:

*** (p=<0.01), ** (p=<0.05), * (p=<0.10)

1. ESRD in 2010–2012–The beneficiary had ESRD any time in 2010, 2011, or 2012.
2. Medicaid in 2010–2012–The beneficiary had at least one month of Medicaid eligibility during their therapy episode.
3. ICF is International Classification of Function.
4. Facility type as identified by CARE providers on the CARE assessment.
5. Episode: Variable Length Episode with a 60-day terminating clean period, January 1, 2010–December, 31, 2010 with a 1 year run out period
6. Annual Period: March 2011–February 2012

SOURCE: RTI analysis of 2011–2012 Outpatient Therapy Medicare Claims and CARE data.

Program: PA021_PA022

Table 7-11
CARE-C physical therapy payment and comprehensive model adjusted R^2s with and without facility identifier

	Without facility ID	With facility ID
Annual		
Payment	0.0933	0.3156
Comprehensive	0.1613	0.3320
Episode		
Payment	0.0871	0.3219
Comprehensive	0.1419	0.3329

NOTE: Facility identifiers (IDs) are of those providers who contributed data to the DOTPA primary data collection effort.

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims and CARE data.

Program: PA030

8. EXPLORING THERAPY CASE-MIX GROUPS

Multivariate regression is used in Sections 4, 5, and 7 to determine what patient characteristics predict outpatient therapy expenditures and how much of the variation they explain. Regression analysis assumes a parametric—often linear, additive as in Sections 5 and 7—relationship between therapy expenditures and the explanatory variables such as diagnosis and functional status, and estimates the incremental contribution of each explanatory variable to predicted therapy expenditures.[38] Regression analysis does not directly define groups of beneficiaries who are similar in therapy expenditures.[39] In this section, we use a different statistical methodology—classification and regression tree analysis (CART)—to explore developing mutually-exclusive therapy case-mix groups. CART is a non-parametric technique that does not assume a specific mathematical relationship between expenditures and explanatory variables, and efficiently investigates higher-order interactions (cross-classifications)[40] among the explanatory variables in explaining therapy expenditures. The objective in using CART is to create case-mix groups that have relatively little intra-group payment (resource use) variation and large inter-group variation.

The episode-level files used for the CART evaluation are briefly described in Section 8.1. Section 8.2 contains a discussion of three discipline-specific models evaluated along with the associated explanatory variables. Section 8.3 provides brief notes on CART. The remaining three sections contain results from the CART analysis: physical therapy (PT) in Section 8.4, occupational therapy (OT) in Section 8.5, and speech-language pathology (SLP) in Section 8.6. In a non-CART approach, Section 8.7 introduces case-mix groups defined from clinically- and cost-determined primary diagnosis categories, with subclasses based on clinician-observed mobility ranges. A summary of the findings concludes this section (Section 8.8). A technical primer on the CART methodology is contained in the Appendix to Section 8.

8.1 Episode Analysis Files

The CART analysis was conducted on an episode basis, using the same episode definition as is used for the regression episode analysis reported in Section 7. The sample for the analysis is the full set of episodes defined by CARE-C admission assessments conducted from March 2011 through June 2012. The date the CARE-C instrument was administered for each Medicare beneficiary marked the beginning of a variable-length episode that was terminated by a 60-day discipline-specific, therapy-claims-free clean period. Medicare expenditures on therapy within

[38] Regression analysis can incorporate non-linearity and interaction effects, but is not as well-suited to these dimensions of analysis.

[39] Groups of beneficiaries with similar therapy expenditures can be defined based on regression results, but this would require additional analysis.

[40] An example of interactions is the specification of a set of age/gender indicator (dummy) variables for classifying individuals. For instance, one such interaction could be females aged 70 to 74. A set of these interaction terms replaces a gender indicator (e.g., 0=male, 1=female) and a set of age classes (e.g., under 65, 65-69, 70-74, 75-79, 80-84, and 85+). The idea is that, for each age class, males and females have different outcomes. Similarly, male outcomes are not the same over all age groups. The use of interaction terms, then, allows the identification of specific outcomes for each age/gender class.

the episode period, by discipline, were derived from therapy claims as described in Section 3 and attached to each observation. Episodes, even if not completed, were censored on December 31, 2012 (i.e., no claims expenditures were accrued beyond that point). The dependent therapy expenditure variable is allowed charges, including beneficiary cost sharing amounts.

8.2 CART Model and their Explanatory Variables

The CART analysis is discipline-specific. Medicare expenditure by episode, as in Section 7, is the dependent variable in all models. For each outpatient therapy discipline, two sets of exploratory CART runs were performed:

1. A *comprehensive model*, using a large set of explanatory variables, some of which may not be suitable for payment purposes. This large set was used to conduct as full an exploration as possible of the CARE-C variables and their correlations with Medicare expenditures. The CART computer program was allowed to choose which variables to use in creating the case-mix groupings and the order in which the variables were used according to purely statistical criteria.

2. A *payment model*, excluding CARE-C items used in the comprehensive model that are susceptible to payment gaming. The CART computer program was allowed to choose which variables to use in creating the case-mix groupings and the order in which the variables were used according to purely statistical criteria.

3. A *primary diagnosis model*, using only CARE-C primary diagnoses to form payment groups for the PT sample. We estimated this model because diagnosis is usually the first stage in case-mix classification of individuals. In future work, this model could be extended through additional hierarchical stages of classification within the diagnosis groups, such as by functional status. Since there are too few observations in the OT and SLP samples, only the PT sample was run using CART.

The explanatory variables included in the payment and comprehensive CART models are the same as the explanatory variables included in the corresponding payment and comprehensive regression models in Sections 5 and 7.

8.3 Specification and Presentation of CART Models

In preliminary runs, we let CART create payment groups without regard to the minimum number of observations per group. This resulted in payment groups with only one or two observations. With so few observations, there is no statistical validity to the results. We would normally prefer a minimum of 30 observations per node. However, we have only 4,825 observations in the full PT sample and much fewer in the OT and SLP samples. Consequently, as a compromise between statistical validity and unconstrained exploration of case-mix, we set the minimum number of observations per group to 10 to illustrate the types of payment groups that could be created with CART.

The results are organized in the next three sections by discipline (PT, OT, and SLP) with separate results for each of the model specifications: comprehensive, payment, and primary diagnosis (PT only). A regression tree is shown for each of the seven sets of results. In most cases we show more than just the CART statistically "optimal" tree. The terminal nodes of the CART optimal tree are identified with double asterisks at the front of the first line (which identifies the variable used in creating the node) in each node.[41] A node (group of beneficiaries defined by the CART algorithm) without child nodes (i.e., with no further CART splits) is a terminal node (final case-mix group). The nodes and branches below the nodes belonging to the optimal tree represent the portion of the tree that was pruned through CART's 10-fold cross-validation process. We show in the figures below for each node the number of beneficiaries in the group, the mean Medicare expenditures (allowed charges), and the standard error of mean expenditures.

For each of the seven trees, there is an accompanying table showing the model fit/explained variance (conventional and cross-validated R^2) at each stage of the CART recursive-splitting process. For the PT primary diagnosis model, an additional table shows the mean Medicare expenditures, their standard errors, and the number of observations in each of the terminal case-mix groups (nodes) sorted in descending order of mean expenditures.

In discussing each tree, we start by describing the results for the final or optimal tree. We then discuss the rest of the presented tree. The tree presented in each figure represents the tree that is the most legible tree that can fit on one page. For instance, for the PT comprehensive model, CART initially produced a tree with 369 terminal nodes. Through the validation process, CART prunes trees to remove nodes and branches that are not statistically reliable. In all, CART produced 258 trees for the PT comprehensive model. The tree that we present in a figure contains seven terminal nodes, any more would have been too difficult to read. In the accompanying table, we list the trees that CART lists as part of its default output—for the PT comprehensive model, CART listed the eleven "best" trees in the default output.

8.4 CART Empirical Results – Physical Therapy

8.4.1 PT-Comprehensive Model

Figure 8-1 shows the CART regression tree with seven terminal nodes (case-mix groups) as well as the CART statistically optimal tree (based on cross-validated reliability) for the PT comprehensive model. The 4,825 beneficiaries comprising the root node (entire sample) have mean expenditures of $1,335 with a standard error of $20. The statistically optimal tree contains only two terminal nodes and is split on whether the beneficiary *uses a walker* as a mobility aid. The 833 beneficiaries using a walker have mean Medicare expenditures of $1,898 with a standard error of $74. The 3,992 beneficiaries who do not use a walker have mean expenditures of $1,218 with a standard error of $19. The difference in mean expenditures between the two groups is $680.

[41] Nodes with a single asterisk in a tree diagram indicate the node belongs to the optimal tree.

We now briefly describe parts of the larger tree shown in Figure 8-1 that contains additional splits beyond the statistically optimal two-way split. Although the additional splits may not have optimal statistical reliability, they provide tentative information on therapy case-mix that is useful in our exploratory analysis.[42] For beneficiaries who did not use a walker, CART splits first on when they most recently had surgery related to the condition for which they are currently receiving therapy. CART created two classes: (1) for the 1,213 beneficiaries who had surgery one or more months ago or for which there is no response and (2) 2,779 beneficiaries who stated that they had no surgery related to current therapy and those who had a current therapy-related surgery within the past month. Mean payments for the first group were $1,486 while, for the second group, they were $1,101, a difference of $385.

A concern about the second group is why beneficiaries with a therapy-related surgery within the past month are grouped with beneficiaries with no therapy-related surgery. That is, why are payments for beneficiaries with a surgery in the past month similar to payments for beneficiaries with no therapy-related surgery? Are more recent surgeries less complex or have fewer effects on functioning than more distant surgeries? Is therapy more intensive for conditions where the waiting period after surgery for the initiation of therapy is longer? It appears that information on the CARE-C by itself is not sufficient to answer these questions and that claims-based information (e.g., type of surgery or count of surgeries) might be necessary to supplement the CARE-C tool.

For beneficiaries with no surgery or surgery within the past month, the next split is on the Rasch *self-reported participation* estimates.[43] The 479 beneficiaries having the higher degree of participation (Rasch estimate greater than 75.19 based on a scale of 0 = lowest to 100 = highest) were split to the right branch, while the 734 with lower degrees of participation (Rasch estimate of 75.19 or lower) were split to the left branch. The two resulting nodes are not split any further and may be regarded as two final case-mix groups. The higher-participation group had mean expenditures of $1,205, while the lower-participation group had mean expenditures of $1,669.

For beneficiaries who use a walker, CART split the sample into even more nodes than for beneficiaries not using a walker—at least in the context of a tree with seven terminal nodes. Among the variables used to split the beneficiaries using a walker are *full-time wheel chair use*, *surgery within the past three months*, and primary diagnosis. Use of a walker in beneficiaries who use a wheelchair full-time possibly reflects walker use for certain activities, such as transfers and standing.

Some CART results are difficult to interpret such as the earlier example of the surgery splits for beneficiaries who did not use a walker and the above use of a walker in conjunction with full-time wheelchair use. Other examples will be noted as they appear. While some

[42] Further analysis, ideally with larger samples, is necessary to confirm the tentative hypotheses that are generated by our exploratory analysis.

[43] Figure 8-1 does not show any splits under the node for beneficiaries who had surgery one or more months prior to PT or did not provide a response. However, with 1,213 beneficiaries, it is possible that a tree with more than the seven terminal nodes in Figure 8-1 would have had further splits under this node. The same possibility applies to all nodes with more than 20 observations.

difficult-to-interpret results might be due to small sample size, others might be due to lack of more specific information as in the case of when surgery was performed.

Table 8-1 shows re-substitution relative errors, conventional R^2, cross-validated relative errors, and cross-validated R^2. The statistically optimal model has the lowest cross-validated relative error of 0.97 and is marked by a single asterisk in the “terminal nodes” column.[44] This corresponds to a conventional R^2 of 3.3 percent and a cross-validated R^2 of 3.1 percent, that is, relatively low predictive power. The conventional R^2 for the full 7-terminal-node tree shown in Figure 8-1 is 10 percent. However, the cross-validated R^2 for this tree is only 1.3 percent, which is why CART finds it to be statistically less attractive than the 2-node “optimal” tree. Through its cross-validation process, CART concludes that the conventional R^2 is misleadingly high because the 7-terminal node case-mix model overfits the data. We show the model goodness-of-fit statistics in ***Table 8-1*** for CART trees that include up to 13 terminal nodes. The conventional R^2 always rises with more terminal nodes (splits), but the cross-validated R^2 may fall with more nodes. Stopping at 13 terminal nodes in ***Table 8-1*** is arbitrary; our intention is simply to show goodness-of-fit statistics for a few more CART splits beyond what is shown in Figure 8-1. The 13-terminal node model has no “optimality” properties and we are not implying that it is a recommended or benchmark model by stopping at it in ***Table 8-1***.

A shortcoming of the PT-comprehensive model is that the statistically optimal tree and other CART splits are based on beneficiary utilization of mobility devices. Walkers and other mobility devices are subject to gaming by providers and beneficiaries in that they might acquire and utilize mobility devices in order to raise their predicted therapy expenditure case-mix score and hence their payments. Ideally a payment model would be based on direct measures of beneficiaries’ functional status, rather than their use of mobility aids.

8.4.2 PT-Payment Model

The PT payment model contains a subset of the explanatory variables used in the comprehensive model. The mobility devices, in particular, were removed. **Figure 8-2** shows the tree with six terminal nodes as well as the statistically optimal tree for the PT-payment model. The optimal tree contains five terminal nodes. The first split is on when a therapy-related surgery took place (if at all) and is split among the same classes as for beneficiaries who did not use a walker in Figure 8-1. The 3,172 beneficiaries who *did not have surgery* or *had surgery within the past month* had mean expenditures of $1,165 with a standard error of $20. The 1,653 beneficiaries who had a therapy-related surgery more than a month prior to therapy (or did not respond to the question) had mean expenditures of $1,662 with a standard error of $44. . The difference in expenditures between the two groups is $497.

For beneficiaries who *did not have surgery* or *had surgery within one month*, there is one further split that appears in Figure 8-2. It is on clinician-observed mobility with a cut point of 67.18. These two nodes, however, are not part of the statistically optimal tree.

44 In general, trees with higher numbers of terminal nodes have higher conventional R^2 and the maximal tree has the highest conventional R^2. We don’t show a row containing values for the maximal tree in this and similar tables.

For beneficiaries who had a therapy-related surgery more than a month prior to therapy (or did not respond to the question), there is a further split on self-reported participation at cut point of 62.32 on the Rasch scale. For those with low participation (less than or equal to 62.32), there is a further split on clinician-observed mobility with a cut point of 46.08 on its Rasch scale. For those with low mobility, one final split on primary diagnosis appears in Figure 8-2. All of the nodes on the right side of tree diagram are part of the statistically optimal tree.

If the tree in Figure 8-2 were to be used in a payment system, there would be five payment groups:

1. Beneficiaries who *did not have surgery* or *had surgery within the past month* (the only terminal node on left side of the tree).

2. Beneficiaries who had a therapy-related surgery more than a month prior to therapy (or did not respond to the question) and had a "high" self-reported participation Rasch score (greater than 62.32).

3. Beneficiaries who had a therapy-related surgery more than a month prior to therapy (or did not respond to the question), had a low Rasch self-reported participation score, and a high clinician-observed mobility Rasch score.

4. Beneficiaries who had a therapy-related surgery more than a month prior to therapy (or did not respond to the question), had a low Rasch self-reported participation score, a low clinician-observed mobility Rasch score, and a primary diagnosis group 11 (Parkinson's and Other Progressive Neurological), 13 (Unspecified and Miscellaneous Neurological), or (Multiple Major Etiologies).

5. Beneficiaries who had a therapy-related surgery more than a month prior to therapy (or did not respond to the question), had a low Rasch self-reported participation score, a low clinician-observed mobility Rasch score, and a primary diagnosis group other than one of the three in class 4 above.

Classes 2 through 5 all represent examples of interactions between different variables.

Table 8-2 shows re-substitution relative errors, conventional R^2, cross-validated relative errors, and cross-validated R^2. The optimal model has the lowest cross-validated relative error of 0.98, or a cross-validated R^2 of 1.7 percent. The conventional R^2 of the optimal tree is 7.2 percent. The conventional R^2 of the 6-terminal-node tree shown in Figure 8-2 is 8.4 percent, but the cross-validated R^2 is nearly zero. In CART analysis, cross-validated R^2 can be negative. This occurs when the cross-validated error at a stage of the splitting process is greater than the cross-validated error without any splits (at the root node, when predicted expenditure is the mean of the entire sample).

8.4.3 PT Primary Diagnosis Model

For the PT-comprehensive and PT-payment models, aside from the requirement of a minimum of 10 observations for a terminal node, CART was allowed to choose based on the statistical model-fit criteria which variables to use and the order they were used in constructing the regression trees (case-mix groups). The CARE beneficiary diagnosis categories while appearing in the comprehensive (Figure 8-1) or the payment (Figure 8-2) models, are not the initial classification variables. However, in many Medicare and other case-mix classification systems, diagnosis is a primary classification variable, and is often used as the initial grouping variable. Using diagnosis as the initial grouping variable enhances clinical face validity because diagnosis identifies the underlying clinical problem that is the reason for treatment. Therefore, we decided to use an approach employed elsewhere by Medicare—to use primary diagnosis as the initial classification variable for payment groups.

No other explanatory variables were entered into the primary diagnosis model. In Section 8.7 we consider a "hierarchical" model where functional status (clinician-observed mobility) is used to split aggregated diagnosis categories. Unlike the comprehensive and payment models, we required a minimum of 100 observations for each terminal node for this section's PT primary diagnosis model

Unlike the two previous figures, **Figure 8-3** shows only the optimal tree which has eight terminal nodes. In Figure 8-3, we show the numbers of the diagnosis groups defining each node, and label the diagnosis groups in the 8 terminal nodes. None of the terminal nodes consist of just one primary diagnosis. The grouping of the primary diagnoses categories is on statistical grounds only, and might require adjustment for clinical face validity. For example, the grouping of vertigo and genitourinary disorders does not appear to have face validity. If the sample size were larger, perhaps this group would have been ultimately split by CART.

Table 8-3 shows the CART goodness-of-fit measures for each tree. The 8-terminal-node optimal tree, which is the full tree shown in Figure 8-3, has a cross-validated R^2 of 2.9 percent and a conventional R^2 of 3.6 percent. The conventional R^2 of the primary diagnosis tree is well below the 7.2 percent conventional R^2 of the 5-terminal-node payment model tree that extensively uses the Rasch function scales and other variables. And the cross-validated primary diagnosis model R^2 is about the same as for optimal comprehensive and payment trees.

Table 8-3 also shows that most of the maximum conventional and cross-validated explanatory power (R^2) of the primary diagnosis model does not change much as the number of terminal nodes changes. For example, the cross-validated R^2 with 3 terminal nodes is 2.6 percent, nearly identical to the 2.9 percent cross-validated R^2 of the optimal 8-node model.

Table 8-4 shows the CART optimal PT primary diagnosis groups, sorted in descending order of mean expenditures. These are the eight terminal nodes from Figure 8-4. The CART-defined primary diagnosis case-mix groups distinguish a 3 to 1 range of mean episode expenditures, from $2,009 for stroke, unspecified, and miscellaneous neurological to $694 for vertigo and genitourinary system. As mentioned above, some of the groups might not have clinical face validity. As expected, stroke is near the top as is progressive neurological, and sprains/strains and pain are near the bottom.

8.5 CART Empirical Results – Occupational Therapy

8.5.1 OT-Comprehensive Model

Figure 8-4 shows the tree with 10 terminal nodes as well as the optimal tree for the OT comprehensive model. The 533 beneficiaries comprising the root node (the entire OT sample) have mean episode expenditures of $1,319 with a standard error of $63. The statistically optimal tree contains only two terminal nodes and is based on whether the beneficiary is in a wheelchair full time. The 48 beneficiaries who were in a wheelchair full time have mean Medicare expenditures of $2,756 with a standard error of $365. The 485 beneficiaries who did not use a wheelchair full time have mean expenditures of $1,177 and a standard error of $57. The difference in expenditures between the two groups is $1,579.

In the non-optimal parts of the Figure 8-4 tree, for beneficiaries who use a *wheelchair full time*, OT primary diagnosis and Rasch *self-reported everyday activities* estimates were the only two additional explanatory variables CART considered. For beneficiaries who did not use a wheelchair full time, CART used *pain effects on activity*, *age*, *OT primary diagnosis*, *whether duration of health condition was reported*, Rasch *clinician-observed self-care* estimates, and secondary diagnosis to define case-mix groups. Although the sample sizes are small, the two nodes based on whether the duration of health condition was reported have a large difference in mean expenditures of $2,081. In particular, beneficiaries who did not report the duration had higher expenditures. It is possible that the non-reporting of duration might be representing other conditions related to high expenditures.

With only 533 beneficiaries in the sample, many of the terminal nodes in the 10-node tree shown in Figure 8-4 contain few beneficiaries and their mean expenditures have large standard errors. Such results based on very few beneficiaries must be viewed with caution. Aside from the small sample sizes, a different set of splitters seems suggested for the OT episodes than for PT episodes.

Table 8-5 shows the CART goodness-of-fit measures for each tree. The two-node optimal tree has a cross-validated R^2 of 8.4 percent and a conventional R^2 of 9.3 percent. The full 10-terminal-node tree shown in Figure 8-5 has a conventional R^2 of 23.9 percent but a negative cross-validated R^2.

8.5.2 OT-Payment Model

Figure 8-5 shows the tree with 10 terminal nodes as well as the optimal tree for the OT payment model. The optimal tree contains only the root node. This means that CART did not find any splits that reduced the cross-validated error below the error attained by using entire sample mean expenditures to predict each sample beneficiary's episode therapy expenditures. According to CART's statistical criteria, the best case-mix grouping for OT expenditures is a single group for all beneficiaries receiving OT services. The 533 beneficiaries comprising the root node had mean expenditures of $1,320 and a standard error of $63.

In the non-optimal parts of the Figure 8-5 tree, under the root node, there is a split based on Rasch self-reported every day activities with a cut point of 36.99. The 45 beneficiaries with a low Rasch score had mean Medicare expenditures of $2,282 with a standard error of $263. The 488 beneficiaries with a high Rasch score had mean expenditures of $1,231 and a standard error of $64. The difference in expenditures between the two groups is $1,051. For beneficiaries with a low Rasch activities score, *OT primary diagnosis and secondary diagnosis* were used by CART as additional explanatory variables. For beneficiaries with high Rasch activities scores, Medicaid *dual-eligibility* status, Rasch *clinician-observed self-care*, *OT body function*, *disability as original reason for Medicare eligibility*, *OT activity group reported*, and *when therapy-related surgery took place* were used by CART.

Many of the terminal nodes in the 10-node tree have few beneficiaries and case-mix groups must be viewed with considerable caution.

Table 8-6 shows the CART goodness-of-fit measures for each tree. The optimal tree (the entire sample) has a conventional R^2 of zero. While the 10-node tree has a conventional R^2 of 21 percent, its cross-validated R^2 is negative.

8.6 CART Empirical Results – Speech-Language Pathology

8.6.1 SLP-Comprehensive Model

Figure 8-6 shows the tree with 10 terminal nodes as well as the optimal tree for the SLP comprehensive model. The 187 beneficiaries comprising the root node (entire sample) have mean expenditures of $1,825 and a standard error of $131. The optimal tree contains only two terminal nodes and is based on the *clinician-observed problem-solving* scale, with a split at an estimated ability of 64.35 on a 0 (lowest ability) to 100 (highest ability) Rasch scale. The 89 beneficiaries with lower problem solving ability have mean Medicare expenditures of $2,517 with a standard error of $230. The 98 beneficiaries with higher problem solving ability have mean expenditures of $1,198 and a standard error of $101. The difference in expenditures between the two groups is $1,319.

In the non-optimal portion of the tree, for beneficiaries with lower problem solving ability, Rasch *clinician-observed problem solving* estimates, SLP *body structure*, and Rasch *clinician-observed speech* estimates served to subdivide the population into a series of terminal nodes with fewer than 25 observations each. For beneficiaries with higher problem solving ability, SLP medical diagnosis, SLP body function, when therapy-related surgery took place, and *gender* subdivided the population into terminal nodes with no more than 35 observations.

Table 8-7 shows the CART goodness-of-fit measures for each tree. The optimal tree (two terminal nodes) has a cross-validated R^2 of 8.7 percent while the conventional R^2 is 13.5 percent. The conventional R^2 reaches as high as 41 percent in **Table 8-7**, but the cross-validated R^2 are all negative aside from the optimal (two terminal node) tree.

8.6.2 SLP-Payment Model

Figure 8-7 shows the tree with 10 terminal nodes as well as the optimal tree for the SLP payment model. The optimal tree contains only two terminal nodes and is based on the Rasch *clinician-observed problem-solving* scale. The SLP payment model optimal tree is identical to the optimal tree for the SLP comprehensive model. Not only are the optimal trees identical, but Figures 8-6 and 8-7 are identical as well.

Table 8-8 shows the CART goodness-of-fit measures for each tree. The optimal tree has a cross-validated R^2 of 8.7 percent and a conventional R^2 of 13.5 percent. Although not identical to *Table 8-7*, the cross-validated R^2 and conventional R^2 in *Table 8-8* are similar for each of terminal node listed in the tables. The validation process is a likely reason why the two tables are similar but not identical. That is, the tables were generated in separate runs. As mentioned in the CART primer appendix, the validation process randomly assigns observations to ten groups. It is probably different beneficiaries randomly assigned to the 10 validation groups that accounts for the differences in the two tables.

8.7 Exploratory Physical Therapy Case-Mix Groups Based on Primary Diagnosis and Clinician-Observed Mobility Estimates

Instead of utilizing CART, we explored mean episode and annual expenditures for pre-defined exploratory case-mix groups for the PT sample. This analysis was not performed for the OT and SLP samples given their small sample sizes. Given the large set of explanatory variables examined in the regression and CART analyses, the motivation for this analysis was to examine expenditures for well-defined case-mix groups based on a reduced set of key explanatory variables. We selected two variables, primary diagnosis and clinician-observed mobility Rasch estimates, to define our exploratory case-mix groups. These exploratory case-mix groups were pre-defined based on clinical reasoning, and revised based on empirical results.

Primary diagnosis has conventionally been the key factor in existing case-mix group classifications, and was selected as the first case-mix classification variable. For this analysis, the 21 mutually exclusive primary diagnosis groups defined in Section 3 and used in the regression and CART analyses were collapsed into 12 aggregated groups, based on clinical and cost similarity. Clinician-observed mobility estimates were selected as the key functional status variable. In addition to clinical justification for using mobility status in defining PT case-mix groups, the clinician-observed mobility estimates were identified at multiple splits in the PT CART payment model, supporting their use. Primary diagnosis and motor functional ability are also key factors in the case-mix groups used in the Inpatient Rehabilitation Facility Prospective Payment System. While additional functional variables and demographic characteristics such as age may be important to explore in future analyses, we limited our initial case-mix variables to primary diagnosis and clinician-observed mobility, to allow for sufficient sample sizes to make inferences from the data.

We initially examined mean expenditures for 48 case-mix groups shown in ***Tables 8-9a*** (annual expenditures) and 8-10a (episode expenditures); these case-mix groups were defined by cross-classifying the 12 aggregated primary diagnosis groups and 4 categories of clinician-observed mobility Rasch estimates (0 to < 50, 50 to < 70, 70 to < 97, and ≥ 97). The mobility categories were chosen to capture a range of functioning from low to high, with sufficient sample size in each category. Upon examination of sample sizes and mean expenditures for these case-mix groups, we determined that further splitting based on clinician-observed mobility estimates added little additional information and may not be appropriate and/or necessary for the following diagnosis groups: Stroke, Joint Replacement, Parkinson's and Other Progressive Neurological, Circulatory and Pulmonary, Fracture, Genitourinary Conditions, and Vertigo. This determination was based on several factors, including inadequate sample sizes to reliably support mobility splits (e.g., Stroke, Parkinson's and Other Progressive Neurological); relatively well-defined, clinically homogeneous diagnosis groups with one or few diagnoses (e.g., Joint Replacement); minimal empirical cost differences and/or no clear monotonic cost trend by mobility estimate (e.g., Circulatory and Pulmonary); and limited clinical relevance of clinician-observed mobility estimates to the diagnosis group (e.g., Genitourinary Conditions). It is important to note that the above determinations are based on trends in the available data with its sample size restrictions; it is possible that examining therapy expenditures in larger samples may reveal different expenditure patterns.

Next, we created case-mix groups for the following five diagnosis groups stratified by clinician-observed mobility estimates: Unspecified and Miscellaneous Diagnoses; Multiple Etiologies, at least One Major; Osteoarthritis, Other Major Musculoskeletal, Unspecified Musculoskeletal; Peripheral Nervous System and Other Neurological Disorders; and Sprain, Strain, Bursitis, Tendonitis. The mean expenditure distributions for these five diagnosis groups in ***Tables 8-9a and 8-10a*** showed that, for the majority of diagnosis groups, the mobility estimate cutoff of 70 was the most important splitter, with the largest difference in expenditures noted between beneficiaries with estimates less than 70, compared with those who had estimates equal to or greater than 70. There was little variation in expenditures among beneficiaries below an estimate of 70, and those above an estimate of 70. Therefore, we collapsed the clinician-observed mobility estimate into dichotomous categories using a cutoff of 70. Collapsing the mobility estimate to dichotomous categories also strengthened sample sizes, particularly given the small number of beneficiaries with mobility estimates < 50.

Mean expenditures for the 10 case-mix groups that involve mobility splits for 5 primary diagnoses are shown in ***Tables 8-9b*** (annual expenditures) and 8-10b (episode expenditures). Within each diagnosis group, a clear difference is noted between the two mobility categories in mean episode and annual expenditures, suggesting that a mobility estimate of 70 may be a useful 'mobility modifier' to primary diagnosis. When these 10 groups are combined with the 7 diagnosis groups not split by mobility, 17 final case-mix groups are the result. The 17 final case-mix groups—7 primary diagnosis groups and 5 primary diagnosis groups split into higher and lower mobility subgroups—are shown in Tables 8-9c (annual expenditures) and 8-10c (episode expenditures). The percentage of variation in expenditures explained (unadjusted R^2) by the 17 final case-mix groups is 4.49 percent for annual expenditures and 4.22 percent for episode expenditures.

Future work could include further classification of the case-mix groups based on additional variables deemed important based on a priori clinical expectations, and/or identified as important in regression or CART analyses. Examples of other variables that may be explored for further case-mix classification include age, surgical status (e.g., surgery vs. no surgery), select CARE primary reason for therapy variables, and comorbidities. When defining case-mix groups in the future, it would be important to select variables that are well-suited for payment analyses, e.g., variables that are well-defined with low potential for gameability.

8.8 Conclusions

This section uses a statistical technique, Classification and Regression Trees (CART), to analyze therapy case-mix. The advantage of this technique over the regression analysis used in earlier Sections is that CART analyzes cross-classifications of variables more naturally than regression analysis, which typically presupposes a linear, additive relationship between case-mix variables and expenditures. CART analysis defines exhaustive and mutually exclusive case-mix groups. A major limitation of CART is that it defines case-mix groups using purely statistical criteria, and the resulting groups may lack clinical face validity. In our discussion, we focus on the results for PT, which has sufficient sample size to provide more statistically stable results than for OT and SLP.

The result of the PT CART analysis including the widest range of variables shows patient use of a walker and full-time wheelchair use to be among the most important variables defining case-mix groups. This indicates that beneficiary mobility and perhaps frailty is important in defining case-mix. For payment, it may be preferable to measure mobility using clinician assessment or patient report, not based on patient utilization of medical devices. Another utilization-related variable—timing of surgery—is also important in defining case-mix. Nevertheless, even the "comprehensive" model of PT case-mix achieves a maximum cross-validated R^2 of only 3.2 percent. The conclusion is that the vast majority of variation in PT episode expenditures is not explained by the available clinical, patient, and case-mix factors.

When a smaller set of "payment" case-mix variables are employed, timing of surgery followed by clinician-observed mobility and self-reported participation are most important. This is consistent with the stepwise regression analysis presented in Section 5. The maximum cross-validated R^2 using the payment variables is 1.7 percent, which is about half of what is attained with the larger comprehensive set of variables.

Since primary diagnosis is a key and initial case-mix classification variable in many existing Medicare case-mix systems, but the unguided CART classifications did not statistically choose to begin groupings with diagnosis, we examined PT case-mix groups beginning with primary diagnosis. A CART analysis on our 21 mutually exclusive primary diagnosis groups defined 8 terminal aggregated diagnosis groups, and achieved a cross-validated R^2 of 2.9 percent, which approaches the cross-validated R^2 achieved from the comprehensive model.

We also defined 12 aggregated PT primary diagnosis groups from our 21 groups using clinical and cost criteria (but without using CART), and cross-classified them with pre-defined clinician-observed mobility categories. We split 5 of the 12 diagnostic groups using Rasch mobility estimates of less than or greater than or equal to 70 (on a scale of 0 = lowest mobility and 100 = highest mobility). This process resulted in 17 final case-mix groups, 7 based on diagnosis alone and 10 based on 5 diagnosis groups split into higher and lower mobility subgroups. This process assigned a greater role to clinical judgment, payment policy considerations, simplicity, and face validity than the CART analyses, and utilized only two key variables—primary diagnosis and clinician-observed mobility—from among the large number of potential case-mix variables. This method could be expanded with more variables and more splits, but, as is true of all of the case-mix analyses, it would be limited by available sample sizes.

In the OT CART analyses, full-time wheelchair use was the most important variable in the comprehensive model, and self-reported everyday activities was the most important among the variables considered suitable for payment. In the SLP CART analysis, clinician-observed problem solving skills was the most important variable in both the comprehensive and payment models.

Table 8-1
CART regression tree goodness of fit for CARE-C physical therapy episode expenditures, comprehensive specification

Terminal nodes	Resubstitution relative error	Conventional R^2	Cross-validated relative error	Cross-validated R^2
1	1.00000	0.00000	1.00001	-0.00001
*2	0.96691	0.03309	0.96825	0.03175
4	0.92855	0.07145	0.97215	0.02785
5	0.91559	0.08441	0.97323	0.02677
6	0.90633	0.09367	0.97566	0.02434
**7	0.89985	0.10015	0.98672	0.01328
9	0.88770	0.11230	0.99402	0.00598
10	0.88168	0.11832	0.99926	0.00074
11	0.87591	0.12409	1.00438	-0.00438
12	0.87098	0.12902	1.01304	-0.01304
13	0.86635	0.13365	1.01360	-0.01360

NOTES:
1. Episode Definition = Variable length episode with 60-day terminating clean period
2. Conventional R^2 = 1 - Resubstitution Relative Error
3. Cross-Validated R^2 = 1 - Cross-Validated Relative Error

*This tree represents the "statistically optimal" tree with the lowest cross-validated relative error.
**This tree was presented in the report as Figure 8.1.
SOURCE: RTI International analyses of CARE-C and Claims data for the CARE/Claims sample.
Program: PT_Full_v02

Table 8-2
CART regression tree goodness of fit for CARE-C physical therapy episode expenditures, payment specification

Terminal nodes	Resubstitution relative error	Conventional R^2	Cross-validated relative error	Cross-validated R^2
1	1.00000	0.00000	1.00001	-0.00001
2	0.97215	0.02785	0.99095	0.00905
*5	0.92792	0.07208	0.98333	0.01667
**6	0.91634	0.08366	0.99718	0.00282
9	0.89444	0.10556	1.00058	-0.00058
10	0.88865	0.11135	1.00031	-0.00031
11	0.88302	0.11698	1.00229	-0.00229
12	0.87835	0.12165	1.00120	-0.00120
14	0.86911	0.13089	1.00079	-0.00079
16	0.86195	0.13805	1.00730	-0.00730
17	0.85850	0.14150	1.00721	-0.00721

NOTES:
1. Episode Definition = Variable length episode with 60-day terminating clean period
2. Conventional R^2 = 1 - Resubstitution Relative Error
3. Cross-Validated R^2 = 1 - Cross-Validated Relative Error

*This tree represents the "statistically optimal" tree with the lowest cross-validated relative error.

**This tree was presented in the report as Figure 8.2.

SOURCE: RTI International analyses of CARE-C and Claims data for the CARE/Claims sample.

Program: PT_Paymt_v03

Table 8-3
CART regression tree goodness of fit for CARE-C physical therapy episode expenditures, primary diagnosis specification

Terminal nodes	Resubstitution relative error	Conventional R^2	Cross-validated relative error	Cross-validated R^2
1	1.00000	0.00000	1.00001	-0.00001
2	0.97693	0.02307	0.98194	0.01806
3	0.96842	0.03158	0.97399	0.02601
4	0.96698	0.03302	0.97561	0.02439
5	0.96553	0.03447	0.97593	0.02407
6	0.96469	0.03531	0.97360	0.02640
7	0.96389	0.03611	0.97121	0.02879
**8	0.96371	0.03629	0.97091	0.02909
9	0.96366	0.03634	0.97127	0.02873
10	0.96360	0.03640	0.97143	0.02857
11	0.96357	0.03643	0.97148	0.02852
12	0.96356	0.03644	0.97137	0.02863
13	0.96356	0.03644	0.97134	0.02866

NOTES:

1. Episode Definition = Variable length episode with 60-day terminating clean period
2. Conventional R^2 = 1 - Resubstitution Relative Error
3. Cross-Validated R^2 = 1 - Cross-Validated Relative Error

**This tree represents the "statistically optimal" tree with the lowest cross-validated relative error. This tree was also presented in the report as Figure 8.3.

SOURCE: RTI International analyses of CARE-C and Claims data for the CARE/Claims sample.

Program: PT_Heir_v04

Table 8-4
CART CARE-C physical therapy primary medical diagnosis groups, in descending order of episode mean expenditures

Primary medical diagnosis group	N	Mean episode expenditure ($)	SE
Entire Sample	4,825	1,335	20
Stroke, Unspecified and Miscellaneous Neurological	133	2,009	213
Joint Replacement, Parkinson's and Other Progressive Neurological	637	1,744	75
Fracture, Circulatory (including Lymphatic) and Pulmonary/Respiratory, Unspecified and Miscellaneous Diagnoses	422	1,564	71
Spinal Stenosis, Multiple Major Etiologies, Multiple Etiologies, One Major, No Primary Diagnosis	887	1,374	50
Herniated Disc and Other Major Musculoskeletal, Unspecified and Miscellaneous Musculoskeletal	1076	1,315	39
Osteoarthritis, Peripheral Nervous System and Other Major Neurological Disorders	805	1,186	36
Sprain/Strain, Bursitis/Tendonitis, Pain, Multiple Etiologies, no major	753	981	34
Vertigo, Genitourinary Disorders	112	694	75

NOTES:

1. N = Number of cases in each terminal primary medical diagnosis group; SE = Standard Error of the mean
2. Episode Definition = Variable length episode with 60-day terminating clean period
3. This table represents the output from the "statistically optimal" tree with the lowest cross-validated relative error.
4. This tree is presented in the report as Figure 8.3.

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims/CARE data.

Program: PT_Heir_v04

Table 8-5
CART regression tree goodness of fit for CARE-C occupational therapy episode expenditures, comprehensive specification

Terminal nodes	Resubstitution relative error	Conventional R^2	Cross-validated relative error	Cross-validated R^2
1	1.00000	0.00000	1.00019	-0.00019
*2	0.90711	0.09289	0.91510	0.08490
3	0.86895	0.13105	0.97589	0.02411
4	0.85007	0.14993	0.97859	0.02141
7	0.79735	0.20265	0.99223	0.00777
9	0.77248	0.22752	1.00659	-0.00659
**10	0.76116	0.23884	1.01603	-0.01603
11	0.75172	0.24828	1.00100	-0.00100
12	0.74427	0.25573	1.02290	-0.02290
13	0.73859	0.26141	1.03516	-0.03516
15	0.73030	0.26970	1.04136	-0.04136

NOTES:
1. Episode Definition = Variable length episode with 60-day terminating clean period
2. Conventional R^2 = 1 - Resubstitution Relative Error
3. Cross-Validated R^2 = 1 - Cross-Validated Relative Error

*This tree represents the "statistically optimal" tree with the lowest cross-validated relative error.

**This tree represents the "statistically optimal" tree with the lowest cross-validated relative error. This tree was also presented in the report as Figure 8.4.

SOURCE: RTI International analyses of CARE-C and Claims data for the CARE/Claims sample.

Program: OT_Full_v03

Table 8-6
CART regression tree goodness of fit for CARE-C occupational therapy episode expenditures, payment specification

Terminal nodes	Resubstitution relative error	Conventional R^2	Cross-validated relative error	Cross-validated R^2
*1	1.00000	0.00000	1.00019	-0.00019
5	0.83700	0.16300	1.05658	-0.05658
6	0.82233	0.17767	1.11080	-0.11080
7	0.81060	0.18940	1.12069	-0.12069
8	0.80195	0.19805	1.11568	-0.11568
**10	0.79032	0.20968	1.12476	-0.12476
11	0.78462	0.21538	1.12476	-0.12476
13	0.77356	0.22644	1.13109	-0.13109
14	0.76857	0.23143	1.13817	-0.13817
15	0.76362	0.23638	1.13817	-0.13817
19	0.74452	0.25548	1.11902	-0.11902

NOTES:
1. Episode Definition = Variable length episode with 60-day terminating clean period
2. Conventional R^2 = 1 - Resubstitution Relative Error
3. Cross-Validated R^2 = 1 - Cross-Validated Relative Error

*This tree represents the "statistically optimal" tree with the lowest cross-validated relative error.
**This tree was presented in the report as Figure 8.5.
SOURCE: RTI International analyses of CARE-C and Claims data for the CARE/Claims sample.
Program: OT_Paymt_v03

Table 8-7
CART regression tree goodness of fit for CARE-C speech-language pathology episode expenditures, comprehensive specification

Terminal nodes	Resubstitution relative error	Conventional R^2	Cross-validated relative error	Cross-validated R^2
1	1.00000	0.00000	1.00098	-0.00098
*2	0.86472	0.13528	0.91326	0.08674
4	0.74969	0.25031	1.09226	-0.09226
5	0.69543	0.30457	1.00838	-0.00838
6	0.66484	0.33516	1.02571	-0.02571
7	0.64414	0.35586	1.03043	-0.03043
**10	0.60524	0.39476	1.05444	-0.05444
11	0.59842	0.40158	1.06208	-0.06208
12	0.59180	0.40820	1.07002	-0.07002
13	0.58614	0.41386	1.08791	-0.08791
14	0.58478	0.41522	1.09133	-0.09133

NOTES:

1. Episode Definition = Variable length episode with 60-day terminating clean period
2. Conventional R^2 = 1 - Resubstitution Relative Error
3. Cross-Validated R^2 = 1 - Cross-Validated Relative Error

*This tree represents the "statistically optimal" tree with the lowest cross-validated relative error.

**This tree was presented in the report as Figure 8.6.

SOURCE: RTI International analyses of CARE-C and Claims data for the CARE/Claims sample.

Program: SLP_Full_v03

Table 8-8
CART regression tree goodness of fit for CARE-C speech-language pathology episode expenditures, payment specification

Terminal nodes	Resubstitution relative error	Conventional R^2	Cross-validated relative error	Cross-validated R^2
1	1.00000	0.00000	1.00098	-0.00098
*2	0.86472	0.13528	0.91326	0.08674
4	0.74969	0.25031	1.07078	-0.07078
5	0.69543	0.30457	0.99841	0.00159
6	0.66484	0.33516	1.02030	-0.02030
7	0.64414	0.35586	1.02668	-0.02668
**10	0.60524	0.39476	1.04180	-0.04180
11	0.59670	0.40330	1.06231	-0.06231
12	0.59008	0.40992	1.09320	-0.09320
13	0.58804	0.41196	1.09449	-0.09449
14	0.58722	0.41278	1.09312	-0.09312

NOTES:
1. Episode Definition = Variable length episode with 60-day terminating clean period
2. Conventional R^2 = 1 - Resubstitution Relative Error
3. Cross-Validated R^2 = 1 - Cross-Validated Relative Error

*This tree represents the "statistically optimal" tree with the lowest cross-validated relative error.
**This tree was presented in the report as Figure 8.7.
SOURCE: RTI International analyses of CARE-C and Claims data for the CARE/Claims sample.
Program: SLP_Paymt_v03

Table 8-9
Annual expenditures for exploratory case-mix groups stratified by diagnosis and clinician-observed mobility Rasch estimates: CARE-C physical therapy admission assessments

Table 8-9a
Annual expenditures for the total PT sample and 48 case-mix groups (12 diagnosis groups stratified by four (4) clinician-observed mobility estimate ranges)

Exploratory case-mix groups	N	Mean annual expenditure	SE	Minimum annual expenditure	Maximum annual expenditure
Stroke					
0 ≤ CO Mobility estimate < 50	14	2,751	494.19	526	6,002
50 ≤ CO Mobility estimate < 70	31	2,076	475.64	77	14,603
70 ≤ CO Mobility estimate < 97	19	2,073	300.70	281	4,124
CO Mobility estimate ≥ 97	†	†	†	†	†
Joint replacement					
0 ≤ CO Mobility estimate < 50	16	2,655	592.57	138	10,418
50 ≤ CO Mobility estimate < 70	122	2,103	139.41	78	7,438
70 ≤ CO Mobility estimate < 97	234	1,771	98.3	77	9,472
CO Mobility estimate ≥ 97	96	2,067	212.07	71	10,766
Parkinson's and other progressive neurological					
0 ≤ CO Mobility estimate < 50	15	3,294	992.78	428	14,690
50 ≤ CO Mobility estimate < 70	22	2,124	436.38	107	8,156
70 ≤ CO Mobility estimate < 97	19	1,028	137.11	202	2,024
CO Mobility estimate ≥ 97	†	†	†	†	†
Circulatory & pulmonary					
0 ≤ CO Mobility estimate < 50	†	†	†	†	†
50 ≤ CO Mobility estimate < 70	22	1,713	369.98	109	7,170
70 ≤ CO Mobility estimate < 97	27	1,681	330.89	193	6,462
CO Mobility estimate ≥ 97	†	†	†	†	†

(continued)

Table 8-9a (continued)
Annual expenditures for the total PT sample and 48 case-mix groups (12 diagnosis groups stratified by four (4) clinician-observed mobility estimate ranges)

Exploratory case-mix groups	N	Mean annual expenditure	SE	Minimum annual expenditure	Maximum annual expenditure
Fracture					
0 ≤ CO Mobility estimate < 50	23	1,803	305.32	69	6,532
50 ≤ CO Mobility estimate < 70	50	1,759	214.11	276	6,853
70 ≤ CO Mobility estimate < 97	101	1,641	167.28	72	8,945
CO Mobility estimate ≥ 97	32	1,183	182.83	75	4,515
Unspecified & miscellaneous diagnoses					
0 ≤ CO Mobility estimate < 50	23	2,595	532.5	79	9,537
50 ≤ CO Mobility estimate < 70	48	1,784	270.83	124	9,661
70 ≤ CO Mobility estimate < 97	100	1,262	126.67	82	5,592
CO Mobility estimate ≥ 97	33	1,148	164.63	131	4,570
Multiple etiologies, at least one major					
0 ≤ CO Mobility estimate < 50	31	2,168	520.74	115	14,391
50 ≤ CO Mobility estimate < 70	134	1,900	133.01	95	9,108
70 ≤ CO Mobility estimate < 97	185	1,430	89.98	77	7,191
CO Mobility estimate ≥ 97	110	1,318	98.94	75	5,731
Osteoarthritis, other major musculoskeletal, unspecified musculoskeletal					
0 ≤ CO Mobility estimate < 50	56	1,889	251.9	73	8,120
50 ≤ CO Mobility estimate < 70	320	1,864	91.13	81	12,056
70 ≤ CO Mobility estimate < 97	845	1,282	42.05	20	13,672
CO Mobility estimate ≥ 97	595	1,356	51.89	71	10,568
Peripheral Nervous System and Other Neurological Disorders					
0 ≤ CO Mobility estimate < 50	15	2,945	800.44	383	8,724
50 ≤ CO Mobility estimate < 70	34	1,936	339.25	71	9,120
70 ≤ CO Mobility estimate < 97	39	1,376	151.23	140	4,380
CO Mobility estimate ≥ 97	29	1,116	187.06	74	3,739

(continued)

Table 8-9a (continued)
Annual expenditures for the total PT sample and 48 case-mix groups (12 diagnosis groups stratified by four (4) clinician-observed mobility estimate ranges)

Exploratory case-mix groups	N	Mean annual expenditure	SE	Minimum annual expenditure	Maximum annual expenditure
Sprain, strain, bursitis, tendonitis					
0 ≤ CO Mobility estimate < 50	12	1,332	492.63	195	5,903
50 ≤ CO Mobility estimate < 70	61	1,507	220.41	97	10,214
70 ≤ CO Mobility estimate < 97	290	1,048	58.85	86	5,853
CO Mobility estimate ≥ 97	239	1,115	64.2	73	5,903
Genitourinary conditions					
0 ≤ CO Mobility estimate < 50	†	†	†	†	†
50 ≤ CO Mobility estimate < 70	†	†	†	†	†
70 ≤ CO Mobility estimate < 97	18	940	140.53	195	2,082
CO Mobility estimate ≥ 97	†	†	†	†	†
Vertigo					
0 ≤ CO Mobility estimate < 50	†	†	†	†	†
50 ≤ CO Mobility estimate < 70	23	858	146.28	82	3,315
70 ≤ CO Mobility estimate < 97	39	809	262.42	74	10,196
CO Mobility estimate ≥ 97	†	†	†	†	†
Total PT sample					
0 ≤ CO Mobility estimate < 50	215	2,209	162.58	69	14,690
50 ≤ CO Mobility estimate < 70	871	1,850	56.91	71	14,603
70 ≤ CO Mobility estimate < 97	1,916	1,339	29.36	20	13,672
CO Mobility estimate ≥ 97	1,163	1,349	37.82	71	10,766

NOTES:
† = Fewer than 11 cases.
1. PT = Physical Therapy; CO = Clinician-Observed; Rasch Estimate range: 0 (lowest ability)–100 (highest ability).
2. The count column refers to the number of beneficiaries within the diagnosis group whose CO Mobility estimate falls within the specified ranges.
3. Annual Period: March 2011–February 2012
4. SE = Standard error of the mean
5. Mean expenditures for the total PT sample stratified by mobility estimates are shown for comparison.

SOURCE: RTI analysis of 2011–2012 Outpatient Therapy Medicare Claims and CARE data.
Programs: PA022

Table 8-9
Annual expenditures for exploratory case-mix groups stratified by diagnosis and clinician-observed mobility Rasch estimates: CARE-C physical therapy admission assessments

Table 8-9b
Annual expenditures for 10 case-mix groups (5 diagnosis groups stratified by two (2) clinician-observed mobility estimate ranges)

Exploratory case-mix groups	N	Mean annual expenditure	SE	Minimum annual expenditure	Maximum annual expenditure
Unspecified & miscellaneous diagnoses					
0 ≤ CO Mobility estimate < 70	71	2,047	253.41	79	9,661
CO Mobility estimate ≥ 70	133	1,234	103.43	82	5,592
Multiple etiologies, at least one major					
0 ≤ **CO** Mobility estimate < 70	165	1,950	145.05	95	14,391
CO Mobility estimate ≥ 70	295	1,389	67.39	75	7,191
Osteoarthritis, other major musculoskeletal, unspecified musculoskeletal					
0 ≤ CO Mobility estimate < 70	376	1,868	86.02	73	12,056
CO Mobility estimate ≥ 70	1,440	1,313	32.69	20	13,672
Peripheral nervous system and other neurological disorders					
0 ≤ CO Mobility estimate < 70	49	2,244	341.49	71	9,120
CO Mobility estimate ≥ 70	68	1,265	117.99	74	4,380
Sprain, strain, bursitis, tendonitis					
0 ≤ CO Mobility estimate < 70	73	1,478	199.95	97	10,214
CO Mobility estimate ≥ 70	529	1,078	43.37	73	5,903

NOTES:

1. PT = Physical Therapy; CO = Clinician-Observed; Rasch estimate range: 0 (low ability)–100 (high ability).
2. The count column refers to the number of beneficiaries within the diagnosis group whose CO Mobility estimate falls within the specified ranges.
3. Annual Period: March 2011–February 2012
4. SE = Standard error of the mean

SOURCE: RTI analysis of 2011–2012 Outpatient Therapy Medicare Claims and CARE data.

Programs: PA022

Table 8-9
Annual expenditures for exploratory case-mix groups stratified by diagnosis and clinician-observed mobility Rasch estimates: CARE-C physical therapy admission assessments

Table 8-9c
Annual expenditures for exploratory case-mix groups stratified by diagnosis and clinician-observed mobility Rasch estimates: CARE-C physical therapy admission assessments

Exploratory case-mix groups	N	Mean annual expenditure	SE
Stroke	71	2,157	249.06
Joint replacement	468	1,949	77.94
Parkinson's and other progressive neurological	64	2,063	297.57
Circulatory and pulmonary	61	1,663	216.31
Fracture	206	1,617	106.97
Unspecified and miscellaneous diagnoses			
0 ≤ CO Mobility estimate < 70	71	2,047	253.41
CO Mobility estimate ≥ 70	133	1,234	103.43
Multiple etiologies, at least one major			
0 ≤ CO Mobility estimate < 70	165	1,950	145.05
CO Mobility estimate ≥ 70	295	1,389	67.39
Osteoarthritis, other major musculoskeletal, unspecified musculoskeletal			
0 ≤ CO Mobility estimate < 70	376	1,868	86.02
CO Mobility estimate ≥ 70	1,440	1,313	32.69
Peripheral nervous system and other neurological disorders			
0 ≤ CO Mobility estimate < 70	49	2,244	341.49
CO Mobility estimate ≥ 70	68	1,265	117.99
Sprain, strain, bursitis, and tendonitis			
0 ≤ CO Mobility estimate < 70	73	1,478	199.95
CO Mobility estimate ≥ 70	529	1,078	43.37
Genitourinary conditions	26	922	115.51
Vertigo	70	800	153.55

NOTES:
1. PT = Physical Therapy; CO = Clinician-Observed; Rasch Estimate range: 0 (low ability) – 100 (high ability);
2. The count column refers to the number of beneficiaries within the diagnosis group whose CO Mobility estimate falls within the specified ranges.
3. Annual Period: March 2011 - February 2012
4. SE = Standard error of the mean
5. When the 17 groups were included in a regression model predicting annual PT expenditures, 4.49 percent of the variation in expenditures was explained by the 17 groups (R^2=0.0449).

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims and CARE data.
Programs: PA022

Table 8-10
Episode expenditures for exploratory case-mix groups stratified by diagnosis and clinician-observed mobility Rasch estimates: CARE-C physical therapy admission assessments

Table 8-10a
Episode expenditures for the total PT sample and 48 case-mix groups (12 diagnosis groups stratified by four (4) clinician-observed mobility estimate ranges)

Exploratory case-mix groups	N	Mean annual expenditure	SE	Minimum annual expenditure	Maximum annual expenditure
Stroke					
0 ≤ CO Mobility estimate < 50	13	2,384	569.04	165	6,495
50 ≤ CO Mobility estimate < 70	34	2,204	438.02	77	14,663
70 ≤ CO Mobility estimate < 97	20	1,660	324.87	196	5,642
CO Mobility estimate ≥ 97	†	†	†	†	†
Joint replacement					
0 ≤ CO Mobility estimate < 50	17	2,951	936.6	138	17,306
50 ≤ CO Mobility estimate < 70	154	2,007	114.79	153	8,585
70 ≤ CO Mobility estimate < 97	285	1,520	75.73	67	10,130
CO Mobility estimate ≥ 97	108	1,795	252.21	71	21,574
Parkinson's and other progressive neurological					
0 ≤ CO Mobility estimate < 50	15	2,697	1363.03	242	21,557
50 ≤ CO Mobility estimate < 70	24	1,617	254.57	107	5,470
70 ≤ CO Mobility estimate < 97	23	1,002	120.51	111	2,108
CO Mobility estimate ≥ 97	†	†	†	†	†
Circulatory & pulmonary					
0 ≤ CO Mobility estimate < 50	†	†	†	†	†
50 ≤ CO Mobility estimate < 70	26	1,592	303.25	203	6,751
70 ≤ CO Mobility estimate < 97	28	1,582	314.67	82	5,987
CO Mobility estimate ≥ 97	†	†	†	†	†

(continued)

Table 8-10a (continued)
Episode expenditures for the total PT sample and 48 case-mix groups (12 diagnosis groups stratified by four (4) clinician-observed mobility estimate ranges)

Exploratory case-mix groups	N	Mean annual expenditure	SE	Minimum annual expenditure	Maximum annual expenditure
Fracture					
0 ≤ CO Mobility estimate < 50	24	1,510	227.63	228	4,555
50 ≤ CO Mobility estimate < 70	56	1,674	196.64	72	6,853
70 ≤ CO Mobility estimate < 97	108	1,598	150.88	72	6,994
CO Mobility estimate ≥ 97	33	1,422	193.77	348	5,691
Unspecified & miscellaneous diagnoses					
0 ≤ CO Mobility estimate < 50	24	2,099	274.67	239	5,389
50 ≤ CO Mobility estimate < 70	57	1,621	195.96	124	8,820
70 ≤ CO Mobility estimate < 97	111	1,214	112.98	104	6,094
CO Mobility estimate ≥ 97	41	1,094	141.27	82	4,261
Multiple etiologies, at least one major					
0 ≤ CO Mobility estimate < 50	37	1,991	526.26	81	18,879
50 ≤ CO Mobility estimate < 70	156	1,532	100.62	110	7,289
70 ≤ CO Mobility estimate < 97	202	1,232	75.24	117	8,450
CO Mobility estimate ≥ 97	131	1,260	88.77	70	5,458
Osteoarthritis, other major musculoskeletal, unspecified musculoskeletal					
0 ≤ CO Mobility estimate < 50	67	1,743	186.57	77	6,771
50 ≤ CO Mobility estimate < 70	378	1,618	73.98	81	12,056
70 ≤ CO Mobility estimate < 97	977	1,152	37.17	70	20,823
CO Mobility estimate ≥ 97	662	1,222	49.12	71	13,232
Peripheral nervous system and other neurological disorders					
0 ≤ CO Mobility estimate < 50	17	3,267	1122.62	81	16,147
50 ≤ CO Mobility estimate < 70	38	1,948	289.49	78	8,118
70 ≤ CO Mobility estimate < 97	45	1,098	119.15	64	3,514
CO Mobility estimate ≥ 97	32	910	128.43	74	3,097

(continued)

Table 8-10a (continued)
Episode expenditures for the total PT sample and 48 case-mix groups (12 diagnosis groups stratified by four (4) clinician-observed mobility estimate ranges)

Exploratory case-mix groups	N	Mean annual expenditure	SE	Minimum annual expenditure	Maximum annual expenditure
Sprain, strain, bursitis, tendonitis					
0 ≤ CO Mobility estimate < 50	14	1,311	427.68	195	6,120
50 ≤ CO Mobility estimate < 70	69	1,243	186.72	119	12,139
70 ≤ CO Mobility estimate < 97	329	915	44.64	57	6,242
CO Mobility estimate ≥ 97	278	974	49.72	82	4,775
Genitourinary conditions					
0 ≤ CO Mobility estimate < 50	†	†	†	†	†
50 ≤ CO Mobility estimate < 70	†	†	†	†	†
70 ≤ CO Mobility estimate < 97	18	828	128.05	122	2,082
CO Mobility estimate ≥ 97	†	†	†	†	†
Vertigo					
0 ≤ CO Mobility estimate < 50	†	†	†	†	†
50 ≤ CO Mobility estimate < 70	28	727	116.72	82	2,691
70 ≤ CO Mobility estimate < 97	48	617	143.49	74	6,602
CO Mobility estimate ≥ 97	†	†	†	†	†
Total PT sample					
0 ≤ CO Mobility estimate < 50	239	2,037	174.72	77	21,557
50 ≤ CO Mobility estimate < 70	1,024	1,645	46.39	72	14,663
70 ≤ CO Mobility estimate < 97	2,194	1,190	24.77	57	20,823
CO Mobility estimate ≥ 97	1,318	1,219	36.83	70	21,574

NOTES:
† = Fewer than 11 cases.
1. PT = Physical Therapy; CO = Clinician-Observed; Rasch Estimate range: 0 (lowest ability)–100 (highest ability).
2. The count column refers to the number of beneficiaries within the diagnosis group whose CO Mobility estimate falls within the specified ranges.
3. Annual Period: March 2011–February 2012
4. SE = Standard error of the mean
5. Mean expenditures for the total PT sample stratified by mobility estimates are shown for comparison.

SOURCE: RTI analysis of 2011–2012 Outpatient Therapy Medicare Claims and CARE data.
Programs: PA021

Table 8-10
Episode expenditures for exploratory case-mix groups stratified by diagnosis and clinician-observed mobility Rasch estimates: CARE-C physical therapy admission assessments

Table 8-10b
Episode expenditures for 10 case-mix groups (5 diagnosis groups stratified by two (2) clinician-observed mobility estimate ranges)

Exploratory case-mix groups	N	Mean annual expenditure	SE	Minimum annual expenditure	Maximum annual expenditure
Unspecified & miscellaneous diagnoses					
0 ≤ CO Mobility estimate < 70	81	1,763	161.05	124	8,820
CO Mobility estimate ≥ 70	152	1,181	90.75	82	6,094
Multiple etiologies, at least one major					
0 ≤ CO Mobility estimate < 70	193	1,620	129.35	81	18,879
CO Mobility estimate ≥ 70	333	1,243	57.39	70	8,450
Osteoarthritis, other major musculoskeletal, unspecified musculoskeletal					
0 ≤ CO Mobility estimate < 70	445	1,636	68.79	77	12,056
CO Mobility estimate ≥ 70	1,639	1,181	29.75	70	20,823
Peripheral nervous system and other neurological disorders					
0 ≤ CO Mobility estimate < 70	55	2,355	402.46	78	16,147
CO Mobility estimate ≥ 70	77	1,020	87.82	64	3,514
Sprain, strain, bursitis, tendonitis					
0 ≤ CO Mobility estimate < 70	83	1,255	170.10	119	12,139
CO Mobility estimate ≥ 70	607	942	32.22	57	6,242

NOTES:

1. PT = Physical Therapy; CO = Clinician-Observed; Rasch estimate range: 0 (low ability)–100 (high ability).
2. The count column refers to the number of beneficiaries within the diagnosis group whose CO Mobility estimate falls within the specified ranges.
3. Annual Period: March 2011–February 2012
4. SE = Standard error of the mean

SOURCE: RTI analysis of 2011–2012 Outpatient Therapy Medicare Claims and CARE data.

Programs: PA021

Table 8-10
Episode expenditures for exploratory case-mix groups stratified by diagnosis and clinician-observed mobility Rasch estimates: CARE-C physical therapy admission assessments

Table 8-10c
Episode expenditures for exploratory case-mix groups stratified by diagnosis and clinician-observed mobility Rasch estimates: CARE-C physical therapy admission assessments

Exploratory case-mix groups	N	Mean episode expenditure	SE
Stroke	75	1,968	243.41
Joint replacement	564	1,749	75.26
Parkinson's and other progressive neurological	71	1,716	308.18
Circulatory and pulmonary	67	1,633	210.49
Fracture	221	1,581	96.41
Unspecified and miscellaneous diagnoses			
0 ≤ CO Mobility estimate < 70	81	1,763	161.05
CO Mobility estimate ≥ 70	152	1,181	90.75
Multiple etiologies, at least one major			
0 ≤ CO Mobility estimate < 70	193	1,620	129.35
CO Mobility estimate ≥ 70	333	1,243	57.39
Osteoarthritis, other major musculoskeletal, unspecified musculoskeletal			
0 ≤ CO Mobility estimate < 70	445	1,636	68.79
CO Mobility estimate ≥ 70	1,639	1,181	29.75
Peripheral nervous system and other neurological disorders			
0 ≤ CO Mobility estimate < 70	55	2,355	402.46
CO Mobility estimate ≥ 70	77	1,020	87.82
Sprain, strain, bursitis, and tendonitis			
0 ≤ CO Mobility estimate < 70	83	1,255	170.1
CO Mobility estimate ≥ 70	607	942	32.22
Genitourinary conditions	27	768	99.72
Vertigo	85	670	94.52

NOTES:

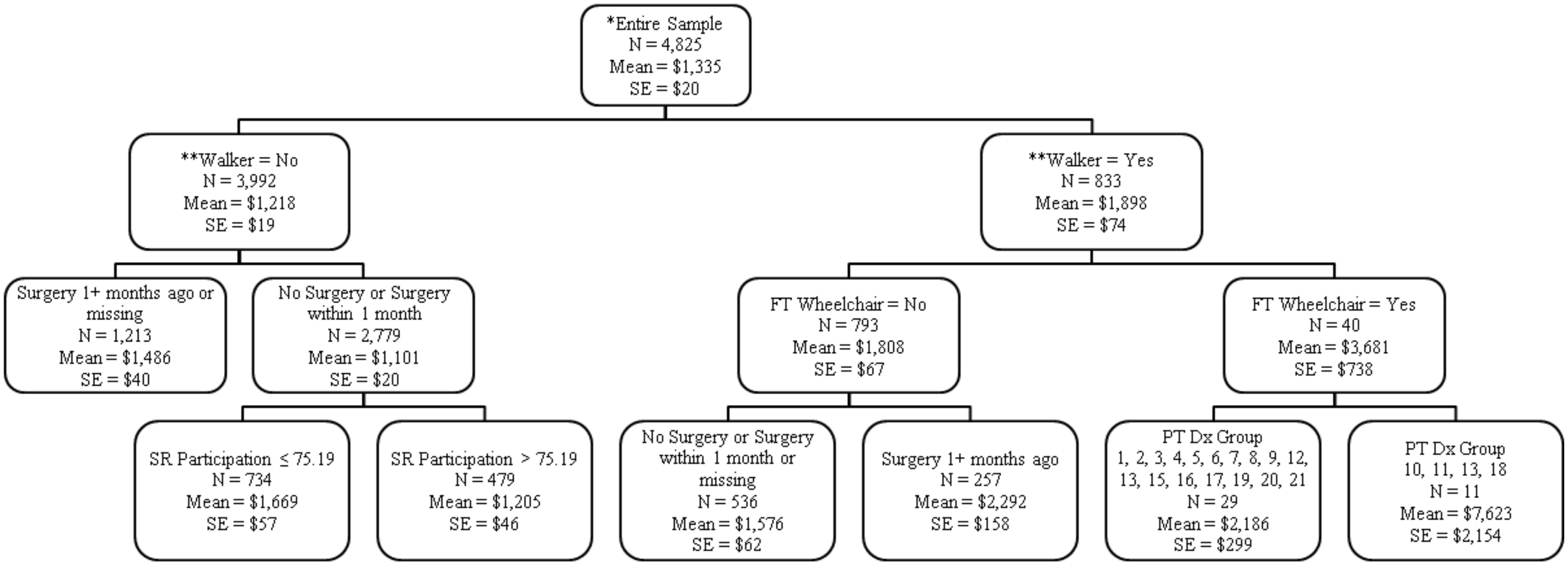
1. PT = Physical Therapy; CO = Clinician-Observed; Rasch Estimate range: 0 (low ability) – 100 (high ability);
2. The count column refers to the number of beneficiaries within the diagnosis group whose CO Mobility estimate falls within the specified ranges.
3. Annual Period: March 2011 - February 2012
4. SE = Standard error of the mean
5. When the 17 groups were included in a regression model predicting episode PT expenditures, 4.22 percent of the variation in expenditures was explained by the 17 groups (R^2=0.0422).

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims and CARE data.

Programs: PA021

INFORMATION NOT RELEASABLE TO THE PUBLIC UNLESS AUTHORIZED BY LAW: This information has not been publicly disclosed and may be privileged and confidential. It is for internal government use only and must not be disseminated, distributed, or copied to persons not authorized to receive the information. Unauthorized disclosure may result in prosecution to the full extent of the law.

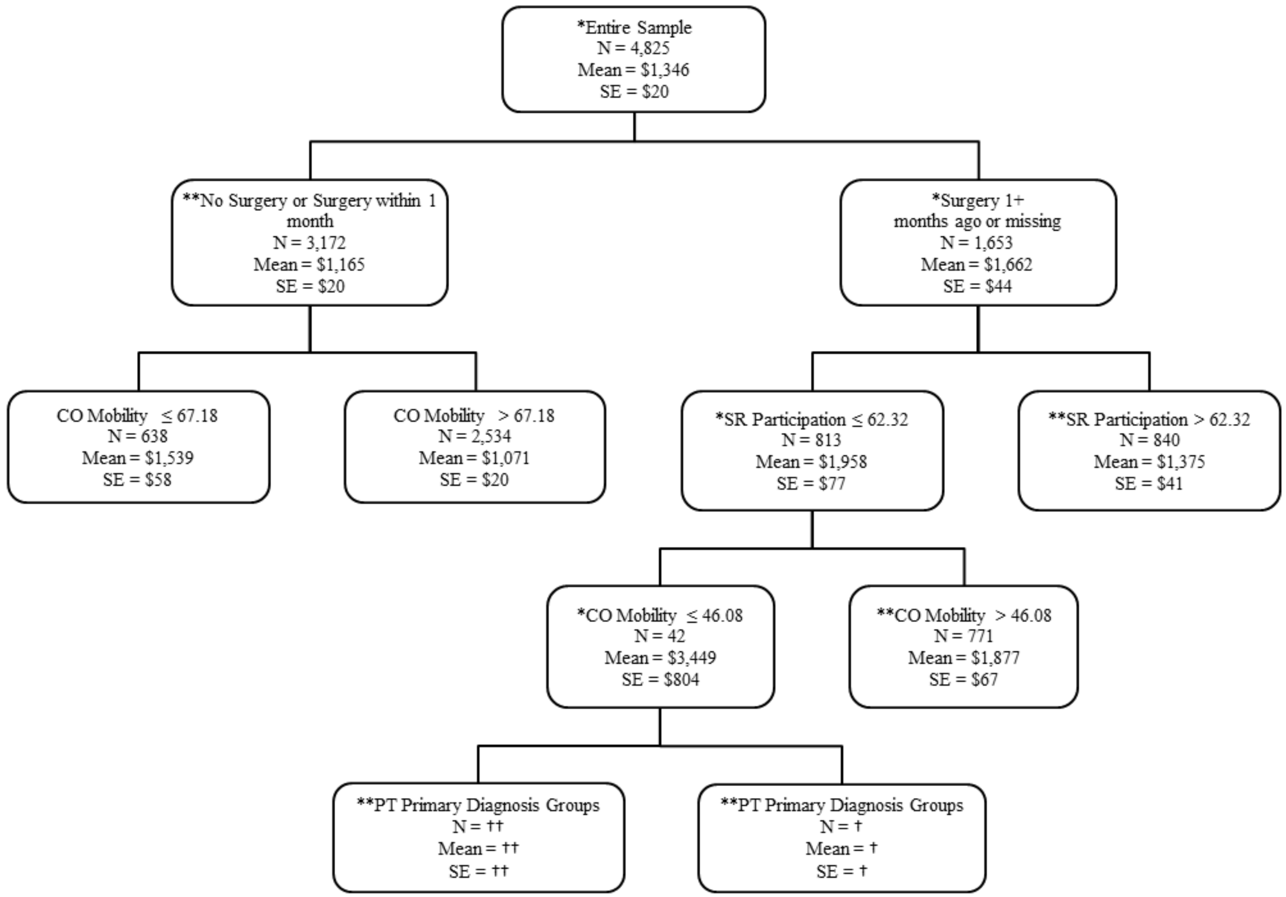
Figure 8-1
CART regression tree for CARE-C physical therapy episode expenditures, comprehensive specification



NOTES:
1. PT = Physical Therapy; SR = Rasch Self-Reported Estimate; Rasch Estimate: 0 (low ability) – 100 (high ability); FT = Full-Time; PT Diagnosis Groups: 1-Fracture, 2-Joint Replacement, 3-Osteoarthritis, 4-Spinal Stenosis, 5-Herniated Disc and Other Major Musculoskeletal, 6-Sprain/Strain, 7-Bursitis/Tendonitis, 8-Unspecified and Miscellaneous Musculoskeletal, 9-Circulatory (including Lymphatic) and Pulmonary/Respiratory, 10 - Stroke, 11- Parkinson's and Other Progressive Neurological , 12-Peripheral Nervous System and Other Major Neurological Disorders, 13- Unspecified and Miscellaneous Neurological, 14-Pain, 15-Vertigo, 16-Genitourinary Disorders, 17-Unspecified and Miscellaneous Diagnoses, 18- Multiple Major Etiologies, 19-Multiple Etiologies, One Major, 20-Multiple Etiologies, No Major, 21-No Primary Diagnosis
2. Episode Definition = Variable length episode with 60-day terminating clean period
3. SE = Standard Error of the Mean
4. The “statistically optimal” tree, with the lowest cross-validated relative error, has asterisks in all of its nodes and double asterisks in its Terminal Nodes. It consists of one (1) split and 2 (two) terminal nodes.

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims/CARE data.
Program: PT_Full_v04

Figure 8-2
CART regression tree for CARE-C physical therapy episode expenditures, payment specification



NOTES:

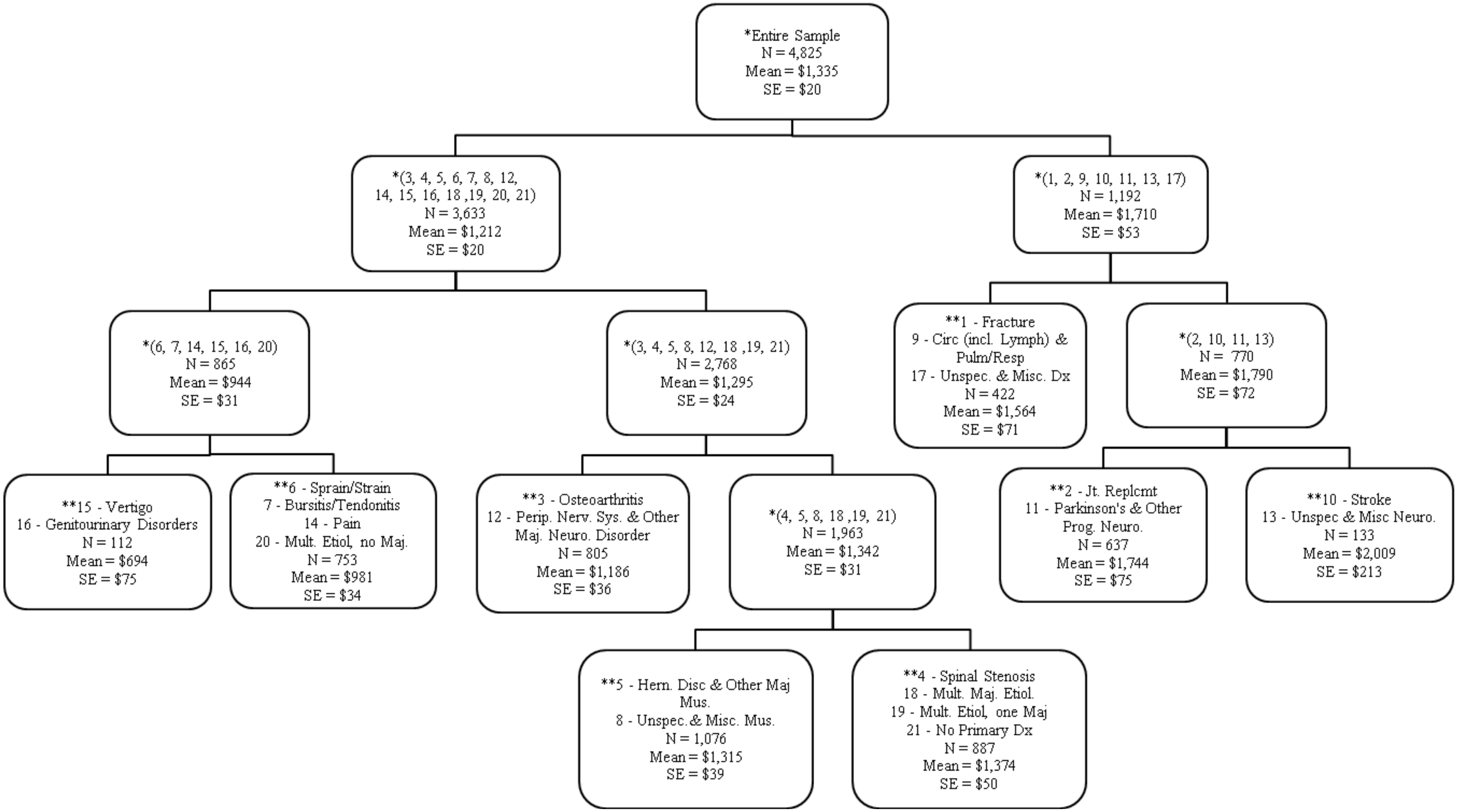
† = Fewer than 11 cases. †† = Count suppressed to maintain confidentiality of cells with fewer than 11 cases.

1. PT = Physical Therapy; SR = Rasch Self-Reported Estimate; Rasch Estimate: 0 (low ability) – 100 (high ability); FT = Full-Time; PT Diagnosis Groups: 1-Fracture, 2-Joint Replacement, 3-Osteoarthritis, 4-Spinal Stenosis, 5-Herniated Disc and Other Major Musculoskeletal, 6-Sprain/Strain, 7-Bursitis/Tendonitis, 8-Unspecified and Miscellaneous Musculoskeletal, 9-Circulatory (including Lymphatic) and Pulmonary/Respiratory, 10 - Stroke, 11- Parkinson's and Other Progressive Neurological , 12-Peripheral Nervous System and Other Major Neurological Disorders, 13- Unspecified and Miscellaneous Neurological, 14-Pain, 15-Vertigo, 16-Genitourinary Disorders, 17-Unspecified and Miscellaneous Diagnoses, 18- Multiple Major Etiologies, 19-Multiple Etiologies, One Major, 20-Multiple Etiologies, No Major, 21-No Primary Diagnosis
2. SE = Standard Error of the Mean
3. The “statistically optimal” tree, with the lowest cross-validated relative error, has asterisks in all of its nodes and double asterisks in it Terminal Nodes. It consists of four (4) splits and 5 (five) terminal nodes.

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims/CARE data.

Program: PT_Paymt_v03

Figure 8-3
CART regression tree for CARE-C physical therapy episode expenditures, primary diagnosis specification



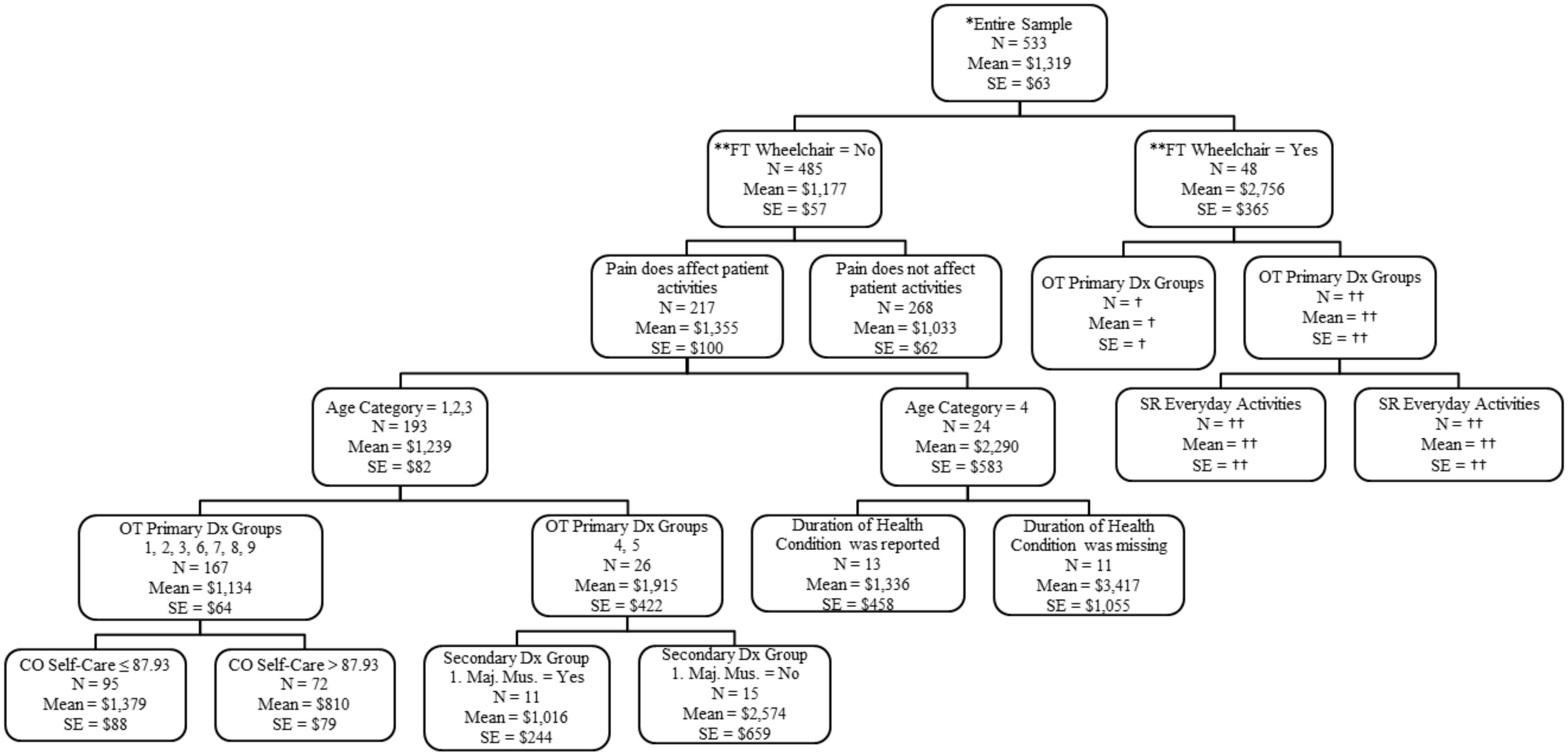
NOTES:

1. Circ = Circulatory; Lymph = Lymphatic; Unspec. = Unspecified; Misc = Miscellaneous; Dx = Diagnosis; Mult. = Multiple; Maj. = Major; Etiol = Etiologies; Perip = Peripheral; Nerv = Nervous; Sys = System; Neuro = Neurological; Jt. Replcmt = Joint Replacement; Prog = Progressive; Hern = Herniated
2. Primary diagnosis groups were mutually-exclusive. Primary diagnosis group numbers are defined when they appear in the terminal nodes.
3. Episode Definition = Variable length episode with 60-day terminating clean period
4. SE = Standard Error of the Mean
5. This is the “statistically optimal” tree, with the lowest cross-validated relative error. Every node as an asterisk, and the 8 (eight) Terminal Nodes have double asterisks.

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims/CARE data.

Program: PT_Heir_v03

Figure 8-4
CART regression tree for CARE-C occupational therapy episode expenditures, comprehensive specification



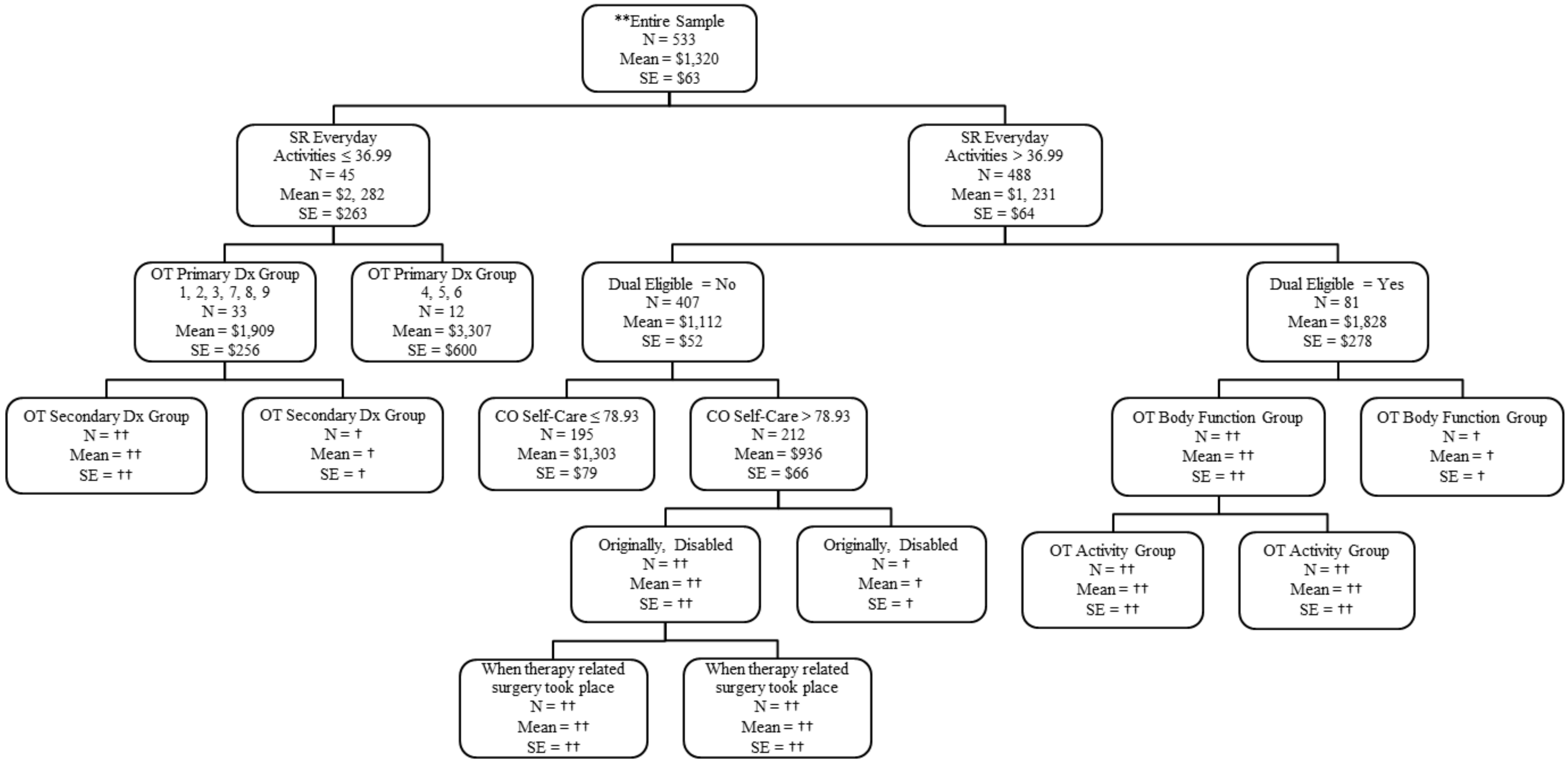
NOTES:

† = Fewer than 11 cases. †† = Count suppressed to maintain confidentiality of cells with fewer than 11 cases.

1. FT = Full-Time; OT = Occupational Therapy; Dx = Diagnosis; Maj. Mus. = Major Musculoskeletal; Age Categories: 1 = (0-64), 2 = (65-74), 3 = (75-84), 4 = (85+); SR = Rasch Self-Reported Estimate; CO = Rasch Clinician-Observed Estimate; Rasch Estimate: 0 (low ability) – 100 (high ability); OT Primary Diagnosis Groups: 1-Fracture and Joint Replacement, 2-Major Musculoskeletal, excluding Fracture and Joint Replacement, 3-Minor, Unspecified, and Miscellaneous Musculoskeletal, 4-Stroke, 5-Neurological, excluding Stroke, 6-Circulatory (including Lymphatic) and Pulmonary/Respiratory, 7-Unspecified and Miscellaneous Diagnoses, 8-Multiple Etiologies, 9-No Primary Diagnosis
2. Episode Definition = Variable length episode with 60-day terminating clean period
3. SE = Standard Error of the Mean
4. The “statistically optimal” tree, with the lowest cross-validated relative error, has one asterisk in all of its nodes and double asterisks in its terminal nodes. This tree consists of one (1) split and 2 (two) terminal nodes.

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims/CARE data.
Program: OT_Full_v03

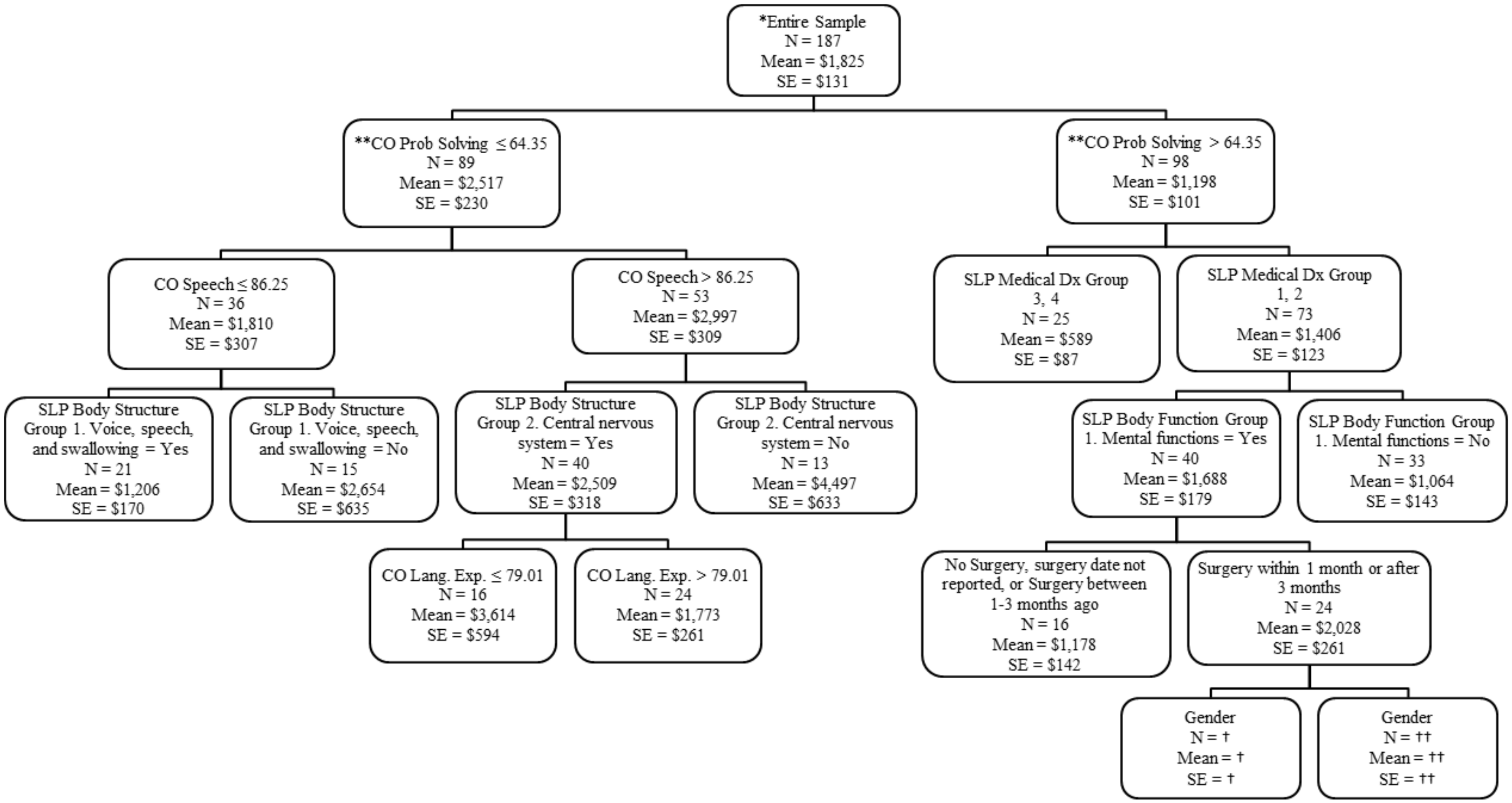
Figure 8-5
CART regression tree for CARE-C occupational therapy episode expenditures, payment specification



NOTES:
† = Fewer than 11 cases. †† = Count suppressed to maintain confidentiality of cells with fewer than 11 cases.
1. OT = Occupational Therapy; SR = Rasch Self-Reported Estimate; CO = Rasch Clinician-Observed Estimate; Rasch Estimate: 0 (low ability) – 100 (high ability); Dx = Diagnosis; OT Primary Diagnosis Groups: 1-Fracture and Joint Replacement, 2-Major Musculoskeletal, excluding Fracture and Joint Replacement, 3-Minor, Unspecified, and Miscellaneous Musculoskeletal, 4-Stroke, 5-Neurological, excluding Stroke, 6-Circulatory (including Lymphatic) and Pulmonary/Respiratory, 7-Unspecified and Miscellaneous Diagnoses, 8-Multiple Etiologies, 9-No Primary Diagnosis
2. Episode Definition = Variable length episode with 60-day terminating clean period
3. SE = Standard Error of the Mean
4. The “statistically optimal” tree, with the lowest cross-validated relative error, has no splits and one Terminal Node. This node is the top node and has a double asterisk.
5. SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims/CARE data.

Program: OT_Paymt_v03

Figure 8-6
CART regression tree for CARE-C speech-language pathology episode expenditures, comprehensive specification

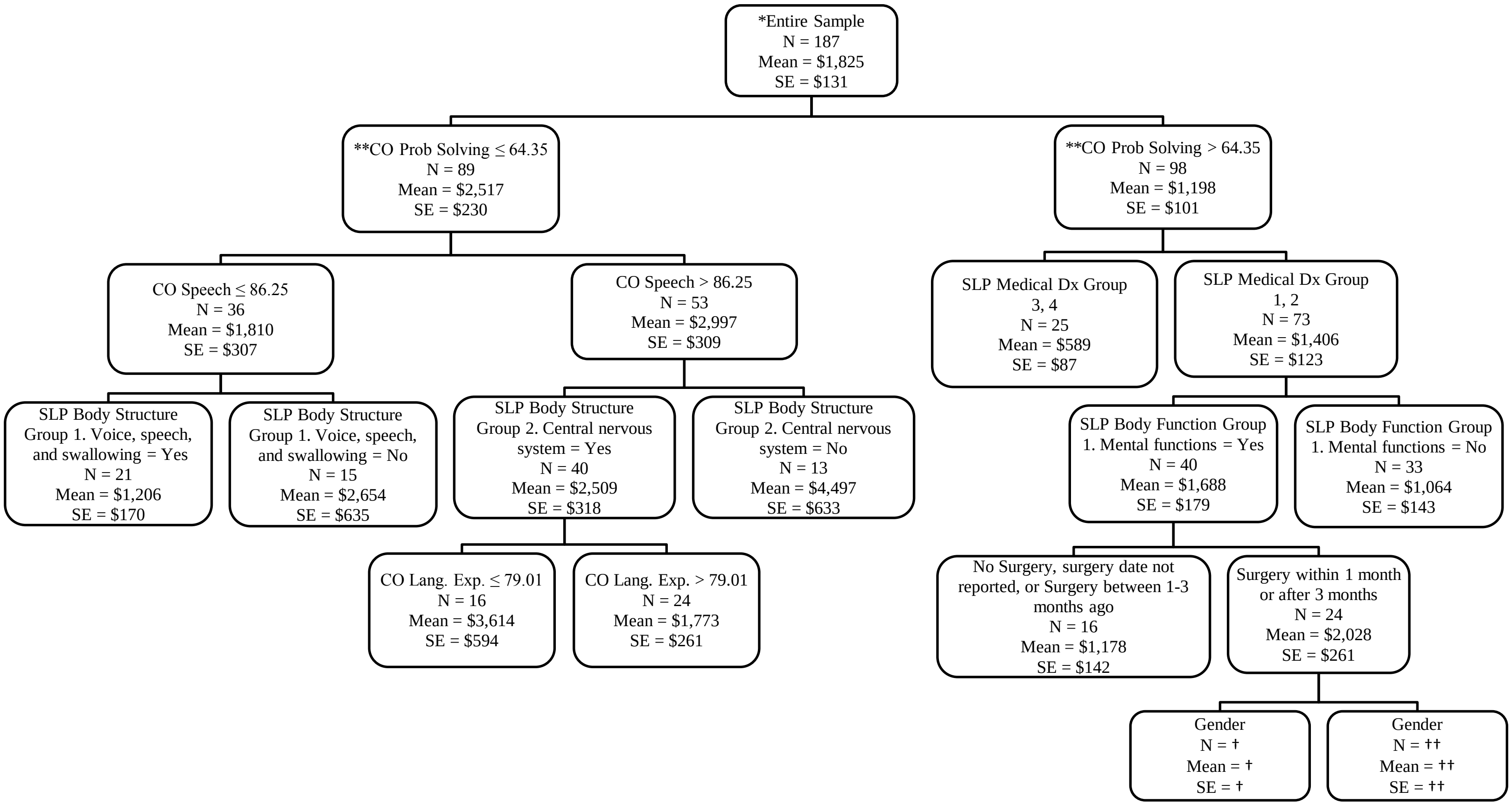


NOTES:
† = Fewer than 11 cases. †† = Count suppressed to maintain confidentiality of cells with fewer than 11 cases.

1. SR = Rasch Self-Reported Estimate; CO = Rasch Clinician-Observed Estimate; Rasch Estimate: 0 (low ability) – 100 (high ability); CO Prob Solving = CO Problem Solving; Dx = Diagnosis; CO Lang Comp = CO Language Comprehension; SLP Impairment Diagnosis Groups: 1-Cognitive Communication Disorders only, 2-Swallowing Disorders only, 3-Cognitive Communication and Swallowing Disorders, 4-No Impairment Diagnosis; SLP Medical Diagnosis Groups: 1-Stroke, 2-Neurological, Excluding Stroke, 3-Miscellaneous Diagnoses, 4-No Medical Diagnosis
2. Episode Definition = Variable length episode with 60-day terminating clean period
3. SE = Standard Error of the Mean
4. The “statistically optimal” tree, with the lowest cross-validated relative error, has an asterisk in all of its nodes and a double asterisk in its Terminal Nodes. It consists of one (1) split and 2 (two) terminal nodes

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims/CARE data.
Program: SLP_Full_v03

Figure 8-7
CART regression tree for CARE-C speech-language pathology episode expenditures, payment specification



NOTES:

† = Fewer than 11 cases. †† = Count suppressed to maintain confidentiality of cells with fewer than 11 cases.

1. SR = Rasch Self-Reported Estimate; CO = Rasch Clinician-Observed Estimate; Rasch Estimate: 0 (low ability) – 100 (high ability); CO Prob Solving = CO Problem Solving; Dx = Diagnosis; CO Lang Comp = CO Language Comprehension; SLP Impairment Diagnosis Groups: 1-Cognitive Communication Disorders only, 2-Swallowing Disorders only, 3-Cognitive Communication and Swallowing Disorders, 4-No Impairment Diagnosis; SLP Medical Diagnosis Groups: 1-Stroke, 2-Neurological, Excluding Stroke, 3-Miscellaneous Diagnoses, 4-No Medical Diagnosis
2. Episode Definition = Variable length episode with 60-day terminating clean period
3. SE = Standard Error of the Mean
4. The “statistically optimal” tree, with the lowest cross-validated relative error, has an asterisk in all of its nodes and a double asterisk in its Terminal Nodes. It consists of one (1) split and 2 (two) terminal nodes

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims/CARE data.

Program: SLP_Paymt_v03

REFERENCES

Balanced Budget Act of 1997, Pub. L. No 105-33, 111 Stat 251 (1997).

106th Congress of the United States of America. (1999, November 29). Medicare, Medicaid, and SCHIP Balanced Budget Refinement Act of 1999 (106-113).

108th Congress of the United States of America. (2003, December 8). Medicare Presecription Drug, Improvement, and Modernization Act of 2003 (108-173).

109th Congress of the United States of America. (2006, February 8). Deficit Reduction Act of 2005 (109-171).

112th Congress of the United States of America. (2012, January 3). Middle Class Tax Relief and Job Creation Act of 2012 (H.R. 3060).

American Medical Association. (2012). *CPT 2013 Professional Edition* (1st Edition ed.).

American Physical Therapy Association. (2012, April 8). *Alternative Payment System Overview*. Retrieved October 23, 2012, from APTA.org: American Physical Therapy Association: http://www.apta.org/APS/Overview/

American Physical Therapy Association. (2012, October 3). *History of Medicare Therapy Caps*. Retrieved October 20, 2012, from APTA.org: The American Physical Therapy Association: http://www.apta.org/FederalIssues/TherapyCap/History/

Andres PL, Haley SM, Ni PS. Is patient-reported function reliable for monitoring postacute outcomes? Am J Phys Med Rehabil. 2003 Aug; 82(8):614-21.

Bond, T. G., and Fox, C. M.: Applying the Rasch Model: Fundamental Measurement in the Human Sciences. Mahwah NJ: Lawrence Erlbaum Assoc. 2001.

Breiman, Leo, Jerome H. Friedman, Richard A. Olshen and Charles J. Stone. *Classification and Regression Trees*. Belmont, California: Wadsworth, 1984.

Centers for Medicare and Medicaid Services. (2012a). *Medicare Benefit Policy Manual - Chapter 15.* Retrieved December 27, 2012, from CMS.gov: http://www.cms.gov/Regulations-and-Guidance/Guidance/Manuals/downloads/bp102c15.pdf

Centers for Medicare and Medicaid Services. (2012b). *Medicare Claims Processing Manual Chapter 5 - Part B Outpatient Rehabilitation and CORF/OPT Services.* US Department of Health and Human Services.

Centers for Medicare and Medicaid Services: Medicare Outpatient Therapy Billing. Medicare Learning Network. August 2010.

Computer Sciences Corporation, 2010, Short-Term Alternatives for Therapy Services (STATS) Task Order: Final Report on Short-Term Alternatives. Prepared for CMS, Contract Number GS-23F-8029H, Task Order Number HHSM-500-2008-00065C.

Gage et al. (2012). Post-Acute Care Payment Reform Demonstration: Final Report. Report prepared for the Centers for Medicare & Medicaid Services – Center for Medicare & Medicaid Innovation, CMS Contract No. HHSM-500-2005-00029I.

Haley SM, Ni P, Coster WJ, Black-Schaffer R, Siebens H, Tao W. Agreement in functional assessment: graphic approaches to displaying respondent effects. Am J Phys Med Rehabil. 2006 Sep; 85(9):747-55.

Hastie, Trevor, Robert Tibshirani and Jerome Friedman. *The Elements of Statistical Learning: Data Mining, Inference, and Prediction*, Second Edition. New York City, NY: Springer, 2009.

Kline, T., Deutsch, A., Pardasaney, P., Amico, P., Gordon, T., Pope, G., Ridenhour, J., Jette, A., Silver, B., and Dever, J. A. (2014). *Developing Outpatient Therapy Payment Alternatives (DOTPA): Payment Measurement Report*. Prepared for the Centers for Medicare & Medicaid Services by RTI International, CMS Contract No. HHSM-500—2012-00169G, February 2014.

Koenker, R., & Hallock, K. (2001). Quantile regression: An introduction. *Journal of Economic Perspectives*, 15(4), 43-56.

Linacre, J. M.: Winsteps® Rasch Measurement Computer Program. Beaverton, OR. www.winsteps.com 2012a.

Linacre, J. M.: Winsteps® Rasch Measurement Computer Program User's Guide. Beaverton, OR. http://www.winsteps.com/winman/index.htm 2012b.

Lyda-McDonald, B., Drozd, E., & Gage, B. (2012). Developing Outpatient Therapy Payment Alternatives (DOTPA): 2009 Utilization Report. Technical Report, Centers for Medicare and Medicaid Services, Center for Medicare and Medicaid Innovation.

Medicare Payment Advisory Commission (MedPAC), 2006, Report to the Congress: Increasing the Value of Medicare, Chapter 6. Washington, DC: MedPAC.

Medicare Payment Advisory Commission (MedPAC), 2011, A Data Book: Health Care Spending and the Medicare Program, Section 6. Washington, DC: MedPAC

Medicare Payment Advisory Commission (MedPAC), 2013, Report to the Congress: Medicare Payment Policy. Washington, DC: Medicare Payment Advisory Commission.

Silver, B. and Dever, J.A. (2013). *Developing Outpatient Therapy Payment Alternatives (DOTPA): Phase I Final Report*. Report prepared for the Centers for Medicare & Medicaid Services, CMS Contract No. 500-2005-00029I/0012.

Silver, B., Lyda-McDonald, B., Bachofer, H., & Gage, B. (2013). *Developing Outpatient Therapy Payment Alternatives (DOTPA): 2010 Utilization Report*. Technical Report, Centers for Medicare and Medicaid Services, Center for Medicare and Medicaid Innovation.

United States Government Accountability Office, 2005, Little Progress Made in Targeting Outpatient Therapy to Beneficiaries' Needs. Washington, DC: GAO-06-59.

World Health Organization. International classification of functioning, disability and health: ICF. Geneva, Switzerland: World Health Organization, 2001.

[This page intentionally left blank.]

APPENDIX A:
SECTION 3 APPENDIX TABLES

[This page intentionally left blank.]

Appendix Table 3-1
Original primary diagnosis frequencies, by therapy discipline: CARE-F admission assessments

Original primary diagnoses	Total		1. PT+OT+SLP		2. PT+OT		3. PT+SLP		4. OT+SLP		5. PT		6. OT		7. SLP		8. NONE	
	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN
Total number of CARE-F admission assessments	840	100.00	124	100.00	150	100.00	57	100.00	47	100.00	142	100.00	93	100.00	88	100.00	139	100.00
Number of CARE-F admission assessments with no primary diagnosis indicated	25	2.98	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†
A. Musculoskeletal																		
Total	180	21.43	19	15.32	48	32.00	†	†	†	†	56	39.44	24	25.81	†	†	25	17.99
Osteoarthritis	53	6.31	11	8.87	†	†	—	—	†	†	11	7.75	†	†	†	†	13	9.35
Joint Replacement	37	4.40	—	—	†	†	—	—	†	†	27	19.01	†	†	—	—	—	—
Other	31	3.69	†	†	14	9.33	—	—	†	†	†	†	†	†	†	†	†	†
Fracture	26	3.10	†	†	†	†	†	†	—	—	†	†	†	†	—	—	†	†
Osteoporosis	11	1.31	†	†	†	†	—	—	†	†	†	†	†	†	—	—	†	†
Amputation	†	†	—	—	†	†	—	—	—	—	†	†	†	†	†	†	—	—
Contracture	†	†	—	—	—	—	—	—	—	—	†	†	†	†	—	—	†	†
Spinal Stenosis	†	†	†	†	†	†	—	—	—	—	†	†	—	—	—	—	†	†
Rheumatoid Arthritis	†	†	—	—	—	—	—	—	—	—	†	†	—	—	—	—	†	†
Sprain/Strain	†	†	†	†	—	—	—	—	—	—	—	—	—	—	—	—	†	†
Herniated Disc	†	†	—	—	†	†	—	—	—	—	†	†	—	—	—	—	—	—
Torticollis	†	†	—	—	†	†	—	—	—	—	—	—	—	—	—	—	†	†
Nerve Entrapment	†	†	—	—	†	†	—	—	—	—	—	—	†	†	—	—	—	—
Scoliosis	†	†	—	—	—	—	—	—	—	—	—	—	—	—	—	—	†	†
Internal Derangement of Joint	†	†	—	—	—	—	—	—	—	—	†	†	—	—	—	—	—	—
TMJ Disorder	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Contusion	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Bursitis	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Tendonitis	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Tendon Rupture	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

(continued)

Appendix Table 3-1 (continued)
Original primary diagnosis frequencies, by therapy discipline: CARE-F admission assessments

Original primary diagnoses	Total		1. PT+OT+SLP		2. PT+OT		3. PT+SLP		4. OT+SLP		5. PT		6. OT		7. SLP		8. NONE	
	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN
B. Circulatory																		
Total	242	28.81	44	35.48	37	24.67	13	22.81	17	36.17	27	19.01	23	24.73	28	31.82	53	38.13
Stroke	147	17.50	35	28.23	21	14.00	†	†	†	†	14	9.86	14	15.05	11	12.50	38	27.34
Heart Failure	32	3.81	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†
Hypertension	28	3.33	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†
Other	11	1.31	†	†	†	†	—	—	—	—	—	—	†	†	†	†	†	†
Coronary Artery Disease	†	†	†	†	—	—	†	†	—	—	†	†	†	†	†	†	†	†
Atrial Fibrillation/Dysrhythmia	†	†	†	†	—	—	—	—	—	—	†	†	—	—	†	†	†	†
TIA	†	†	—	—	†	†	—	—	—	—	—	—	—	—	†	†	†	†
Deep Vein Thrombosis	†	†	†	†	†	†	†	†	—	—	—	—	—	—	—	—	—	—
Peripheral Vascular/Arterial Disease	†	†	—	—	—	—	—	—	—	—	—	—	†	†	—	—	—	—
C. Lymphatic System																		
Total	†	†	—	—	—	—	—	—	—	—	†	†	—	—	—	—	—	—
Other	†	†	—	—	—	—	—	—	—	—	†	†	—	—	—	—	—	—
Lymphedema	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
D. Pulmonary/ Respiratory System																		
Total	45	5.36	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†
COPD	23	2.74	†	†	†	†	†	†	†	†	†	†	†	†	—	—	†	†
Pneumonia	13	1.55	†	†	†	†	—	—	—	—	†	†	†	†	†	†	†	†
Other	†	†	†	†	†	†	†	†	—	—	†	†	†	†	†	†	†	†
Bronchitis	†	†	—	—	—	—	—	—	†	†	—	—	—	—	—	—	—	—
Asthma	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Cystic Fibrosis	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

(continued)

Appendix Table 3-1 (continued)
Original primary diagnosis frequencies, by therapy discipline: CARE-F admission assessments

Original primary diagnoses	Total		1. PT+OT+SLP		2. PT+OT		3. PT+SLP		4. OT+SLP		5. PT		6. OT		7. SLP		8. NONE	
	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN
E. Integumentary System																		
Total	†	†	—	—	†	†	—	—	—	—	†	†	—	—	—	—	—	—
Skin Ulcer/Wound	†	†	—	—	—	—	—	—	—	—	†	†	—	—	—	—	—	—
Other	†	†	—	—	†	†	—	—	—	—	—	—	—	—	—	—	—	—
Burn	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
F. Genitourinary System																		
Total	19	2.26	†	†	†	†	†	†	—	—	†	†	†	†	†	†	†	†
Other	15	1.79	†	†	†	†	†	†	—	—	†	†	†	†	†	†	†	†
ESRD	†	†	—	—	†	†	—	—	—	—	†	†	—	—	—	—	—	—
Incontinence	†	†	—	—	—	—	—	—	—	—	†	†	—	—	—	—	—	—
Pelvic Pain	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
G. Mental Health																		
Total	140	16.67	12	9.68	11	7.33	13	22.81	18	38.30	31	21.83	17	18.28	23	26.14	15	10.79
Alzheimer's Disease	96	11.43	†	†	†	†	†	†	14	29.79	16	11.27	13	13.98	19	21.59	12	8.63
Other	23	2.74	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†
Anxiety Disorder	†	†	†	†	—	—	—	—	—	—	†	†	†	†	—	—	†	†
Schizophrenia	†	†	†	†	†	†	—	—	—	—	†	†	†	†	†	†	—	—
Depression	†	†	†	†	—	—	†	†	—	—	†	†	—	—	—	—	†	†
Bipolar Disease	†	†	—	—	—	—	—	—	—	—	†	†	—	—	—	—	—	—
Attention Disorder	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
H. Cancer/Other Neoplasms																		
Total	†	†	†	†	—	—	—	—	—	—	†	†	—	—	†	†	—	—
I. Metabolic System																		
Total	25	2.98	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†
Diabetes Mellitus	22	2.62	†	†	†	†	†	†	†	†	†	†	—	—	†	†	—	—
Other	†	†	†	†	—	—	—	—	—	—	—	—	†	†	—	—	†	†

(continued)

Appendix Table 3-1 (continued)
Original primary diagnosis frequencies, by therapy discipline: CARE-F admission assessments

Original primary diagnoses	Total		1. PT+OT+SLP		2. PT+OT		3. PT+SLP		4. OT+SLP		5. PT		6. OT		7. SLP		8. NONE	
	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN
J. Generalized Weakness																		
Total	32	3.81	†	†	†	†	—	—	—	—	12	8.45	†	†	—	—	†	†
K. Infectious Diseases																		
Total	†	†	—	—	—	—	†	†	—	—	†	†	†	†	†	†	—	—
L. HIV																		
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
M. Gastrointestinal Disorders																		
Total	†	†	—	—	†	†	—	—	—	—	†	†	†	†	†	†	†	†
N. Immune Disorders																		
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
O. Anemia/Other Hematological Disorders																		
Total	26	3.10	—	—	—	—	—	—	†	†	†	†	†	†	—	—	23	16.55
Other	24	2.86	—	—	—	—	—	—	†	†	†	†	—	—	—	—	††	††
Anemia	†	†	—	—	—	—	—	—	—	—	—	—	†	†	—	—	†	†
P. Congenital Abnormalities																		
Total	†	†	—	—	—	—	†	†	†	†	—	—	—	—	—	—	—	—
Neurological Congenital/Developmental Anomalies	†	†	—	—	—	—	†	†	—	—	—	—	—	—	—	—	—	—
Other	†	†	—	—	—	—	—	—	†	†	—	—	—	—	—	—	—	—
Musculoskeletal Congenital Anomalies	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

(continued)

Appendix Table 3-1 (continued)
Original primary diagnosis frequencies, by therapy discipline: CARE-F admission assessments

Original primary diagnoses	Total		1. PT+OT+SLP		2. PT+OT		3. PT+SLP		4. OT+SLP		5. PT		6. OT		7. SLP		8. NONE	
	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN
Q. Neurological Conditions																		
Total	108	12.86	21	16.94	12	8.00	13	22.81	†	†	11	7.75	†	†	15	17.05	22	15.83
Parkinson's	30	3.57	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†
Other	30	3.57	†	†	†	†	†	†	—	—	†	†	†	†	†	†	†	†
Multiple Sclerosis	†	†	†	†	—	—	†	†	—	—	†	†	—	—	†	†	†	†
Traumatic Brain Injury	†	†	†	†	†	†	—	—	†	†	—	—	†	†	†	†	†	†
Head Injury	†	†	†	†	†	†	—	—	—	—	—	—	†	†	†	†	†	†
Seizure Disorder	†	†	—	—	†	†	†	†	—	—	†	†	—	—	—	—	†	†
Non-Traumatic Brain Injury	†	†	†	†	†	†	—	—	—	—	—	—	—	—	—	—	†	†
Encephalopathy	†	†	†	†	—	—	†	†	—	—	—	—	—	—	—	—	†	†
PNS Disorder	†	†	—	—	†	†	—	—	—	—	†	†	—	—	—	—	†	†
Specific Diseases of CNS	†	†	—	—	—	—	—	—	—	—	—	—	†	†	—	—	—	—
Huntington's Disease	†	†	†	†	—	—	—	—	†	†	—	—	—	—	—	—	—	—
Guillain-Barre Syndrome	†	†	—	—	—	—	—	—	—	—	—	—	—	—	—	—	†	†
Cranial Neuralgia	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Cranial Nerve Injury	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Complex Regional Syndrome	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Retinopathy	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
R. Cognition/ Judgment																		
Total	82	9.76	†	†	†	†	†	†	†	†	23	16.20	†	†	16	18.18	†	†
Dementia	77	9.17	†	†	†	†	†	†	†	†	22	15.49	†	†	16	18.18	†	†
Memory Impairment	†	†	†	†	—	—	†	†	—	—	†	†	—	—	—	—	—	—

(continued)

Appendix Table 3-1 (continued)
Original primary diagnosis frequencies, by therapy discipline: CARE-F admission assessments

Original primary diagnoses	Total N	Total ColPctN	1. PT+OT+SLP N	1. PT+OT+SLP ColPctN	2. PT+OT N	2. PT+OT ColPctN	3. PT+SLP N	3. PT+SLP ColPctN	4. OT+SLP N	4. OT+SLP ColPctN	5. PT N	5. PT ColPctN	6. OT N	6. OT ColPctN	7. SLP N	7. SLP ColPctN	8. NONE N	8. NONE ColPctN
Executive Function Disorder	†	†	†	†	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Pragmatics Disorder	†	†	†	†	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
S. Communication, Voice, or Speech Disorder																		
Total	12	1.43	†	†	†	†	—	—	†	†	—	—	†	†	†	†	†	†
Cognitive Communication Disorder	†	†	†	†	†	†	—	—	—	—	—	—	—	—	†	†	†	†
Aphasia	†	†	†	†	†	†	—	—	†	†	—	—	†	†	—	—	—	—
Apraxia of Speech	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Reading/Writing Dysfunction	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Voice Disorder (Dysphonia)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Speech Disorder	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
T. Swallowing Disorder (Dysphagia)																		
Total	25	2.98	†	†	†	†	—	—	†	†	†	†	†	†	†	†	†	†
U. Sensory Disorders/Gait or Balance Disorder																		
Total	18	2.14	†	†	†	†	†	†	—	—	†	†	—	—	—	—	—	—
Gait/Balance Disorder	15	1.79	†	†	†	†	†	†	—	—	†	†	—	—	—	—	—	—
Vision Impairment	†	†	†	†	—	—	—	—	—	—	†	†	—	—	—	—	—	—
Hearing Impairment	†	†	†	†	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

(continued)

Appendix Table 3-1 (continued)
Original primary diagnosis frequencies, by therapy discipline: CARE-F admission assessments

Original primary diagnoses	Total		1. PT+OT+SLP		2. PT+OT		3. PT+SLP		4. OT+SLP		5. PT		6. OT		7. SLP		8. NONE	
	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN
V. Other Conditions and Symptoms																		
Total	33	3.93	†	†	†	†	†	†	—	—	14	9.86	†	†	†	†	†	†
Other	15	1.79	—	—	†	†	†	†	—	—	†	†	†	†	†	†	†	†
Pain, not syndrome	†	†	—	—	†	†	—	—	—	—	†	†	†	†	—	—	—	—
Pain Syndrome	†	†	†	†	—	—	—	—	—	—	†	†	—	—	—	—	—	—
Paralysis	†	†	—	—	—	—	—	—	—	—	—	—	†	†	—	—	†	†
Vertigo	†	†	†	†	—	—	—	—	—	—	†	†	—	—	—	—	—	—
Obesity	†	†	—	—	—	—	†	†	—	—	†	†	—	—	—	—	—	—

NOTES:

† = Fewer than 11 cases. †† = Count suppressed to maintain confidentiality of cells with fewer than 11 cases.

1. N = Count of CARE-F admission assessments
2. Diagnoses within a category are sorted in descending order of Total Frequency.
3. There were a total of 1,062 primary diagnoses recorded on 840 CARE-F admission assessments. This confirms that more than one primary diagnosis was recorded on admission assessments.
4. PT = Physical Therapy, OT = Occupational Therapy, SLP = Speech-Language Pathology, TMJ = Temporomandibular Joint Disorder; TIA = Transient Ischemic Attack; COPD = Chronic Obstructive Pulmonary Disease; ESRD = End-Stage Renal Disease; CNS = Central Nervous System; PNS = Peripheral Nervous System

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims/CARE data.

Program: TG002

Appendix Table 3-2
Original secondary diagnosis frequencies, by therapy discipline: CARE-F admission assessments

Original secondary diagnoses	Total		1. PT+OT+SLP		2. PT+OT		3. PT+SLP		4. OT+SLP		5. PT		6. OT		7. SLP		8. NONE	
	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN
Total number of CARE-F admission assessments	840	100.00	124	100.00	150	100.00	57	100.00	47	100.00	142	100.00	93	100.00	88	100.00	139	100.00
Number of CARE-F admission assessments with no secondary diagnosis indicated	41	4.88	†	†	†	†	—	—	†	†	†	†	†	†	†	†	†	†
A. Musculoskeletal																		
Total	436	51.90	58	46.77	85	56.67	39	68.42	32	68.09	68	47.89	40	43.01	36	40.91	78	56.12
Osteoarthritis	229	27.26	20	16.13	45	30.00	25	43.86	17	36.17	38	26.76	19	20.43	21	23.86	44	31.65
Osteoporosis	138	16.43	20	16.13	19	12.67	20	35.09	12	25.53	†	†	††	††	18	20.45	28	20.14
Other	93	11.07	15	12.10	20	13.33	†	†	†	†	†	†	14	15.05	13	14.77	†	†
Fracture	51	6.07	†	†	15	10.00	†	†	†	†	†	†	†	†	—	—	12	8.63
Contracture	39	4.64	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†
Joint Replacement	22	2.62	†	†	†	†	†	†	†	†	†	†	†	†	—	—	†	†
Spinal Stenosis	19	2.26	†	†	†	†	†	†	—	—	†	†	†	†	†	†	†	†
Rheumatoid Arthritis	16	1.90	†	†	†	†	†	†	—	—	†	†	—	—	†	†	†	†
Amputation	14	1.67	†	†	†	†	—	—	—	—	†	†	†	†	—	—	†	†
Scoliosis	†	†	—	—	†	†	—	—	†	†	†	†	—	—	†	†	—	—
Herniated Disc	†	†	†	†	†	†	—	—	—	—	†	†	—	—	—	—	†	†
Internal Derangement of Joint	†	†	—	—	†	†	—	—	—	—	†	†	†	†	—	—	†	†
Contusion	†	†	†	†	†	†	—	—	—	—	†	†	—	—	—	—	—	—
Torticollis	†	†	—	—	—	—	—	—	—	—	†	†	—	—	—	—	—	—
Tendonitis	†	†	†	†	†	†	—	—	—	—	†	†	—	—	—	—	—	—
Sprain/Strain	†	†	†	†	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Bursitis	†	†	—	—	—	—	—	—	—	—	†	†	—	—	—	—	—	—
Nerve Entrapment	†	†	—	—	†	†	—	—	—	—	—	—	—	—	—	—	—	—
TMJ Disorder	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Tendon Rupture	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

(continued)

Appendix Table 3-2 (continued)
Original secondary diagnosis frequencies, by therapy discipline: CARE-F admission assessments

Original secondary diagnoses	Total		1. PT+OT+SLP		2. PT+OT		3. PT+SLP		4. OT+SLP		5. PT		6. OT		7. SLP		8. NONE	
	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN
B. Circulatory																		
Total	617	73.45	88	70.97	123	82.00	46	80.70	39	82.98	104	73.24	58	62.37	61	69.32	98	70.50
Hypertension	462	55.00	66	53.23	93	62.00	31	54.39	28	59.57	82	57.75	43	46.24	49	55.68	70	50.36
Coronary Artery Disease	177	21.07	29	23.39	34	22.67	†	†	†	†	35	24.65	19	20.43	12	13.64	28	20.14
Other	125	14.88	26	20.97	23	15.33	16	28.07	†	†	19	13.38	†	†	†	†	12	8.63
Atrial Fibrillation/ Dysrhythmia	113	13.45	16	12.90	23	15.33	††	††	†	†	17	11.97	13	13.98	12	13.64	15	10.79
Heart Failure	85	10.12	14	11.29	13	8.67	13	22.81	†	†	†	†	13	13.98	†	†	11	7.91
Stroke	75	8.93	14	11.29	11	7.33	†	†	†	†	16	11.27	†	†	†	†	†	†
Peripheral Vascular/ Arterial Disease	75	8.93	†	†	17	11.33	14	24.56	†	†	13	9.15	†	†	†	†	†	†
TIA	36	4.29	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†
Deep Vein Thrombosis	27	3.21	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†
C. Lymphatic System																		
Total	18	2.14	†	†	†	†	†	†	—	—	†	†	†	†	†	†	†	†
Lymphedema	†	†	—	—	†	†	†	†	—	—	—	—	†	†	—	—	†	†
Other	†	†	†	†	—	—	†	†	—	—	†	†	—	—	†	†	†	†
D. Pulmonary/ Respiratory System																		
Total	222	26.43	33	26.61	46	30.67	18	31.58	17	36.17	38	26.76	30	32.26	24	27.27	16	11.51
COPD	126	15.00	21	16.94	26	17.33	12	21.05	†	†	19	13.38	16	17.20	15	17.05	†	†
Other	68	8.10	†	†	16	10.67	†	†	†	†	†	†	†	†	†	†	†	†
Pneumonia	48	5.71	†	†	12	8.00	†	†	—	—	12	8.45	†	†	†	†	†	†
Asthma	20	2.38	—	—	†	†	†	†	†	†	†	†	†	†	†	†	†	†
Bronchitis	†	†	—	—	†	†	†	†	†	†	—	—	†	†	†	†	†	†
Cystic Fibrosis	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

(continued)

Appendix Table 3-2 (continued)
Original secondary diagnosis frequencies, by therapy discipline: CARE-F admission assessments

Original secondary diagnoses	Total		1. PT+OT+SLP		2. PT+OT		3. PT+SLP		4. OT+SLP		5. PT		6. OT		7. SLP		8. NONE	
	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN
E. Integumentary System																		
Total	53	6.31	†	†	†	†	†	†	†	†	12	8.45	†	†	†	†	†	†
Skin Ulcer/Wound	34	4.05	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†
Other	17	2.02	†	†	†	†	†	†	†	†	†	†	†	†	—	—	—	—
Burn	†	†	†	†	—	—	—	—	—	—	†	†	—	—	—	—	—	—
F. Genitourinary System																		
Total	191	22.74	17	13.71	40	26.67	14	24.56	13	27.66	33	23.24	33	35.48	20	22.73	21	15.11
Other	126	15.00	11	8.87	23	15.33	††	††	†	†	24	16.90	19	20.43	15	17.05	13	9.35
Incontinence	70	8.33	†	†	†	†	†	†	†	†	†	†	15	16.13	11	12.50	†	†
ESRD	22	2.62	†	†	12	8.00	—	—	—	—	†	†	†	†	—	—	†	†
Pelvic Pain	†	†	†	†	—	—	—	—	—	—	†	†	—	—	—	—	—	—
G. Mental Health																		
Total	421	50.12	47	37.90	71	47.33	37	64.91	30	63.83	69	48.59	56	60.22	52	59.09	59	42.45
Depression	268	31.90	25	20.16	49	32.67	24	42.11	20	42.55	41	28.87	37	39.78	36	40.91	36	25.90
Anxiety Disorder	121	14.40	14	11.29	18	12.00	11	19.30	12	25.53	20	14.08	15	16.13	12	13.64	19	13.67
Alzheimer's Disease	115	13.69	16	12.90	14	9.33	††	††	†	†	15	10.56	13	13.98	16	18.18	19	13.67
Other	101	12.02	†	†	18	12.00	†	†	†	†	13	9.15	21	22.58	17	19.32	†	†
Bipolar Disease	23	2.74	—	—	†	†	†	†	—	—	†	†	†	†	†	†	†	†
Schizophrenia	17	2.02	†	†	†	†	†	†	†	†	†	†	†	†	†	†	—	—
Attention Disorder	†	†	—	—	—	—	—	—	—	—	—	—	—	—	†	†	—	—
H. Cancer/Other Neoplasms																		
Total	60	7.14	†	†	15	10.00	†	†	†	†	13	9.15	†	†	†	†	†	†
I. Metabolic System																		
Total	234	27.86	36	29.03	49	32.67	19	33.33	16	34.04	30	21.13	26	27.96	31	35.23	27	19.42
Diabetes Mellitus	192	22.86	31	25.00	43	28.67	11	19.30	11	23.40	27	19.01	25	26.88	23	26.14	21	15.11
Other	57	6.79	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†

(continued)

Appendix Table 3-2 (continued)
Original secondary diagnosis frequencies, by therapy discipline: CARE-F admission assessments

Original secondary diagnoses	Total		1. PT+OT+SLP		2. PT+OT		3. PT+SLP		4. OT+SLP		5. PT		6. OT		7. SLP		8. NONE	
	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN
J. Generalized Weakness																		
Total	198	23.57	20	16.13	41	27.33	13	22.81	14	29.79	33	23.24	24	25.81	18	20.45	35	25.18
K. Infectious Diseases																		
Total	16	1.90	†	†	†	†	—	—	—	—	†	†	†	†	—	—	†	†
L. HIV																		
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
M. Gastrointestinal Disorders																		
Total	144	17.14	14	11.29	30	20.00	14	24.56	11	23.40	19	13.38	17	18.28	22	25.00	17	12.23
N. Immune Disorders																		
Total	†	†	—	—	†	†	—	—	—	—	—	—	†	†	†	†	—	—
O. Anemia/Other Hematological Disorders																		
Total	146	17.38	18	14.52	31	20.67	14	24.56	12	25.53	28	19.72	18	19.35	††	††	†	†
Anemia	139	16.55	15	12.10	29	19.33	13	22.81	12	25.53	28	19.72	18	19.35	††	††	†	†
Other	†	†	†	†	†	†	†	†	†	†	—	—	—	—	†	†	†	†
P. Congenital Abnormalities																		
Total	†	†	—	—	—	—	—	—	†	†	—	—	†	†	†	†	—	—
Musculoskeletal Congenital Anomalies	†	†	—	—	—	—	—	—	—	—	—	—	†	†	†	†	—	—
Neurological Congenital/Developmental Anomalies	†	†	—	—	—	—	—	—	—	—	—	—	†	†	—	—	—	—
Other	†	†	—	—	—	—	—	—	†	†	—	—	—	—	—	—	—	—

(continued)

Appendix Table 3-2 (continued)
Original secondary diagnosis frequencies, by therapy discipline: CARE-F admission assessments

Original secondary diagnoses	Total		1. PT+OT+SLP		2. PT+OT		3. PT+SLP		4. OT+SLP		5. PT		6. OT		7. SLP		8. NONE	
	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN
Q. Neurological Conditions																		
Total	168	20.00	33	26.61	27	18.00	21	36.84	11	23.40	28	19.72	13	13.98	14	15.91	21	15.11
Other	48	5.71	13	10.48	†	†	†	†	†	†	†	†	†	†	†	†	†	†
Seizure Disorder	47	5.60	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†
PNS Disorder	32	3.81	†	†	†	†	†	†	†	†	†	†	†	†	—	—	†	†
Parkinson's	20	2.38	†	†	†	†	†	†	—	—	†	†	†	†	†	†	†	†
Encephalopathy	13	1.55	†	†	†	†	†	†	†	†	†	†	—	—	†	†	†	†
Traumatic Brain Injury	†	†	†	†	†	†	†	†	—	—	—	—	—	—	†	†	†	†
Multiple Sclerosis	†	†	—	—	—	—	—	—	†	†	†	†	†	†	†	†	—	—
Non-Traumatic Brain Injury	†	†	†	†	—	—	†	†	†	†	†	†	—	—	—	—	—	—
Head Injury	†	†	†	†	†	†	—	—	—	—	—	—	—	—	—	—	—	—
Retinopathy	†	†	†	†	†	†	†	†	—	—	—	—	—	—	—	—	—	—
Cranial Nerve Injury	†	†	—	—	†	†	—	—	—	—	†	†	—	—	—	—	—	—
Specific Diseases of CNS	†	†	—	—	†	†	—	—	—	—	—	—	—	—	—	—	—	—
Guillain-Barre Syndrome	†	†	—	—	—	—	—	—	—	—	—	—	—	—	—	—	†	†
Cranial Neuralgia	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Complex Regional Syndrome	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Huntington's Disease	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
R. Cognition/ Judgment																		
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Dementia	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Executive Function Disorder	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

(continued)

Appendix Table 3-2 (continued)
Original secondary diagnosis frequencies, by therapy discipline: CARE-F admission assessments

Original secondary diagnoses	Total		1. PT+OT+SLP		2. PT+OT		3. PT+SLP		4. OT+SLP		5. PT		6. OT		7. SLP		8. NONE	
	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN
Memory Impairment	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Pragmatics Disorder	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
S. Communication, Voice, or Speech Disorder																		
Total	137	16.31	36	29.03	†	†	11	19.30	14	29.79	12	8.45	†	†	19	21.59	28	20.14
Aphasia	64	7.62	15	12.10	†	†	†	†	†	†	†	†	†	†	†	†	11	7.91
Cognitive Communication Disorder	63	7.50	21	16.94	†	†	†	†	†	†	†	†	†	†	†	†	14	10.07
Other	14	1.67	†	†	†	†	—	—	†	†	†	†	†	†	†	†	†	†
Speech Disorder	11	1.31	†	†	—	—	—	—	†	†	†	†	†	†	†	†	—	—
Reading/Writing Dysfunction	†	†	†	†	—	—	†	†	—	—	†	†	†	†	—	—	†	†
Apraxia of Speech	†	†	—	—	—	—	—	—	—	—	†	†	—	—	†	†	†	†
Voice Disorder (Dysphonia)	†	†	†	†	—	—	—	—	†	†	†	†	—	—	—	—	—	—
T. Swallowing Disorder (Dysphagia)																		
Total	192	22.86	31	25.00	14	9.33	29	50.88	28	59.57	†	†	††	††	41	46.59	22	15.83
U. Sensory Disorders/Gait or Balance Disorder																		
Total	315	37.50	54	43.55	50	33.33	46	80.70	27	57.45	41	28.87	28	30.11	38	43.18	31	22.30
Gait/Balance Disorder	199	23.69	39	31.45	28	18.67	41	71.93	20	42.55	25	17.61	13	13.98	††	††	†	†
Vision Impairment	118	14.05	17	13.71	20	13.33	11	19.30	11	23.40	16	11.27	14	15.05	16	18.18	13	9.35
Hearing Impairment	72	8.57	†	†	16	10.67	†	†	†	†	†	†	†	†	†	†	12	8.63
Other	24	2.86	†	†	†	†	†	†	†	†	†	†	†	†	†	†	—	—

(continued)

Appendix Table 3-2 (continued)
Original secondary diagnosis frequencies, by therapy discipline: CARE-F admission assessments

Original secondary diagnoses	Total		1. PT+OT+SLP		2. PT+OT		3. PT+SLP		4. OT+SLP		5. PT		6. OT		7. SLP		8. NONE	
	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN
V. Other Conditions and Symptoms																		
Total	236	28.10	19	15.32	47	31.33	24	42.11	22	46.81	47	33.10	36	38.71	24	27.27	17	12.23
Pain, not syndrome	122	14.52	†	†	24	16.00	†	†	†	†	27	19.01	22	23.66	14	15.91	†	†
Other	78	9.29	11	8.87	14	9.33	†	†	11	23.40	11	7.75	13	13.98	†	†	†	†
Obesity	31	3.69	†	†	11	7.33	†	†	†	†	†	†	†	†	—	—	†	†
Vertigo	21	2.50	—	—	†	†	†	†	†	†	†	†	†	†	†	†	†	†
Paralysis	†	†	—	—	—	—	—	—	—	—	†	†	†	†	†	†	†	†
Pain Syndrome	†	†	—	—	†	†	—	—	†	†	†	†	—	—	†	†	†	†

NOTES:

† = Fewer than 11 cases. †† = Count suppressed to maintain confidentiality of cells with fewer than 11 cases.

1. N = Count of CARE-F admission assessments
2. Diagnoses within a category are sorted in descending order of Total Frequency.
3. PT = Physical Therapy, OT = Occupational Therapy, SLP = Speech-Language Pathology, TMJ = Temporomandibular Joint Disorder; TIA = Transient Ischemic Attack; COPD = Chronic Obstructive Pulmonary Disease; ESRD = End-Stage Renal Disease; CNS = Central Nervous System; PNS = Peripheral Nervous System

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims/CARE data.

Program: TG002

Appendix Table 3-3
Primary diagnosis group definitions and final primary diagnosis frequencies: CARE-C physical therapy admission assessments

CARE-C PT primary diagnosis groups	N
Osteoarthritis	**759**
Unspecified and Miscellaneous Musculoskeletal	**608**
Musculoskeletal, Other	575
Osteoporosis	21
Contusion	11
TMJ disorder	†
Musculoskeletal Congenital Anomalies	—
Torticollis	—
Joint Replacement	**584**
Herniated Disc and Other Major Musculoskeletal	**492**
Herniated Disc	121
Tendon Rupture	120
Internal Derangement of Joint	113
Nerve Entrapment	62
Rheumatoid Arthritis	25
Scoliosis	23
Amputation	20
Contracture	14
Sprain/Strain	**334**
Bursitis/Tendonitis	**315**
Tendonitis	229
Bursitis	89
Spinal Stenosis	**310**
Multiple Etiologies, One Major	**278**
Multiple Major Etiologies	**272**
Fracture	**234**
Unspecified and Miscellaneous Diagnoses	**140**
Gait or Balance Disorder	40
Other Conditions and Symptoms, Other	27
Generalized Weakness	23
Hypertension	13
Cancer/Other Neoplasms, Other	12

(continued)

Appendix Table 3-3 (continued)
Primary diagnosis group definitions and final primary diagnosis frequencies: CARE-C physical therapy admission assessments

CARE-C PT primary diagnosis groups	N
Sensory Disorders/Gait or Balance Disorder, Other	†
Diabetes Mellitus	†
Depression	†
Dementia	†
Alzheimer's Disease	†
Skin Ulcer/Wound	†
Immune Disorders	†
Obesity	†
Vision Impairment	†
Seizure disorder	†
Burn	†
Integumentary System, Other	†
Gastrointestinal Disorders, Other	†
ESRD	†
Memory impairment	†
Anxiety disorder	†
Metabolic System, Other	—
Hearing Impairment	—
Anemia	—
Executive function disorder	—
Infectious Diseases, Other	—
Retinopathy	—
Pragmatics disorder	—
Cognition/Judgment, Other	—
Bipolar disorder	—
Mental Health, Other	—
Speech disorder	—
Communication, Voice, or Speech disorder, Other	—
HIV	—
Anemias/Other Hematological Disorders, Other	—
Congenital Abnormalities, Other	—
Attention disorder	—
Schizophrenia	—

(continued)

Appendix Table 3-3 (continued)
Primary diagnosis group definitions and final primary diagnosis frequencies: CARE-C physical therapy admission assessments

CARE-C PT primary diagnosis groups	N
Aphasia	—
Apraxia of speech	—
Reading or writing dysfunction	—
Voice disorder	—
Cognitive-communication disorder	—
Dysphagia	—
Vertigo	**86**
Stroke	**83**
Peripheral Nervous System and Other Major Neurological Disorders	**82**
Peripheral Nervous System Disorder (Including Neuropathy)	57
Specific Disease of Central Nervous System (CNS)	†
Traumatic Brain Injury	†
Non-traumatic brain injury	†
Head Injury	†
Encephalopathy	†
Paralysis	—
Guillain-Barre Syndrome	—
Parkinson's and Other Progressive Neurological	**75**
Parkinson's	58
Multiple Sclerosis	17
Huntington's Disease	—
Circulatory (including Lymphatic) and Pulmonary/Respiratory	**70**
Lymphedema	16
Chronic obstructive pulmonary disease (COPD)	12
Coronary Artery Disease	†
Circulatory, Other	†
Heart Failure	†
Atrial Fibrillation & Other Dysrhythmia (bradycardia, tachycardia)	†
Peripheral Vascular/Arterial Disease	†
Pneumonia	†
Asthma	†
Pulmonary, Other	†
Deep vein thrombosis (DVT)	†

(continued)

Appendix Table 3-3 (continued)
Primary diagnosis group definitions and final primary diagnosis frequencies: CARE-C physical therapy admission assessments

CARE-C PT primary diagnosis groups	N
Lymphatic, Other	†
Bronchitis	—
Cystic fibrosis	—
Multiple Etiologies, No Major	**69**
No Primary Diagnosis	**69**
Pain	**61**
Pain, Not Pain Syndrome	56
Pain Syndrome (Fibromyalgia, Polymyalgia, etc.)	†
Complex Regional Syndrome	†
Unspecified and Miscellaneous Neurological	**59**
Neurological, Other	50
TIA	†
Cranial Neuralgia	†
Cranial Nerve Injury	†
Neurological Congenital/Development Anomalies	†
Genitourinary Disorders	**27**
Incontinence	22
Pelvic Pain	†
Genitourinary, Other	†

NOTES:
† = Fewer than 11 cases.
1. N = Count of CARE-C PT admission assessments
2. Diagnoses within a category are sorted in descending order of their count.
3. PT = Physical Therapy, TMJ = Temporomandibular Joint Disorder; TIA = Transient Ischemic Attack; COPD = Chronic Obstructive Pulmonary Disease; ESRD = End-Stage Renal Disease; CNS = Central Nervous System; PNS = Peripheral Nervous System; HIV -Human Immunodeficiency Virus.
4. Beneficiaries can have multiple diagnoses within a group. Therefore, primary diagnosis group frequencies are sometimes smaller than the sum of individual diagnosis frequencies within the group.
5. The most common diagnoses in 18. Multiple Major Etiologies are Osteoarthritis (N=182), Spinal Stenosis (N=105), Joint Replacement (N=56), PNS Disorder (N=52), and Herniated Disc (N=39). All of the remaining diagnosis counts were less than or equal to 37.
6. The most common diagnoses in 19. Multiple Etiologies, one major are Osteoarthritis (N=124), Musculoskeletal, Other (N=89), Osteoporosis (N=40), Sprain/Strain (N=38), and Joint Replacement (N=36). All of the remaining diagnosis counts were less than or equal to 23.
7. The most common diagnoses in 20. Multiple Etiologies, no major are Musculoskeletal, Other (N=36), Sprain/Strain (N=30), and Tendonitis (N=15). All of the remaining diagnosis counts were less than or equal to 9.

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims and CARE data.
Program: TG002

Appendix Table 3-4
Primary diagnosis group definitions and final primary diagnosis frequencies: CARE-C occupational therapy admission assessments

CARE-C OT primary diagnosis groups	N
Major Musculoskeletal, Excluding Fracture and Joint Replacement	**110**
Osteoarthritis	53
Nerve Entrapment	33
Tendon Rupture	†
Contracture	†
Herniated disc	†
Amputation	†
Internal Derangement of Joint	†
Rheumatoid arthritis	†
Spinal Stenosis	†
Scoliosis	†
Fracture and Joint Replacement	**99**
Fracture	71
Joint Replacement	28
Minor and Miscellaneous Musculoskeletal	**93**
Musculoskeletal, Other	43
Tendonitis	33
Sprain/Strain	†
Bursitis	†
Osteoporosis	†
Contusion	†
Musculoskeletal Congenital Anomalies	†
TMJ disorder	—
Torticollis	—
Neurological, Excluding Stroke	**70**
Parkinson's	20
Neurological, Other	15
Multiple Sclerosis	†
Peripheral Nervous System Disorder (including Neuropathy)	†
Traumatic Brain Injury	†

(continued)

Appendix Table 3-4 (continued)
Primary diagnosis group definitions and final primary diagnosis frequencies: CARE-C occupational therapy admission assessments

CARE-C OT primary diagnosis groups	N
Guillain-Barre Syndrome	†
Head Injury	†
Non-traumatic brain injury	†
Paralysis	†
Encephalopathy	†
Specific Diseases of Central Nervous System (CNS)	†
TIA	†
Neurological Congenital/Developmental Anomalies	†
Huntington's Disease	—
Cranial Neuralgia	—
Cranial Nerve Injury	—
Stroke	**63**
Circulatory (including Lymphatic) and Pulmonary/Respiratory	**58**
Lymphedema	51
Chronic obstructive pulmonary disease (COPD)	†
Peripheral Vascular Disease/Peripheral Arterial Disease	†
Heart Failure (including pulmonary edema)	†
Circulatory, Other	†
Atrial Fibrillation & Other Dysrhythmia (bradycardia, tachycardia)	†
Pneumonia	†
Pulmonary/Respiratory System, Other	†
Lymphatic, Other	—
Coronary Artery Disease (angina, myocardial infarction)	—
Asthma	—
Bronchitis	—
Cystic fibrosis	—
Unspecified and Miscellaneous Diagnoses	**51**
Vision Impairment	13
Dementia	†
Cancer/Other Neoplasms, Other	†

(continued)

Appendix Table 3-4 (continued)
Primary diagnosis group definitions and final primary diagnosis frequencies: CARE-C occupational therapy admission assessments

CARE-C OT primary diagnosis groups	N
Pain, Not Pain Syndrome	†
Other Conditions and Symptoms, Other	†
Generalized Weakness	†
Memory impairment	†
Integumentary System, Other	†
Infectious Diseases	†
Immune Disorders	†
Incontinence	†
Genitourinary System, Other	†
Communication, Voice, or Speech Disorder, Other	†
Alzheimer's Disease	†
Pain Syndrome (Fibromyalgia, Polymyalgia, etc.)	†
Skin Ulcer/Wound	—
Burn	—
Diabetes Mellitus	—
Metabolic System, Other	—
Aphasia	—
Apraxia of speech	—
Hypertension	—
Depression	—
Mental Health, Other	—
Executive function disorder	—
Cognition/Judgment, Other	—
Gait or Balance Disorder	—
Hearing Impairment	—
Vertigo	—
HIV	—
Gastrointestinal Disorders	—
Anemia	—
Anemias/Other Hematological Disorders, Other	—

(continued)

Appendix Table 3-4 (continued)
Primary diagnosis group definitions and final primary diagnosis frequencies: CARE-C occupational therapy admission assessments

CARE-C OT primary diagnosis groups	N
Congenital Abnormalities, Other	—
End Stage Renal Disease (ESRD)	—
Retinopathy	—
Obesity	—
Sensory Disorders/Gait or Balance Disorder, Other	—
Deep vein thrombosis (DVT)	—
Pelvic Pain	—
Reading or writing dysfunction	—
Voice Disorder (Dysphonia)	—
Speech disorder	—
Cognitive-communication disorder	—
Swallowing Disorder (Dysphagia)	—
Anxiety disorder	—
Bipolar disorder	—
Schizophrenia	—
Seizure disorder	—
Pragmatics disorder	—
Attention Disorder	—
Complex Regional Syndrome	—
Multiple Etiologies	**35**
No Primary Diagnosis	†

NOTES:

† = Fewer than 11 cases.

1. N = Count of CARE-C OT admission assessments
2. Diagnoses within a category are sorted in descending order of their count.
3. OT = Occupational Therapy, TMJ = Temporomandibular Joint Disorder; TIA = Transient Ischemic Attack; COPD = Chronic Obstructive Pulmonary Disease; ESRD = End-Stage Renal Disease; CNS = Central Nervous System; PNS = Peripheral Nervous System; HIV-Human Immunodeficiency Virus.

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims/CARE data.

Program: TG004

Appendix Table 3-5
Cross-tabulations of Initial Primary Diagnosis Groups vs. Final Primary Diagnosis Groups after Reassignment: CARE-C physical therapy admission assessments

Initial primary diagnosis groups	Final primary diagnosis groups										
	Fracture	Joint replace-ment	Osteo-arthritis	Spinal stenosis	Herniated disc and other major musculo-skeletal	Sprain/ strain	Bursitis/ tendonitis	Unspeci-fied and miscell-aneous musculo-skeletal	Circulatory (including lymphatic) and pulmonary/ respiratory	Stroke	Parkinson's and other progressive neuro-logical
Fracture	232	—	—	—	—	—	—	—	—	—	—
Joint Replacement	—	465	—	—	—	—	—	—	—	—	—
Osteoarthritis	—	118	694	—	—	—	—	—	—	—	—
Spinal Stenosis	—	—	—	300	—	—	—	—	—	—	—
Herniated Disc and Other Major Musculoskeletal	—	—	—	—	476	—	—	—	—	—	—
Sprain/Strain	—	—	—	—	—	331	—	—	—	—	—
Bursitis/Tendonitis	—	—	—	—	—	—	307	—	—	—	—
Unspecified and Miscellaneous Musculoskeletal	—	—	—	—	—	—	—	575	—	—	—
Circulatory (including Lymphatic) and Pulmonary/Respiratory	—	—	—	—	—	—	—	—	53	†	—
Stroke	—	—	—	—	—	—	—	—	—	75	—
Parkinson's and Other Progressive Neurological	—	—	—	—	—	—	—	—	—	—	72
Peripheral Nervous System and Other Major Neurological Disorders	—	—	—	—	—	—	—	—	—	—	—

(continued)

Appendix Table 3-5 (continued)
Cross-tabulations of Initial Primary Diagnosis Groups vs. Final Primary Diagnosis Groups after Reassignment: CARE-C physical therapy admission assessments

	Final primary diagnosis groups										
Initial primary diagnosis groups	Fracture	Joint replace-ment	Osteo-arthritis	Spinal stenosis	Herniated disc and other major musculo-skeletal	Sprain/ strain	Bursitis/ tendonitis	Unspeci-fied and miscell-aneous musculo-skeletal	Circulatory (including lymphatic) and pulmonary/ respiratory	Stroke	Parkinson's and other progressive neuro-logical
Unspecified and Miscellaneous Neurological	—	—	—	—	—	—	—	—	—	†	—
Gait or Balance Disorder	†	†	22	†	†	†	—	18	12	†	†
Pain	†	31	98	15	28	16	21	56	†	†	—
Vertigo	—	—	—	—	—	—	—	—	—	—	—
Generalized Weakness	†	†	40	†	†	†	†	28	14	†	†
Genitourinary Disorders	—	—	—	—	—	—	—	—	—	—	—
Unspecified and Miscellaneous Diagnoses	†	†	15	†	†	†	†	12	†	†	—
No Primary Diagnosis	—	—	—	—	—	—	—	—	—	—	—
Total	252	631	869	320	525	356	333	689	83	96	78

(continued)

Appendix Table 3-5 (continued)
Cross-tabulations of Initial Primary Diagnosis Groups vs. Final Primary Diagnosis Groups after Reassignment: CARE-C physical therapy admission assessment

Initial primary diagnosis groups	Final primary diagnosis groups										
	Peripheral nervous system and other major neuro-logical disorders	Unspeci-fied and miscellan-eous neuro-logical	Pain	Vertigo	Genitour-inary disorders	Unspeci-fied and miscellan-eous diagnoses	Multiple major etiologies	Multiple etiologies, one major	Multiple etiologies, no major	No primary diagnosis	Total
Fracture	—	—	—	—	—	—	†	†	—	—	242
Joint Replacement	—	—	—	—	—	—	†	†	—	—	478
Osteoarthritis	—	—	—	—	—	—	57	58	—	—	927
Spinal Stenosis	—	—	—	—	—	—	††	†	—	—	342
Herniated Disc and Other Major Musculoskeletal	—	—	—	—	—	—	40	33	—	—	549
Sprain/Strain	—	—	—	—	—	—	†	††	25	—	373
Bursitis/Tendonitis	—	—	—	—	—	—	†	††	19	—	351
Unspecified and Miscellaneous Musculoskeletal	—	—	—	—	—	—	13	62	32	—	682
Circulatory (including Lymphatic) and Pulmonary/Respiratory	—	—	—	—	—	—	†	29	11	—	104
Stroke	—	—	—	—	—	—	†	†	—	—	81
Parkinson's and Other Progressive Neurological	—	—	—	—	—	—	†	†	—	—	81
Peripheral Nervous System and Other Major Neurological Disorders	69	—	—	—	—	—	††	†	—	—	90

(continued)

Appendix Table 3-5 (continued)
Cross-tabulations of Initial Primary Diagnosis Groups vs. Final Primary Diagnosis Groups after Reassignment: CARE-C physical therapy admission assessments

Initial primary diagnosis groups	Final primary diagnosis groups										
	Peripheral nervous system and other major neuro-logical disorders	Unspeci-fied and miscellan-eous neuro-logical	Pain	Vertigo	Genitour-inary disorders	Unspeci-fied and miscellan-eous diagnoses	Multiple major etiologies	Multiple etiologies, one major	Multiple etiologies, no major	No primary diagnosis	Total
Unspecified and Miscellaneous Neurological	—	51	—	—	—	—	—	†	†	—	66
Gait or Balance Disorder	†	†	†	†	†	59	76	64	11	—	326
Pain	†	†	58	—	†	†	131	103	19	—	598
Vertigo	—	—	—	81	—	—	†	†	†	—	89
Generalized Weakness	†	†	†	—	†	29	35	51	13	—	262
Genitourinary Disorders	—	—	—	—	26	—	—	†	†	—	38
Unspecified and Miscellaneous Diagnoses	—	†	—	—	—	65	15	21	†	—	158
No Primary Diagnosis	—	—	—	—	—	—	—	—	—	69	69
Total	90	66	62	90	31	154	448	513	151	69	—

NOTES:

† = Fewer than 11 cases. †† = Count suppressed to maintain confidentiality of cells with fewer than 11 cases.

1. The initial primary diagnosis groups reflect the diagnosis groups beneficiaries could be classified into based on the original primary diagnoses reported on CARE-C PT admission assessments. The initial diagnosis groups are not mutually-exclusive, and beneficiaries could be classified within multiple groups. The initial diagnosis groups were not used for analyses.
2. The final primary diagnosis groups reflect the diagnosis groups beneficiaries were classified into after conducting diagnosis reassignments. The final diagnosis groups are mutually-exclusive, and were used for payment analysis.
3. The row totals represent the total frequencies of the individual cell counts across the row. The column totals represent the total frequencies of the individual cell counts within the column.

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims/CARE data.

Program: TG005

Appendix Table 3-6
Cross-tabulations of Initial Primary Diagnosis Groups vs. Final Primary Diagnosis Groups after Reassignment: CARE-C occupational therapy admission assessments

Initial primary diagnosis groups	Final primary diagnosis groups: Fracture and joint replacement	Major musculoskeletal, excluding fracture and joint replacement	Minor, unspecified, and miscellaneous musculoskeletal	Stroke	Neurological, excluding stroke	Circulatory (including lymphatic) and pulmonary/respiratory	Unspecified and miscellaneous diagnoses	Multiple etiologies	No primary diagnosis	Total
Fracture	††	—	—	—	—	—	—	†	—	89
Major Musculoskeletal, excluding Fracture and Joint Replacement	14	109	—	—	—	—	—	11	—	134
Minor, Unspecified, and Miscellaneous Musculoskeletal	—	—	93	—	—	—	—	14	—	107
Stroke	—	—	—	††	—	—	—	†	—	65
Neurological, excluding Stroke	—	—	—	—	††	—	—	†	—	74
Generalized Weakness	†	†	†	†	†	—	†	14	—	42
Circulatory (including Lymphatic) and Pulmonary/Respiratory	—	—	—	—	—	††	—	†	—	67
Unspecified and Miscellaneous Diagnoses	†	†	†	†	†	†	46	13	—	88
No Primary Diagnosis	—	—	—	—	—	—	—	—	†	†
Total	103	126	102	69	79	62	52	73	†	—

NOTES:
† = Fewer than 11 cases. †† = Count suppressed to maintain confidentiality of cells with fewer than 11 cases.

1. The initial primary diagnosis groups reflect the diagnosis groups beneficiaries could be classified into based on the original primary diagnoses reported on CARE-C OT admission assessments. The initial diagnosis groups are not mutually-exclusive, and beneficiaries could be classified within multiple groups. The initial diagnosis groups were not used for analyses.
2. The final primary diagnosis groups reflect the diagnosis groups beneficiaries were classified into after conducting diagnosis reassignments. The final diagnosis groups are mutually-exclusive, and were used for payment analysis.
3. The row totals represent the total frequencies of the individual cell counts across the row. The column totals represent the total frequencies of the individual cell counts within the column

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims/CARE data.
Program: TG005

Appendix Table 3-7
Secondary diagnosis group definitions and final secondary diagnosis frequencies after reassignment: CARE-C physical therapy admission assessments

CARE-C PT secondary diagnosis groups	N
Pain	**2,210**
Pain, Not Pain Syndrome	2,115
Pain Syndrome (Fibromyalgia, Polymyalgia, etc.)	139
Complex Regional Syndrome	†
Osteoarthritis	**1,613**
Generalized weakness	**1,457**
Hypertension	**1,411**
Gait or balance disorder	**1,075**
Spinal stenosis, herniated disc, and other major musculoskeletal	**871**
Spinal Stenosis	275
Herniated disc	167
Internal Derangement of Joint	121
Fracture	116
Rheumatoid arthritis	110
Scoliosis	101
Nerve Entrapment	90
Contracture	54
Tendon Rupture	49
Amputation	†
Circulatory (including lymphatic system)	**807**
Coronary Artery Disease (angina, myocardial infarction)	311
Circulatory, Other	259
Atrial Fibrillation & Other Dysrhythmia (bradycardia, tachycardia)	204
Peripheral Vascular Disease/Peripheral Arterial Disease	75
Heart Failure (including pulmonary edema)	71
Deep vein thrombosis (DVT)	56
Lymphedema	43
Lymphatic System , Other	†
Osteoporosis, sprain/strain, and other minor musculoskeletal	**786**
Osteoporosis	324
Sprain/Strain	238
Tendonitis	184
Bursitis	126
Contusion	32

(continued)

Appendix Table 3-7 (continued)
Secondary diagnosis group definitions and final secondary diagnosis frequencies after reassignment: CARE-C physical therapy admission assessments

CARE-C PT secondary diagnosis groups	N
Musculoskeletal Congenital Deformities/Anomalies	13
TMJ disorder	13
Torticollis	—
Unspecified and miscellaneous diagnoses	**700**
Other Conditions and Symptoms, Other	129
Gastrointestinal Disorders, Other	119
Incontinence	100
Genitourinary System, Other	91
Anemia	82
Metabolic System, Other	68
Integumentary System, Other	52
Skin Ulcer/Wound	42
Seizure disorder	41
Infectious Diseases, Other	27
Sensory Disorders/Gait or Balance Disorder, Other	21
Immune Disorders	20
End Stage Renal Disease	17
Pelvic Pain	11
Dysphagia	†
HIV	†
Anemias/Other Hematological Disorders, Other	†
Congenital Abnormalities, Other	†
Retinopathy	†
Burn	†
Diabetes mellitus	**592**
Pulmonary/respiratory system	**477**
Asthma	229
Chronic obstructive pulmonary disease (COPD)	151
Pulmonary, Other	96
Bronchitis	90
Pneumonia	40
Cystic fibrosis	—
No secondary diagnoses	**461**

(continued)

Appendix Table 3-7 (continued)
Secondary diagnosis group definitions and final secondary diagnosis frequencies after reassignment: CARE-C physical therapy admission assessments

CARE-C PT secondary diagnosis groups	N
Mental health	**410**
Depression	297
Anxiety Disorder	164
Bipolar Disease	31
Mental Health, Other	31
Schizophrenia	†
Cancer and other neoplasms	**372**
Unspecified musculoskeletal	**340**
Joint replacement	**231**
Communication and cognition disorders	**215**
Hearing Impairment	153
Alzheimer's disease	17
Reading or writing dysfunction	13
Aphasia	11
Speech disorder	†
Communication, Voice, or Speech, Other	†
Memory impairment	†
Attention Disorder	†
Cognitive-Communication Disorder	†
Apraxia of speech	†
Executive function disorder	†
Dementia	†
Voice disorder (dysphonia)	†
Pragmatics disorder	†
Cognition/Judgment, Other	†
Unspecified and miscellaneous neurological	**183**
Neurological, Other	107
TIA	69
Neurological Congenital/Development Anomalies	†
Cranial Neuralgia	†
Cranial Nerve Injury	—
Peripheral nervous system and other major neurological disorders	**173**
Peripheral Nervous System Disorder (Including Neuropathy)	98
Parkinson's	24

(continued)

Appendix Table 3-7 (continued)
Secondary diagnosis group definitions and final secondary diagnosis frequencies after reassignment: CARE-C physical therapy admission assessments

CARE-C PT secondary diagnosis groups	N
Head Injury	22
Paralysis	13
Traumatic Brain Injury	11
Specific Disease of Central Nervous System (CNS)	†
Multiple Sclerosis	†
Encephalopathy	†
Non-traumatic brain injury	†
Huntington's Disease	—
Guillain-Barre Syndrome	—
Vision impairment	**170**
Obesity	**156**
Stroke	**117**
Vertigo	**85**

NOTES:

† = Fewer than 11 cases.

1. N = Count of CARE-C PT admission assessments
2. Diagnoses within a category are sorted in descending order of their count.
3. PT = Physical Therapy, TMJ = Temporomandibular Joint Disorder; TIA = Transient Ischemic Attack; COPD = Chronic Obstructive Pulmonary Disease; ESRD = End-Stage Renal Disease; CNS = Central Nervous System; PNS = Peripheral Nervous System; HIV -Human Immunodeficiency Virus.
4. Beneficiaries can have multiple diagnoses within a group. Therefore, secondary diagnosis group frequencies are sometimes smaller than the sum of individual diagnosis frequencies within the group.

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims/CARE data.

Program: TG004

Appendix Table 3-8
Secondary diagnosis group definitions and final secondary diagnosis frequencies after reassignment: CARE-C occupational therapy admission assessments

CARE-C OT secondary diagnosis groups	N
Osteoarthritis and other major musculoskeletal	**243**
Osteoarthritis	168
Joint Replacement	38
Contracture	25
Fracture	24
Spinal Stenosis	17
Rheumatoid arthritis	15
Nerve Entrapment	13
Internal Derangement of Joint	12
Herniated disc	11
Scoliosis	†
Amputation	†
Tendon Rupture	†
Unspecified and miscellaneous diagnoses	**224**
Gait or Balance Disorder	55
Cancer/Other Neoplasms, Other	49
Vision Impairment	47
Other Conditions and Symptoms, Other	26
Gastrointestinal Disorders, Other	25
Obesity	23
Incontinence	17
Skin Ulcer/Wound	15
Genitourinary System, Other	13
Integumentary System, Other	12
Metabolic System, Other	11
Vertigo	†
Seizure disorder	†
Anemia	†
Sensory Disorders/Gait or Balance Disorder, Other	†
Infectious Diseases, Other	†
Dysphagia	†
Immune Disorders, Other	†
End Stage Renal Disease	†
HIV	†

(continued)

Appendix Table 3-8 (continued)
Secondary diagnosis group definitions and final secondary diagnosis frequencies after reassignment: CARE-C occupational therapy admission assessments

CARE-C OT secondary diagnosis groups	N
Pelvic Pain	†
Congenital Abnormalities, Other	†
Retinopathy	†
Burn	—
Anemias/Other Hematological Disorders, Other	—
Generalized weakness	**168**
Hypertension	**162**
Pain	**156**
Pain, Not Pain Syndrome	144
Pain Syndrome (Fibromyalgia, Polymyalgia, etc.)	14
Complex Regional Syndrome	—
Circulatory (including lymphatic) and pulmonary/respiratory	**142**
Circulatory, Other	34
Coronary Artery Disease (angina, myocardial infarction)	30
Chronic obstructive pulmonary disease (COPD)	26
Atrial Fibrillation & Other Dysrhythmia (bradycardia, tachycardia)	25
Asthma	22
Peripheral Vascular Disease/Peripheral Arterial Disease	16
Pneumonia	12
Pulmonary, Other	†
Heart Failure (including pulmonary edema)	†
Bronchitis	†
Deep vein thrombosis (DVT)	†
Lymphedema	†
Lymphatic System, Other	†
Cystic fibrosis	†
Cognitive, communication, and mental health disorders	**115**
Depression	53
Hearing Impairment	36
Anxiety Disorder	26
Bipolar Disease	†
Mental Health, Other	†
Attention Disorder	†

(continued)

Appendix Table 3-8 (continued)
Secondary diagnosis group definitions and final secondary diagnosis frequencies after reassignment: CARE-C occupational therapy admission assessments

CARE-C OT secondary diagnosis groups	N
Aphasia	†
Apraxia of speech	†
Reading or writing dysfunction	†
Alzheimer's disease	†
Speech disorder	†
Communication, Voice, or Speech, Other	†
Dementia	†
Voice disorder (dysphonia)	†
Cognitive-Communication Disorder	†
Memory impairment	†
Executive function disorder	†
Cognition/Judgment, Other	†
Schizophrenia	—
Pragmatics disorder	—
Osteoporosis, unspecified, and miscellaneous musculoskeletal	**108**
Osteoporosis	38
Musculoskeletal, Other	36
Tendonitis	29
Sprain/Strain	16
Bursitis	†
Contusion	†
Musculoskeletal Congenital Deformities/Anomalies	†
TMJ disorder	†
Torticollis	—
Peripheral nervous system and other neurological disorders	**104**
Peripheral Nervous System Disorder (Including Neuropathy)	36
Neurological, Other	21
Stroke	19
Paralysis	†
Non-traumatic brain injury	†
TIA	†
Parkinson's	†
Head Injury	†
Multiple Sclerosis	†

(continued)

Appendix Table 3-8 (continued)
Secondary diagnosis group definitions and final secondary diagnosis frequencies after reassignment: CARE-C physical therapy admission assessments

CARE-C PT secondary diagnosis groups	N
Huntington's Disease	†
Specific Disease of Central Nervous System (CNS)	†
Cranial Nerve Injury	†
Encephalopathy	†
Neurological Congenital/Development Anomalies	†
Guillain-Barre Syndrome	—
Traumatic Brain Injury	—
Cranial Neuralgia	—
Diabetes mellitus	**85**
No secondary diagnosis	**65**

NOTES:

† = Fewer than 11 cases.

1. N = Count of CARE-C OT admission assessments
2. Diagnoses within a category are sorted in descending order of their count.
3. OT = Occupational Therapy; Therapy, TMJ = Temporomandibular Joint Disorder; TIA = Transient Ischemic Attack; COPD = Chronic Obstructive Pulmonary Disease; ESRD = End-Stage Renal Disease; CNS = Central Nervous System; PNS = Peripheral Nervous System; HIV - Human Immunodeficiency Virus.
4. Beneficiaries can have multiple diagnoses within a group. Therefore, secondary diagnosis group frequencies are sometimes smaller than the sum of individual diagnosis frequencies within the group.

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims/CARE data.

Program: TG004

Appendix Table 3-9a
Final SLP impairment diagnosis group definitions and frequencies

CARE-C SLP Impairment diagnosis groups	N (primary + secondary)
Cognitive communication disorders only	**136**
Cognitive-Communication disorder	75
Aphasia	55
Speech disorder	33
Voice disorder (dysphonia)	28
Reading or writing dysfunction	25
Apraxia of speech	15
Hearing Impairment	14
Memory impairment	11
Executive function disorder	†
Communication, Voice, or Speech Disorder, Other	†
Attention Disorder	†
Cognition/Judgment, Other	—
Pragmatics disorder	—
Cognitive, communication, and swallowing disorders only	**34**
Aphasia	34
Apraxia of speech	19
Cognitive-Communication disorder	14
Executive function disorder	13
Hearing Impairment	†
Memory impairment	†
Communication, Voice, or Speech Disorder, Other	†
Cognition/Judgment, Other	†
Pragmatics disorder	†
Reading or writing dysfunction	†
Speech disorder	—
Voice disorder (dysphonia)	—
Attention Disorder	—
Swallowing Disorder (Dysphagia)	—
No impairment diagnosis	**34**

(continued)

Appendix Table 3-9a
Final SLP impairment diagnosis group definitions and frequencies

CARE-C SLP Impairment diagnosis groups	N (primary + secondary)
Swallowing disorders only	**23**
Swallowing Disorder (Dysphagia)	26

NOTES:

† = Fewer than 11 cases.

1. SLP = Speech-Language Pathology
2. N = Sum of primary and secondary diagnoses. For example, Swallowing Disorder (Dysphagia) was present as a primary diagnosis on 22 CARE-C SLP admission assessments and as a secondary diagnosis on 38 CARE-C SLP admission assessments. Therefore, the total frequency of Swallowing Disorder (Dysphagia) in this table is 60 (see Groups 3 and 2).
3. Diagnoses within a category are sorted in descending order of their count.
4. Beneficiaries can have multiple diagnoses within a group. Therefore, diagnosis group frequencies are smaller than the sum of individual diagnosis frequencies within the group.

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims/CARE data.

Program: TG004

Appendix Table 3-9b
Final SLP medical diagnosis group definitions and frequencies

CARE-C SLP Medical diagnosis groups	N (primary + secondary)
Stroke	**104**
Neurological, excluding stroke	**75**
Parkinson's	25
Neurological, Other	13
Traumatic Brain Injury	13
Dementia	†
Non-traumatic brain injury	†
Head Injury	†
TIA	†
Multiple Sclerosis	†
Specific Diseases of Central Nervous System (CNS)	†
Alzheimer's Disease	†
Cranial Nerve Injury	†
Cranial Neuralgia	—
Guillain-Barre Syndrome	—
Huntington's Disease	—
Neurological Congenital/Developmental Anomalies	—
Paralysis	—
Encephalopathy	—
Miscellaneous diagnosis	**38**
Cancer/Other neoplasms	15
Hypertension	†
Gastrointestinal Disorders	†
Generalized Weakness	†
Circulatory, Other	†
Musculoskeletal, Other	†
Vision Impairment	†
Asthma	†
Coronary Artery Disease (angina, myocardial infarction)	†
Depression	†
Diabetes Mellitus	†
Gait or Balance Disorder	†
Joint Replacement	†
Osteoporosis	†

(continued)

Appendix Table 3-9b
Final SLP medical diagnosis group definitions and frequencies

CARE-C SLP Medical diagnosis groups	N (primary + secondary)
Anemia	†
Anxiety disorder	†
Bronchitis	†
Chronic obstructive pulmonary disease (COPD)	†
Osteoarthritis	†
Pulmonary/Respiratory System, Other	†
Pneumonia	†
Seizure disorder	†
Atrial Fibrillation & Other Dysrhythmia (bradycardia, tachycardia)	†
Bipolar disorder	†
Deep vein thrombosis (DVT)	†
Fracture	†
Incontinence	†
Infectious Diseases	†
Lymphedema	†
Obesity	†
Conditions and Symptoms, Other	†
Mental Health, Other	†
Pain, Not Pain Syndrome	†
Amputation	—
Burn	—
Bursitis	—
Complex Regional Syndrome	—
Contracture	—
Contusion	—
Cystic fibrosis	—
End Stage Renal Disease (ESRD)	—
Heart Failure (including pulmonary edema)	—
Herniated disc	—
HIV	—
Immune Disorders	—
Internal Derangement of Joint	—
Musculoskeletal Congenital Deformities/Anomalies	—
Nerve Entrapment	—
Anemias/Other Hematological Disorders, Other	—

(continued)

Appendix Table 3-9b
Final SLP medical diagnosis group definitions and frequencies

CARE-C SLP Medical diagnosis groups	N (primary + secondary)
Congenital Abnormalities, Other	—
Genitourinary System, Other	—
Integumentary System, Other	—
Lymphatic System, Other	—
Metabolic System, Other	—
Sensory Disorders/Gait or Balance Disorder, Other	—
Pain Syndrome (Fibromyalgia, Polymyalgia, etc.)	—
Pelvic Pain	—
Peripheral Nervous System Disorder (including Neuropathy)	—
Peripheral Vascular Disease/Peripheral Arterial Disease	—
Retinopathy	—
Rheumatoid arthritis	—
Schizophrenia	—
Scoliosis	—
Skin Ulcer/Wound	—
Spinal Stenosis	—
Sprain/Strain	—
Tendon Rupture	—
Tendonitis	—
TMJ disorder	—
Torticollis	—
Vertigo	—
No medical diagnosis	**†**

NOTES:
† = Fewer than 11 cases.
1. SLP = Speech-Language Pathology
2. N = Counts of the sum of primary and secondary diagnoses. For example, there were 99 CARE-C SLP admission assessments with a Stroke primary diagnosis and 5 CARE-C SLP admission assessments with this secondary diagnosis. In this table, Stroke is presented with an N of 104.
3. Diagnoses within a category are sorted in descending order of their count.
4. Beneficiaries can have multiple diagnoses within a group. Therefore, diagnosis group frequencies are sometimes smaller than the sum of individual diagnosis frequencies within the group.

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims/CARE data.
Program: TG004

Appendix Table 3-10
Primary diagnosis group definitions and final primary diagnosis frequencies after reassignment: CARE-F admission assessments

Primary diagnosis groups	Overall (N)	Nursing facility (N)	Day rehabilitation facility (N)
Musculoskeletal	**156**	**99**	**57**
Osteoarthritis	40	††	†
Joint Replacement	39	†	††
Musculoskeletal, Other	26	††	†
Fracture	23	††	†
Amputation	†	†	†
Osteoporosis	†	†	—
Spinal Stenosis	†	†	†
Contracture	†	†	—
Rheumatoid Arthritis	†	†	†
Sprain/Strain	†	†	—
Herniated Disc	†	†	—
Torticollis	†	†	†
Nerve Entrapment	†	†	—
Scoliosis	†	—	†
TMJ Disorder	—	—	—
Contusion	—	—	—
Bursitis	—	—	—
Tendonitis	—	—	—
Internal Derangement of Joint	—	—	—
Tendon Rupture	—	—	—
Musculoskeletal Congenital Anomalies	—	—	—
Stroke	**147**	**71**	**76**
Stroke	147	71	76
Dementia/Alzheimer's disease	**134**	**134**	**—**
Dementia	56	56	—
Alzheimer's Disease	87	87	—

(continued)

Appendix Table 3-10 (continued)
Primary diagnosis group definitions and final primary diagnosis frequencies after reassignment: CARE-F admission assessments

Primary diagnosis groups	Overall (N)	Nursing facility (N)	Day rehabilitation facility (N)
Unspecified and miscellaneous diagnoses	**117**	**††**	**†**
Diabetes Mellitus	17	17	—
Hypertension	13	13	—
Other Conditions and Symptoms, Other	13	†	†
Mental Health, Other	11	11	—
Genitourinary System, Other	†	†	†
Schizophrenia	†	†	—
Anemias/Other Hematological Disorders, Other	†	†	—
Depression	†	†	—
Please Specify	†	†	†
Generalized Weakness	†	†	—
Cancer/Other Neoplasms, Other	†	†	—
Gait/Balance Disorder	†	†	†
Pain, not syndrome	†	†	—
Other	†	†	—
Gastrointestinal Disorders, Other	†	†	—
Skin Ulcer/Wound	†	†	—
ESRD	†	†	—
Anxiety Disorder	†	†	—
Aphasia	†	†	—
Cognitive Communication Disorder	†	†	—
Other	†	†	—
Bipolar Disease	†	†	—
Anemia	†	†	—
Congenital Abnormalities, Other	†	†	—
Vision Impairment	†	†	—
Executive Function Disorder	†	†	—
Memory Impairment	†	†	—

(continued)

Appendix Table 3-10 (continued)
Primary diagnosis group definitions and final primary diagnosis frequencies after reassignment: CARE-F admission assessments

Primary diagnosis groups	Overall (N)	Nursing facility (N)	Day rehabilitation facility (N)
Vertigo	†	—	†
Obesity	†	†	—
Burn	—	—	—
Incontinence	—	—	—
Pelvic Pain	—	—	—
Retinopathy	—	—	—
HIV	—	—	—
Immune Disorders	—	—	—
Hearing Impairment	—	—	—
Sensory Disorders/Gait or Balance Disorder, Other	—	—	—
Pragmatics Disorder	—	—	—
Attention Disorder	—	—	—
Cognition/Judgment, Other	—	—	—
Apraxia of Speech	—	—	—
Reading/Writing Dysfunction	—	—	—
Voice Disorder (Dysphonia)	—	—	—
Speech Disorder	—	—	—
Communication, Voice, or Speech disorder, Other	—	—	—
Pain Syndrome	—	—	—
Complex Regional Syndrome	—	—	—
Parkinson's, other neurological, and swallowing disorders	**116**	**85**	**31**
Parkinson's	28	28	—
Neurological, Other	27	††	†
Dysphagia	16	16	—
Multiple Sclerosis	†	†	†
Traumatic Brain Injury	†	†	†

(continued)

Appendix Table 3-10 (continued)
Primary diagnosis group definitions and final primary diagnosis frequencies after reassignment: CARE-F admission assessments

Primary diagnosis groups	Overall (N)	Nursing facility (N)	Day rehabilitation facility (N)
Head Injury	†	†	†
Non-Traumatic Brain Injury	†	†	†
Seizure Disorder	†	†	—
PNS Disorder	†	†	†
Encephalopathy	†	†	†
TIA	†	†	—
Huntington's Disease	†	†	—
Neurological Congenital/Developmental Anomalies	†	†	—
Guillain-Barre Syndrome	†	—	†
Specific Diseases of CNS	—	—	—
Cranial Neuralgia	—	—	—
Cranial Nerve Injury	—	—	—
Paralysis	—	—	—
Circulatory (including lymphatic) and pulmonary/respiratory	**95**	**†**	**†**
Heart Failure	28	††	†
COPD	21	21	—
Pneumonia	14	††	†
Coronary Artery Disease	11	†	†
Circulatory, Other	†	†	†
Pulmonary, Other	†	†	†
Atrial Fibrillation/Dysrhythmia	†	†	†
Deep Vein Thrombosis	†	†	—
Peripheral Vascular/Arterial Disease	†	†	—
Other, Lymphatic System	†	†	—
Lymphedema	—	—	—
Asthma	—	—	—
Bronchitis	—	—	—

(continued)

Appendix Table 3-10 (continued)
Primary diagnosis group definitions and final primary diagnosis frequencies after reassignment: CARE-F admission assessments

Primary diagnosis groups	Overall (N)	Nursing facility (N)	Day rehabilitation facility (N)
Cystic Fibrosis	—	—	—
Multiple etiologies	**50**	**††**	**†**
No primary diagnosis	**25**	**††**	**†**

NOTES:

† = Fewer than 11 cases. †† = Count suppressed to maintain confidentiality of cells with fewer than 11 cases.

1. N = Count of CARE-F admission assessments classified in each primary diagnosis group.
2. Primary diagnosis groups are not discipline-specific.
3. Primary diagnosis groups are not mutually exclusive.
4. Primary diagnosis groups are sorted in descending order of Overall count.
5. Beneficiaries can have multiple diagnoses within a group. Therefore, primary diagnosis group frequencies are sometimes smaller than the sum of individual diagnosis frequencies within the group.
6. The most common diagnoses for 7. Multiple Etiologies (Overall) are Dementia (N=21), Osteoarthitis (N=17), Stroke (N=13), and Alzheimer's Disease (N=12). All of the remaining diagnosis counts were less than or equal to 9.

SOURCE: RTI International Analysis of CARE-F data collected from March 2011 through June 2012.

Program: PP006

Appendix Table 3-11
Cross-tabulations of initial primary diagnosis groups vs. final primary diagnosis groups after reassignment: CARE-F nursing facility admission assessments

	Final primary diagnosis groups							
Initial primary diagnosis groups	Musculo-skeletal	Circulatory (including lymphatic) and pulmonary/respiratory	Stroke	Parkinson's, other neurological, and swallowing disorders	Dementia/ Alzheimer's disease	Unspecified and miscellaneous diagnoses	Multiple etiologies	No primary diagnosis
Musculoskeletal	156	—	—	—	—	—	24	—
Circulatory (including Lymphatic) and Pulmonary/ Respiratory	—	89	†	—	—	—	12	—
Stroke	—	—	135	—	—	—	12	—
Parkinson's, Other Neurological, and Swallowing Disorders	—	—	†	116	—	—	20	—
Dementia/ Alzheimer's Disease	—	—	—	—	133	—	26	—
Unspecified and Miscellaneous Diagnoses	19	17	†	†	17	117	32	—
No Primary Diagnosis	—	—	—	—	—	—	—	25

NOTE: † = Fewer than 11 cases.

Appendix Table 3-12
Secondary diagnosis group definitions and final primary diagnosis frequencies after reassignment: CARE-F admission assessments

Secondary diagnosis groups	Overall (N)	Nursing facility (N)	Day rehabilitation facility (N)
Unspecified and miscellaneous diagnoses	**486**	**424**	**62**
Gastrointestinal Disorders, Other	147	134	13
Anemia	139	††	†
Genitourinary System, Other	130	116	14
Other Conditions and Symptoms, Other	79	††	†
Incontinence	71	††	†
Cancer/Other Neoplasms, Other	61	42	19
Metabolic System, Other	57	45	12
Skin Ulcer/Wound	35	††	†
Obesity	32	32	—
Anemias/Other Hematological Disorders, Other	28	††	†
Sensory Disorders/Gait or Balance Disorder, Other	24	††	†
ESRD	23	††	†
Vertigo	22	††	†
Integumentary System, Other	17	††	†
Infectious Diseases, Other	17	††	†
Immune Disorders	†	†	—
Retinopathy	†	†	†
Burn	†	†	—
Pelvic Pain	†	†	—
Congenital Abnormalities, Other	†	†	—
HIV	—	—	—
Hypertension	**476**	**372**	**104**
Hypertension	476	372	104
Circulatory (including lymphatic)	**406**	**314**	**92**
Coronary Artery Disease	174	135	39
Circulatory, Other	125	86	39

(continued)

Appendix Table 3-12 (continued)
Secondary diagnosis group definitions and final primary diagnosis frequencies after reassignment: CARE-F admission assessments

Secondary diagnosis groups	Overall (N)	Nursing facility (N)	Day rehabilitation facility (N)
Atrial Fibrillation/Dysrhythmia	107	77	30
Heart Failure	87	76	11
Peripheral Vascular/Arterial Disease	74	56	18
Deep Vein Thrombosis	26	††	†
Lymphedema	†	†	—
Lymphatic System , Other	†	†	—
Mental health	**392**	**362**	**30**
Anxiety Disorder	128	††	†
Depression	271	252	19
Bipolar Disease	23	††	†
Schizophrenia	18	18	—
Mental Health, Other	113	††	†
Osteoporosis, unspecified, and miscellaneous musculoskeletal	**309**	**260**	**49**
Osteoporosis	137	††	†
Musculoskeletal, Other	90	71	19
Fracture	51	††	†
Contracture	38	††	†
Spinal Stenosis	19	††	†
Joint Replacement	19	††	†
Rheumatoid Arthritis	16	†	†
Amputation	12	†	†
Scoliosis	†	†	—
Herniated Disc	†	†	†
Internal Derangement of Joint	†	†	†
Contusion	†	†	†
Torticollis	†	†	†
Tendonitis	†	†	†
Musculoskeletal Congenital Anomalies	†	†	—

(continued)

Appendix Table 3-12 (continued)
Secondary diagnosis group definitions and final primary diagnosis frequencies after reassignment: CARE-F admission assessments

Secondary diagnosis groups	Overall (N)	Nursing facility (N)	Day rehabilitation facility (N)
Sprain/Strain	†	—	†
Bursitis	†	†	—
Nerve Entrapment	†	†	—
TMJ Disorder	—	—	—
Tendon Rupture	—	—	—
Osteoarthritis	**225**	**190**	**35**
Osteoarthritis	225	190	35
Generalized weakness	**225**	**211**	**14**
Generalized Weakness	225	211	14
Pulmonary/respiratory	**214**	**181**	**33**
COPD	120	104	16
Pulmonary, Other	64	51	13
Pneumonia	46	††	†
Asthma	20	††	†
Bronchitis	†	†	†
Cystic Fibrosis	—	—	—
Gait or balance disorder	**209**	**178**	**31**
Gait or Balance Disorder	209	178	31
Communication, voice, or speech disorders	**200**	**154**	**46**
Hearing Impairment	73	57	16
Aphasia	67	54	13
Cognitive-Communication Disorder	67	46	21
Communication, Voice, or Speech, Other	14	††	†
Speech Disorder	11	†	†
Reading/Writing Disorder	†	†	†
Apraxia of Speech	†	†	†
Voice Disorder (Dysphonia)	†	†	†

(continued)

Appendix Table 3-12 (continued)
Secondary diagnosis group definitions and final primary diagnosis frequencies after reassignment: CARE-F admission assessments

Secondary diagnosis groups	Overall (N)	Nursing facility (N)	Day rehabilitation facility (N)
Diabetes mellitus	**197**	**166**	**31**
Diabetes Mellitus	197	166	31
Swallowing disorders	**192**	**173**	**19**
Swallowing Disorders	192	173	19
Parkinson's, peripheral nervous system, and other neurological disorders	**191**	**152**	**39**
Seizure Disorder	48	36	12
Neurological, Other	47	††	†
PNS Disorder	32	††	†
TIA	28	††	†
Parkinson's	20	††	†
Encephalopathy	12	†	†
Traumatic Brain Injury	†	†	†
Multiple Sclerosis	†	†	—
Non-Traumatic Brain Injury	†	†	†
Head Injury	†	†	†
Paralysis	†	†	—
Cranial Nerve Injury	†	†	—
Neurological Congenital/Developmental Anomalies	†	†	—
Specific Diseases of CNS	†	—	†
Guillain-Barre Syndrome	†	—	†
Cranial Neuralgia	—	—	—
Huntington's Disease	—	—	—
Pain	**135**	**117**	**18**
Pain	9	†	†
Pain, not syndrome	127	110	17
Complex Regional Syndrome	—	—	—

(continued)

Appendix Table 3-12 (continued)
Secondary diagnosis group definitions and final primary diagnosis frequencies after reassignment: CARE-F admission assessments

Secondary diagnosis groups	Overall (N)	Nursing facility (N)	Day rehabilitation facility (N)
Vision impairment	**120**	**100**	**20**
Vision Impairment	120	100	20
Dementia/Alzheimer's and other cognitive disorders	**118**	**††**	**†**
Alzheimer's Disease	112	††	†
Memory Impairment	†	†	—
Executive Function Disorder	†	†	†
Pragmatics Disorder	†	†	—
Attention Disorder	†	†	—
Dementia	—	—	—
Cognition/Judgment, Other	—	—	—
Stroke	**62**	**††**	**†**
Stroke	62	††	†
No secondary diagnosis	**39**	**26**	**13**

NOTES:

† = Fewer than 11 cases. †† = Count suppressed to maintain confidentiality of cells with fewer than 11 cases.

1. N = Count of CARE-F admission assessments classified in each secondary diagnosis group.
2. Secondary diagnosis groups are not discipline-specific.
3. Secondary diagnosis groups are not mutually exclusive.
4. Secondary diagnosis groups are sorted in descending order of Overall count.
5. Beneficiaries can have multiple diagnoses within a group. Therefore, secondary diagnosis group frequencies are sometimes smaller than the sum of individual diagnosis frequencies within the group.

SOURCE: RTI International Analysis of CARE-F data collected from March 2011 through June 2012.

Program: PP006

Appendix Table 3-13
Original primary reason for therapy (body function, body structure, and activities and participation), by therapy discipline; CARE-F admission assessments

	Total		Discipline							
			1. PT+OT+SLP		2. PT+OT		3. PT+SLP		4. OT+SLP	
Original primary reason for therapy	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN
Total number of CARE-F Admission Assessments	840	100.00	124	100.00	150	100.00	57	100.00	47	100.00
Number of CARE-F Admission Assessments where no Primary Reason for Therapy was indicated.	14	1.67	†	†	†	†	—	—	—	—
A. Body Function										
Muscle Functions	593	70.60	97	78.23	126	84.00	45	78.95	37	29.84
Movement Functions	417	49.64	87	70.16	76	50.67	36	63.16	25	20.16
Functions of Joints and Bones	282	33.57	34	27.42	60	40.00	23	40.35	33	26.61
Pain	137	16.31	24	19.35	43	28.67	†	†	†	†
Specific Mental Functions	112	13.33	40	32.26	†	†	†	†	†	†
Global Mental Functions	46	5.48	11	8.87	†	†	†	†	†	†
Digestive	39	4.64	—	—	†	†	†	†	†	†
Cardiovascular	37	4.40	†	†	†	†	†	†	†	†
Proprioceptive and Touch	36	4.29	†	†	†	†	—	—	—	—
Voice and Speech	27	3.21	18	14.52	—	—	†	†	†	†
Respiratory	27	3.21	†	†	†	†	†	†	—	—
Functions of Skin	23	2.74	†	†	†	†	†	†	†	†
Vestibular	18	2.14	†	†	†	†	—	—	—	—
Seeing	18	2.14	†	†	†	†	—	—	†	†
Other Sensory Functions	16	1.90	†	†	—	—	—	—	—	—
Hearing	†	†	†	†	—	—	—	—	†	†

(continued)

Appendix Table 3-13 (continued)
Original primary reason for therapy (body function, body structure, and activities and participation), by therapy discipline; CARE-F admission assessments

	Total		Discipline							
			1. PT+OT+SLP		2. PT+OT		3. PT+SLP		4. OT+SLP	
Original primary reason for therapy	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN
Urinary	†	†	—	—	†	†	—	—	—	—
Metabolism/Endocrine	†	†	†	†	—	—	—	—	—	—
Immunological and Hematological	†	†	—	—	—	—	—	—	—	—
Functions of Hair and Nails	†	†	†	†	—	—	—	—	—	—
Genital and Reproductive	†	†	—	—	†	†	—	—	—	—
Number of CARE-F Admission Assessments where no Primary Reason for Therapy - Body Function was indicated.	61	7.26	12	9.68	†	†	—	—	—	—
B. Body Structure										
Body Structure Movement										
General/No Specific Body Location	265	31.55	23	18.55	43	28.67	26	45.61	16	12.90
Lumbar Spine	39	4.64	†	†	†	†	†	†	†	†
Pelvic Girdle	24	2.86	†	†	†	†	†	†	†	†
Thoracic Spine	22	2.62	†	†	†	†	†	†	†	†
Cervical Spine	21	2.50	†	†	†	†	†	†	†	†
Head	15	1.79	—	—	†	†	—	—	†	†
Body Structure Limb										
Knee	237	28.21	50	40.32	49	32.67	21	36.84	†	†
Hip	209	24.88	53	42.74	45	30.00	21	36.84	†	†
Hand	178	21.19	50	40.32	38	25.33	†	†	15	12.10
Foot/Ankle	168	20.00	45	36.29	25	16.67	20	35.09	†	†

(continued)

INFORMATION NOT RELEASABLE TO THE PUBLIC UNLESS AUTHORIZED BY LAW: This information has not been publicly disclosed and may be privileged and confidential. It is for internal government use only and must not be disseminated, distributed, or copied to persons not authorized to receive the information. Unauthorized disclosure may result in prosecution to the full extent of the law.

Appendix Table 3-13 (continued)
Original primary reason for therapy (body function, body structure, and activities and participation), by therapy discipline; CARE-F admission assessments

	Total		Discipline: 1. PT+OT+SLP		2. PT+OT		3. PT+SLP		4. OT+SLP	
Original primary reason for therapy	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN
Arm	160	19.05	51	41.13	39	26.00	†	†	†	†
Shoulders	159	18.93	38	30.65	48	32.00	†	†	12	9.68
Thigh	143	17.02	35	28.23	28	18.67	12	21.05	†	†
Fingers	141	16.79	37	29.84	31	20.67	†	†	†	†
Wrist	130	15.48	31	25.00	34	22.67	†	†	†	†
Elbow	117	13.93	32	25.81	30	20.00	†	†	†	†
Calf	116	13.81	23	18.55	25	16.67	12	21.05	†	†
Toes	41	4.88	†	†	†	†	†	†	†	†
Body Structure Voice, Speech, and Swallowing										
Mouth	156	18.57	38	30.65	†	†	11	19.30	†	†
Tongue	151	17.98	43	34.68	†	†	†	†	†	†
Pharynx	99	11.79	29	23.39	†	†	†	†	†	†
Larynx	75	8.93	19	15.32	—	—	†	†	†	†
Nose	18	2.14	†	†	—	—	†	†	†	†
Body Structure Other										
Central Nervous System	58	6.90	24	19.35	†	†	†	†	†	†
Peripheral Nervous System	22	2.62	†	†	†	†	†	†	—	—
Cardiovascular, Immunological, and Respiratory Systems	20	2.38	†	†	†	†	†	†	—	—
Skin	16	1.90	†	†	†	†	†	†	†	†
Eye	†	†	†	†	—	—	—	—	—	—

(continued)

Appendix Table 3-13 (continued)
Original primary reason for therapy (body function, body structure, and activities and participation), by therapy discipline; CARE-F admission assessments

	Total		Discipline							
			1. PT+OT+SLP		2. PT+OT		3. PT+SLP		4. OT+SLP	
Original primary reason for therapy	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN
Digestive, Metabolic, and Endocrine Systems	†	†	†	†	—	—	†	†	—	—
Ear	†	†	—	—	—	—	—	—	—	—
Genitourinary and Reproductive Systems	†	†	—	—	†	†	—	—	—	—
Number of CARE-F Admission Assessments where no Primary Reason for Therapy - Body Structure was indicated.	46	5.48	†	†	†	†	—	—	†	†
C. Activities and Participation										
Walking and moving	438	52.14	86	69.35	115	76.67	42	73.68	†	†
Body Position	388	46.19	61	49.19	86	57.33	28	49.12	31	25.00
Self Care	365	43.45	81	65.32	98	65.33	†	†	16	12.90
Handling Objects	154	18.33	36	29.03	46	30.67	†	†	†	†
General Tasks	129	15.36	36	29.03	16	10.67	†	†	†	†
Household tasks	111	13.21	39	31.45	29	19.33	†	†	—	—
Applying Knowledge	108	12.86	41	33.06	†	†	†	†	†	†
Education	96	11.43	14	11.29	†	†	†	†	19	15.32
Moving using Transportation	66	7.86	20	16.13	††	††	†	†	—	—
Expressive Communication	60	7.14	35	28.23	†	†	†	†	†	†
Basic Learning	56	6.67	†	†	†	†	†	†	†	†
Receptive Communication	49	5.83	26	20.97	†	†	†	†	†	†

(continued)

Appendix Table 3-13 (continued)
Original primary reason for therapy (body function, body structure, and activities and participation), by therapy discipline; CARE-F admission assessments

	Total		Discipline							
			1. PT+OT+SLP		2. PT+OT		3. PT+SLP		4. OT+SLP	
Original primary reason for therapy	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN
Community, Social, and Civic life	38	4.52	12	9.68	†	†	†	†	†	†
Purposeful Sensory (watching, listening)	32	3.81	†	†	†	†	†	†	†	†
Caring for Objects/Helping Others	21	2.50	†	†	†	†	†	†	—	—
Conversation and Communication Devices	15	1.79	†	†	—	—	†	†	†	†
General Interpersonal Interactions	†	†	†	†	—	—	—	—	—	—
Work and Employment	†	†	†	†	†	†	—	—	—	—
Acquisition of Necessities	†	†	†	†	†	†	—	—	—	—
Specific Interpersonal Interactions	†	†	†	†	—	—	—	—	—	—
Economic Life	†	†	†	†	—	—	—	—	—	—
Number of CARE-F Admission Assessments where no Primary Reason for Therapy - Activity and Participation was indicated.	66	7.86	†	†	†	†	†	†	†	†

(continued)

Appendix Table 3-13 (continued)
Original primary reason for therapy (body function, body structure, and activities and participation), by therapy discipline; CARE-F admission assessments

			Discipline							
	Total		5. PT		6. OT		7. SLP		8. NONE	
Original primary reason for therapy	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN
Total number of CARE-F Admission Assessments	840	100.00	142	100.00	93	100.00	88	100.00	139	100.00
Number of CARE-F Admission Assessments where no Primary Reason for Therapy was indicated.	14	1.67	†	†	†	†	†	†	†	†
A. Body Function										
Muscle Functions	593	70.60	99	66.00	58	101.75	28	22.58	103	68.67
Movement Functions	417	49.64	83	55.33	39	68.42	†	†	††	††
Functions of Joints and Bones	282	33.57	60	40.00	41	71.93	†	†	††	††
Pain	137	16.31	36	24.00	13	22.81	—	—	†	†
Specific Mental Functions	112	13.33	†	†	†	†	11	8.87	26	17.33
Global Mental Functions	46	5.48	†	†	†	†	†	†	†	†
Digestive	39	4.64	†	†	†	†	15	12.10	14	9.33
Cardiovascular	37	4.40	†	†	†	†	—	—	11	7.33
Proprioceptive and Touch	36	4.29	11	7.33	†	†	—	—	†	†
Voice and Speech	27	3.21	†	†	†	†	†	†	†	†
Respiratory	27	3.21	†	†	†	†	†	†	†	†
Functions of Skin	23	2.74	†	†	†	†	†	†	†	†
Vestibular	18	2.14	†	†	†	†	†	†	†	†
Seeing	18	2.14	†	†	†	†	†	†	†	†
Other Sensory Functions	16	1.90	†	†	†	†	†	†	—	—
Hearing	†	†	†	†	—	—	—	—	†	†

(continued)

Appendix Table 3-13 (continued)
Original primary reason for therapy (body function, body structure, and activities and participation), by therapy discipline; CARE-F admission assessments

			Discipline							
	Total		5. PT		6. OT		7. SLP		8. NONE	
Original primary reason for therapy	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN
Urinary	†	†	†	†	—	—	—	—	†	†
Metabolism/Endocrine	†	†	†	†	—	—	—	—	†	†
Immunological and Hematological	†	†	†	†	—	—	—	—	†	†
Functions of Hair and Nails	†	†	†	†	—	—	—	—	†	†
Genital and Reproductive	†	†	—	—	—	—	—	—	†	†
Number of CARE-F Admission Assessments where no Primary Reason for Therapy - Body Function was indicated.	61	7.26	†	†	†	†	27	21.77	†	†
B. Body Structure										
Body Structure Movement										
General/No Specific Body Location	265	31.55	48	32.00	30	52.63	†	†	††	††
Lumbar Spine	39	4.64	†	†	†	†	†	†	†	†
Pelvic Girdle	24	2.86	†	†	†	†	†	†	†	†
Thoracic Spine	22	2.62	†	†	†	†	†	†	†	†
Cervical Spine	21	2.50	†	†	†	†	†	†	†	†
Head	15	1.79	†	†	†	†	†	†	†	†
Body Structure Limb										
Knee	237	28.21	62	41.33	13	22.81	—	—	38	25.33
Hip	209	24.88	35	23.33	†	†	†	†	42	28.00
Hand	178	21.19	†	†	38	66.67	—	—	29	19.33
Foot/Ankle	168	20.00	31	20.67	†	†	—	—	33	22.00

(continued)

Appendix Table 3-13 (continued)
Original primary reason for therapy (body function, body structure, and activities and participation), by therapy discipline; CARE-F admission assessments

			Discipline							
	Total		5. PT		6. OT		7. SLP		8. NONE	
Original primary reason for therapy	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN
Arm	160	19.05	†	†	27	47.37	—	—	27	18.00
Shoulders	159	18.93	†	†	27	47.37	—	—	19	12.67
Thigh	143	17.02	28	18.67	†	†	—	—	33	22.00
Fingers	141	16.79	†	†	33	57.89	—	—	21	14.00
Wrist	130	15.48	†	†	27	47.37	—	—	20	13.33
Elbow	117	13.93	†	†	23	40.35	—	—	17	11.33
Calf	†	†	†	†	†	†	—	—	†	†
Toes	†	†	†	†	†	†	—	—	†	†
Body Structure Voice, Speech, and Swallowing										
Mouth	†	†	†	†	†	†	70	56.45	†	†
Tongue	†	†	†	†	†	†	68	54.84	†	†
Pharynx	†	†	†	†	—	—	45	36.29	†	†
Larynx	†	†	†	†	—	—	35	28.23	†	†
Nose	†	†	†	†	—	—	†	†	†	†
Body Structure Other										
Central Nervous System	†	†	†	†	†	†	†	†	†	†
Peripheral Nervous System	†	†	†	†	†	†	—	—	†	†
Cardiovascular, Immunological, and Respiratory Systems	†	†	†	†	—	—	†	†	†	†
Skin	†	†	†	†	†	†	—	—	†	†
Eye	†	†	†	†	—	—	—	—	†	†

(continued)

Appendix Table 3-13 (continued)
Original primary reason for therapy (body function, body structure, and activities and participation), by therapy discipline; CARE-F admission assessments

			Discipline							
	Total		5. PT		6. OT		7. SLP		8. NONE	
Original primary reason for therapy	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN
Digestive, Metabolic, and Endocrine Systems	†	†	†	†	—	—	†	†	†	†
Ear	†	†	†	†	—	—	†	†	—	—
Genitourinary and Reproductive Systems	†	†	†	†	—	—	—	—	—	—
Number of CARE-F Admission Assessments where no Primary Reason for Therapy - Body Structure was indicated.	46	5.48	†	†	†	†	†	†	†	†
C. Activities and Participation										
Walking and moving	438	52.14	93	62.00	15	26.32	†	†	81	54.00
Body Position	388	46.19	77	51.33	54	94.74	†	†	††	††
Self Care	365	43.45	26	17.33	50	87.72	26	20.97	62	41.33
Handling Objects	154	18.33	21	14.00	20	35.09	—	—	22	14.67
General Tasks	129	15.36	13	8.67	15	26.32	†	†	30	20.00
Household tasks	111	13.21	†	†	†	†	—	—	32	21.33
Applying Knowledge	108	12.86	†	†	†	†	†	†	28	18.67
Education	96	11.43	23	15.33	†	†	28	22.58	†	†
Moving using Transportation	66	7.86	12	8.00	†	†	—	—	15	10.00
Expressive Communication	60	7.14	†	†	—	—	†	†	†	†
Basic Learning	56	6.67	†	†	†	†	†	†	†	†
Receptive Communication	49	5.83	†	†	—	—	†	†	†	†

(continued)

Appendix Table 3-13 (continued)
Original primary reason for therapy (body function, body structure, and activities and participation), by therapy discipline; CARE-F admission assessments

	Total		Discipline							
			5. PT		6. OT		7. SLP		8. NONE	
Original primary reason for therapy	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN	N	ColPctN
Community, Social, and Civic life	38	4.52	†	†	†	†	†	†	†	†
Purposeful Sensory (watching, listening)	32	3.81	†	†	†	†	†	†	†	†
Caring for Objects/Helping Others	†	†	†	†	†	†	—	—	†	†
Conversation and Communication Devices	†	†	†	†	—	—	†	†	†	†
General Interpersonal Interactions	†	†	†	†	—	—	†	†	†	†
Work and Employment	†	†	—	—	—	—	—	—	†	†
Acquisition of Necessities	†	†	—	—	—	—	—	—	†	†
Specific Interpersonal Interactions	†	†	—	—	—	—	—	—	†	†
Economic Life	†	†	—	—	—	—	—	—	—	—
Number of CARE-F Admission Assessments where no Primary Reason for Therapy - Activity and Participation was indicated.	66	7.86	16	10.67	†	†	26	20.97	†	†

(continued)

Appendix Table 3-13 (continued)
Original primary reason for therapy (body function, body structure, and activities and participation), by therapy discipline; CARE-F admission assessments

NOTES:

† = Fewer than 11 cases. †† = Count suppressed to maintain confidentiality of cells with fewer than 11 cases.

1. N = Count of CARE-F admission assessments
2. Body Functions, Body Structures, and Activities and Participation were sorted in descending order of total frequency.
3. Subgroups do not sum up to group totals, because multiple primary reasons for therapy could be identified.
4. Body Structure - Limbs were recorded by right/left side of the body. The right/left side counts were combined in this table.
5. PT = Physical Therapy, OT = Occupational Therapy, SLP = Speech-Language Pathology

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims/CARE data.

Program: TG001

Appendix Table 3-14
Individual body functions which compose the body function groups, by therapy discipline: CARE-C admission assessments

PT - Body function groups (8 groups)	N	OT - Body function groups (7 groups)	N	SLP - Body function groups (4 groups)	N
Motor functions	**4,495**	**Motor functions**	**487**	**Mental functions**	**130**
Muscle Functions	3,936	Muscle Functions	411	Specific Mental	127
Functions of the Joints and Bones	3,153	Functions of the Joints and Bones	304	Global Mental	25
Movement Functions	2,190	Movement Functions	234	**Voice and speech functions**	**88**
Pain	**2,839**	**Pain**	**213**	**Other body functions**	**42**
Proprioceptive and touch functions	**319**	**Other body functions**	**101**	Functions of the Digestive System	17
Vestibular functions	**287**	Functions of the Skin	42	Functions of the Respiratory System	12
No body functions	**163**	Functions of the Cardiovascular System	37	Muscle Functions	†
Other body functions	**152**	Vestibular Functions	†	Movement Functions	†
Specific Mental	45	Functions of the Respiratory System	†	Seeing & Related Functions	†
Functions of the Skin	42	Urinary Functions	†	Hearing	†
Global Mental	39	Functions of the Immunological & Hematological Systems	†	Other Sensory (taste, smell)	†
Seeing & Related Functions	21	Genital & Reproductive Functions	†	Functions of the Joints & Bones	†
Hearing	17	Voice and Speech Functions	†	Vestibular Functions	—
Functions related to Metabolism and Endocrine System	†	Functions related to Metabolism & Endocrine System	†	Pain	—
Other Sensory (taste, smell)	†	Functions of the Digestive System	—	Functions of the Cardiovascular System	—
Functions of the Immunological and Hematological Systems	†	Functions of Hair & Nails	—	Urinary Functions	—
Voice and Speech Functions	†	**Mental functions**	**70**	Genital & Reproductive Functions	—
Functions of the Digestive System	†	Specific Mental	66	Proprioceptive & Touch Functions	—
Functions of Hair and Nails	†	Global Mental	19	Functions of the Immunological & Hematological Systems	—

(continued)

Appendix Table 3-14
Individual body function which compose the body function groups, by therapy discipline: CARE-C admission assessments

PT - Body function groups (8 groups)	N	OT - Body function groups (7 groups)	N	SLP - Body function groups (4 groups)	N
Cardiovascular and respiratory	**134**	**Proprioceptive & touch functions**	**64**	Functions related to Metabolism & Endocrine System	—
Functions of the Cardiovascular System	112	**Sensory functions**	**36**	Functions of the Skin	—
Functions of the Respiratory System	50	Seeing & Related Functions	33	Functions of Hair & Nails	—
Genitourinary functions	**27**	Other Sensory (taste, smell)	†	**No body functions**	**33**
Urinary Functions	23	Hearing	†	—	—
Genital & Reproductive Functions	†	**No body functions**	**19**	—	—

NOTES:

† = Fewer than 11 cases.

1. N = Count of CARE-C admission assessments classified in each body function group.
2. Individual body functions are sorted in descending order of group frequency in each discipline and in each group.
3. PT = Physical Therapy, OT = Occupational Therapy, SLP = Speech-Language Pathology

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims and CARE data.

Programs: TG002

Appendix Table 3-15
Individual body function which compose the body function groups: CARE-F admission assessments

Body function groups	Overall (N)	Nursing facility (N)	Day rehabilitation facility (N)
Motor functions	**688**	**514**	**174**
Muscle functions	593	441	152
Movement functions	417	299	118
Functions of joints and bones	282	228	54
Other body functions	**184**	**130**	**54**
Digestive	39	39	—
Cardiovascular	37	23	14
Proprioceptive and touch	36	††	†
Respiratory	27	††	†
Voice and speech	27	11	16
Skin	23	††	†
Seeing	18	†	††
Vestibular	18	††	†
Other sensory functions	16	16	—
Hearing	†	†	†
Urinary	†	†	†
Metabolism/Endocrine	†	†	†
Immunological and hematological	†	†	†
Hair and nails	†	†	†
Genital and reproductive	†	†	†
Pain	**137**	**102**	**35**
Pain	137	102	35
Mental functions	**131**	**86**	**45**
Specific mental functions	112	69	43
Global mental functions	46	††	†
No body functions	**57**	**††**	**†**

NOTES:

† = Fewer than 11 cases. †† = Count suppressed to maintain confidentiality of cells with fewer than 11 cases.

1. N = Count of CARE-F admission assessments classified in each body function group.
2. Body function groups are sorted in descending order of Overall count.
3. Body function groups are not discipline-specific.

SOURCE: RTI International Analysis of CARE-F data collected from March 2011 through June 2012.

Program: PP006

Appendix Table 3-16
Definition of body structures which compose the body structure groups, by therapy discipline: CARE-C admission assessments

PT - Body structure groups (16 groups)	PT-N	OT - Body structure groups (7 groups)	OT-N	SLP - Body structure groups (4 groups)	SLP-N
Lower spine (Lumbar spine, pelvic girdle)	1,609	**Unilateral wrist/hand/fingers** (Unilateral = only one side involved, left wrist/hand/fingers or right wrist/hand/fingers)	233	**Voice, speech, and swallowing** (Nose, mouth, tongue, pharynx, larynx)	99
Unilateral knee (Unilateral = only one side involved, left knee or right knee)	979	**Unilateral shoulder/arm/elbow** (Unilateral = only one side involved, left shoulder/arm/elbow or right shoulder/arm/elbow)	155	**No body structure**	69
Unilateral hip/thigh (Unilateral = only one side involved, left thigh/hip or right thigh/hip)	856	**Bilateral upper extremity** (Both Left and Right Upper Extremity involved - shoulder/arm/elbow and/or wrist/hand/fingers	106	**Other body structures** (Hip, thigh, knee, calf, foot/ankle, toes, shoulder, arm, elbow, wrist, hand, fingers, head, cervical spine, thoracic spine, lumbar spine, pelvic girdle, general/no specific body location, eye, ear, peripheral nervous system, cardiovascular, immunological, respiratory, digestive, metabolic, endocrine, genitourinary and reproductive, skin and related)	58
Upper spine (Head, cervical spine, thoracic spine)	791	**General/no specific body location**	91	**Central nervous system**	35
Unilateral shoulder/arm/elbow (Unilateral = only one side involved, left shoulder/arm/elbow or right shoulder/arm/elbow)	777	**Lower extremity and spine** (No distinction between unilateral and bilateral involvement = hip/thigh/knee/calf/foot/ankle/toes /hip/thigh and head, cervical spine, thoracic spine, lumbar spine, pelvic girdle)	82	—	—

(continued)

Appendix Table 3-16 (continued)
Definition of body structures which compose the body structure groups, by therapy discipline: CARE-C admission assessments

PT - Body structure groups (16 groups)	PT-N	OT - Body structure groups (7 groups)	OT-N	SLP - Body structure groups (4 groups)	SLP-N
Bilateral lower extremity (Both Left and Right Lower Extremity involved, where lower extremity = hip/thigh and/or knee and/or calf/ankle/foot and/or toes)	739	**Other body structures** (Nose, mouth, tongue, pharynx, larynx, eye, ear, peripheral nervous system, central nervous system, cardiovascular, immunological, respiratory, digestive, metabolic, endocrine, genitourinary and reproductive, skin and related)	82	—	—
Unilateral calf/foot/ankle (Unilateral = only one side involved, left calf/foot/ankle or right calf/foot/ankle)	447	**No body structure**	80	—	—
General/no specific body location	446	—	—	—	—
No body structure	404	—	—	—	—
Bilateral upper extremity (Both Left and Right Upper Extremity involved, where upper extremity = shoulder/arm/elbow and/or wrist/hand/fingers	194	—	—	—	—
Peripheral nervous system	157	—	—	—	—
Central nervous system	131	—	—	—	—
Unilateral wrist/hand/fingers (Unilateral = only one side involved, left wrist/hand/fingers or right wrist/hand/fingers)	124	—	—	—	—
Other body structures (Nose, mouth, tongue, pharynx, larynx, eye, cardiovascular, immunological, respiratory, digestive, metabolic, endocrine, genitourinary and reproductive, skin and related)	120	—	—	—	—

(continued)

Appendix Table 3-16 (continued)
Definition of body structures which compose the body structure groups, by therapy discipline: CARE-C admission assessments

PT - Body structure groups (16 groups)	PT-N	OT - Body structure groups (7 groups)	OT-N	SLP - Body structure groups (4 groups)	SLP-N
Ear	78	—	—	—	—
Unilateral toes (Unilateral = only one side involved, left toes or right toes)	55	—	—	—	—

NOTES:

1. PT = Physical Therapy, OT = Occupational Therapy, SLP = Speech-Language Pathology
2. Body structure groups are sorted in descending order of group frequency within each therapy discipline.

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims and CARE data.

Programs: TG003

Appendix Table 3-17
Definition of body structures which compose the body structure groups: CARE-F admission assessments

Body structure groups	Overall (N)	Nursing facility (N)	Day rehabilitation facility (N)
General/No Specific Body Location	**265**	**228**	**37**
General	265	228	37
Knee	**237**	**140**	**97**
Left knee	190	119	71
Right knee	185	120	65
Hip and Thigh	**216**	**130**	**86**
Right hip	182	115	67
Left hip	171	111	60
Left thigh	125	78	47
Right thigh	121	78	43
Shoulder/Arm/Elbow	**208**	**127**	**81**
Left arm	137	74	63
Left shoulder	132	89	43
Right arm	126	75	51
Right shoulder	125	90	35
Left elbow	96	61	35
Right elbow	85	60	25
Wrist/Hand/Fingers	**193**	**118**	**75**
Left hand	148	87	61
Right hand	125	80	45
Left fingers	113	67	46
Left wrist	104	65	39
Right wrist	90	63	27
Right fingers	90	60	30
Calf/Foot/Ankle/Toes	**181**	**115**	**66**
Left foot/ankle	147	94	53
Right foot/ankle	142	92	50
Right calf	113	71	42
Left toes	33	17	16
Right toes	31	19	12
Left calf	23	12	11

(continued)

Appendix Table 3-17 (continued)
Definition of body structures which compose the body structure groups: CARE-F admission assessments

Body structure groups	Overall (N)	Nursing facility (N)	Day rehabilitation facility (N)
Voice, Speech, and Swallowing	**168**	**143**	**25**
Mouth	156	135	21
Tongue	151	127	24
Pharynx	99	††	†
Larynx	75	62	13
Nose	18	††	†
Other Body Structures	**106**	**65**	**41**
Central nervous system	58	31	27
Peripheral nervous systems	22	††	†
Cardiovascular, immunological, and respiratory systems	20	††	†
Skin	16	††	†
Eye	†	†	†
Digestive, metabolic, and endocrine systems	†	†	—
Ear	†	†	—
Genitourinary and reproductive systems	†	†	†
Spine	**81**	**65**	**16**
Lumbar Spine	39	††	†
Pelvic Girdle	24	24	—
Thoracic Spine	22	††	†
Cervical Spine	21	††	†
Head	15	††	†
No Body Structure	**42**	**††**	**†**

NOTES:

† = Fewer than 11 cases. †† = Count suppressed to maintain confidentiality of cells with fewer than 11 cases.

1. N = Count of CARE-F admission assessments classified in each body structure group.
2. Body structure groups are sorted in descending order of Overall count.
3. Body structure groups are not discipline-specific.

SOURCE: RTI International Analysis of CARE-F data collected from March 2011 through June 2012.

Program: PP006

Appendix Table 3-18
Individual activities which compose the activities groups, by therapy discipline: CARE-C admission assessments

PT - Activity groups (4 groups)	N	OT - Activity groups (4 groups)	N	SLP - Activity groups (4 groups)	N
Mobility	3,799	**Daily activities**	512	**Communication**	144
Walking and Moving Around	3,381	Self-care	392	Applying Knowledge	122
Changing and Maintaining Body Position	2,106	Carrying, Moving and Handling Objects	366	Basic Learning	34
Daily activities	3,067	Household Tasks	321	Purposeful Sensory Experiences	11
Carrying, Moving and Handling Objects	2,265	General Tasks and& Demands	115	**Cognitive**	132
Household Tasks	1,651	**Mobility**	191	Communication: Expression	134
Self-care	1,098	Changing and Maintaining Body Position	149	Communication: Reception	93
General Tasks and Demands	307	Walking and Moving Around	110	Conversation and Use of Communication Devices	55
No activities	463	**Cognitive/communication**	94	**Mobility and daily activities**	87
Cognitive/communication	93	Applying Knowledge	71	General Tasks and Demands	68
Applying Knowledge	63	Purposeful Sensory Experiences	25	Self-care	14
Purposeful Sensory Experiences	53	Basic Learning	22	Household Tasks	12
Basic Learning	37	Communication: Expression	12	Changing and Maintaining Body Position	†
Communication: Expression	34	Communication: Reception	†	Walking and Moving Around	†
Communication: Reception	31	Conversation and Use of Communication Devices	†	Carrying, Moving and Handling Objects	—
Conversation & Use of Communication Devices	†	**No activities**	53	**No activities**	39

NOTES:

† = Fewer than 11 cases.

1. N = Count of CARE-C admission assessments classified in each body function group.
2. Individual activities are sorted in descending order of group frequency in each discipline and in each group.
3. PT = Physical Therapy, OT = Occupational Therapy, SLP = Speech-Language Pathology

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims and CARE data.

Programs: TG003

Appendix Table 3-19
Individual activities which compose the activities groups: CARE-F admission assessments

Activity structure groups	Overall (N)	Nursing facility (N)	Day rehabilitation facility (N)
Mobility	**571**	**417**	**154**
Walking and moving	438	288	150
Body Position	388	306	82
Daily Activities	**469**	**321**	**148**
Self-Care	365	259	106
Handling objects	154	80	74
General tasks	129	81	48
Household tasks	111	20	91
Cognitive	**165**	**114**	**51**
Applying knowledge	108	60	48
Basic learning	56	††	†
Purposeful sensory (watching, listening)	32	32	—
Communication	**72**	**29**	**43**
Expressive communication	60	24	36
Receptive communication	49	18	31
Conversation and communication devices	15	††	†
No Activity	**71**	**††**	**†**

NOTES:

† = Fewer than 11 cases. †† = Count suppressed to maintain confidentiality of cells with fewer than 11 cases.

1. N = Count of CARE-F admission assessments classified in each activity group.
2. Activity groups are sorted in descending order of Overall count.
3. Activity groups are not discipline-specific.

SOURCE: RTI International Analysis of CARE-F data collected from March 2011 through June 2012.

Program: PP006

Appendix Table 3-20

Percent of missing Rasch function estimates by primary diagnosis, body function, body structure, and activity groups: CARE-C occupational therapy admission assessments

CARE-C OT Groups	N	*SR Partici-pation	*SR Every-day activi-ties	*SR Life skills	*CO Self-care	SR Mobil-ity	SR Wheel-chair	CO Mobil-ity	CO IADL	CO Pro-blem solving	CO Mem-ory	CO Atten-tion	CO Fxn voice	CO Speech	CO Lan-guage expres-sion	CO Lan-guage compre-hension
Primary diagnosis groups																
Major Musculoskeletal, excluding Fracture and Joint Replacement	110	10.00	6.40	7.30	10.90	5.50	9.10	22.70	27.30	29.10	28.20	28.20	26.40	26.40	25.50	25.50
Fracture and Joint Replacement	99	7.10	4.00	4.00	12.10	4.00	5.10	19.20	21.20	33.30	31.30	34.30	30.30	30.30	30.30	30.30
Minor, Unspecified, and Miscellaneous Musculoskeletal	93	10.80	3.20	3.20	10.80	3.20	2.20	15.10	24.70	25.80	25.80	26.90	24.70	23.70	23.70	23.70
Neurological, excluding Stroke	70	5.70	2.90	2.90	1.40	4.30	7.10	28.60	18.60	31.40	30.00	31.40	34.30	31.40	30.00	30.00
Stroke	63	6.30	6.30	7.90	4.80	4.80	6.30	11.10	20.60	38.10	38.10	38.10	41.30	39.70	39.70	41.30
Circulatory (including Lymphatic) and Pulmonary/ Respiratory	58	13.80	12.10	13.80	6.90	12.10	13.80	8.60	39.70	37.90	37.90	37.90	37.90	37.90	37.90	37.90
Unspecified and Miscellaneous Diagnoses	51	9.80	7.80	5.90	7.80	5.90	9.80	3.90	15.70	21.60	23.50	25.50	25.50	25.50	25.50	25.50

(continued)

Appendix Table 3-20 (continued)

Percent of missing Rasch function estimates by primary diagnosis, body function, body structure, and activity groups: CARE-C occupational therapy admission assessments

CARE-C OT Groups	N	*SR Partici-pation	*SR Every-day activi-ties	*SR Life skills	*CO Self-care	SR Mobil-ity	SR Wheel-chair	CO Mobil-ity	CO IADL	CO Pro-blem solving	CO Mem-ory	CO Atten-tion	CO Fxn voice	CO Speech	CO Lan-guage expres-sion	CO Lan-guage compre-hension
Multiple Etiologies	35	17.10	14.30	14.30	8.60	14.30	14.30	5.70	20.00	14.30	14.30	14.30	17.10	17.10	17.10	17.10
No Primary Diagnosis	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†
Body function groups																
Motor Functions	487	9.70	6.40	6.80	8.20	5.70	7.80	17.20	22.00	29.60	28.70	30.00	28.30	27.70	27.30	27.50
Pain	213	12.20	7.00	7.00	8.90	8.00	9.40	18.30	18.80	28.20	27.70	28.20	25.40	25.40	24.90	24.90
Other Body Functions	101	10.90	11.90	11.90	4.00	9.90	12.90	6.90	28.70	27.70	27.70	27.70	24.80	24.80	24.80	24.80
Mental Functions	70	15.70	12.90	11.40	1.40	10.00	14.30	10.00	15.70	7.10	8.60	7.10	32.90	30.00	28.60	28.60
Proprioceptive & Touch Functions	64	7.80	4.70	4.70	3.10	4.70	6.30	28.10	17.20	23.40	21.90	21.90	26.60	25.00	25.00	25.00
Sensory Functions	36	2.80	2.80	2.80	5.60	0.00	0.00	5.60	13.90	16.70	16.70	16.70	30.60	27.80	27.80	27.80
No Body Functions	19	5.30	0.00	0.00	10.50	0.00	0.00	26.30	21.10	26.30	26.30	31.60	31.60	31.60	31.60	31.60

(continued)

Appendix Table 3-20 (continued)

Percent of missing Rasch function estimates by primary diagnosis, body function, body structure, and activity groups: CARE-C occupational therapy admission assessments

CARE-C OT Groups	N	*SR Partici-pation	*SR Every-day activi-ties	*SR Life skills	*CO Self-care	SR Mobil-ity	SR Wheel-chair	CO Mobil-ity	CO IADL	CO Pro-blem solving	CO Mem-ory	CO Atten-tion	CO Fxn voice	CO Speech	CO Lan-guage expres-sion	CO Lan-guage compre-hension
Body structure groups																
Unilateral Wrist/Hand/ Fingers	233	10.30	5.60	6.40	9.40	4.30	6.40	17.60	19.70	33.90	32.60	34.30	33.00	32.20	31.80	31.80
Unilateral Shoulder/Arm/ Elbow	155	9.00	5.80	7.10	5.20	5.20	7.10	16.10	22.60	36.10	35.50	37.40	35.50	34.20	33.50	33.50
Bilateral Upper Extremity	106	4.70	3.80	3.80	4.70	3.80	8.50	17.90	22.60	20.80	20.80	21.70	23.60	21.70	21.70	22.60
General/No Specific Body Location	91	24.20	17.60	16.50	11.00	16.50	20.90	19.80	20.90	24.20	23.10	25.30	27.50	26.40	25.30	25.30
Lower Extremity & Spine	82	7.30	6.10	8.50	7.30	7.30	8.50	8.50	39.00	28.00	28.00	28.00	23.20	23.20	23.20	24.40
Other Body Structures	82	9.80	9.80	9.80	2.40	7.30	11.00	12.20	17.10	20.70	19.50	20.70	25.60	25.60	25.60	25.60
No Body Structures	80	8.80	3.80	3.80	12.50	3.80	3.80	13.80	26.30	28.80	30.00	30.00	26.30	26.30	26.30	26.30
Activity groups																
Daily Activities	512	9.40	6.40	6.80	7.80	6.10	8.00	15.40	21.90	28.70	27.90	28.70	28.10	27.50	27.10	27.30

(continued)

Appendix Table 3-20 (continued)
Percent of missing Rasch function estimates by primary diagnosis, body function, body structure, and activity groups: CARE-C occupational therapy admission assessments

CARE-C OT Groups	N	*SR Partici-pation	*SR Every-day activi-ties	*SR Life skills	*CO Self-care	SR Mobil-ity	SR Wheel-chair	CO Mobil-ity	CO IADL	CO Pro-blem solving	CO Mem-ory	CO Atten-tion	CO Fxn voice	CO Speech	CO Lan-guage expres-sion	CO Lan-guage compre-hension
Mobility	191	11.50	11.50	11.50	3.70	10.50	13.10	6.80	25.10	19.40	19.40	19.90	19.40	19.40	19.40	19.90
Cognitive / Communication	94	9.60	7.40	6.40	1.10	6.40	9.60	10.60	14.90	8.50	9.60	8.50	31.90	28.70	27.70	27.70
No Activities	53	9.40	1.90	3.80	15.10	1.90	1.90	24.50	30.20	34.00	34.00	37.70	34.00	34.00	34.00	34.00

NOTES:

† = Fewer than 11 cases.

1. N = Count of CARE-C Admission Assessments classified in each of the diagnosis\body function\body structure group.
2. Each of the groups was sorted in descending order of their count.
3. The estimates denoted with an asterisk (*) were included for the OT payment analysis.
4. Missing Rasch estimates for each Group were displayed as percentages. A Rasch estimate was computed if at least one rated item in the measure was present. If none of the measure items were rated, then the Rasch estimate for the measure was missing.
5. Missing rates for Rasch estimates on the Self-Reported estimates were computed after recoding Rasch estimates to 100 (high ability), when responses to preceding gateway questions were negative.
6. Missing rates for Rasch estimates on Clinician-Observed Cognition and Communication estimates were computed after recoding Rasch estimates to 100 (high ability), when responses to preceding gateway questions were negative.
7. Missing rates for Rasch estimates on Clinician-Observed Mobility, Self-Care, and IADL estimates included non-responses (when no item response was selected) and 'N' responses (indicating that item(s) were not assessed because (a) the item(s) were clinically irrelevant to the patient, and/or (b) the therapist did not feel the item could be coded based upon his/her skill, knowledge, or training.
8. There was a total of 588 CARE-C OT Admission Assessments.
9. SR - Self-Reported Rasch Estimate; CO - Clinician-Observed Rasch Estimate; Rasch Estimate: 0 (low ability) – 100 (high ability); IADL - Instrumental Activities of Daily Living; Fxn - Functional

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims/CARE data.

Program: PP004

Appendix Table 3-21

Percent of missing Rasch function estimates by primary diagnosis, body function, body structure, and activity groups: CARE-C speech-language pathology admission assessments

CARE-C SLP Groups	N	*SR Life Skills	*CO Problem Solving	*CO Mem-ory	*CO Atten-tion	*CO Fxn Voice	*CO Speech	*CO Lan-guage Expres-sion	*CO Lan-guage Compre hension	SR Partici-pation	SR Every-day Activi-ties	CO Self-Care	SR Mobil-ity	SR Wheel-chair	CO Mobil-ity	CO IADL
Impairment diagnosis groups																
Cognitive Communication Disorders only	136	5.10	15.40	14.70	15.40	11.00	5.10	4.40	4.40	8.80	4.40	86.00	5.90	8.10	83.10	80.90
Cognitive Communication and Swallowing Disorders	34	2.90	23.50	20.60	23.50	8.80	2.90	5.90	5.90	5.90	2.90	76.50	2.90	2.90	79.40	58.80
No Impairment Diagnosis	34	5.90	23.50	20.60	20.60	17.60	11.80	8.80	5.90	8.80	5.90	85.30	5.90	5.90	82.40	70.60
Swallowing Disorders only	23	8.70	39.10	39.10	39.10	34.80	34.80	34.80	34.80	8.70	8.70	60.90	4.30	17.40	82.60	65.20
Medical diagnosis groups																
Stroke	104	4.80	17.30	17.30	17.30	16.30	5.80	4.80	2.90	9.60	3.80	86.50	3.80	4.80	83.70	76.00
Neurological, Excluding Stroke	75	4.00	16.00	13.30	14.70	8.00	6.70	5.30	6.70	5.30	4.00	80.00	6.70	8.00	80.00	80.00
Miscellaneous Diagnoses	38	10.50	34.20	31.60	34.20	15.80	18.40	21.10	21.10	13.20	10.50	71.10	7.90	15.80	81.60	60.50
No Medical Diagnosis	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†

(continued)

Appendix Table 3-21 (continued)
Percent of missing Rasch function estimates by primary diagnosis, body function, body structure, and activity groups: CARE-C speech-language pathology admission assessments

CARE-C SLP Groups	N	*SR Partici-pation	*SR Every-day activi-ties	*SR Life skills	*CO Self-care	SR Mobil-ity	SR Wheel-chair	CO Mobil-ity	CO IADL	CO Pro-blem solving	CO Mem-ory	CO Atten-tion	CO Fxn voice	CO Speech	CO Lan-guage expres-sion	CO Lan-guage compre-hension
Body function groups																
Mental Functions	130	3.80	6.20	4.60	5.40	9.20	6.20	2.30	1.50	6.90	3.10	87.70	3.80	6.90	82.30	76.20
Voice and Speech Functions	88	5.70	22.70	20.50	21.60	11.40	2.30	6.80	5.70	8.00	5.70	77.30	5.70	8.00	83.00	65.90
Other Body Functions	42	7.10	26.20	26.20	26.20	21.40	19.00	21.40	21.40	7.10	4.80	66.70	2.40	7.10	81.00	59.50
No Body Functions	33	6.10	42.40	39.40	42.40	18.20	6.10	6.10	9.10	9.10	6.10	84.80	9.10	9.10	84.80	81.80
Body structure groups																
Voice, Speech, Swallowing	99	6.10	25.30	23.20	24.20	15.20	11.10	12.10	13.10	7.10	6.10	74.70	6.10	10.10	83.80	66.70
No Body Structures	69	5.80	21.70	20.30	21.70	13.00	5.80	5.80	4.30	8.70	5.80	81.20	7.20	10.10	78.30	76.80
Other Body Structures	58	1.70	13.80	12.10	12.10	17.20	8.60	5.20	3.40	6.90	1.70	89.70	1.70	1.70	89.70	77.60
Central Nervous System	35	5.70	2.90	2.90	2.90	2.90	2.90	0.00	0.00	8.60	2.90	91.40	2.90	2.90	82.90	80.00
Activity groups																
Communication	144	4.90	16.70	15.30	16.00	12.50	4.90	2.80	2.80	6.90	4.20	81.90	4.90	6.30	81.30	72.90

(continued)

Appendix Table 3-21 (continued)
Percent of missing Rasch function estimates by primary diagnosis, body function, body structure, and activity groups: CARE-C speech-language pathology admission assessments

CARE-C SLP Groups	N	*SR Partici-pation	*SR Every-day activi-ties	*SR Life skills	*CO Self-care	SR Mobil-ity	SR Wheel-chair	CO Mobil-ity	CO IADL	CO Pro-blem solving	CO Mem-ory	CO Atten-tion	CO Fxn voice	CO Speech	CO Lan-guage expres-sion	CO Lan-guage compre-hension
Cognitive	132	2.30	7.60	6.80	6.80	11.40	6.80	3.80	3.00	6.10	1.50	84.80	2.30	5.30	83.30	72.00
Mobility & Daily Activities	87	4.60	12.60	11.50	11.50	17.20	12.60	8.00	5.70	5.70	3.40	81.60	2.30	5.70	80.50	74.70
No Activities	39	7.70	41.00	38.50	41.00	15.40	12.80	17.90	17.90	10.30	7.70	92.30	7.70	10.30	84.60	87.20

NOTES:

† = Fewer than 11 cases.

1. N = Count of CARE-C Admission Assessments classified in each of the diagnosis\body function\body structure group.
2. Each of the groups was sorted in descending order of their count.
3. The estimates denoted with an asterisk (*) were included for the SLP payment analysis.
4. Missing Rasch estimates for each Group were displayed as percentages. A Rasch estimate was computed if at least one rated item in the measure was present. If none of the measure items were rated, then the Rasch estimate for the measure was missing.
5. Missing rates for Rasch estimates on the Self-Reported estimates were computed after recoding Rasch estimates to 100 (high ability), when responses to preceding gateway questions were negative.
6. Missing rates for Rasch estimates on Clinician-Observed Cognition and Communication estimates were computed after recoding Rasch estimates to 100 (high ability), when responses to preceding gateway questions were negative.
7. Missing rates for Rasch estimates on Clinician-Observed Mobility, Self-Care, and IADL estimates included non-responses (when no item response was selected) and 'N' responses (indicating that item(s) were not assessed because (a) the item(s) were clinically irrelevant to the patient, and/or (b) the therapist did not feel the item could be coded based upon his/her skill, knowledge, or training.
8. There was a total of 227 CARE-C SLP Admission Assessments.
9. SR - Self-Reported Rasch Estimate; CO - Clinician-Observed Rasch Estimate; Rasch Estimate: 0 (low ability) – 100 (high ability); IADL - Instrumental Activities of Daily Living; Fxn - Functional

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims/CARE data.

Program: PP004

Appendix Table 3-22
Percent of missing clinician-observed Rasch function estimates due to non-response vs. not-assessed responses by primary diagnosis, body function, body structure, and activity groups: CARE-C occupational therapy admission assessments

CARE-C OT Groups	N	*CO mobility		CO self-care		CO IADL	
		Non-response (%)	'N' response (%)	Non-response (%)	'N' response (%)	Non-response (%)	'N' response (%)
Overall OT sample	588	1.20	15.00	0.30	8.20	0.20	19.20
Primary diagnosis groups							
Major Musculoskeletal, excluding Fracture and Joint Replacement	110	3.60	19.10	0.00	10.90	0.00	21.80
Fracture and Joint Replacement	99	0.00	19.20	0.00	12.10	0.00	21.20
Minor, Unspecified, and Miscellaneous Musculoskeletal	93	0.00	15.10	0.00	10.80	0.00	21.50
Neurological, excluding Stroke	70	1.40	27.10	0.00	1.40	0.00	11.40
Stroke	63	0.00	11.10	0.00	4.80	0.00	14.30
Circulatory (including Lymphatic) and Pulmonary/Respiratory	58	3.40	5.20	0.00	6.90	1.70	37.90
Unspecified and Miscellaneous Diagnoses	51	0.00	3.90	0.00	7.80	0.00	9.80
Multiple Etiologies	35	0.00	5.70	2.90	5.70	0.00	11.40
No Primary Diagnosis	†	†	†	†	†	†	†
Body function groups							
Motor Functions	487	1.00	16.20	0.40	7.80	0.00	17.50
Pain	213	1.40	16.90	0.00	8.90	0.00	17.40
Other Body Functions	101	1.00	5.90	0.00	4.00	1.00	25.70
Mental Functions	70	0.00	10.00	0.00	1.40	0.00	2.90
Proprioceptive & Touch Functions	64	0.00	28.10	0.00	3.10	0.00	12.50
Sensory Functions	36	0.00	5.60	0.00	5.60	0.00	5.60
No Body Functions	19	5.30	21.10	0.00	10.50	0.00	21.10

(continued)

Appendix Table 3-22 (continued)

Percent of missing clinician-observed Rasch function estimates due to non-response vs. not-assessed responses by primary diagnosis, body function, body structure, and activity groups: CARE-C occupational therapy admission assessments

CARE-C OT Groups	N	*CO mobility Non-Response (%)	*CO mobility 'N' Response (%)	CO self-care Non-Response (%)	CO self-care 'N' Response (%)	CO IADL Non-Response (%)	CO IADL 'N' Response (%)
Body structure groups							
Unilateral Wrist/Hand/Fingers	233	0.40	17.20	0.90	8.60	0.00	15.90
Unilateral Shoulder/Arm/Elbow	155	1.30	14.80	0.60	4.50	0.00	18.70
Bilateral Upper Extremity	106	1.90	16.00	0.00	4.70	0.00	13.20
General/No Specific Body Location	91	0.00	19.80	0.00	11.00	0.00	17.60
Lower Extremity & Spine	82	1.20	7.30	0.00	7.30	0.00	29.30
Other Body Structures	82	0.00	12.20	0.00	2.40	0.00	11.00
No Body Structures	80	2.50	11.30	0.00	12.50	1.30	25.00
Activity groups							
Daily Activities	512	0.80	14.60	0.40	7.40	0.00	17.40
Mobility	191	0.50	6.30	0.00	3.70	0.00	17.30
Cognitive / Communication	94	0.00	10.60	0.00	1.10	0.00	3.20
No Activities	53	5.70	18.90	0.00	15.10	1.90	28.30

NOTES:

† = Fewer than 11 cases.

1. N = Count of CARE-C admission assessments classified in each of the diagnosis\body function\body structure\activity groups.
2. Each of the groups was sorted in descending order of count.
3. The Rasch estimate denoted with an asterisk (*) was included for the OT payment analysis.
4. Missing Rasch estimates for each group were displayed as percentages. A Rasch estimate was computed if at least one rated item in the measure was present. If none of the items were rated, then the Rasch estimate for the measure was missing.
5. Non-response indicates no response was checked for the items in the estimate resulting in a missing Rasch estimate.
6. 'N' responses (indicating that item(s) were not assessed because (a) the item(s) were clinically irrelevant to the patient, and/or (b) the therapist did not feel the item could be coded based upon his/her skill, knowledge, or training.
7. OT–Occupational Therapy; SR–Self-Reported Rasch Estimate; CO–Clinician-Observed Rasch Estimate; IADL–Instrumental Activities of Daily Living

SOURCE: RTI analysis of 2011–2012 Outpatient Therapy Medicare Claims/CARE data.

Programs: PP004

Appendix Table 3-23
Percent of missing clinician-observed Rasch function estimates due to non-response vs. not-assessed responses by primary diagnosis, body function, body structure, and activity groups: CARE-C speech-language pathology therapy admission assessments

CARE-C SLP groups	N	*CO mobility		CO self-care		CO IADL	
		Non-response (%)	'N' response (%)	Non-response (%)	'N' response (%)	Non-response (%)	'N' response (%)
Overall SLP Sample	227	7.90	74.40	6.60	75.30	7.00	65.60
Impairment diagnosis groups							
Cognitive-Communication Disorders only	136	8.10	75.00	5.90	80.10	6.60	73.50
Cognitive-Communication and Swallowing Disorders	34	5.90	73.50	5.90	70.60	5.90	47.10
No Impairment Diagnosis	34	5.90	76.50	5.90	79.40	5.90	64.70
Swallowing Disorders only	23	13.00	69.60	13.00	47.80	13.00	47.80
Medical diagnosis groups							
Stroke	104	6.70	76.90	5.80	80.80	6.70	68.30
Neurological, Excluding Stroke	75	10.70	69.30	8.00	72.00	8.00	68.00
Miscellaneous Diagnoses	38	5.30	76.30	5.30	65.80	5.30	55.30
No Medical Diagnosis	†	†	†	†	†	†	†
Body function groups							
Mental Functions	130	6.20	76.20	4.60	83.10	5.40	70.00
Voice and Speech Functions	88	8.00	75.00	6.80	70.50	6.80	56.80
Other Body Functions	42	2.40	78.60	2.40	64.30	2.40	47.60
No Body Functions	33	12.10	72.70	12.10	72.70	12.10	69.70
Body structure groups							
Voice, Speech, Swallowing	99	6.10	77.80	6.10	68.70	6.10	57.60
No Body Structures	69	14.50	63.80	10.10	71.00	11.60	65.20
Other Body Structures	58	1.70	87.90	1.70	87.90	1.70	75.90
Central Nervous System	35	8.60	74.30	8.60	82.90	8.60	68.60

(continued)

Appendix Table 3-23 (continued)

Percent of missing clinician-observed Rasch function estimates due to non-response vs. not-assessed responses by primary diagnosis, body function, body structure, and activity groups: CARE-C speech-language pathology therapy admission assessments

CARE-C SLP groups	N	*CO mobility Non-response (%)	*CO mobility 'N' response (%)	CO self-care Non-response (%)	CO self-care 'N' response (%)	CO IADL Non-response (%)	CO IADL 'N' response (%)
Activity groups							
Communication	144	3.50	77.80	2.80	79.20	3.50	68.10
Cognitive	132	6.10	77.30	4.50	80.30	5.30	65.90
Mobility & Daily Activities	87	4.60	75.90	3.40	78.20	4.60	67.80
No Activities	39	23.10	61.50	20.50	71.80	20.50	66.70

NOTES:

† = Fewer than 11 cases.

1. N = Count of CARE-C admission assessments classified in each of the diagnosis\body function\body structure\activity groups.
2. Each of the groups was sorted in descending order of count.
3. Missing Rasch estimates for each group were displayed as percentages. A Rasch estimate was computed if at least one rated item in the measure was present. If none of the items were rated, then the Rasch estimate for the measure was missing.
4. Non-response indicates no response was checked for the items in the estimate resulting in a missing Rasch estimate.
5. 'N' responses (indicating that item(s) were not assessed because (a) the item(s) were clinically irrelevant to the patient, and/or (b) the therapist did not feel the item could be coded based upon his/her skill, knowledge, or training.
6. SLP–Speech-Language Pathology; SR–Self-Reported Rasch Estimate CO–Clinician-Observed Rasch Estimate; IADL–Instrumental Activities of Daily Living

SOURCE: RTI analysis of 2011–2012 Outpatient Therapy Medicare Claims/CARE data.

Programs: PP004

[This page intentionally left blank.]

APPENDIX B:
REASSIGNMENT ALGORITHMS FOR PRIMARY AND SECONDARY DIAGNOSES AND DIAGNOSIS GROUPS: CARE-C

[This page intentionally left blank.]

Objective: The purpose of these reassignments was (i) to assign beneficiaries to primary diagnosis groups reflecting underlying etiologic diagnoses, when etiologic diagnoses could be identified from CARE-C assessments, and (ii) to create mutually-exclusive primary diagnosis groups.

Diagnosis group definitions: The PT and OT diagnosis groups referred to in these reassignment algorithms are shown at the end of this Appendix. They reflect a preliminary set of primary and secondary diagnosis groups that were created prior to the final diagnosis groups presented in ***Appendix Tables 3-3, 3-4, 3-6, and 3-7***. Only the final diagnosis groups were used for analysis.

Reassignments:

1. **For PT and OT cases:**

   a. If primary diagnosis = 'Gait or Balance Disorder' and patient with multiple primary diagnoses, then assign patient to primary diagnosis group(s) based on the other primary diagnoses. Do not assign to the 'Gait or Balance Disorders' primary diagnosis group; instead treat gait or balance disorder as a secondary diagnosis and assign it to corresponding secondary diagnosis group (PT_SEC_DIAG_GRP11: Gait or Balance Disorder, or OT_SEC_DIAG_GRP8: Miscellaneous Diagnoses).

      Exception: when the only other primary diagnosis = Generalized Weakness, then retain gait or balance disorder as a primary diagnosis and do not conduct any reassignment.

      For e.g., a PT case has primary diagnoses = Gait/Balance Disorder and Osteoarthritis:

      - Assign to primary diagnosis group PT_DIAG_GRP3: Osteoarthritis
      - Assign to secondary diagnosis group PT_SEC_DIAG_GRP11: Gait or Balance Disorder
      - Do not assign to PT_DIAG_GRP14: Gait or Balance Disorder

   b. If patient with a single primary diagnosis of 'Gait or Balance Disorder', then assign patient to primary diagnosis group(s) based on the secondary diagnoses. Do not assign to the 'Gait or Balance Disorders' primary diagnosis group; instead treat gait/balance disorder as a secondary diagnosis and assign to corresponding secondary diagnosis group (PT_SEC_DIAG_GRP11: Gait or Balance Disorder, or OT_SEC_DIAG_GRP8: Miscellaneous Diagnoses). Zero out the secondary diagnoses used for primary diagnosis group reassignment to avoid duplication of diagnoses.

      Exception: when the only secondary diagnosis is Generalized Weakness, then retain gait/balance disorder as a primary diagnosis and do not conduct any reassignment.

For e.g., a PT case has a single primary diagnosis of Gait/Balance Disorder and a secondary diagnosis of Stroke:

- Assign to PT primary diagnosis group PT_DIAG_GRP10: Stroke
- Assign to secondary diagnosis group PT_SEC_DIAG_GRP11: Gait or Balance Disorders
- Do not assign to primary diagnosis group PT_DIAG_GRP14: Gait or Balance Disorders
- Do not assign to Secondary Diagnosis Group PT_SEC_DIAG_GRP23: Stroke (as Stroke will be zeroed out as a secondary diagnosis)

c. If primary diagnosis = 'Generalized Weakness' and patient with multiple primary diagnoses, then assign patient to primary diagnosis group(s) based on the other primary diagnoses. Do not assign to the Generalized Weakness primary diagnosis group; instead treat generalized weakness as a secondary diagnosis and assign to corresponding secondary diagnosis group (PT_SEC_DIAG_GRP14, or OT_SEC_DIAG_GRP6).

Exception: when the only other primary diagnosis = Gait or Balance Disorder, then retain generalized weakness as a primary diagnosis and do not conduct any reassignment.

d. If patient with a single primary diagnosis of 'Generalized Weakness', then assign patient to primary diagnosis group(s) based on the secondary diagnoses. Do not assign to the Generalized Weakness primary diagnosis group; instead treat Generalized Weakness as a secondary diagnosis and assign to corresponding secondary diagnosis group. Zero out the secondary diagnoses used for primary diagnosis group reassignment to avoid duplication of diagnoses.

Exception: when the only secondary diagnosis is Gait or Balance Disorder, then retain Generalized Weakness as the primary diagnosis and do not conduct any reassignment.

For e.g., An OT case has a single primary diagnosis of 'Generalized Weakness' and a secondary diagnosis of Parkinson's:

- Assign to OT primary diagnosis group OT_DIAG_GRP5: Other Neurological.
- Assign to OT_SEC_DIAG_GRP6: Generalized Weakness.
- Do not assign to OT Secondary Diagnosis Group OT_SEC_DIAG_GRP4: Neurological (as Parkinson's would be zeroed out as a secondary diagnosis)

e. For cases with a single primary diagnosis of Osteoarthritis and a secondary diagnosis of Joint Replacement:

- Assign PT cases to PT primary diagnosis group 2 (PT_DIAG_GRP2: Joint Replacement)

- Assign OT cases to OT primary diagnosis group 1 (OT_DIAG_GRP1: Fracture + Joint Replacement)

- Treat Osteoarthritis as a secondary diagnosis and assign to PT_SEC_DIAG_GRP1 (Osteoarthritis) or OT_SEC_DIAG_GRP1 (Major Musculoskeletal).

- Zero out Joint Replacement as a secondary diagnosis.

f. If patient with a primary diagnosis of Diabetes and a secondary diagnosis of Amputation, then treat amputation as a primary diagnosis and diabetes as a secondary diagnosis. Zero out diabetes as a primary diagnosis, and amputation as a secondary diagnosis. This would result in the following reassignments:

   - For PT: assign to PT primary diagnosis group 5: Other Major Musculoskeletal and PT secondary diagnosis group 20: Diabetes.

   - For OT: assign to OT primary diagnosis group 2: Other Major Musculoskeletal and OT secondary diagnosis group 10: Diabetes.

g. If patient with a primary diagnosis of Hypertension and a secondary diagnosis of Stroke, then treat Stroke as a primary diagnosis and Hypertension as a secondary diagnosis. Zero out hypertension as a primary diagnosis, and stroke as a secondary diagnosis. This would result in the following reassignments:

   - For PT: assign to PT primary diagnosis group 10: Stroke and PT secondary diagnosis group 7: Hypertension.

   - For OT: assign to OT primary diagnosis group 4: Stroke and OT secondary diagnosis group 9: Hypertension.

h. If a patient has Stroke as a primary or secondary diagnosis and also has one or more of the following circulatory primary diagnoses [Atrial Fibrillation & Other Dysrhythmia (bradycardia, tachycardia), Coronary Artery Disease (angina, myocardial infarction), Deep Vein Thrombosis, Heart Failure (including pulmonary edema), Peripheral Vascular Disease/Peripheral Arterial Disease, Other Circulatory diagnoses], then treat Stroke as the primary diagnosis, and treat the listed circulatory diagnoses as secondary diagnoses. Reassign as follows:

   - PT cases: assign to PT primary diagnosis group 10: Stroke, PT Secondary diagnosis group 6: Circulatory (incl. Lymphatic System). Do not assign to PT primary diagnosis group 9: Circulatory (incl. Lymphatic System) + Pulmonary/Respiratory System; also do not assign to PT secondary diagnosis group 23: Stroke.

- OT cases: assign to OT primary diagnosis group 4: Stroke, OT secondary diagnosis group 3: Circulatory (incl. Lymphatic System) + Pulmonary/Respiratory System. Do not assign to OT primary diagnosis group 7: Circulatory (incl. Lymphatic System) + Pulmonary/Respiratory System; also do NOT assign to OT secondary diagnosis group 4: Neurological.

2. For PT cases:

a. For PT cases who have both Paralysis and Stroke as primary diagnoses:

- Assign to PT_DIAG_GRP10: Stroke

- Zero out Paralysis as a primary diagnosis.

For PT cases that have Paralysis as a primary diagnosis and Stroke as a secondary diagnosis, zero out Paralysis and treat Stroke as a primary diagnosis. This person would be assigned to PT Primary Diagnosis group 10: Stroke. This person would not be assigned to PT Secondary diagnosis group 23: Stroke (since stroke will be treated as a primary and not secondary diagnosis).

For PT cases that have both Paralysis and Stroke as secondary diagnoses, zero out Paralysis and retain assignment to Stroke secondary.

b. If patient belongs to primary diagnosis group PT_DIAG_GRP15: Pain, and also belongs to any of the following primary diagnosis groups (PT_DIAG_GRP1-8, PT_DIAG_GRP10-13, PT_DIAG_GRP18-19):

- Zero out primary diagnosis group PT_DIAG_GRP15, and retain assignment to the remaining primary diagnosis groups

- Assign to PT_SEC_DIAG_GRP12 : Pain (i.e., we are treating pain diagnoses as secondary diagnoses)

For e.g., a PT case is assigned to primary diagnosis groups PT_DIAG_GRP6 (Sprain/Strain) and PT_DIAG_GRP15 (Pain), reassign as follows:

- Retain assignment to PT_DIAG_GRP6 (Sprain/Strain)

- Assign to PT_SEC_DIAG_GRP12 : Pain

- Do not assign to PT_DIAG_GRP15: Pain (zero out)

c. If patient falls into single primary diagnosis group of Pain (PT_DIAG_GRP15), and any of the following secondary diagnosis groups (PT_SEC_DIAG_GRP1-5 , PT_SEC_DIAG_GRP9-10 , PT_SEC_DIAG_GRP23), then reassign as follows:

- Assign to primary diagnosis group based on secondary diagnoses within PT_SEC_DIAG_GRP1-5 , PT_SEC_DIAG_GRP9-10 , PT_SEC_DIAG_GRP23 and zero out these secondary diagnosis groups to avoid duplicate diagnoses

- Zero out assignment to primary group Pain (PT_DIAG_GRP15) and assign to secondary group PT_SEC_DIAG_GRP12 : Pain (i.e., we are treating pain diagnoses as secondary diagnoses)

For e.g., a PT case falls into PT_DIAG_GRP15, PT_SEC_DIAG_GRP3, and PT_SEC_DIAG_GRP4 . This person's secondary diagnoses are Fracture and Bursitis. This person would be reassigned as follows:

- Assign to PT_DIAG_GRP1: Fracture

- Assign to PT_DIAG_GRP7: Bursitis/Tendonitis

- Assign to PT_SEC_DIAG_GRP12 : Pain

- Zero out assignment to PT_DIAG_GRP15, PT_SEC_DIAG_GRP3 , and PT_SEC_DIAG_GRP4

d. Create the following dummy variables to flag PT primary diagnosis groups as 'major etiologic', 'other etiologic', or 'impairment':

- Major Etiologic: Flag PT_DIAG_GRP1-5, PT_DIAG_GRP10-12 as PT_DX_MAJORETIOL

- Other Etiologic: Flag PT_DIAG_GRP6-9, PT_DIAG_GRP13, PT_DIAG_GRP16, PT_DIAG_GRP18-19 as PT_DX_OTHERETIOL

- Impairment: Flag PT_DIAG_GRP14, PT_DIAG_GRP15, PT_DIAG_GRP17 as PT_DX_IMPAIR

- Create the following sum variables: PT_DX_MAJORETIOL_SUM, PT_DX_OTHERETIOL_SUM, PT_DX_IMPAIR_SUM to reflect the sum of PT_DX_MAJORETIOL, PT_DX_OTHERETIOL, and PT_DX_IMPAIR respectively.

e. For cases that belong to two or more Impairment Primary Diagnosis groups (PT_DIAG_GRP14, PT_DIAG_GRP15, PT_DIAG_GRP17) and no etiologic primary diagnosis groups

- Assign to primary diagnosis group based on the secondary diagnosis (except when the only secondary diagnoses are gait or balance disorder (PT_SEC_DIAG_GRP11), Pain (PT_SECDIAG_GRP12), and/or generalized weakness (PT_SEC_DIAG_GRP14)

- Zero out the secondary diagnosis used for primary group reassignment

- Treat the impairment primary diagnoses as secondary diagnoses and assign to corresponding secondary diagnosis groups (PT_SEC_DIAG_GRP11 , PT_SECDIAG_GRP12 , and/or PT_SEC_DIAG_GRP14)

For e.g., a PT case has the following group assignments: PT_DIAG_GRP14 (Gait or Balance Disorder), PT_DIAG_GRP15 (Pain), and PT_SEC_DIAG_GRP9 (Major Neurological). This person would have PT_DX_IMPAIR_SUM = 2, PT_DX_MAJORETIOL_SUM = 0, PT_DX_OTHERETIOL_SUM = 0. This person's secondary diagnosis is Multiple Sclerosis. Reassign this person as follows:

- Assign to primary diagnosis group PT_DIAG_GRP11: Progressive Neurological (because Multiple Sclerosis is treated as primary)

- Assign to PT_SEC_DIAG_GRP11 and PT_SECDIAG_GRP12 (because Gait or Balance Disorders and Pain primary groups are assigned to corresponding Secondary Diagnosis Groups)

- Zero out PT_DIAG_GRP14, PT_DIAG_GRP15, and PT_SEC_DIAG_GRP9

f. For PT cases that fall into primary diagnosis groups PT_DIAG_GRP2: Joint Replacement and PT_DIAG_GRP3: Osteoarthritis , reassign as follows:

- Retain assignment to PT_DIAG_GRP2: Joint Replacement.

- Assign to PT_SEC_DIAG_GRP1: Osteoarthritis (treating Osteoarthritis as secondary diagnosis)

- Zero out primary diagnosis group PT_DIAG_GRP3: Osteoarthritis

g. If primary diagnosis group = Miscellaneous Diagnoses (PT_DIAG_GRP19) and patient also falls into any of the following groups (PT_DIAG_GRP1-13, PT_DIAG_GRP16, PT_DIAG_GRP18), then:

- Zero out assignment to Miscellaneous Diagnoses (PT_DIAG_GRP19)

- Retain assignment to remaining primary diagnosis groups

- Treat the primary diagnoses flagged under PT_DIAG_GRP19 as secondary diagnoses and assign to corresponding secondary diagnosis groups

For example, a PT case falls into primary diagnosis groups, PT_DIAG_GRP1: Fracture and PT_DIAG_GRP19: Miscellaneous Diagnoses. This person has Alzheimer's disease and Vision Impairment flagged under PT_DIAG_GRP19. Reassign as follows:

- Retain assignment to PT_DIAG_GRP1

- Zero out assignment to PT_DIAG_GRP19

- Assign to PT_SEC_DIAG_GRP15 : Communication or Cognition Disorders (as Alzheimer's disease will be treated as secondary diagnosis)

- Assign to PT_SEC_DIAG_GRP19 : Vision Impairment (as Vision Impairment will be treated as secondary diagnosis)

3. FOR OT Cases:

a. For OT cases that have both Osteoarthritis and Joint Replacement as primary diagnoses:

- Assign to OT_DIAG_GRP1: Fracture + Joint Replacement

- Assign to OT_SEC_DIAG_GRP1: Major Musculoskeletal (treat Osteoarthritis as a secondary diagnosis)

- Zero out Osteoarthritis as a primary diagnosis and do not assign to primary diagnosis group OT_DIAG_GRP2: Other Major Musculoskeletal.

b. For OT cases who have both Paralysis and Stroke as primary diagnoses:

- Assign to OT_DIAG_GRP4: Stroke

- Zero out Paralysis as a primary diagnosis.

For OT cases that have Paralysis as a primary diagnosis and Stroke as a secondary diagnosis, zero out Paralysis and treat Stroke as a primary diagnosis. Zero out stroke as a secondary diagnosis. This person would be assigned to OT Primary Diagnosis group 4: Stroke. This person would not be assigned to OT Secondary diagnosis group 4: Neurological.

For OT cases that have both Paralysis and Stroke as secondary diagnoses, zero out Paralysis and retain assignment to Stroke secondary. (Also run 3b. for SLP cases).

c. If primary diagnosis group = Miscellaneous Diagnoses (OT_DIAG_GRP8) and patient also falls into any of the following groups (OT_DIAG_GRP1-5, OT_DIAG_GRP7), then:

- Zero out assignment to Miscellaneous Diagnoses group (OT_DIAG_GRP8)

- Retain assignment to remaining groups

- Treat the primary diagnoses flagged under OT_DIAG_GRP8 as secondary diagnoses and assign to corresponding secondary diagnosis groups

See example under 2g for illustration of logic in a PT scenario.

4. **For PT, OT, and SLP cases:**

   If a person has both TIA (as either primary or secondary diagnosis) and Stroke (as either primary or secondary diagnosis), then zero out TIA. Retain assignment to Stroke. (i.e., for any primary/secondary combination of TIA and Stroke, zero out TIA and retain assignment to Stroke).

   Also, if TIA is the primary diagnosis and Stroke is the secondary diagnosis, make Stroke the primary diagnosis and assign to primary diagnosis group accordingly. TIA will be zeroed out.

5. **After running all of the above steps, create the following groups for PT:**

   a. PT_DIAG_GRP20: Multiple Major Etiologies - assign persons to this group if they fall into 2 or more Major Etiologic groups (PT_DIAG_GRP1-5, PT_DIAG_GRP10-12), irrespective of any other groups they belong to (i.e., PT_DX_MAJORETIOL_SUM >/= 2).

      - Once person assigned to PT_DIAG_GRP20, zero out any Major Etiologic primary diagnosis groups.

      - Also zero out any Other Etiologic or Impairment Diagnosis groups the person belongs to; treat the diagnoses flagged under the Other Etiologic or Impairment groups as secondary diagnoses, and assign to corresponding secondary diagnosis groups.

   b. PT_DIAG_GRP21: Other Multiple Etiologies - assign persons to this group if they fall into a total of 2 or more etiologic primary diagnosis groups, with a maximum of one Major Etiologic group. (Do not include Impairment Groups PT_DIAG_GRP14, PT_DIAG_GRP15, PT_DIAG_GRP17 in this count, though persons may fall into these groups). The following combinations are acceptable for assignment to PT_DIAG_GRP21:

      - Any number of Other Etiologic groups (PT_DIAG_GRP6-9, PT_DIAG_GRP13, PT_DIAG_GRP16, PT_DIAG_GRP18)

      - A maximum of one Major Etiologic group (PT_DIAG_GRP1-5, PT_DIAG_GRP10-12)

      - Once person assigned to PT_DIAG_GRP21, zero out any Other Etiologic and Major Etiologic primary diagnosis groups.

      - Also zero out any Impairment primary diagnosis groups the person belongs to; treat the diagnoses flagged under the Impairment groups as secondary diagnoses, and assign to corresponding secondary diagnosis groups.

   (Note: ‘Other Multiple Etiologies’ was further split into (i) ‘Multiple Etiologies, One Major’ and (ii) ‘Multiple Etiologies, No Major’ in the final PT groups)

c. PT_DIAG_GRP22: Multiple Impairments - assign persons to this group if they fall into 2 or more Impairment primary diagnosis groups (PT_DIAG_GRP14, PT_DIAG_GRP15, PT_DIAG_GRP17), and do not fall into any other group besides these three Impairment groups.

   Once person assigned to PT_DIAG_GRP22, zero out all other groups.

d. PT_DIAG_GRP23: No Primary Diagnosis - assign persons to this group if they have no primary diagnosis listed.

6. After running all of the above steps, create the following groups for OT:

a. OT_DIAG_GRP9: Multiple Primary Etiologies – assign persons to this group if fall they into 2 or more of the following groups: (OT_DIAG_GRP1-5, OT_DIAG_GRP7), irrespective of whether person belongs to OT_DIAG_GRP6: Generalized Weakness.

   - Once person assigned to OT_DIAG_GRP9, zero out OT_DIAG_GRP1-5, OT_DIAG_GRP7

   - If person also belonged to OT_DIAG_GRP6: Generalized Weakness, then treat this as a secondary diagnosis and assign to OT_SEC_DIAG_GRP6: Generalized weakness

b. OT_DIAG_GRP10: No Primary Diagnosis - assign persons to this group if they have no primary diagnosis listed.

PT Primary Diagnosis Groups (PT_DIAG_GRPx, where x = 1-23) referenced in this Appendix:

PT PRIMARY DIAGNOSIS GROUPS		TYPE
1	Fracture	Major etiologic
2	Joint Replacement	Major etiologic
3	Osteoarthritis	Major etiologic
4	Spinal Stenosis	Major etiologic
5	Other Major Musculoskeletal	Major etiologic
6	Sprain/Strain	Other etiologic
7	Bursitis/Tendonitis	Other etiologic
8	Other + Minor Musculoskeletal	Other etiologic
9	Circulatory (incl. Lymphatic System) + Pulmonary/Respiratory System	Other etiologic
10	Stroke	Major etiologic
11	Progressive Neurological	Major etiologic
12	Other Major Neurological	Major etiologic
13	Other Neurological	Other etiologic
14	Gait or Balance Disorder	Impairment
15	Pain	Impairment
16	Vertigo	Other etiologic
17	Generalized Weakness	Impairment
18	Genitourinary System	Other etiologic
19	Miscellaneous Diagnoses	Other etiologic
20	Multiple Major Etiologies	—
21	Other Multiple Etiologies	—
22	Multiple Impairments	—
23	No Primary Diagnosis	—

PT Secondary Diagnosis Groups (PT_SEC_DIAG_GRPx, where x = 1-23) referenced in this Appendix:

PT SECONDARY DIAGNOSIS GROUPS	
1	Osteoarthritis
2	Joint Replacement
3	Other Major Musculoskeletal
4	Minor Musculoskeletal
5	Other Musculoskeletal
6	Circulatory (incl. Lymphatic System)
7	Hypertension
8	Pulmonary/Respiratory System
9	Major Neurological
10	Minor Neurological
11	Gait or Balance Disorder
12	Pain
13	Vertigo
14	Generalized weakness
15	Communication and Cognition Disorders
16	Mental Health
17	Cancer/Other Neoplasms
18	Obesity
19	Vision Impairment
20	Diabetes Mellitus
21	Miscellaneous Diagnoses
22	No Secondary Diagnosis
23	Stroke

OT Primary Diagnosis Groups (OT_DIAG_GRPy, where y = 1-10) referenced in this Appendix:

OT PRIMARY DIAGNOSIS GROUPS	
1	Fracture + Joint Replacement
2	Other Major Musculoskeletal
3	Other + Minor Musculoskeletal
4	Stroke
5	Other Neurological
6	Generalized Weakness
7	Circulatory (incl. Lymphatic System) + Pulmonary/ Respiratory System
8	Miscellaneous Diagnoses
9	Multiple Etiologies
10	No Primary Diagnosis

OT Secondary Diagnosis Groups (OT_SEC_DIAG_GRPy, where y = 1-11) referenced in this Appendix:

OT SECONDARY DIAGNOSIS GROUPS	
1	Major Musculoskeletal
2	Minor + Other Musculoskeletal
3	Circulatory (incl. Lymphatic System) + Pulmonary/Respiratory System
4	Neurological
5	Pain
6	Generalized weakness
7	Cognitive, Communication and Mental Health Disorders
8	Miscellaneous Diagnoses
9	Hypertension
10	Diabetes Mellitus
11	No Secondary Diagnosis

APPENDIX C:
REASSIGNMENT ALGORITHMS FOR PRIMARY AND SECONDARY DIAGNOSES AND DIAGNOSIS GROUPS: CARE-F

[This page intentionally left blank.]

Objective: The purpose of these reassignments was (i) to assign beneficiaries to primary diagnosis groups reflecting underlying etiologic diagnoses, when etiologic diagnoses could be identified from CARE-F assessments, and (ii) to create mutually-exclusive primary diagnosis groups.

Diagnosis group definitions: The primary and secondary diagnosis groups referred to in these reassignment algorithms are shown in Appendix Tables 3-10 and 3-11.

Reassignments:

1. If patient with a single primary diagnosis of 'Gait or Balance Disorder', and falls into any of the following secondary diagnostic groups (1: Osteoarthritis; 2: Osteoporosis, Unspecified, and Miscellaneous Musculoskeletal; 3: Circulatory (including Lymphatic); 6: Pulmonary/Respiratory; 7: Stroke; 8: Parkinson's, Peripheral Nervous System, and Other Neurological Disorders; 9: Dementia/Alzheimer's and Other Cognitive Disorders) then:

    - Assign patient to primary diagnostic group(s) based on the secondary diagnoses within secondary groups 1: Osteoarthritis; 2: Osteoporosis, Unspecified, and Miscellaneous Musculoskeletal; 3: Circulatory (including Lymphatic); 6: Pulmonary/Respiratory; 7: Stroke; 8: Parkinson's, Peripheral Nervous System, and Other Neurological Disorders; 9: Dementia/Alzheimer's and Other Cognitive Disorders;

    - Zero out Gait or Balance Disorder as a primary diagnosis. Treat gait/balance disorder as a secondary diagnosis and assign to secondary diagnosis group 13: Gait or Balance Disorder;

    - Zero out the secondary diagnoses used for primary diagnosis group reassignment to avoid duplication of diagnoses. Convert these individual secondary diagnoses to primary diagnoses.

2. If patient with a single primary diagnosis of 'Generalized Weakness', and falls into any of the following secondary diagnostic groups (1: Osteoarthritis; 2: Osteoporosis, Unspecified, and Miscellaneous Musculoskeletal; 3: Circulatory (including Lymphatic); 6: Pulmonary/Respiratory; 7: Stroke; 8: Parkinson's, Peripheral Nervous System, and Other Neurological Disorders; 9: Dementia/Alzheimer's and Other Cognitive Disorders) then:

    - Assign patient to primary diagnostic group(s) based on the secondary diagnoses within secondary groups 1: Osteoarthritis; 2: Osteoporosis, Unspecified, and Miscellaneous Musculoskeletal; 3: Circulatory (including Lymphatic); 6: Pulmonary/Respiratory; 7: Stroke; 8: Parkinson's, Peripheral Nervous System, and Other Neurological Disorders; 9: Dementia/Alzheimer's and Other Cognitive Disorders;

    - Zero out generalized weakness as a primary diagnosis. Treat generalized weakness as a secondary diagnosis and assign to secondary diagnosis group 15: Generalized Weakness;

- Zero out the secondary diagnoses used for primary diagnosis group reassignment to avoid duplication of diagnoses. Convert these individual secondary diagnoses to primary diagnoses.

3. If patient with a single primary diagnosis of 'Pain, Not Syndrome' or 'Pain Syndrome' or 'Complex Regional Syndrome', and falls into any of the following secondary diagnostic groups (1: Osteoarthritis, 2: Osteoporosis, Unspecified, and Miscellaneous Musculoskeletal, 7: Stroke, 8: Parkinson's, Peripheral Nervous System, and Other Neurological Disorders) then:

   - Assign patient to primary diagnostic group(s) based on the secondary diagnoses within secondary groups 1: Osteoarthritis, 2: Osteoporosis, Unspecified, and Miscellaneous Musculoskeletal, 7: Stroke, 8: Parkinson's, Peripheral Nervous System, and Other Neurological Disorders;
   - Zero out 'Pain, Not Syndrome' or 'Pain Syndrome' or 'Complex Regional Syndrome' as a primary diagnosis; instead, treat as a secondary diagnosis and assign to secondary diagnosis group 14: Pain;
   - Zero out the secondary diagnoses used for primary diagnosis group reassignment to avoid duplication of diagnoses. Convert these individual secondary diagnoses to primary diagnoses.

4. If a patient has a single primary diagnosis of Osteoarthritis and a secondary diagnosis of Joint Replacement, treat Osteoarthritis as the secondary diagnosis and Joint Replacement as the primary diagnosis. Reassign to primary and secondary diagnostic groups accordingly.

5. If patient has a primary diagnosis of Diabetes Mellitus and a secondary diagnosis of Amputation, then treat Amputation as a primary diagnosis and Diabetes Mellitus as a secondary diagnosis. Zero out Diabetes Mellitus as a primary diagnosis, and Amputation as a secondary diagnosis. Reassign to primary and secondary diagnostic groups accordingly.

6. If patient has a primary diagnosis of Hypertension and a secondary diagnosis of Stroke, then treat Stroke as a primary diagnosis and Hypertension as a secondary diagnosis. Zero out Hypertension as a primary diagnosis, and Stroke as a secondary diagnosis. Reassign to primary and secondary diagnostic groups accordingly.

7. If a patient has Stroke as a primary or secondary diagnosis and also has one or more of the following primary diagnoses [Atrial Fibrillation & Other Dysrhythmia (bradycardia, tachycardia), Coronary Artery Disease (angina, myocardial infarction), Deep Vein Thrombosis, Heart Failure (including pulmonary edema), Peripheral Vascular Disease/Peripheral Arterial Disease, Other Circulatory diagnoses], then treat Stroke as the primary diagnosis, and treat the listed circulatory diagnoses as secondary diagnoses. Reassign to primary and secondary diagnostic groups accordingly. If Stroke was a secondary diagnosis, convert to primary diagnosis and zero out stroke secondary diagnosis.

8. If a person has both Paralysis (as either primary or secondary diagnosis) and Stroke (as either primary or secondary diagnosis), then zero out Paralysis. Retain assignment to Stroke (i.e., for any primary/secondary combination of Paralysis and Stroke, zero out Paralysis and retain assignment to Stroke). Also, if Paralysis is the primary diagnosis and Stroke is the secondary diagnosis, make Stroke the primary diagnosis and assign to primary diagnostic group accordingly. Paralysis will be zeroed out.

   e.g., If Paralysis and Stroke primary → Stroke remains primary, Paralysis zeroed out.
   If Paralysis and Stroke secondary → Stroke remains secondary, Paralysis zeroed out.
   If Paralysis primary and Stroke secondary → Stroke becomes primary, Paralysis zeroed out.
   If Stroke primary and Paralysis secondary → Stroke remains primary, Paralysis zeroed out.

9. If a person has both TIA (as either primary or secondary diagnosis) and Stroke (as either primary or secondary diagnosis), then zero out TIA. Retain assignment to Stroke (i.e., for any primary/secondary combination of TIA and Stroke, zero out TIA and retain assignment to Stroke). Also, if TIA is the primary diagnosis and Stroke is the secondary diagnosis, make Stroke the primary diagnosis and assign to primary diagnostic group accordingly. TIA will be zeroed out.

   e.g., If TIA and Stroke primary → Stroke remains primary, TIA zeroed out.
   If TIA and Stroke secondary → Stroke remains secondary, TIA zeroed out.
   If TIA primary and Stroke secondary → Stroke becomes primary, TIA zeroed out.
   If Stroke primary and TIA secondary → Stroke remains primary, TIA zeroed out.

10. If primary diagnostic group = "Unspecified and Miscellaneous Diagnoses" and patient falls into multiple primary diagnostic groups, then:

    - Zero out assignment to "Unspecified and Miscellaneous Diagnoses" primary group
    - Retain assignment to remaining primary diagnostic groups
    - Zero out primary diagnoses flagged under the "Unspecified and Miscellaneous Diagnoses" group. Convert the primary diagnoses flagged under "Unspecified and Miscellaneous Diagnoses" primary group to secondary diagnoses and assign to corresponding secondary diagnosis groups.

11. After running the above steps, if a patient falls into more than one primary diagnostic group from primary groups 1-5 (Appendix Table 3-10), then
    a. Assign this person to Primary Diagnostic Group 7: Multiple Etiologies
    b. Zero out primary diagnostic groups 1-5

This page intentionally left blank.

APPENDIX D.1:
BRIEF EXPLANATION OF THE RASCH ANALYSIS MODEL AS USED TO ESTIMATE CARE RESPONDENT FUNCTIONAL ABILITY

[This page intentionally left blank.]

I. Semi-Technical Explanation

The Rasch model specifies that the response (yes/no or 1, 0) of a person s to a CARE questionnaire item i depends on the person's functional ability θs and the item's difficulty β_i. Specifically, the Rasch approach models the log odds of a person's responding 'yes' to a CARE item as the difference between a person's ability and the item's difficulty.

$$\ln[P_{is}/(1 - P_{is})] = \theta_s - \beta_I \qquad (1)$$

where

$\ln[P_{is}/(1 - P_{is})]$ = log odds = natural logarithm of ratio of probability P_{is} of person s responding 'yes' to CARE item i to probability $1\text{-}P_{is}$ of person s responding 'no' to CARE item i.

Equivalently, the Rasch approach models the probability of a person's responding 'yes' to an item as the logistic function of the difference between the person's ability and the item's difficulty:

$$P_{is} = \exp(\theta_s - \beta_i)/[1 + \exp(\theta_s - \beta_i)]. \qquad (2)$$

Each CARE respondent's functional ability θ_s on a CARE functioning scale (set of related questionnaire items) and the difficulty β_i of each CARE item in the scale, are jointly estimated by an iterative maximum likelihood procedure using computer software. The estimation procedure chooses person functional abilities θ_s and item difficulties β_i that jointly maximize the likelihood of the observed pattern of responses to the CARE items. Multiple-category response format items seen in the CARE require a slight extension of the Rasch model, where the item’s difficulty accounts for responding in a particular category. Respondents' functional abilities are placed on a scale of 0 to 100, with 0 indicating the lowest functional ability and 100 the highest functional ability.

Under the Rasch model, all persons who have the same complete data raw score (sum of responses to items) on the CARE functioning scale will have the same Rasch functional ability estimate. The Rasch and the raw scale scores tend to be highly correlated.

II. Non-Technical Explanation

The Rasch model of creating scales of functional ability from the CARE questionnaire items is based on the idea that the probability of a certain response to a CARE item is a function of person and item characteristics. The person characteristic is the person's underlying functional ability. The item characteristic is the difficulty in performing the task specified in the item. These two characteristics—person ability and item difficulty—determine the probability that a person will have a given amount of difficulty in performing the task. Multiple-category response format items seen in the CARE require a slight extension of the Rasch model, where the item’s difficulty accounts for responding in a particular category. The Rasch model estimates the ability of each CARE respondent and the difficulty of each CARE item so that the observed pattern of responses to the CARE questionnaire is most likely to have occurred. Respondents' estimated functional abilities are placed on a scale of 0 to 100, with 0 indicating the lowest functional ability and 100 the highest functional ability.

Under the Rasch model, all persons who have the same complete data raw score (sum of responses to items) on the CARE functioning scale will have the same Rasch functional ability estimate. The Rasch and the raw scale scores tend to be highly correlated.

APPENDIX D.2:
FINAL RASCH SUBSCALE CONFIGURATION

[This page intentionally left blank.]

Appendix Tables D.2-1 through ***D.2-4*** contain detailed information on the CARE-C and CARE-F subscale configurations post psychometric evaluation, including item content and response-option information (in footnotes). The tables are ordered by patient self-reported information for both CARE-C and CARE-F, followed by subscales using clinician-reported information (CARE-C and CARE-F respectively). Recommendations contained within the *DOTPA Measurement Report* (Kline et al., 2014) are addressed in this final item set, and the following item configurations were used to create the subscale summary data used in this report.

Appendix Table D.2-1
CARE-C final subscale configuration: Patient self-report

Subscale	Item content
Basic Mobility[1,2]	How much difficulty do you currently have… a) Moving from sitting at the side of the bed to lying down on your back? b) Moving up in bed? c) Standing for at least one minute? d) Sitting down in an armless straight chair? e) Standing up from an armless straight chair? f) Getting into and out of a car/taxi? g) Walking around on one floor, taking into consideration thresholds, doors, furniture, and a variety of floor coverings? h) Going up and down a flight of stairs inside, using a handrail? i) Bending over from a standing position to pick up a piece of clothing from the floor without holding onto anything? j) Walking several blocks? k) Walking up and down steep unpaved inclines? l) Carrying something in both arms while climbing a flight of stairs?
	How much help from another person do you currently need moving to and from a bed to a chair?
Wheelchair Use[1]	Without help from another person, when you are using your wheelchair, how much difficulty do you currently have… a) Moving around within one room, including making turns in a wheelchair? b) Opening a door away from a wheelchair? c) Opening a door toward a wheelchair? d) Transferring between a wheelchair and other seating surfaces, such as a chair or bed? e) Propelling/driving a wheelchair several blocks?
Everyday Activities[1,2]	How much help do you currently need… a) Taking care of your personal grooming such as brushing teeth, combing hair, etc.? b) Bathing yourself?
	How much difficulty do you currently have… a) Picking up thin, flat objects from a table? b) Putting on and taking off a shirt or blouse? c) Putting on and taking off socks? d) Opening small containers like aspirin or vitamins?

(continued)

Appendix Table D.2-1 (continued)
CARE-C final subscale configuration: Patient self-report

Subscale	Item content
Everyday Activities[1,2]	How much help do you currently need… a) Removing stiff plastic packaging using hands and scissors? b) Tying shoes? c) Unscrewing the lid off a previously unopened jar without using devices? d) Washing indoor windows? e) Lifting 25 pounds from the ground to a table? f) Cutting your toenails?
Life Skills[1]	How much difficulty do you currently have… a) Understanding instructions involving several steps? b) Following/understanding a 10- to 15-minute speech or presentation? c) Making yourself understood to other people during ordinary conversations? d) Telling someone important information about yourself in case of emergency? e) Explaining how to do something involving several steps to another person? f) Reading and following complex instructions? g) Telling others your basic needs? h) Planning for and keeping appointments that are not part of your weekly routine? i) Reading simple material? j) Filling out a long form? k) Writing down a short message or note? l) Remembering where things were placed or put away? m) Keeping track of time? n) Putting together a shopping list of 10 to 15 items? o) Remembering a list of 4 or 5 errands without writing it down? p) Taking care of complicated tasks like managing a checking account or getting appliances fixed?
Participation[3]	Even with help or services, tell us how much you are limited in… a) Keeping your home clean and fixed up? b) Providing personal care to yourself? c) Getting groceries or other things for your home?
	How much are you currently limited in… Going to movies, plays, concerts, sporting events, museums, or similar activities?

NOTES:

1 Response options: Unable, A Lot of Difficulty, A Little Difficulty, No Difficulty

2 Response options: Unable, A Lot of Help Needed, A Little Help Needed, No Help Needed

3 Response options: Extremely Limited, Very Much Limited, Somewhat Limited, A Little Limited, Not at All Limited

Appendix Table D.2-2
CARE-F final subscale configuration: Patient self-report

Subscale	Item content
Patient Ability[1,2,3]	How much difficulty do you currently have… a) Moving from sitting at the side of the bed to lying down on your back? b) Moving up in bed? c) Walking around on one floor, taking into consideration thresholds, doors, furniture, and a variety of floor coverings?
	How much HELP from another person do you currently need… a) Moving to and from a toilet?
Wheelchair Use[1]	Without help from another person, when you are using your wheelchair, how much difficulty do you currently have… a) Moving around within one room, including making turns in a wheelchair? b) Opening a door away from a wheelchair? c) Opening a door toward a wheelchair? d) Transferring between a wheelchair and other seating surfaces, such as a chair or bed?

NOTES:

[1] Response options: Unable, A Lot of Difficulty, A Little Difficulty, No Difficulty

[2] Response options: Unable, A Lot of Help Needed, A Little Help Needed, No Help Needed

[3] These items reflect modifications to the CARE-F self-report Patient Ability subscale, resulting in the self-report Mobility item set discussed in the Payment Report.

Appendix Table D.2-3
CARE-C final subscale configuration: Clinician observation

Subscale	Item content (category)
Self-Care[1]	▪ Oral hygiene ▪ Wash upper body ▪ Upper body dressing ▪ Lower body dressing ▪ Putting on/taking off footwear
Mobility[1]	▪ Sit to lying ▪ Roll left and right ▪ Lying to sitting on side of bed ▪ Sit to stand ▪ Chair/bed-to-chair transfer ▪ Picking up object while standing (restricted to responses from the walking sample) ▪ Walk 50 feet with two turns ▪ Walking 10 feet on uneven surfaces ▪ Four steps ▪ Twelve steps ▪ Wheel up and down ramp ▪ Walk 500 ft., Walk 150 ft., Walk 50 ft., Walk in room once standing – Combined into a single variable using responses from each item ▪ Wheel 500 ft., Wheel 150 ft., Wheel 50 ft., Wheel in room once seated – Combined into a single variable using responses from each item
Instrumental Activities of Daily Living[2]	▪ Medication management-oral ▪ Make a light meal ▪ Wipe down surface and clean the cloth
Cognition	
Problem Solving[3]	Simple Problems: Following basic schedules; requesting assistance; using a call bell; identifying basic wants/needs; preparing a simple cold meal without assistance.
	Complex Problems: Working on a computer; managing personal, medical, and financial affairs; preparing a complex hot meal; grocery shopping; route finding and map reading without assistance.
Memory[3]	Basic Information: Personal information (e.g., family members, biographical information, physical location); basic schedules; names of familiar staff; location of therapy area without assistance.
	Complex Information: Complex and novel information (e.g., carry out multiple-step activities, follow a plan); anticipate future events (e.g., keeping appointments) without assistance.
Attention[3]	Simple Activities Following simple directions; reading environmental signs or short newspaper/magazine/book passage; eating a meal; completing personal hygiene; dressing without assistance.
	Complex Activities Watching a news program; reading a book; planning and preparing a meal; managing one's own medical, financial, and personal affairs without assistance.

(continued)

Appendix Table D.2-3 (continued)
CARE-C final subscale configuration: Clinician observation

Subscale	Item content (category)
Communication	
Spoken-Language Comprehension[3]	Basic Information: Simple 1-step directions; simple yes/no questions; simple words or short phrases; conversations about routine daily activities without assistance.
	Complex Information: Complex sentences, 2-3 step directions, 2-3 part messages, and a variety of complex topics without assistance.
Spoken-Language Expression[3]	Basic Information: Basic information regarding wants/needs or daily routines; using 1-2 words or short phrases without assistance.
	Complex Information: Thoughts/ideas using sentences; in conversations about routine daily activities or a variety of topics without assistance.
Motor Speech Production[3]	Intelligible in Short Utterances: Spontaneous production of automatic words, predictable single words, or short phrases in conversation without assistance.
	Intelligible in Longer Utterances: Spontaneous production of multisyllabic words in sentences without assistance.
Functional Voice[3]	Low Vocal Demand: Speaking softly; speaking in quiet environments; talking for short periods of time without assistance.
	High Vocal Demand: Speaking loudly; speaking in noisy environments; talking for extended periods of time without assistance.

NOTES:

[1] Response options: Unable, A Lot of Difficulty, A Little Difficulty, No Difficulty

[2] Response options: Dependent, Substantial/Maximal Assistance, Partial/Moderate Assistance, Supervising/Touching Assistance, Set-up/Clean-up Assistance, Independent

[2] Response options: Never/Rarely, Sometimes, Usually, Always

Appendix Table D.2-4
CARE-F final subscale configuration: Clinician observation

Subscale	Item Content (Category)
Self-Care[1]	▪ Eating ▪ Oral hygiene ▪ Toileting hygiene ▪ Wash upper body ▪ Shower/bathe self ▪ Upper body dressing ▪ Lower body dressing ▪ Putting on/taking off footwear
Mobility[1]	▪ Sit to lying ▪ Roll left and right ▪ Lying to sitting on side of bed ▪ Sit to stand ▪ Chair/bed-to-chair transfer ▪ Picking up object while standing (restricted to responses from the walking sample) ▪ Walk 50 feet with two turns ▪ Walking 10 feet on uneven surfaces ▪ One step (curb) ▪ Four steps ▪ Twelve steps ▪ Wheel up and down ramp ▪ Walk 150 ft., Walk 100 ft., Walk 50 ft., Walk in room once standing – Combined into a single variable using responses from each item ▪ Wheel 150 ft., Wheel 100 ft., Wheel 50 ft., Wheel in room once seated – Combined into a single variable using responses from each item ▪ Car transfer (from IADL)
Instrumental Activities of Daily Living[1]	▪ Telephone-answering ▪ Telephone-placing call ▪ Medication management-oral ▪ Medication management-inhalant/mist ▪ Medication management-injectable ▪ Make a light meal ▪ Wipe down surface and clean the cloth
Cognition	
Problem Solving[2]	Simple Problems: Following basic schedules; requesting assistance; using a call bell; identifying basic wants/needs; preparing a simple cold meal without assistance.
	Complex Problems: Working on a computer; managing personal, medical, and financial affairs; preparing a complex hot meal; grocery shopping; route finding and map reading without assistance.

(continued)

Appendix Table D.2-4 (continued)
CARE-F final subscale configuration: Clinician observation

Subscale	Item content (category)
Memory[2]	Complex Information: Complex and novel information (e.g., carry out multiple-step activities, follow a plan); anticipate future events (e.g., keeping appointments) without assistance.
	Basic Information: Personal information (e.g., family members, biographical information, physical location); basic schedules; names of familiar staff; location of therapy area with assistance.
Attention[2]	Simple Activities Following simple directions; reading environmental signs or short newspaper/magazine/book passage; eating a meal; completing personal hygiene; dressing without assistance.
	Complex Activities Watching a news program; reading a book; planning and preparing a meal; managing one's own medical, financial, and personal affairs without assistance.
Communication	
Spoken-Language Comprehension[2]	Basic Information: Simple 1-step directions; simple yes/no questions; simple words or short phrases; conversations about routine daily activities without assistance.
	Complex Information: Complex sentences, 2-3 step directions, 2-3 part messages, and a variety of complex topics without assistance.
Spoken-Language Expression[2]	Basic Information: Basic information regarding wants/needs or daily routines; using 1-2 words or short phrases without assistance.
	Complex Information: Thoughts/ideas using sentences; in conversations about routine daily activities or a variety of topics without assistance.
Motor Speech Production[2]	Intelligible in Short Utterances: Spontaneous production of automatic words, predictable single words, or short phrases in conversation without assistance.
	Intelligible in Longer Utterances: Spontaneous production of multisyllabic words in sentences without assistance.
Functional Voice[2]	Low Vocal Demand: Speaking softly; speaking in quiet environments; talking for short periods of time without assistance.
	High Vocal Demand: Speaking loudly; speaking in noisy environments; talking for extended periods of time without assistance.

NOTES:

[1] Response options: Dependent, Substantial/Maximal Assistance, Partial/Moderate Assistance, Supervising/Touching Assistance, Set-up/Clean-up Assistance, Independent

[2] Response options: Never/Rarely, Sometimes, Usually, Always

APPENDIX E:
SECTION 4 APPENDIX TABLE

[This page intentionally left blank.]

Appendix Table 4-1
Annual mean allowed charges of explanatory variables

Variable	PT			OT			SLP		
	Count	Mean annual expendi-ture ($)	SE	Count	Mean annual expendi-ture ($)	SE	Count	Mean annual expendi-ture ($)	SE
Age/sex									
Male, age 0 to 34	12,555	936	13.92	3,458	890	26.14	1,608	1,116	48.99
Male, age 35 to 44	25,664	933	9.06	6,224	1,001	21.20	2,843	1,158	38.73
Male, age 45 to 54	59,543	1,039	6.42	15,186	1,182	14.71	7,578	1,201	22.80
Male, age 55 to 59	40,360	1,186	8.52	11,175	1,399	19.06	6,042	1,356	27.16
Male, age 60 to 64	47,421	1,255	7.62	12,954	1,435	16.94	7,334	1,352	23.18
Male, age 65 to 69	238,506	1,184	2.83	37,928	1,181	8.84	19,001	1,199	13.61
Male, age 70 to 74	271,349	1,225	2.76	44,169	1,257	8.42	23,978	1,168	11.68
Male, age 75 to 79	235,090	1,267	3.06	44,224	1,285	8.37	26,644	1,197	10.67
Male, age 80 to 84	191,666	1,323	3.55	45,284	1,362	8.36	28,528	1,272	10.42
Male, age 85 to 89	116,226	1,407	4.91	36,156	1,459	9.67	22,549	1,324	11.62
Male, age 90 to 94	41,084	1,491	8.62	17,012	1,471	13.54	10,380	1,364	17.51
Male, age 95+	7,914	1,583	20.14	3,969	1,455	27.47	2,599	1,303	31.31
Female, age 0 to 34	17,024	855	9.70	3,329	827	23.77	1,303	894	42.69
Female, age 35 to 44	38,109	897	6.72	6,972	940	19.17	2,706	1,003	36.00
Female, age 45 to 54	93,253	1,001	4.56	18,873	1,072	12.31	7,242	1,038	21.64
Female, age 55 to 59	69,298	1,098	5.54	15,127	1,183	14.42	5,923	1,102	23.33
Female, age 60 to 64	82,528	1,180	5.30	19,108	1,322	13.73	7,594	1,240	23.17
Female, age 65 to 69 (reference group)	414,653	1,186	2.06	61,653	1,111	6.47	20,452	1,057	11.92
Female, age 70 to 74	463,223	1,222	2.01	74,458	1,201	6.09	27,311	1,148	10.62
Female, age 75 to 79	407,267	1,253	2.25	81,463	1,335	6.23	35,669	1,279	9.31
Female, age 80 to 84	362,950	1,320	2.58	102,708	1,488	5.88	49,324	1,421	8.33
Female, age 85 to 89	264,509	1,443	3.32	107,241	1,588	5.75	55,500	1,489	7.64
Female, age 90 to 94	119,317	1,571	5.30	65,691	1,635	7.30	36,730	1,496	9.09
Female, age 95+	36,303	1,595	9.54	23,827	1,565	11.45	15,084	1,422	13.02
Other demographics									
Long term institutionalized	292,605	2,198	4.27	244,453	2,033	4.38	161,687	1,849	5.23
ESRD in 2011	36,958	1,321	9.30	14,527	1,513	16.27	5,464	1,311	24.89
Originally disabled, male, aged	117,586	1,339	4.92	35,460	1,534	10.50	22,442	1,436	13.48
Originally disabled, female, aged	181,778	1,322	3.89	57,692	1,539	8.14	28,432	1,452	11.41
Medicaid, male, aged	137,956	1,803	5.91	66,572	1,947	8.43	44,462	1,744	10.31
Medicaid, female, aged	404,441	1,638	3.10	196,510	1,811	4.60	116,701	1,647	5.68
Medicaid, male, disabled	114,204	1,127	5.08	36,511	1,379	10.38	19,993	1,371	15.09
Medicaid, female, disabled	195,170	1,031	3.36	46,908	1,255	8.66	19,554	1,204	14.20

(continued)

Appendix Table 4-1 (continued)
Annual mean allowed charges of explanatory variables

Variable	PT			OT			SLP		
	Count	Mean annual expenditure ($)	SE	Count	Mean annual expenditure ($)	SE	Count	Mean annual expenditure ($)	SE
Hierarchical condition categories									
HCC1 - HIV/AIDS	9,535	1,108	15.81	2,236	1,179	35.77	895	1,194	61.71
HCC2 - Septicemia/shock	80,381	1,796	7.71	41,124	1,906	11.10	24,429	1,690	13.99
HCC5 - Opportunistic infections	14,422	1,391	14.70	4,136	1,513	30.50	2,696	1,168	36.07
HCC7 - Metastatic cancer and acute leukemia	39,717	1,282	7.78	10,278	1,217	16.25	5,833	1,012	21.53
HCC8 - Lung, upper digestive tract, and other severe cancers	33,750	1,279	8.33	7,787	1,272	19.00	4,907	966	20.82
HCC9 - Lymphatic, head and neck, brain, and other major cancers	72,501	1,311	5.74	16,114	1,313	13.82	12,389	985	13.83
HCC10 - Breast, prostate, colorectal and other cancers and tumors	352,229	1,275	2.48	71,754	1,261	6.38	32,730	1,160	9.25
HCC15 - Diabetes with renal or peripheral circulatory manifestation	196,046	1,533	4.28	68,949	1,735	8.03	32,717	1,579	11.26
HCC16 - Diabetes with neurologic or other specified manifestation	182,368	1,392	4.05	50,474	1,539	8.80	22,840	1,416	12.72
HCC17 - Diabetes with acute complications	6,066	1,449	22.90	1,828	1,625	48.56	975	1,696	72.95
HCC18 - Diabetes with ophthalmologic or unspecified manifestation	70,549	1,319	6.11	17,120	1,436	14.38	8,002	1,350	21.01
HCC19 - Diabetes without complication	618,062	1,271	1.94	148,514	1,423	4.79	73,391	1,369	6.91
HCC21 - Protein-calorie malnutrition	70,397	1,863	8.44	39,214	1,952	11.48	26,133	1,789	14.08
HCC25 - End-stage liver disease	11,581	1,334	16.07	3,669	1,584	33.61	1,813	1,369	46.54
HCC26 - Cirrhosis of liver	15,673	1,268	12.84	4,215	1,434	29.21	1,921	1,334	46.34
HCC27 - Chronic hepatitis	17,794	1,193	12.11	3,797	1,273	30.06	1,473	1,179	48.96
HCC31 - Intestinal obstruction/perforation	77,259	1,463	6.46	26,630	1,635	12.50	14,533	1,495	16.38
HCC32 - Pancreatic disease	61,965	1,301	6.47	15,531	1,358	15.04	7,356	1,237	20.69
HCC33 - Inflammatory bowel disease	42,288	1,295	7.41	9,088	1,295	18.10	4,117	1,152	27.83
HCC37 - Bone/joint/muscle infections/necrosis	59,821	1,616	8.01	18,630	1,689	15.62	7,148	1,463	22.74

(continued)

Appendix Table 4-1 (continued)
Annual mean allowed charges of explanatory variables

Variable	PT			OT			SLP		
	Count	Mean annual expendi-ture ($)	SE	Count	Mean annual expendi-ture ($)	SE	Count	Mean annual expendi-ture ($)	SE
HCC38 - Rheumatoid arthritis and inflammatory connective tissue disease	309,936	1,292	2.74	63,747	1,244	6.93	23,551	1,106	10.76
HCC44 - Severe hematological disorders	39,237	1,391	8.53	11,872	1,509	18.24	5,925	1,285	22.96
HCC45 - Disorders of immunity	38,788	1,291	7.83	8,732	1,218	18.18	4,148	1,027	25.06
HCC51 - Drug/alcohol psychosis	29,897	1,403	10.74	11,104	1,550	19.13	5,604	1,535	27.72
HCC52 - Drug/alcohol dependence	45,503	1,080	7.01	11,325	1,245	17.14	4,612	1,277	28.28
HCC54 - Schizophrenia	59,656	1,544	8.32	27,979	1,881	13.19	17,013	1,757	17.10
HCC55 - Major depressive, bipolar, and paranoid disorders	306,378	1,444	3.29	102,513	1,708	6.57	54,092	1,579	8.80
HCC67 - Quadriplegia, other extensive paralysis	17,962	1,757	18.44	11,226	1,607	20.79	5,943	1,339	25.88
HCC68 - Paraplegia	13,674	1,726	19.66	6,700	1,598	25.18	2,543	1,551	41.06
HCC69 - Spinal cord disorders/injuries	39,317	1,579	9.55	11,452	1,566	19.27	6,125	1,355	24.66
HCC70 - Muscular dystrophy	3,616	1,314	31.17	1,445	1,181	49.06	787	1,210	71.51
HCC71 - Polyneuropathy	384,095	1,443	2.85	97,419	1,520	6.36	42,024	1,295	9.03
HCC72 - Multiple sclerosis	33,265	1,521	10.72	12,544	1,521	17.93	6,133	1,445	25.30
HCC73 - Parkinson’s and Huntington’s diseases	113,916	1,789	5.99	50,676	1,808	9.43	38,758	1,531	9.99
HCC74 - Seizure disorders and convulsions	148,890	1,512	4.99	65,557	1,687	8.22	41,755	1,580	10.36
HCC75 - Coma, brain compression/anoxic damage	10,703	1,854	21.65	6,315	1,969	30.40	4,327	2,045	38.88
HCC77 - Respirator dependence/tracheostomy status	9,434	1,939	25.97	5,614	2,001	32.77	5,734	1,580	32.32
HCC78 - Respiratory arrest	2,208	1,646	45.44	1,056	1,790	73.87	609	1,735	89.71
HCC79 - Cardio-respiratory failure and shock	179,809	1,504	4.45	68,275	1,679	8.02	38,660	1,464	10.13
HCC80 - Congestive heart failure	557,770	1,477	2.43	195,776	1,648	4.57	102,222	1,463	5.99
HCC81 - Acute myocardial infarction	43,388	1,483	8.79	16,580	1,677	15.94	8,870	1,546	21.98
HCC82 - Unstable angina and other acute ischemic heart disease	96,709	1,353	5.39	24,546	1,461	12.14	12,095	1,299	16.97

(continued)

Appendix Table 4-1 (continued)
Annual mean allowed charges of explanatory variables

Variable	PT			OT			SLP		
	Count	Mean annual expendi-ture ($)	SE	Count	Mean annual expendi-ture ($)	SE	Count	Mean annual expendi-ture ($)	SE
HCC83 - Angina pectoris/old myocardial infarction	224,097	1,327	3.40	53,864	1,451	8.16	25,883	1,275	11.25
HCC92 - Specified heart arrhythmias	613,740	1,394	2.13	180,852	1,522	4.53	97,014	1,396	5.98
HCC95 - Cerebral hemorrhage	28,645	1,852	12.80	14,234	1,905	18.84	9,966	1,877	23.07
HCC96 - Ischemic or unspecified stroke	206,558	1,690	4.44	95,523	1,829	6.94	61,550	1,761	9.07
HCC100 - Hemiplegia/hemiparesis	84,290	1,990	8.01	52,486	1,990	9.95	32,886	1,980	13.66
HCC101 - Cerebral palsy and other paralytic syndromes	16,613	1,507	15.37	7,303	1,533	24.45	4,593	1,287	28.07
HCC104 - Vascular disease with complications	111,746	1,556	5.77	37,126	1,705	10.96	17,536	1,498	14.89
HCC105 - Vascular disease	732,734	1,535	2.13	254,561	1,689	3.99	138,529	1,520	5.12
HCC107 - Cystic fibrosis	884	1,255	53.96	179	1,090	104.43	98	992	159.83
HCC108 - Chronic obstructive pulmonary disease	559,824	1,348	2.26	166,098	1,540	4.83	92,614	1,353	6.21
HCC111 - Aspiration and specified bacterial pneumonias	46,376	1,803	10.14	25,752	1,889	13.95	21,372	1,732	15.92
HCC112 - Pneumococcal pneumonia, emphysema, lung abscess	13,393	1,425	15.29	4,683	1,554	28.67	2,703	1,392	35.94
HCC119 - Proliferative diabetic retinopathy and vitreous hemorrhage	35,314	1,354	9.04	10,309	1,456	18.82	4,077	1,352	30.15
HCC130 - Dialysis status	27,476	1,365	11.12	11,162	1,551	18.99	4,237	1,350	28.24
HCC131 - Renal failure	429,399	1,440	2.70	145,122	1,625	5.31	75,516	1,494	7.09
HCC132 - Nephritis	8,572	1,298	17.12	2,011	1,350	41.80	918	1,431	76.62
HCC148 - Decubitus ulcer of skin	76,157	1,929	8.43	47,382	1,927	10.34	26,793	1,706	12.98
HCC149 - Chronic ulcer of skin, except decubitus	129,913	1,510	4.99	41,154	1,577	9.52	18,529	1,410	13.55
HCC150 - Extensive third-degree burns	201	1,417	124.86	107	1,539	187.82	23	1,727	326.83
HCC154 - Severe head injury	1,217	1,955	71.57	619	2,042	101.30	472	2,218	137.16
HCC155 - Major head injury	37,145	1,662	10.26	16,472	1,736	16.58	10,267	1,678	20.94
HCC157 - Vertebral fractures without spinal cord injury	74,373	1,492	6.46	23,066	1,587	12.98	11,176	1,382	17.05
HCC158 - Hip fracture/dislocation	94,106	1,832	6.63	37,327	1,839	10.98	19,106	1,634	14.35

(continued)

Appendix Table 4-1 (continued)
Annual mean allowed charges of explanatory variables

Variable	PT			OT			SLP		
	Count	Mean annual expendi-ture ($)	SE	Count	Mean annual expendi-ture ($)	SE	Count	Mean annual expendi-ture ($)	SE
HCC161 - Traumatic amputation	7,967	1,968	27.35	3,365	1,983	41.71	1,274	1,651	58.20
HCC164 - Major complications of medical care and trauma	187,456	1,481	4.13	52,882	1,554	8.92	25,154	1,426	12.71
HCC174 - Major organ transplant status	8,013	1,178	15.55	1,559	1,006	38.93	701	886	58.81
HCC176 - Artificial openings for feeding or elimination	34,966	1,655	11.38	20,448	1,794	15.41	15,874	1,843	20.01
HCC177 - Amputation status, lower limb/amputation complications	14,480	1,629	17.80	6,558	1,757	27.06	2,660	1,614	40.33
Diagnosis-related groups									
DRG Group 1 - Major joint upper extremity	20,436	1,886	11.03	3,945	1,447	25.28	344	856	66.39
DRG Group 2 - Amputation	7,654	1,803	25.20	3,864	1,910	34.57	1,500	1,686	55.05
DRG Group 3 - Urinary tract infection	59,706	1,634	8.02	35,021	1,755	10.96	20,776	1,641	13.65
DRG Group 4 - Stroke	49,614	1,469	7.54	28,595	1,465	10.22	22,400	1,509	12.01
DRG Group 5 - Chronic obstructive pulmonary disease, bronchitis/asthma	54,688	1,304	7.22	21,537	1,527	13.05	12,033	1,271	16.22
DRG Group 6 - Coronary artery bypass graft surgery	6,453	1,013	14.64	1,250	1,025	41.19	598	912	51.04
DRG Group 7 - Major joint replacement of the lower extremity	222,724	1,599	2.91	17,440	1,134	12.11	5,307	1,218	22.54
DRG Group 8 - Percutaneous coronary intervention	23,694	1,104	8.89	5,103	1,100	21.93	2,143	938	31.66
DRG Group 9 - Pacemaker	13,062	1,276	13.54	3,997	1,381	28.96	1,857	1,206	39.86
DRG Group 10 - Cardiac defibrillator	3,802	1,182	23.80	908	1,136	54.36	434	960	71.03
DRG Group 11 - Pacemaker device replacement or revision	1,674	1,325	42.64	571	1,420	86.20	288	1,431	128.21
DRG Group 12 - Automatic implantable cardiac defibrillator generator or lead	405	1,165	72.85	120	1,270	156.05	42	785	199.97
DRG Group 13 - Congestive heart failure	54,983	1,429	7.62	25,408	1,618	12.30	11,809	1,419	16.77
DRG Group 14 - Acute myocardial infarction	16,580	1,325	12.95	6,847	1,509	22.47	3,564	1,374	28.55

(continued)

Appendix Table 4-1 (continued)
Annual mean allowed charges of explanatory variables

Variable	PT			OT			SLP		
	Count	Mean annual expenditure ($)	SE	Count	Mean annual expenditure ($)	SE	Count	Mean annual expenditure ($)	SE
DRG Group 15 - Cardiac arrhythmia	43,120	1,293	7.51	14,582	1,432	14.87	7,272	1,306	19.83
DRG Group 16 - Cardiac valve	6,625	1,108	15.16	1,415	971	34.67	728	822	39.46
DRG Group 17 - Other vascular surgery	13,904	1,393	15.02	5,227	1,619	27.69	2,194	1,443	38.77
DRG Group 18 - Major cardiovascular procedure	6,023	1,187	17.91	1,492	1,227	41.90	689	1,086	55.51
DRG Group 19 - Gastrointestinal hemorrhage	34,561	1,428	9.50	14,508	1,600	16.29	7,883	1,508	21.71
DRG Group 20 - Major bowel	13,135	1,183	12.32	3,730	1,322	28.62	1,713	1,129	38.61
DRG Group 21 - Fractures femur and hip/pelvis	21,720	1,671	11.93	9,618	1,642	18.38	4,115	1,500	28.12
DRG Group 22 - Medical non-infectious orthopedic	128,919	1,601	4.66	42,010	1,535	8.87	15,903	1,386	13.25
DRG Group 23 - Double joint replacement of the lower extremity	6,207	1,872	19.07	250	854	83.88	52	571	100.60
DRG Group 24 - Revision of the hip or knee	19,702	1,724	11.77	2,302	1,336	37.73	534	1,155	75.06
DRG Group 25 - Spinal fusion (non-cervical)	30,604	1,345	7.50	2,304	737	24.22	584	615	38.22
DRG Group 26 - Hip and femur procedures except major joint	37,333	1,738	9.31	13,773	1,707	16.45	6,058	1,515	23.99
DRG Group 27 - Cervical spinal fusion	14,979	1,255	11.28	2,266	1,128	32.63	1,023	693	39.22
DRG Group 28 - Other knee procedures	5,582	1,733	23.21	681	1,341	68.51	181	1,038	119.59
DRG Group 29 - Complex non-cervical spinal fusion	2,691	1,531	29.32	352	1,226	94.06	103	926	136.66
DRG Group 30 - Combined anterior posterior spinal fusion	3,469	1,488	24.71	378	953	74.47	140	810	133.94
DRG Group 31 - Back and neck except spinal fusion	23,206	1,322	8.69	2,092	890	31.11	553	669	46.48
DRG Group 32 - Lower extremity and humerus procedure except hip, foot, femur	16,698	1,611	12.77	4,693	1,605	27.52	962	1,265	52.44
DRG Group 33 - Removal of orthopedic devices	4,311	1,573	25.70	1,345	1,442	48.57	327	1,332	115.11
DRG Group 34 - Sepsis	59,602	1,596	7.98	33,297	1,731	11.03	21,549	1,602	13.76
DRG Group 35 - Diabetes	15,590	1,468	14.70	7,731	1,640	21.74	3,808	1,551	31.99

(continued)

Appendix Table 4-1 (continued)
Annual mean allowed charges of explanatory variables

Variable	PT			OT			SLP		
	Count	Mean annual expendi-ture ($)	SE	Count	Mean annual expendi-ture ($)	SE	Count	Mean annual expendi-ture ($)	SE
DRG Group 36 - Simple pneumonia and respiratory infections	85,139	1,504	6.34	43,405	1,655	9.49	31,847	1,483	10.99
DRG Group 37 - Other respiratory	33,116	1,452	10.15	16,412	1,639	15.59	10,396	1,461	19.63
DRG Group 38 - Chest pain	21,334	1,251	11.29	6,871	1,459	23.30	3,045	1,295	33.50
DRG Group 39 - Medical peripheral vascular disorders	18,642	1,514	13.47	7,862	1,655	22.36	3,536	1,469	30.12
DRG Group 40 - Atherosclerosis	9,473	1,350	17.22	3,674	1,521	30.51	1,691	1,355	42.98
DRG Group 41 - Gastrointestinal obstruction	15,918	1,306	12.86	5,813	1,484	24.92	3,299	1,406	33.45
DRG Group 42 - Syncope and collapse	28,056	1,377	9.80	10,341	1,430	17.72	5,033	1,285	23.75
DRG Group 43 - Renal failure	41,333	1,472	9.02	20,728	1,632	13.72	10,693	1,553	18.83
DRG Group 44 - Nutritional and metabolic disorders	36,100	1,386	9.09	16,690	1,513	14.35	9,498	1,409	18.68
DRG Group 45 - Cellulitis	30,152	1,387	10.12	12,847	1,475	15.94	4,542	1,348	26.30
DRG Group 46 - Red blood cell disorders	16,516	1,488	14.50	7,584	1,684	23.51	3,906	1,508	31.35
DRG Group 47 - Transient ischemia	18,030	1,401	12.62	6,888	1,481	22.67	4,144	1,321	26.65
DRG Group 48 - Esophagitis, gastroenteritis and other digestive disorders	48,098	1,271	7.29	17,239	1,399	13.94	9,969	1,302	17.98
DRG Group 49 - Other DRG	220,778	1,239	3.37	70,777	1,328	6.79	36,068	1,278	9.49
Inpatient facility type									
Cancer facility	2,022	1,302	32.86	454	1,129	63.00	444	660	48.62
Acute hospital	1,152,729	1,411	1.49	337,285	1,454	3.19	177,922	1,355	4.30
Critical access hospital	30,835	1,412	9.52	14,683	1,508	15.15	7,888	1,452	21.38
Long term care hospital	16,896	1,725	16.41	10,493	1,937	21.46	6,530	1,836	28.47
Inpatient rehabilitation facility	51,803	1,488	7.07	17,874	1,213	12.27	8,361	1,375	19.13
Children's hospital	126	983	135.59	62	581	127.71	37	1,318	281.37
Psychiatric hospital	11,927	1,239	15.29	5,011	1,504	26.24	2,699	1,623	37.99
Skilled nursing facility	407,932	1,634	2.73	186,530	1,632	4.31	99,945	1,539	5.77
Inpatient rehabilitation facility unit	63,311	1,546	6.26	21,077	1,258	10.85	11,229	1,284	14.71
Psychiatric unit	32,353	1,395	9.99	16,652	1,589	15.07	9,699	1,618	19.48
Swing-bed short-term acute care hospital	4,943	1,337	20.20	1,559	1,337	41.09	740	1,236	54.88

(continued)

Appendix Table 4-1 (continued)
Annual mean allowed charges of explanatory variables

Variable	PT			OT			SLP		
	Count	Mean annual expendi-ture ($)	SE	Count	Mean annual expendi-ture ($)	SE	Count	Mean annual expendi-ture ($)	SE
Swing-bed long-term care hospital	20	1,711	251.75	†	†	†	†	†	†
Swing-bed rehabilitation hospital	†	†	†	—	—	—	†	†	†
Rehabilitation unit in critical access hospital	122	1,179	100.25	29	758	135.57	16	1,003	417.84
Swing-bed unit in critical access hospital	9,028	1,359	16.79	3,884	1,382	28.83	1,849	1,367	42.81
Psychiatric unit in critical access hospital	1,277	1,669	56.91	930	1,772	66.76	611	1,963	92.32
Inpatient stay type									
Long stay	108,661	1,475	5.24	46,463	1,485	8.70	24,490	1,539	12.67
Skilled nursing facility stay	416,578	1,626	2.69	188,633	1,625	4.28	100,877	1,534	5.73
Short stay	1,171,102	1,410	1.48	345,953	1,455	3.15	182,859	1,361	4.25
Hospital stay outlier payments									
Outlier payment is greater than $0	45,430	1,485	8.12	18,649	1,573	13.99	10,520	1,458	18.83
Inpatient therapy charges									
Physical therapy and occupational therapy and speech-language pathology charges equal to $0	287,822	1,112	2.71	65,845	1,266	7.03	33,301	1,150	9.80
Physical therapy charges equal to $0	309,379	1,133	2.66	78,465	1,299	6.49	44,792	1,236	8.81
Physical therapy charges greater than $0 and less than or equal to $1,000	281,735	1,311	2.92	72,523	1,311	6.83	38,830	1,231	9.15
Physical therapy charges greater than $1,000 and less than or equal to $5,000	383,596	1,481	2.50	104,077	1,369	5.48	54,614	1,340	7.30
Physical therapy charges greater than $5,000 and less than or equal to $10,000	155,079	1,704	4.50	65,210	1,654	7.39	33,193	1,565	10.22
Physical therapy charges greater than $10,000	82,511	1,929	6.94	45,850	1,891	9.30	21,561	1,695	13.38
Occupational therapy charges equal to $0	502,223	1,230	2.15	110,779	1,340	5.60	63,817	1,218	7.31
Occupational therapy charges greater than $0 and less than or equal to $1,000	232,572	1,364	3.12	57,566	1,220	7.39	29,688	1,217	10.25

(continued)

Appendix Table 4-1 (continued)
Annual mean allowed charges of explanatory variables

Variable	PT			OT			SLP		
	Count	Mean annual expendi-ture ($)	SE	Count	Mean annual expendi-ture ($)	SE	Count	Mean annual expendi-ture ($)	SE
Occupational therapy charges greater than $1,000 and less than or equal to $5,000	306,141	1,522	2.90	101,467	1,373	5.39	52,603	1,379	7.39
Occupational therapy charges greater than $5,000 and less than or equal to $10,000	116,668	1,748	5.41	60,931	1,733	7.78	30,435	1,619	10.81
Occupational therapy charges greater than $10,000	54,696	1,950	8.62	35,382	1,988	10.94	16,447	1,774	15.85
Speech-language pathology charges equal to $0	945,317	1,352	1.57	212,250	1,312	3.88	75,968	1,128	6.12
Speech-language pathology charges greater than $0 and less than or equal to $1,000	103,848	1,474	5.56	49,699	1,486	8.43	33,706	1,243	9.52
Speech-language pathology charges greater than $1,000 and less than or equal to $5,000	118,973	1,630	5.33	71,203	1,638	7.07	53,883	1,442	7.46
Speech-language pathology charges greater than $5,000 and less than or equal to $10,000	31,653	1,912	11.20	23,038	1,910	13.21	19,814	1,871	14.56
Speech-language pathology charges greater than $10,000	12,509	2,114	19.12	9,935	2,117	21.30	9,619	2,330	25.81
HCC prospective risk score									
HCC prospective risk score	3,655,812	1,258	0.78	858,189	1,365	1.94	423,922	1,306	2.77

NOTES:

† = Fewer than 11 cases.

1. Long Term Institutionalized - If the beneficiary had a 90-day MDS assessment at any point during 2011, then they were considered long-term institutionalized.
2. ESRD (End-Stage Renal Disease) - The beneficiary had ESRD at any point during 2011.
3. Originally Disabled - The beneficiary's original reason for entitlement was disability, among beneficiaries currently entitled by age.
4. Disabled - The beneficiary's current reason for entitlement is disability.
5. Medicaid - The beneficiary had at least one month of Medicaid while receiving therapy during 2011.
6. HCC = Hierarchical Condition Categories; DRG = Diagnosis-Related Groups
7. Annual Period: January 1, 2011 - December 31, 2011.
8. The count column refers to the number of unique beneficiaries where that variable was equal to 1.
9. SE = Standard error of the mean

SOURCE: RTI analysis of 2011-2012 Inpatient and Outpatient Therapy Medicare Claims.

Programs: PA016

[This page intentionally left blank.]

APPENDIX F:
SECTION 5 APPENDIX TABLES

[This page intentionally left blank.]

Appendix Table 5-1
CARE-C percentile distribution of Rasch function estimates for annual therapy utilization, by therapy discipline

Rasch function estimates	Mean	Minimum	1st	5th	10th	25th	Median	75th	90th	95th	99th	Maximum
PT (N = 3,749)												
Clinician-observed mobility	81.94	1.73	39.55	49.90	56.12	68.44	88.66	97.89	97.89	97.89	99.70	100.00
Self-reported everyday activities	76.53	0.04	34.89	43.89	48.83	57.19	73.13	100.00	100.00	100.00	100.00	100.00
Self-reported mobility	72.50	0.03	31.22	40.71	44.81	52.44	64.98	100.00	100.00	100.00	100.00	100.00
Self-reported participation	70.34	0.05	13.22	28.53	37.90	53.67	72.15	87.01	99.95	99.95	99.95	99.95
OT (N = 384)												
Clinician-observed self-care	76.45	0.05	0.57	41.14	46.39	60.24	76.99	99.96	99.96	99.96	99.96	99.96
Self-reported everyday activities	65.05	0.04	12.36	33.12	38.05	46.28	57.19	100.00	100.00	100.00	100.00	100.00
Self-reported participation	61.06	0.05	0.05	13.22	27.99	41.90	62.28	83.76	99.95	99.95	99.95	99.95
Self-reported life skills	85.50	12.63	22.22	43.70	50.56	68.17	100.00	100.00	100.00	100.00	100.00	100.00
SLP (N = 124)												
Self-reported life skills	65.57	0.05	10.49	30.16	40.59	53.03	61.89	78.71	100.00	100.00	100.00	100.00
Clinician-observed problem solving	65.76	0.05	0.05	24.16	37.50	48.55	66.07	99.83	100.00	100.00	100.00	100.00
Clinician-observed memory	68.26	0.04	0.04	22.12	35.86	47.82	73.23	85.74	100.00	100.00	100.00	100.00
Clinician-observed attention	70.59	0.04	0.04	22.22	35.92	52.90	74.21	99.95	100.00	100.00	100.00	100.00
Clinician-observed function voice	80.64	0.04	0.04	12.00	43.19	60.64	99.95	99.95	100.00	100.00	100.00	100.00
Clinician-observed speech	82.79	0.04	0.04	14.68	34.71	76.00	99.96	99.96	100.00	100.00	100.00	100.00
Clinician-observed language expression	76.70	0.03	0.03	20.78	41.24	60.51	87.08	99.96	100.00	100.00	100.00	100.00
Clinician-observed language comprehension	78.53	0.04	0.04	35.43	48.00	63.80	86.82	99.96	100.00	100.00	100.00	100.00

NOTES:

1. Annual Period: March 2011 - February 2012
2. Rasch function estimates presented were the estimates used in discipline-respective analyses
3. Rasch function estimates (0 = lowest ability; 100 = highest ability)

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims and CARE data.

Programs: PA022

Appendix Table 5-2
CARE-C physical therapy annual model, mean allowed charges of explanatory variables

Variable	Variable range	Count	Mean annual expenditure	SE
Demographics				
Male, age 0 to 64	—	112	1,438	152
Male, age 65-74	—	603	1,437	58
Male, age 75-84	—	503	1,572	70
Male, age 85+	—	119	1,505	112
Female, age 0 to 64	—	279	1,471	100
Female, age 65-74 (reference group)	—	1,123	1,527	42
Female, age 75-84	—	779	1,486	54
Female, age 85+	—	231	1,879	119
Originally disabled	—	238	1,551	99
Medicaid in 2010–2012	—	338	1,558	105
ESRD in 2010–2012	—	29	2,187	414
Primary diagnosis groups				
Fracture	—	191	1,650	114
Joint replacement	—	432	1,977	84
Osteoarthritis (reference group)	—	566	1,453	56
Spinal stenosis	—	222	1,501	99
Herniated disc and other major musculoskeletal	—	370	1,428	66
Sprain/strain	—	250	1,128	80
Bursitis/tendonitis	—	228	1,205	70
Unspecified and Miscellaneous Musculoskeletal	—	457	1,434	67
Circulatory (including Lymphatic) and Pulmonary/Respiratory	—	56	1,725	233
Stroke	—	66	2,154	265
Parkinson's and Other Progressive Neurological	—	59	2,139	320
Peripheral Nervous System and Other Major Neurological Disorders	—	59	1,404	188
Unspecified and Miscellaneous Neurological	—	47	2,109	312
Pain	—	39	1,151	162
Vertigo	—	57	846	185
Genitourinary Disorders	—	23	915	129
Unspecified and Miscellaneous Diagnoses	—	109	1,678	174

(continued)

Appendix Table 5-2 (continued)
CARE-C physical therapy annual model, mean allowed charges of explanatory variables

Variable	Variable range	Count	Mean annual expenditure	SE
Multiple major etiologies	—	216	1,776	115
Multiple etiologies, one major	—	213	1,429	83
Multiple etiologies, no major	—	56	1,098	133
No primary diagnosis	—	33	1,703	287
Secondary diagnosis groups				
Osteoarthritis	—	1,187	1,649	45
Joint replacement	—	172	1,644	129
Spinal Stenosis, Herniated Disc, and Other Major Musculoskeletal	—	642	1,686	72
Osteoporosis, Sprain/Strain, and Other Minor Musculoskeletal	—	581	1,573	62
Unspecified musculoskeletal	—	255	1,676	101
Circulatory (including lymphatic system)	—	609	1,620	68
Hypertension	—	1,068	1,454	45
Pulmonary/respiratory system	—	373	1,473	76
Stroke	—	87	1,688	206
Peripheral Nervous System and Other Major Neurological Disorders	—	136	1,911	179
Unspecified and Miscellaneous Neurological	—	144	1,843	172
Gait or balance disorder	—	849	1,837	61
Pain	—	1,654	1,485	34
Vertigo	—	63	1,767	204
Generalized weakness	—	1,118	1,793	50
Communication and cognition disorders	—	172	1,817	151
Mental health	—	305	1,405	82
Cancer and other neoplasms	—	303	1,462	83
Obesity	—	122	1,766	137
Vision impairment	—	133	1,827	153
Diabetes mellitus	—	449	1,499	72
Unspecified and Miscellaneous Diagnoses	—	543	1,655	68
No secondary diagnoses	—	333	1,334	76

(continued)

Appendix Table 5-2 (continued)
CARE-C physical therapy annual model, mean allowed charges of explanatory variables

Variable	Variable range	Count	Mean annual expenditure	SE
ICF function groups (reason for therapy)				
Motor functions	—	3,397	1,554	26
Pain	—	2,132	1,530	32
Proprioceptive and touch functions	—	238	2,152	134
Vestibular functions	—	222	1,694	129
Cardiovascular and respiratory	—	110	2,184	208
Genitourinary functions	—	22	1,162	278
Other body functions	—	118	2,177	188
Body functions not reported	—	104	1,317	119
ICF structure groups (reason for therapy)				
Unilateral hip/thigh	—	654	1,456	52
Unilateral knee	—	728	1,631	54
Unilateral calf/foot/ankle	—	352	1,531	72
Unilateral toes	—	42	2,180	276
Unilateral shoulder/arm/elbow	—	589	1,540	60
Unilateral wrist/hand/fingers	—	93	1,550	167
Upper spine	—	583	1,450	62
Lower spine	—	1,210	1,437	41
General/no specific body location	—	324	2,044	107
Bilateral lower extreme	—	604	1,614	63
Bilateral upper extreme	—	149	1,644	119
Peripheral nervous system	—	117	1,672	152
Central nervous system	—	99	1,815	161
Ear	—	56	1,572	210
Other body structures	—	98	1,643	146
Body structures not reported	—	284	1,499	105
ICF activity groups (reason for therapy)				
Cognitive/communication	—	71	2,448	280
Mobility	—	2,838	1,579	29
Daily activities	—	2,320	1,562	31
Activities not reported	—	350	1,276	68

(continued)

Appendix Table 5-2 (continued)
CARE-C physical therapy annual model, mean allowed charges of explanatory variables

Variable	Variable range	Count	Mean annual expenditure	SE
Rasch function estimates (0 = low ability; 100 = high ability)	**Rasch estimate range**			
Clinician-observed mobility	0 < Rasch estimate ≤ 40	41	2,152	369
Clinician-observed mobility	40 < Rasch estimate ≤ 70	944	1,946	60
Clinician-observed mobility	70 < Rasch estimate ≤ 97	1,710	1,372	32
Clinician-observed mobility	Rasch estimate > 97	1,054	1,370	40
Self-reported everyday activities	0 < Rasch estimate ≤ 40	100	2,221	199
Self-reported everyday activities	40 < Rasch estimate ≤ 70	1,652	1,710	41
Self-reported everyday activities	70 < Rasch estimate ≤ 97	449	1,314	59
Self-reported everyday activities	Rasch estimate > 97	1,548	1,342	34
Self-reported mobility	0 < Rasch estimate ≤ 40	175	2,266	179
Self-reported mobility	40 < Rasch estimate ≤ 70	1,920	1,639	36
Self-reported mobility	70 < Rasch estimate ≤ 97	204	1,431	92
Self-reported mobility	Rasch estimate > 97	1,450	1,296	33
Self-reported participation	0 < Rasch estimate ≤ 40	398	2,011	92
Self-reported participation	40 < Rasch estimate ≤ 70	1,345	1,668	45
Self-reported participation	70 < Rasch estimate ≤ 97	1,201	1,412	38
Self-reported participation	Rasch estimate > 97	805	1,210	42
CARE-C individual items				
Number of related surgeries = 0 (reference group)	—	2,453	1,354	27
Number of related surgeries = 1	—	722	1,830	64
Number of related surgeries = 2+	—	458	1,939	85
Number of related surgeries - missing	—	116	1,585	145
Time of most recent related surgery—none (reference group)	—	2,296	1,326	27
Time of most recent related surgery—within 1 month	—	473	1,788	71
Time of most recent related surgery—within 1–3 months	—	281	2,066	113
Time of most recent related surgery—3+ months	—	573	1,826	75
Time of most recent related surgery - missing	—	126	1,565	134
Patient feels sad (never, rarely, sometimes, I do not know) (reference group)	—	2,282	1,474	30
Patient feels sad (often)	—	1,040	1,569	48

(continued)

Appendix Table 5-2 (continued)
CARE-C physical therapy annual model, mean allowed charges of explanatory variables

Variable	Variable range	Count	Mean annual expenditure	SE
Patient feels sad (always)	—	328	1,726	103
Patient feels sad - missing	—	99	1,539	151
Pain has effect on activities	—	2,153	1,558	33
Pain has effect on sleep	—	1,576	1,516	36
Pain severity (0–2) (reference group)	—	631	1,636	72
Pain severity (3–7)	—	2,001	1,508	32
Pain severity (8–10)	—	881	1,513	49
Pain severity - missing	—	236	1,407	84
Duration of related health problem—0-1 months (reference group)	—	689	1,338	50
Duration of related health problem—1-3 months	—	783	1,421	52
Duration of related health problem—3+ months	—	2,201	1,608	33
Duration of related health problem - missing	—	76	1,862	195
Mobility device—none (reference group)	—	2,180	1,302	26
Mobility device—cane/crutch	—	892	1,735	51
Mobility device—walker	—	670	2,065	77
Mobility device—orthotics/prosthetic	—	53	2,259	278
Mobility device—wheelchair/scooter full-time	—	70	3,378	423
Mobility device—wheelchair/scooter part-time	—	120	2,079	173
Mobility device—mechanical lift	—	†	†	†
Mobility device—other	—	97	1,938	167
Mobility device - missing	—	144	1,371	103
Patient has memory difficulty	—	239	1,917	124
Patient has communication problem	—	87	2,140	233
Facility type				
Private practice (reference group)	—	2,116	1,531	31
Assisted living facility	—	116	3,142	248
Comprehensive\outpatient rehabilitation facility	—	610	1,401	65
Hospital outpatient department	—	898	1,389	44
Nursing facility	—	†	†	†

(continued)

Appendix Table 5-2 (continued)
CARE-C physical therapy annual model, mean allowed charges of explanatory variables

Variable	Variable range	Count	Mean annual expenditure	SE
Census division				
South Atlantic (reference group)	—	1,242	1,423	43
New England	—	233	1,069	67
Mid-Atlantic	—	876	1,893	53
East North Central	—	593	1,516	64
West North Central	—	214	1,526	109
East South Central	—	159	1,088	74
West South Central	—	153	1,612	116
Mountain	—	48	1,286	262
Pacific	—	230	1,443	87

NOTES:

† = Fewer than 11 cases.

1. ESRD in 2010-2012 - The beneficiary had ESRD any time in 2010, 2011, or 2012.
2. Medicaid in 2010-2012 - The beneficiary had at least one month of Medicaid eligibility during their therapy episode.
3. The count column refers to the number of beneficiaries where that variable = 1. If it is an ordinal/continuous variable, then it refers to the number of people where that variable > 0.
4. ICF is International Classification of Function.
5. Annual Period: March 2011 - February 2012
6. Facility type as identified by CARE providers on the CARE assessment.
7. SE = Standard error of the mean

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims and CARE data.

Programs: PA022

Appendix Table 5-3
CARE-C occupational therapy annual model, mean allowed charges of explanatory variables

Variable	Variable range	Count	Mean annual expenditure	SE
Demographics				
Male, age 0 to 64	—	30	1,398	288
Male, age 65-74	—	50	1,234	157
Male, age 75-84	—	38	1,328	236
Male, age 85+	—	12	1,431	240
Female, age 0 to 64	—	35	1,477	253
Female, age 65-74 (reference group)	—	*92*	*1,609*	*214*
Female, age 75-84	—	80	1,340	143
Female, age 85+	—	47	2,504	411
Originally disabled	—	22	1,803	522
Medicaid in 2010–2012	—	58	2,681	429
ESRD in 2010–2012	—	†	†	†
Primary diagnosis groups				
Fracture and joint replacement	—	68	1,572	193
Major musculoskeletal, excluding fracture and joint replacement (reference group)	—	67	1,509	284
Minor, Unspecified, and Miscellaneous Musculoskeletal	—	63	1,357	172
Stroke	—	42	1,833	251
Neurological, excluding stroke	—	52	1,700	248
Circulatory (including Lymphatic) and Pulmonary/Respiratory	—	37	1,448	323
Unspecified and Miscellaneous Diagnoses	—	27	1,168	224
Multiple etiologies	—	22	1,849	497
No primary diagnosis	—	†	†	†
Secondary diagnosis groups				
Osteoarthritis and Other Major Musculoskeletal	—	156	1,405	105
Osteoporosis, Unspecified, and Miscellaneous Musculoskeletal	—	76	1,657	168
Circulatory (including lymphatic system) and pulmonary/respiratory	—	90	1,496	136
Peripheral Nervous System and Other Neurological Disorders	—	70	1,858	230
Pain	—	92	1,159	101

(continued)

Appendix Table 5-3 (continued)
CARE-C occupational therapy annual model, mean allowed charges of explanatory variables

Variable	Variable range	Count	Mean annual expenditure	SE
Generalized weakness	—	114	2,058	229
Cognitive, communication, and mental health disorders	—	75	1,629	261
Unspecified and Miscellaneous Diagnoses	—	152	1,619	137
Hypertension	—	112	1,479	137
Diabetes mellitus	—	50	1,594	168
No secondary diagnosis	—	38	1,246	222
ICF function groups (reason for therapy)				
Motor functions	—	325	1,582	95
Pain	—	129	1,353	117
Mental functions	—	47	2,563	364
Proprioceptive and touch functions	—	46	1,638	249
Sensory functions	—	21	1,556	364
Other body functions	—	69	1,685	272
Body functions not reported	—	15	1,694	570
ICF structure groups (reason for therapy)				
Lower extremity and spine	—	56	1,757	314
Unilateral shoulder/arm/elbow	—	104	1,538	139
Unilateral wrist/hand/fingers	—	155	1,424	115
General/no specific body location	—	41	2,059	379
Bilateral upper extremity	—	86	1,950	236
Other body structures	—	54	1,427	159
Body structures not reported	—	49	1,661	332
ICF activity groups (reason for therapy)				
Cognitive/communication	—	60	1,917	217
Mobility	—	124	1,851	178
Daily activities	—	335	1,472	83
Activities not reported	—	36	2,575	561
Rasch function estimates (0 = low ability; 100 = high ability)	**Rasch estimate range**			
Clinician-observed mobility	0 < Rasch estimate ≤ 40	18	2,097	738
Clinician-observed mobility	40 < Rasch estimate ≤ 70	136	1,906	167
Clinician-observed mobility	70 < Rasch estimate ≤ 97	89	1,312	126

(continued)

Appendix Table 5-3 (continued)
CARE-C occupational therapy annual model, mean allowed charges of explanatory variables

Variable	Variable range	Count	Mean annual expenditure	SE
Clinician-observed mobility	Rasch estimate > 97	141	1,291	139
Self-reported everyday activities	0 < Rasch estimate ≤ 40	49	2,263	279
Self-reported everyday activities	40 < Rasch estimate ≤ 70	204	1,547	129
Self-reported everyday activities	70 < Rasch estimate ≤ 97	16	1,501	577
Self-reported everyday activities	Rasch estimate > 97	115	1,263	135
Self-reported participation	0 < Rasch estimate ≤ 40	85	2,221	240
Self-reported participation	40 < Rasch estimate ≤ 70	152	1,508	150
Self-reported participation	70 < Rasch estimate ≤ 97	87	1,252	135
Self-reported participation	Rasch estimate > 97	60	1,148	173
Self-reported life skills	0 < Rasch estimate ≤ 40	11	2,230	456
Self-reported life skills	40 < Rasch estimate ≤ 70	95	1,921	232
Self-reported life skills	70 < Rasch estimate ≤ 97	29	962	197
Self-reported life skills	Rasch estimate > 97	249	1,450	103
CARE-C individual items				
Number of related surgeries = 0 (reference group)	—	218	1,579	135
Number of related surgeries = 1	—	97	1,576	176
Number of related surgeries = 2+	—	50	1,446	158
Number of related surgeries - missing	—	19	1,390	218
Time of most recent related surgery—none (reference group)	—	201	1,603	145
Time of most recent related surgery—within 1 month	—	53	1,377	211
Time of most recent related surgery—within 1–3 months	—	40	1,429	184
Time of most recent related surgery—3+ months	—	73	1,677	191
Time of most recent related surgery - missing	—	17	1,237	224
Patient feels sad (never, rarely, sometimes, I do not know) (reference group)	—	203	1,519	134
Patient feels sad (often)	—	126	1,728	163
Patient feels sad (always)	—	48	1,229	154
Patient feels sad - missing	—	†	†	†
Pain has effect on activities	—	169	1,501	140

(continued)

Appendix Table 5-3 (continued)
CARE-C occupational therapy annual model, mean allowed charges of explanatory variables

Variable	Variable range	Count	Mean annual expenditure	SE
Pain has effect on sleep	—	99	1,406	163
Pain severity (0–2) (reference group)	—	121	1,749	182
Pain severity (3–7)	—	161	1,425	123
Pain severity (8–10)	—	63	1,379	236
Pain severity - missing	—	39	1,742	293
Duration of related health problem—0-1 months (reference group)	—	73	1,504	221
Duration of related health problem—1-3 months	—	70	1,280	164
Duration of related health problem—3+ months	—	237	1,639	122
Duration of related health problem - missing	—	†	†	†
Mobility device—none (reference group)	—	179	1,102	69
Mobility device—cane/crutch	—	67	1,787	262
Mobility device—walker	—	105	2,181	231
Mobility device—orthotics/prosthetic	—	†	†	†
Mobility device—wheelchair/scooter full-time	—	43	3,169	463
Mobility device—wheelchair/scooter part-time	—	48	1,585	217
Mobility device—mechanical lift	—	†	†	†
Mobility device—other	—	†	†	†
Mobility device - missing	—	24	1,311	226
Patient has memory difficulty	—	79	2,210	274
Patient has communication problem	—	20	1,578	327
Patient has swallowing problem		†	†	†
Facility type				
Private practice (reference group)	—	119	1,212	121
Assisted living facility	—	54	3,235	407
Hospital outpatient department	—	160	1,327	109
Comprehensive\outpatient rehabilitation facility	—	51	1,266	156
Nursing facility	—	—	—	—

(continued)

Appendix Table 5-3 (continued)
CARE-C occupational therapy annual model, mean allowed charges of explanatory variables

Variable	Variable range	Count	Mean annual expenditure	SE
Census division				
South Atlantic (reference group)	—	105	1,531	240
New England	—	30	1,179	212
Mid-Atlantic	—	87	1,606	154
East North Central	—	118	1,618	122
West North Central	—	23	863	249
East South Central	—	†	†	†
West South Central	—	13	3,186	745
Mountain	—	†	†	†
Pacific	—	†	†	†

NOTES:

† = Fewer than 11 cases.

1. ESRD in 2010-2012 - The beneficiary had ESRD any time in 2010, 2011, or 2012.
2. Medicaid in 2010-2012 - The beneficiary had at least one month of Medicaid eligibility during their therapy episode.
3. The count column refers to the number of beneficiaries where that variable = 1. If it is an ordinal/continuous variable, then it refers to the number of people where that variable > 0.
4. ICF is International Classification of Function.
5. Annual Period: March 2011 - February 2012
6. Facility type as identified by CARE providers on the CARE assessment.
7. SE = Standard error of the mean

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims and CARE data.

Programs: PA022

Appendix Table 5-4
CARE-C speech-language pathology annual mean allowed charges of explanatory variables

Variable	Variable range	Count	Mean annual expenditure ($)	SE
Demographics				
Male, age 0–64	—	12	1,748	483
Male, age 65–74	—	29	1,686	233
Male, age 75–84	—	16	1,872	249
Male, age 85+	—	†	†	†
Female, age 0–64	—	13	1,417	431
Female, age 65–74 (reference group)	—	19	1,342	276
Female, age 75–84	—	17	1,836	354
Female, age 85+	—	†	†	†
Originally disabled	—	†	†	†
Medicaid in 2010–2012	—	31	1,773	284
ESRD in 2010–2012	—	†	†	—
Primary impairment diagnosis groups				
Cognitive communication disorders only (reference group)	—	77	1,770	145
Swallowing disorders only	—	11	998	305
Cognitive, communication, and swallowing disorders only	—	19	1,519	300
No impairment diagnosis	—	17	1,296	327
Primary medical diagnosis groups				
Stroke	—	57	1,888	173
Neurological, excluding stroke	—	42	1,696	213
Miscellaneous diagnosis	—	20	749	107
No medical *diagnosis (reference group)*	—	†	†	†
ICF function groups (reason for therapy)				
Mental functions	—	84	1,828	147
Voice and speech functions	—	47	1,709	192
Other body functions	—	23	1,082	177
Body functions not reported	—	13	1,619	337
ICF structure groups (reason for therapy)				
Voice, speech, and swallowing	—	52	1,323	154
Central nervous system	—	21	2,389	345
Other body structures	—	40	1,609	180
Body structures not reported	—	37	1,723	217

(continued)

Appendix Table 5-4 (continued)
CARE-C speech-language pathology annual mean allowed charges of explanatory variables

Variable	Variable range	Count	Mean annual expenditure ($)	SE
ICF activity groups (reason for therapy)				
Cognitive	—	82	1,767	145
Communication	—	77	1,739	131
Mobility and daily activities	—	50	1,834	209
Activities not reported	—	18	1,247	308
Rasch function estimates				
(0 = low ability; 100 = high ability)	**Rasch estimate range**			
Self-reported life skills	0 < Rasch estimate ≤ 40	11	1,751	405
Self-reported life skills	40 < Rasch estimate ≤ 70	73	1,736	144
Self-reported life skills	70 < Rasch estimate ≤ 97	15	1,481	346
Self-reported life skills	Rasch estimate > 97	25	1,200	269
Clinician-observed problem solving	0 < Rasch estimate ≤ 40	20	1,456	296
Clinician-observed problem solving	40 < Rasch estimate ≤ 70	48	2,061	193
Clinician-observed problem solving	70 < Rasch estimate ≤ 97	24	1,529	257
Clinician-observed problem solving	Rasch estimate > 97	32	1,045	164
Clinician-observed memory	0 < Rasch estimate ≤ 40	15	1,855	393
Clinician-observed memory	40 < Rasch estimate ≤ 70	45	1,848	190
Clinician-observed memory	70 < Rasch estimate ≤ 97	35	1,632	228
Clinician-observed memory	Rasch estimate > 97	29	1,037	166
Clinician-observed attention	0 < Rasch estimate ≤ 40	20	1,865	333
Clinician-observed attention	40 < Rasch estimate ≤ 70	39	1,828	238
Clinician-observed attention	70 < Rasch estimate ≤ 97	27	1,699	185
Clinician-observed attention	Rasch estimate > 97	38	1,150	168
Clinician-observed function voice	0 < Rasch estimate ≤ 40	11	1,666	335
Clinician-observed function voice	40 < Rasch estimate ≤ 70	25	1,609	201
Clinician-observed function voice	70 < Rasch estimate ≤ 97	17	1,726	340
Clinician-observed function voice	Rasch estimate > 97	71	1,553	164
Clinician-observed speech	0 < Rasch estimate ≤ 40	15	1,616	300
Clinician-observed speech	40 < Rasch estimate ≤ 70	15	1,760	377
Clinician-observed speech	70 < Rasch estimate ≤ 97	15	1,938	356
Clinician-observed speech	Rasch estimate > 97	79	1,499	142
Clinician-observed language expression	0 < Rasch estimate ≤ 40	11	1,754	468
Clinician-observed language expression	40 < Rasch estimate ≤ 70	29	1,807	242
Clinician-observed language expression	70 < Rasch estimate ≤ 97	37	1,764	187
Clinician-observed language expression	Rasch estimate > 97	47	1,302	188

(continued)

Appendix Table 5-4 (continued)
CARE-C speech-language pathology annual mean allowed charges of explanatory variables

Variable	Variable range	Count	Mean annual expenditure ($)	SE
Clinician-observed language comprehension	0 < Rasch estimate ≤ 40	†	†	†
Clinician-observed language comprehension	40 < Rasch estimate ≤ 70	30	1,889	222
Clinician-observed language comprehension	70 < Rasch estimate ≤ 97	41	1,827	201
Clinician-observed language comprehension	Rasch estimate > 97	46	1,210	177
CARE-C individual items				
Number of related surgeries = 0 (reference group)	—	73	1,533	142
Number of related surgeries = 1	—	25	1,339	258
Number of related surgeries = 2+	—	18	2,051	352
Number of related surgeries - missing	—	†	†	†
Time of most recent related surgery—none (reference group)	—	69	1,525	148
Time of most recent related surgery—within 1 month	—	†	†	†
Time of most recent related surgery—within 1–3 months	—	11	1,553	464
Time of most recent related surgery—3+ months	—	32	1,806	213
Time of most recent related surgery - missing	—	†	†	†
Patient feels sad (never, rarely, sometimes, I do not know) (reference group)	—	61	1,615	155
Patient feels sad (often)	—	40	1,712	213
Patient feels sad (always)	—	17	1,558	364
Patient feels sad - missing	—	†	†	†
Pain has effect on activities	—	22	1,263	277
Pain has effect on sleep	—	13	1,368	471
Pain severity (0–2) (reference group)	—	70	1,654	149
Pain severity (3–7)	—	29	1,403	222
Pain severity (8–10)	—	†	†	†
Pain severity - missing	—	17	1,429	270
Duration of related health problem—0–1 months (reference group)	—	16	1,690	437
Duration of related health problem—1–3 months	—	31	1,808	233
Duration of related health problem—3+ months	—	72	1,543	139
Duration of related health problem - missing	—	†	†	†
Mobility device—none (reference group)	—	51	1,480	166
Mobility device—cane/crutch	—	15	1,485	316
Mobility device—walker	—	25	1,649	281
Mobility device—orthotics/prosthetic	—	—	—	—

(continued)

Appendix Table 5-4 (continued)
CARE-C speech-language pathology annual mean allowed charges of explanatory variables

Variable	Variable range	Count	Mean annual expenditure ($)	SE
Mobility device—wheelchair/scooter full-time	—	14	1,698	375
Mobility device—wheelchair/scooter part-time	—	12	1,379	398
Mobility device—mechanical lift	—	—	—	—
Mobility device—other	—	†	†	†
Mobility device - missing	—	13	2,041	444
Patient has diet modification	—	24	1,333	283
Patient has swallowing assistance	—	29	1,628	261
Facility type				
Hospital outpatient department (reference group)	—	86	1,429	128
Assisted living facility	—	13	1,781	358
Comprehensive/outpatient rehabilitation facility	—	23	2,117	320
Private practice	—	†	†	†
Census division				
South Atlantic (reference group)	—	28	1,787	240
New England	—	38	1,951	255
Mid-Atlantic	—	†	†	†
East North Central	—	30	1,164	172
West North Central	—	†	†	†
East South Central	—	—	—	—
West South Central	—	†	†	†
Mountain	—	†	†	†
Pacific	—	†	†	†

NOTES:

† = Fewer than 11 cases.

1. ESRD in 2010-2012–The beneficiary had ESRD any time in 2010, 2011, or 2012.
2. Medicaid in 2010-2012–The beneficiary had at least one month of Medicaid eligibility during their therapy episode.
3. The count column refers to the number of beneficiaries where that variable = 1. If it is an ordinal/continuous variable, then it refers to the number of people where that variable > 0.
4. ICF is International Classification of Function.
5. Annual Period: March 2011–February 2012
6. Facility type as identified by CARE providers on the CARE assessment.
7. SE = Standard error of the mean

SOURCE: RTI analysis of 2011–2012 Outpatient Therapy Medicare Claims and CARE data.

Program: PA02

Appendix Table 5-5
Percentile distribution of Rasch function estimates for annual therapy utilization: CARE-F nursing facility

Rasch function estimates	N	Mean	Minimum	1st	5th	10th	25th	Median	75th	90th	95th	99th	Maximum
Clinician-observed mobility	410	44.47	0.04	1.55	4.70	14.05	30.44	44.32	60.43	70.35	79.51	92.87	99.20
Clinician-observed self-care	400	41.66	0.04	0.04	0.13	7.65	28.79	43.95	55.17	65.79	78.03	95.58	99.97
Self-reported mobility	495	47.36	0.04	0.04	0.04	0.04	28.23	39.16	65.03	100.00	100.00	100.00	100.00
Self-reported wheelchair	486	52.70	0.05	0.05	0.05	0.05	22.21	53.38	88.42	100.00	100.00	100.00	100.00

NOTES:

1. Annual Period: March 2011 - February 2012
2. There are 516 CARE-F nursing facility admission assessments used in the analyses. This distribution does not include assessments with missing Rasch estimates. A categorical variable was used to flag missing values in the regression estimates in order to retain all observations.
3. Rasch function estimates (0 = lowest ability; 100 = highest ability)

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims and CARE data.

Programs: PA022

Appendix Table 5-6
CARE-F nursing facility annual model, mean allowed charges of explanatory variables

Variable	Count	Mean annual expenditure	SE
Demographics			
Age 0 to 64	50	7,720	1,161
Age 65 to 74 (reference group)	*99*	*4,420*	*567*
Age 75 to 84	144	5,989	589
Age 85+	226	4,917	369
Male	159	5,900	574
Originally disabled	85	5,506	783
Medicaid in 2010–2012	322	5,563	336
ESRD in 2010–2012	12	9,544	1,797
Long term institutionalized	372	5,286	345
Primary diagnosis groups			
Musculoskeletal (reference group)	*79*	*5,061*	*665*
Circulatory (including lymphatic) and pulmonary/respiratory	71	5,222	804
Stroke	52	4,559	674
Parkinson's, other neurological, and swallowing disorders	68	4,133	588
Dementia/Alzheimer's disease	109	5,570	619
Unspecified and miscellaneous diagnoses	78	5,938	783
Multiple etiologies	42	5,535	1,040
No primary diagnosis	20	10,293	2,013
Secondary diagnosis groups			
Osteoarthritis	136	6,458	577
Osteoporosis, unspecified, and miscellaneous musculoskeletal	202	4,836	433
Circulatory (including lymphatic)	249	5,189	395
Hypertension	292	5,395	401
Diabetes mellitus	131	5,494	556
Pulmonary/respiratory	150	5,050	530
Stroke	44	5,099	1,020
Parkinson's, peripheral nervous system, and other neurological disorders	116	5,666	589
Dementia/Alzheimer's and other cognitive disorders	92	4,976	601

(continued)

Appendix Table 5-6 (continued)
CARE-F nursing facility annual model, mean allowed charges of explanatory variables

Variable	Count	Mean annual expenditure	SE
Mental health	299	5,332	377
Communication, voice, or speech disorders	129	5,655	577
Swallowing disorders	138	3,782	454
Gait or balance disorder	143	4,378	454
Pain	95	4,376	558
Generalized weakness	166	6,277	529
Vision impairment	83	4,455	707
Unspecified and miscellaneous diagnoses	336	5,157	350
No secondary diagnosis	20	5,454	1,003
ICF body function groups (primary reason for therapy)			
Motor functions	414	5,772	332
Mental functions	63	8,304	1,001
Pain	81	6,395	822
Other body functions	102	7,962	860
Body functions not reported	47	3,955	661
ICF body structure groups (primary reason for therapy)			
General/no specific body location	169	7,124	569
Spine	57	6,625	957
Hip and thigh	106	6,061	660
Knee	115	5,824	616
Calf/foot/ankle/toes	91	5,269	692
Shoulder/arm/elbow	111	6,811	639
Wrist/hand/fingers	102	5,637	618
Voice, speech, and swallowing	113	4,135	507
Other body structures	48	8,540	1,375
Body structures not reported	33	6,833	1,187
ICF activity groups (primary reason for therapy)			
Cognitive	87	6,394	808
Communication	26	7,434	1,031
Mobility	338	6,129	381
Daily activities	255	7,149	462
Activities not reported	56	3,845	576

(continued)

Appendix Table 5-6 (continued)
CARE-F nursing facility annual model, mean allowed charges of explanatory variables

Variable	Count	Mean annual expenditure	SE
Rasch functional ability estimates (0 = low ability; 100 = high ability)			
Clinician-observed mobility			
0 < Rasch estimate ≤ 30	96	5,256	586
30 < Rasch estimate ≤ 60	211	6,383	481
60 < Rasch estimate ≤ 90	93	5,393	670
Rasch estimate > 90 (reference group)	*12*	*3,214*	*1,417*
Rasch estimate - missing	42	5,378	788
Rasch estimate - not assessed	65	2,769	637
Clinician-observed self-care			
0 < Rasch estimate ≤ 30	109	6,001	659
30 < Rasch estimate ≤ 60	222	6,211	433
60 < Rasch estimate ≤ 90	64	5,256	884
Rasch estimate > 90 (reference group)	*†*	*†*	*†*
Rasch estimate - missing	44	4,794	721
Rasch estimate - not assessed	73	2,664	571
Self-reported mobility			
0 < Rasch estimate ≤ 30	179	4,985	421
30 < Rasch estimate ≤ 60	158	6,264	528
60 < Rasch estimate ≤ 90	83	5,939	859
Rasch estimate > 90 (reference group)	*78*	*3,577*	*542*
Rasch estimate - missing	21	6,825	1,641
Self-reported wheelchair function			
Wheelchair not used	101	4,473	582
0 < Rasch estimate ≤ 30	141	4,859	446
30 < Rasch estimate ≤ 60	139	6,487	625
60 < Rasch estimate ≤ 90	91	5,443	717
Rasch estimate > 90 (reference group)	*17*	*3,904*	*884*
Rasch estimate - missing	30	6,569	1,237
Additional function items			
Diet modifications needed	203	5,157	464
Rarely/never/sometimes understands verbal content	178	4,414	396
Cognitive function mildly impaired, not impaired, or not reported (reference group)	275	5,241	352

(continued)

Appendix Table 5-6 (continued)
CARE-F nursing facility annual model, mean allowed charges of explanatory variables

Variable	Count	Mean annual expenditure	SE
Cognitive function moderately impaired	97	4,868	624
Cognitive function severely impaired	147	6,012	607
CARE-F individual items			
Admitted from skilled nursing facility (reference group)	*232*	*4,721*	*429*
Admitted from long term nursing facility	212	6,004	442
Admitted from other facility	75	5,582	745
Acute care hospital use in the past 2 months	46	5,331	778
History of surgery for the presenting condition	25	5,901	1,319
Onset of presenting condition within past 3 months	179	5,550	515
Prior self-care function needed assistance	433	5,621	323
Prior mobility function impaired	254	6,075	424
Wheelchair use prior to presenting condition	368	5,306	324
Two or more falls in the past year	149	5,804	492
Expression of ideas/wants (rarely/never, frequently/some difficulty)	178	4,256	400
Inattention	161	6,128	546
Disorganized thinking	127	5,477	540
Altered level of consciousness/alertness	103	5,270	547
Cues for swallowing	191	5,102	412
Cognitive problems present	76	8,789	864
Respiratory impairments present	101	5,621	695
Endurance impairments present	350	5,756	357
Bladder/bowel impairments present	307	5,249	366
Felt sad in past two weeks (never, rarely, sometimes, unable to respond) (reference group)	373	4,985	316
Felt sad in past two weeks often	56	5,260	872
Felt sad in past two weeks always	24	7,315	1,412
Felt sad in past two weeks missing	66	7,086	880
Pain affects sleep	83	7,360	854
Pain affects activities	105	7,621	793
Mobility device—walker	141	6,134	611
Mobility device—wheelchair/scooter full-time	201	5,265	430

(continued)

Appendix Table 5-6 (continued)
CARE-F nursing facility annual model, mean allowed charges of explanatory variables

Variable	Count	Mean annual expenditure	SE
Mobility device—wheelchair/scooter part-time	80	5,104	750
Mobility device—other	64	4,525	726
Census division			
South Atlantic (reference group)	*44*	*10,142*	*1,615*
New England	148	2,193	218
Mid-Atlantic	60	5,580	718
East North Central	35	2,745	352
West North Central	79	4,325	612
East South Central	119	8,909	638
West South Central	†	†	†
Mountain	19	3,420	658
Pacific	14	9,064	1,204

NOTES:

† = Fewer than 11 cases.

1. Originally Disabled - The beneficiary's original reason for entitlement was disability, among beneficiaries currently entitled by age.
2. Medicaid in 2010-2012 - The beneficiary had at least one month of Medicaid eligibility during their therapy episode.
3. ESRD in 2010-2012 - The beneficiary had ESRD any time in 2010, 2011, or 2012.
4. Long Term Institutionalized - If the beneficiary had a 90-day MDS assessment at any point during 2011, then they were considered long-term institutionalized.
5. The count column refers to the number of beneficiaries where that variable = 1. If it is an ordinal/continuous variable, then it refers to the number of people where that variable > 0.
6. ICF is International Classification of Function.
7. The reference group (Admitted from skilled nursing facility) includes 218 beneficiaries admitted from a skilled nursing facility and 14 beneficiaries with missing admitted from facilities.
8. Annual Period: March 2011 - February 2012
9. SE = Standard error of the mean

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims and CARE data.

Programs: PA022

APPENDIX G:
SECTION 7 APPENDIX TABLES

[This page intentionally left blank.]

Appendix Table 7-1
CARE-C percentile distribution of Rasch function estimates for episodes of therapy utilization, by therapy discipline

Rasch function estimates	Mean	Minimum	1st	5th	10th	25th	Median	75th	90th	95th	99th	Maximum
PT (N =4,268)												
Clinician-observed mobility	81.91	1.73	39.65	50.14	56.37	68.16	88.66	97.89	97.89	97.89	99.70	100.00
Self-reported everyday activities	76.23	0.04	34.89	44.25	48.83	57.19	70.84	100.00	100.00	100.00	100.00	100.00
Self-reported mobility	72.34	0.03	31.92	40.71	44.81	52.35	64.47	100.00	100.00	100.00	100.00	100.00
Self-reported participation	70.12	0.05	13.22	28.53	37.90	53.67	72.15	87.01	99.95	99.95	99.95	99.95
OT (N = 435)												
Clinician-observed self-care	75.68	0.05	0.57	38.21	46.39	60.02	73.80	99.96	99.96	99.96	99.96	99.96
Self-reported everyday activities	63.82	0.04	18.64	33.12	37.02	45.66	56.74	100.00	100.00	100.00	100.00	100.00
Self-reported participation	60.52	0.05	0.05	13.22	22.27	41.90	62.28	82.17	99.95	99.95	99.95	99.95
Self-reported life skills	85.31	12.63	23.86	43.70	50.56	68.17	100.00	100.00	100.00	100.00	100.00	100.00
SLP (N = 125)												
Self-reported life skills	66.29	0.05	10.49	30.16	42.66	54.54	62.44	78.11	100.00	100.00	100.00	100.00
Clinician-observed problem solving	65.57	0.05	0.05	24.16	37.50	43.13	66.07	99.72	100.00	100.00	100.00	100.00
Clinician-observed memory	67.60	0.04	0.04	22.12	35.86	47.82	71.62	85.74	100.00	100.00	100.00	100.00
Clinician-observed attention	70.57	0.04	0.04	22.22	35.92	53.49	74.21	99.95	100.00	100.00	100.00	100.00
Clinician-observed function voice	82.98	0.04	0.04	21.91	48.53	75.38	99.95	99.95	100.00	100.00	100.00	100.00
Clinician-observed speech	82.61	0.04	0.04	14.68	34.71	76.00	99.96	99.96	100.00	100.00	100.00	100.00
Clinician-observed language expression	77.32	0.03	0.03	20.78	34.82	67.44	87.08	99.96	100.00	100.00	100.00	100.00
Clinician-observed language comprehension	78.14	0.04	0.04	29.82	48.00	66.60	86.82	99.96	100.00	100.00	100.00	100.00

NOTES:

1. Episode: Variable Length Episode with a 60-day terminating clean period.
2. Rasch function estimates presented were the estimates used in discipline-respective analyses
3. Rasch function estimates (0 = lowest ability; 100 = highest ability)

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims and CARE data.

Programs: PA021

Appendix Table 7-2
CARE-C physical therapy episode mean allowed charges of explanatory variables

Variable	Variable range	Count	Mean episode expenditure	SE
Demographics				
Male, age 0 to 64	—	136	1,238	139.84
Male, age 65-74	—	668	1,392	66.09
Male, age 75-84	—	567	1,387	62.79
Male, age 85+	—	135	1,336	97.05
Female, age 0 to 64	—	325	1,291	78.77
Female, age 65-74 (reference group)	—	*1,279*	*1,354*	*34.96*
Female, age 75-84	—	894	1,333	48.28
Female, age 85+	—	264	1,579	101.24
Originally disabled	—	288	1,327	71.16
Medicaid in 2010–2012	—	434	1,301	82.32
ESRD in 2010–2012	—	30	1,922	385.89
Primary diagnosis groups				
Fracture	—	202	1,639	103.12
Joint replacement	—	517	1,760	80.78
Osteoarthritis (reference group)	—	*648*	*1,221*	*40.55*
Spinal stenosis	—	250	1,366	111.19
Herniated disc and other major musculoskeletal	—	429	1,361	62.13
Sprain/strain	—	281	977	61.71
Bursitis/tendonitis	—	262	1,043	54.95
Unspecified and Miscellaneous Musculoskeletal	—	514	1,309	58.48
Circulatory (including lymphatic) and pulmonary/respiratory	—	61	1,684	229.06
Stroke	—	69	1,965	260.41
Parkinson's and Other Progressive Neurological	—	66	1,735	330.03
Peripheral Nervous System and Other Major Neurological Disorders	—	67	1,200	130.86
Unspecified and Miscellaneous Neurological	—	53	2,166	410.42
Pain	—	49	1,128	136.63
Vertigo	—	71	699	111.40
Genitourinary disorders	—	24	770	108.47
Unspecified and Miscellaneous Diagnoses	—	122	1,519	130.25
Multiple major etiologies	—	244	1,426	101.86
Multiple etiologies, one major	—	241	1,346	74.75

(continued)

Appendix Table 7-2 (continued)
CARE-C physical therapy episode mean allowed charges of explanatory variables

Variable	Variable range	Count	Mean episode expenditure	SE
Multiple etiologies, no major	—	62	1,000	115.25
No primary diagnosis	—	36	1,547	206.19
Secondary diagnosis groups				
Osteoarthritis	—	1,393	1,432	36.03
Joint replacement	—	201	1,436	130.31
Spinal Stenosis, Herniated Disc, and Other Major Musculoskeletal	—	752	1,514	70.40
Osteoporosis, Sprain/Strain, and Other Minor Musculoskeletal	—	681	1,374	47.40
Unspecified musculoskeletal	—	290	1,413	78.64
Circulatory (including lymphatic system)	—	690	1,498	73.44
Hypertension	—	1,218	1,323	38.42
Pulmonary/respiratory system	—	422	1,342	60.45
Stroke	—	102	1,477	177.53
Peripheral Nervous System and Other Major Neurological Disorders	—	150	1,597	158.60
Unspecified and Miscellaneous Neurological	—	160	1,532	165.08
Gait or balance disorder	—	944	1,586	54.85
Pain	—	1,917	1,333	30.06
Vertigo	—	76	1,603	208.09
Generalized weakness	—	1,249	1,576	45.49
Communication and cognition disorders	—	193	1,556	116.87
Mental health	—	350	1,212	61.97
Cancer and other neoplasms	—	334	1,246	73.23
Obesity	—	140	1,493	105.69
Vision impairment	—	151	1,609	131.06
Diabetes mellitus	—	510	1,366	62.07
Unspecified and miscellaneous diagnoses	—	612	1,441	58.96
No secondary diagnoses	—	376	1,232	72.74
ICF function groups (reason for therapy)				
Motor functions	—	3,872	1,402	23.85
Pain	—	2,423	1,358	28.58
Proprioceptive and touch functions	—	270	1,869	122.11
Vestibular functions	—	244	1,413	116.47
Cardiovascular and respiratory	—	119	1,877	201.70
Genitourinary functions	—	23	749	107.86

(continued)

Appendix Table 7-2 (continued)
CARE-C physical therapy episode mean allowed charges of explanatory variables

Variable	Variable range	Count	Mean episode expenditure	SE
Other body functions	—	129	1,959	188.83
Body functions not reported	—	114	1,050	87.01
ICF structure groups (reason for therapy)				
Unilateral hip/thigh	—	727	1,306	43.51
Unilateral knee	—	854	1,479	47.78
Unilateral calf/foot/ankle	—	391	1,370	65.11
Unilateral toes	—	47	1,631	183.81
Unilateral shoulder/arm/elbow	—	658	1,432	50.72
Unilateral wrist/hand/fingers	—	104	1,366	141.57
Upper spine	—	665	1,269	52.80
Lower spine	—	1,365	1,266	37.08
General/no specific body location	—	378	1,826	103.70
Bilateral lower extreme	—	638	1,399	58.60
Bilateral upper extreme	—	167	1,490	128.76
Peripheral nervous system	—	139	1,424	116.11
Central nervous system	—	113	1,575	131.81
Ear	—	66	1,552	180.58
Other body structures	—	107	1,486	129.61
Body structures not reported	—	333	1,399	102.96
ICF activity groups (reason for therapy)				
Cognitive/communication	—	75	2,060	295.07
Mobility	—	3,265	1,409	26.51
Daily activities	—	2,669	1,415	27.06
Activities not reported	—	370	1,100	58.26
Rasch function estimates (0 = low ability; 100 = high ability)	**Rasch estimate range**			
Clinician-observed mobility	0 < Rasch estimate ≤ 40	44	2,092	468.06
Clinician-observed mobility	40 < Rasch estimate ≤ 70	1,089	1,735	53.37
Clinician-observed mobility	70 < Rasch estimate ≤ 97	1,951	1,219	26.89
Clinician-observed mobility	Rasch estimate > 97	1,184	1,238	39.72
Self-reported everyday activities	0 < Rasch estimate ≤ 40	108	2,180	231.20
Self-reported everyday activities	40 < Rasch estimate ≤ 70	1,925	1,525	37.53
Self-reported everyday activities	70 < Rasch estimate ≤ 97	499	1,149	45.43
Self-reported everyday activities	Rasch estimate > 97	1,736	1,199	28.48
Self-reported mobility	0 < Rasch estimate ≤ 40	188	1,954	197.19
Self-reported mobility	40 < Rasch estimate ≤ 70	2,216	1,463	32.26
Self-reported mobility	70 < Rasch estimate ≤ 97	232	1,270	73.49

(continued)

Appendix Table 7-2 (continued)
CARE-C physical therapy episode mean allowed charges of explanatory variables

Variable	Variable range	Count	Mean episode expenditure	SE
Self-reported mobility	Rasch estimate > 97	1,632	1,177	27.89
Self-reported participation	0 < Rasch estimate ≤ 40	453	1,883	93.01
Self-reported participation	40 < Rasch estimate ≤ 70	1,559	1,503	42.27
Self-reported participation	70 < Rasch estimate ≤ 97	1,342	1,247	30.59
Self-reported participation	Rasch estimate > 97	914	1,046	33.26
CARE-C individual items				
Number of related surgeries = 0 (reference group)	—	*2,765*	*1,208*	*22.42*
Number of related surgeries = 1	—	843	1,695	58.78
Number of related surgeries = 2+	—	537	1,681	89.78
Number of related surgeries - missing	—	123	1,255	100.92
Time of most recent related surgery—none (reference group)	—	*2,599*	*1,183*	*22.82*
Time of most recent related surgery—within 1 month	—	541	1,754	69.33
Time of most recent related surgery—within 1–3 months	—	328	1,951	116.64
Time of most recent related surgery—3+ months	—	660	1,498	70.39
Time of most recent related surgery - missing	—	140	1,232	88.64
Patient feels sad (never, rarely, sometimes, I do not know) (reference group)	—	*2,599*	*1,347*	*27.57*
Patient feels sad (often)	—	1,162	1,399	44.60
Patient feels sad (always)	—	397	1,419	82.34
Patient feels sad - missing	—	110	1,233	89.07
Pain has effect on activities	—	2,468	1,388	28.26
Pain has effect on sleep	—	1,805	1,352	31.50
Pain severity (0–2) (reference group)	—	*722*	*1,506*	*75.07*
Pain severity (3–7)	—	2,278	1,352	27.20
Pain severity (8–10)	—	1,005	1,306	42.98
Pain severity - missing	—	263	1,311	69.08
Duration of related health problem—0-1 months (reference group)	—	*799*	*1,254*	*47.85*
Duration of related health problem—1-3 months	—	876	1,344	54.45
Duration of related health problem—3+ months	—	2,509	1,402	28.33
Duration of related health problem - missing	—	84	1,544	161.25
Mobility device—none (reference group)	—	*2,503*	*1,176*	*22.35*
Mobility device—cane/crutch	—	999	1,507	43.27

(continued)

Appendix Table 7-2 (continued)
CARE-C physical therapy episode mean allowed charges of explanatory variables

Variable	Variable range	Count	Mean episode expenditure	SE
Mobility device—walker	—	760	1,937	80.52
Mobility device—orthotics/prosthetic	—	57	2,008	245.68
Mobility device—wheelchair/scooter full-time	—	78	2,969	470.65
Mobility device—wheelchair/scooter part-time	—	127	1,786	147.62
Mobility device—mechanical lift	—	†	†	†
Mobility device—other	—	107	1,575	115.25
Mobility device - missing	—	155	1,209	83.99
Patient has memory difficulty	—	261	1,596	107.35
Patient has communication problem	—	91	1,738	240.85
Facility type				
Private practice (reference group)	—	*2,432*	*1,377*	*25.92*
Assisted living facility	—	118	2,694	252.81
Comprehensive\outpatient rehabilitation facility	—	795	1,370	63.69
Hospital outpatient department	—	895	1,144	39.53
Nursing facility	—	28	1,645	291.49
Census division				
South Atlantic (reference group)	—	*1,368*	*1,263*	*44.52*
New England	—	243	1,019	58.06
Mid-Atlantic	—	965	1,675	49.86
East North Central	—	659	1,271	47.99
West North Central	—	248	1,240	74.05
East South Central	—	243	1,209	66.40
West South Central	—	182	1,672	120.34
Mountain	—	67	1,319	177.92
Pacific	—	293	1,376	67.91

NOTES:

† = Fewer than 11 cases.

1. ESRD in 2010-2012 - The beneficiary had ESRD any time in 2010, 2011, or 2012.
2. Medicaid in 2010-2012 - The beneficiary had at least one month of Medicaid eligibility during their therapy episode.
3. The count column refers to the number of beneficiaries where that variable = 1. If it is an ordinal/continuous variable, then it refers to the number of people where that variable > 0.
4. ICF is International Classification of Function.
5. Episode: Variable Length Episode with a 60-day terminating clean period.
6. Facility type as identified by CARE providers on the CARE assessment.
7. SE = Standard error of the mean

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims and CARE data.

Programs: PA021

Appendix Table 7-3
CARE-C occupational therapy episode mean allowed charges of explanatory variables

Variable	Variable range	Count	Mean episode expenditure	SE
Demographics				
Male, age 0 to 64	—	32	1,564	307.19
Male, age 65-74	—	57	1,134	141.72
Male, age 75-84	—	43	1,010	118.00
Male, age 85+	—	16	1,467	369.66
Female, age 0 to 64	—	38	1,156	133.07
Female, age 65-74 (reference group)	—	*108*	*1,350*	*140.66*
Female, age 75-84	—	92	1,210	122.45
Female, age 85+	—	49	2,167	394.33
Originally disabled	—	28	1,521	377.86
Medicaid in 2010–2012	—	67	2,060	329.69
ESRD in 2010–2012	—	†	†	†
Primary diagnosis groups				
Fracture and joint replacement	—	78	1,556	176.93
Major musculoskeletal, excluding fracture and joint replacement (reference group)	—	*75*	*1,486*	*221.27*
Minor, Unspecified, and Miscellaneous Musculoskeletal	—	71	1,136	114.41
Stroke	—	47	1,392	209.62
Neurological, excluding stroke	—	55	1,427	199.22
Circulatory (including lymphatic) and pulmonary/respiratory	—	42	1,320	286.70
Unspecified and Miscellaneous Diagnoses	—	39	990	165.11
Multiple etiologies	—	22	1,296	388.83
No primary diagnosis	—	†	†	†
Secondary diagnosis groups				
Osteoarthritis and Other Major Musculoskeletal	—	185	1,298	84.77
Osteoporosis, Unspecified, and Miscellaneous Musculoskeletal	—	81	1,476	133.78
Circulatory (including lymphatic) and pulmonary/respiratory	—	100	1,415	135.41
Peripheral Nervous System and Other Neurological Disorders	—	79	1,630	177.08
Pain	—	119	1,186	97.36
Generalized weakness	—	120	1,630	186.43
Cognitive, communication, and mental health disorders	—	80	1,506	217.07
Unspecified and Miscellaneous Diagnoses	—	170	1,408	115.99
Hypertension	—	119	1,438	141.64

(continued)

Appendix Table 7-3 (continued)
CARE-C occupational therapy episode mean allowed charges of explanatory variables

Variable	Variable range	Count	Mean episode expenditure	SE
Diabetes mellitus	—	58	1,401	152.23
No secondary diagnosis	—	46	996	159.40
ICF function groups (reason for therapy)				
Motor functions	—	363	1,379	74.63
Pain	—	153	1,321	100.87
Mental functions	—	51	2,148	324.51
Proprioceptive and touch functions	—	51	1,586	203.46
Sensory functions	—	30	1,083	204.42
Other body functions	—	79	1,371	222.19
Body functions not reported	—	14	1,616	611.01
ICF structure groups (reason for therapy)				
Lower extremity and spine	—	63	1,516	251.29
Unilateral shoulder/arm/elbow	—	115	1,323	114.47
Unilateral wrist/hand/fingers	—	172	1,277	93.18
General/no specific body location		52	1,525	238.36
Bilateral upper extremity		86	1,710	203.56
Other body structures		67	1,146	107.88
Body structures not reported		59	1,453	274.94
ICF activity groups (reason for therapy)				
Cognitive/communication	—	75	1,520	163.35
Mobility	—	145	1,488	130.95
Daily activities	—	383	1,326	69.72
Activities not reported	—	37	1,795	454.70
Rasch function estimates (0 = low ability; 100 = high ability)	**Rasch estimate range**			
Clinician-observed self-care	0 < Rasch estimate ≤ 40	23	1,731	573.16
Clinician-observed self-care	40 < Rasch estimate ≤ 70	159	1,669	120.23
Clinician-observed self-care	70 < Rasch estimate ≤ 97	95	1,238	110.34
Clinician-observed self-care	Rasch estimate > 97	158	1,051	115.82
Self-reported everyday activities	0 < Rasch estimate ≤ 40	65	1,846	198.30
Self-reported everyday activities	40 < Rasch estimate ≤ 70	233	1,349	103.43
Self-reported everyday activities	70 < Rasch estimate ≤ 97	16	1,045	493.79
Self-reported everyday activities	Rasch estimate > 97	121	1,139	112.10
Self-reported participation	0 < Rasch estimate ≤ 40	96	1,754	167.24
Self-reported participation	40 < Rasch estimate ≤ 70	173	1,325	124.95
Self-reported participation	70 < Rasch estimate ≤ 97	101	1,103	107.94
Self-reported participation	Rasch estimate > 97	65	1,227	186.98
Self-reported life skills	0 < Rasch estimate ≤ 40	11	2,165	433.34

(continued)

Appendix Table 7-3 (continued)
CARE-C occupational therapy episode mean allowed charges of explanatory variables

Variable	Variable range	Count	Mean episode expenditure	SE
Self-reported life skills	40 < Rasch estimate ≤ 70	111	1,551	194.06
Self-reported life skills	70 < Rasch estimate ≤ 97	32	965	190.72
Self-reported life skills	Rasch estimate > 97	281	1,288	77.41
CARE-C individual items				
Number of related surgeries = 0 (reference group)	—	*250*	*1,370*	*106.67*
Number of related surgeries = 1	—	103	1,422	142.98
Number of related surgeries = 2+	—	64	1,229	127.30
Number of related surgeries - missing	—	18	1,177	222.40
Time of most recent related surgery—none (reference group)	—	*232*	*1,367*	*113.63*
Time of most recent related surgery—within 1 month	—	60	1,458	193.41
Time of most recent related surgery—within 1–3 months	—	45	1,266	157.19
Time of most recent related surgery—3+ months	—	79	1,353	134.21
Time of most recent related surgery - missing	—	19	1,066	234.48
Patient feels sad (never, rarely, sometimes, I do not know) (reference group)	—	*233*	*1,349*	*109.81*
Patient feels sad (often)	—	141	1,427	120.42
Patient feels sad (always)	—	54	1,180	140.45
Patient feels sad - missing	—	†	†	†
Pain has effect on activities	—	192	1,426	115.93
Pain has effect on sleep	—	118	1,426	148.94
Pain severity (0–2) (reference group)	—	*136*	*1,320*	*142.49*
Pain severity (3–7)	—	188	1,387	104.64
Pain severity (8–10)	—	71	1,284	184.03
Pain severity - missing	—	40	1,434	224.58
Duration of related health problem—0-1 months (reference group)	—	*84*	*1,343*	*142.83*
Duration of related health problem—1-3 months	—	80	1,218	135.92
Duration of related health problem—3+ months	—	264	1,367	100.78
Duration of related health problem - missing	—	†	†	†
Mobility device—none (reference group)	—	*212*	*1,161*	*75.08*
Mobility device—cane/crutch	—	81	1,428	198.56
Mobility device—walker	—	109	1,674	178.27
Mobility device—orthotics/prosthetic	—	†	†	†

(continued)

Appendix Table 7-3 (continued)
CARE-C occupational therapy episode mean allowed charges of explanatory variables

Variable	Variable range	Count	Mean episode expenditure	SE
Mobility device—wheelchair/scooter full-time	—	44	2,705	391.93
Mobility device—wheelchair/scooter part-time	—	54	1,226	143.45
Mobility device—mechanical lift	—	†	†	†
Mobility device—other	—	15	989	186.00
Mobility device—missing	—	21	992	171.36
Patient has memory difficulty	—	91	1,806	228.42
Patient has communication problem	—	24	1,563	339.69
Patient has swallowing problem		†	†	†
Facility type				
Private practice (reference group)	—	*160*	*1,211*	*100.97*
Assisted living facility	—	49	2,773	397.18
Hospital outpatient department	—	162	1,108	86.17
Comprehensive\outpatient rehabilitation facility	—	64	1,245	130.98
Nursing facility	—	—	—	—
Census division				
South Atlantic (reference group)	—	*116*	*1,401*	*198.64*
New England	—	31	1,220	214.06
Mid-Atlantic	—	110	1,514	110.43
East North Central	—	122	1,307	102.48
West North Central	—	23	901	298.46
East South Central	—	†	†	†
West South Central	—	12	2,343	678.50
Mountain	—	†	†	†
Pacific	—	†	†	†

NOTES:

† = Fewer than 11 cases.

1. ESRD in 2010-2012 - The beneficiary had ESRD any time in 2010, 2011, or 2012.
2. Medicaid in 2010-2012 - The beneficiary had at least one month of Medicaid eligibility during their therapy episode.
3. The count column refers to the number of beneficiaries where that variable = 1. If it is an ordinal/continuous variable, then it refers to the number of people where that variable > 0.
4. ICF is International Classification of Function.
5. Episode: Variable Length Episode with a 60-day terminating clean period.
6. Facility type as identified by CARE providers on the CARE assessment.
7. SE = Standard error of the mean

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims and CARE data.

Programs: PA021

Appendix Table 7-4
CARE-C speech-language pathology episode mean allowed charges of explanatory variables

Variable	Variable range	Count	Mean episode expenditure	SE
Demographics				
Male, age 0 to 64	—	13	2,437	704.16
Male, age 65-74	—	25	2,156	490.67
Male, age 75-84	—	19	2,007	248.24
Male, age 85+	—	†	†	†
Female, age 0 to 64	—	12	1,698	447.06
Female, age 65-74 (reference group)	—	*21*	*1,440*	*281.28*
Female, age 75-84	—	17	2,052	429.30
Female, age 85+	—	†	†	†
Originally disabled	—	†	†	†
Medicaid in 2010–2012	—	33	2,006	322.33
ESRD in 2010–2012	—	†	†	†
Primary diagnosis groups				
Cognitive communication disorders only (reference group)	—	*81*	*2,051*	*197.96*
Swallowing disorders only	—	†	†	†
Cognitive, communication, and swallowing disorders only	—	17	1,891	535.64
No impairment diagnosis	—	17	1,423	365.14
Primary medical diagnosis groups				
Stroke	—	56	2,263	251.43
Neurological, excluding stroke	—	44	1,788	220.17
Miscellaneous diagnosis	—	19	1,188	483.47
No medical diagnosis (reference group)	—	*†*	*†*	*†*
ICF function groups (reason for therapy)				
Mental functions	—	88	2,231	204.36
Voice and speech functions	—	45	1,877	256.57
Other body functions	—	23	1,202	222.81
Body functions not reported	—	12	1,513	370.77
ICF structure groups (reason for therapy)				
Voice, speech, and swallowing	—	52	1,339	194.02
Central nervous system	—	26	2,878	457.11
Other body structures	—	37	1,860	298.83
Body structures not reported	—	35	1,848	245.89
ICF activity groups (reason for therapy)				
Cognitive	—	83	2,233	216.41
Communication	—	79	2,069	201.40

(continued)

Appendix Table 7-4 (continued)
CARE-C speech-language pathology demographic, payment, and comprehensive models of episode allowed charges

Variable	Variable range	Count	Mean episode expenditure	SE
Mobility and daily activities	—	50	2,541	320.06
Activities not reported	—	18	1,128	237.43
Rasch function estimates (0 = low ability; 100 = high ability)	**Rasch estimate range**			
Self-reported life skills	0 < Rasch estimate ≤ 40	†	†	†
Self-reported life skills	40 < Rasch estimate ≤ 70	74	2,026	212.99
Self-reported life skills	70 < Rasch estimate ≤ 97	17	1,947	537.64
Self-reported life skills	Rasch estimate > 97	25	1,336	264.82
Clinician-observed problem solving	0 < Rasch estimate ≤ 40	23	2,290	463.93
Clinician-observed problem solving	40 < Rasch estimate ≤ 70	46	2,552	291.63
Clinician-observed problem solving	70 < Rasch estimate ≤ 97	24	1,328	210.35
Clinician-observed problem solving	Rasch estimate > 97	32	969	153.66
Clinician-observed memory	0 < Rasch estimate ≤ 40	17	1,989	432.79
Clinician-observed memory	40 < Rasch estimate ≤ 70	45	2,610	333.96
Clinician-observed memory	70 < Rasch estimate ≤ 97	34	1,597	207.26
Clinician-observed memory	Rasch estimate > 97	29	943	152.89
Clinician-observed attention	0 < Rasch estimate ≤ 40	19	1,887	370.63
Clinician-observed attention	40 < Rasch estimate ≤ 70	40	2,556	384.12
Clinician-observed attention	70 < Rasch estimate ≤ 97	29	1,745	202.38
Clinician-observed attention	Rasch estimate > 97	37	1,195	183.26
Clinician-observed function voice	0 < Rasch estimate ≤ 40	†	†	†
Clinician-observed function voice	40 < Rasch estimate ≤ 70	21	1,803	397.76
Clinician-observed function voice	70 < Rasch estimate ≤ 97	20	2,248	491.47
Clinician-observed function voice	Rasch estimate > 97	75	1,817	197.71
Clinician-observed speech	0 < Rasch estimate ≤ 40	16	1,413	286.18
Clinician-observed speech	40 < Rasch estimate ≤ 70	14	1,571	306.28
Clinician-observed speech	70 < Rasch estimate ≤ 97	15	2,395	636.19
Clinician-observed speech	Rasch estimate > 97	80	1,905	203.11
Clinician-observed language expression	0 < Rasch estimate ≤ 40	13	1,480	405.00
Clinician-observed language expression	40 < Rasch estimate ≤ 70	24	2,600	493.11
Clinician-observed language expression	70 < Rasch estimate ≤ 97	41	1,970	218.76
Clinician-observed language expression	Rasch estimate > 97	47	1,500	246.51
Clinician-observed language comprehension	0 < Rasch estimate ≤ 40	†	†	†
Clinician-observed language comprehension	40 < Rasch estimate ≤ 70	32	2,469	360.43
Clinician-observed language comprehension	70 < Rasch estimate ≤ 97	39	2,117	319.01
Clinician-observed language comprehension	Rasch estimate > 97	46	1,264	175.94

(continued)

Appendix Table 7-4 (continued)
CARE-C speech-language pathology demographic, payment, and comprehensive models of episode allowed charges

Variable	Variable range	Count	Mean episode expenditure	SE
CARE-C individual items				
Number of related surgeries = 0 (reference group)	—	*73*	*1,689*	*204.27*
Number of related surgeries = 1	—	22	1,769	479.94
Number of related surgeries = 2+	—	22	2,532	303.33
Number of related surgeries - missing	—	†	†	†
Time of most recent related surgery—none (reference group)	—	*69*	*1,683*	*214.98*
Time of most recent related surgery—within 1 month	—	†	†	†
Time of most recent related surgery—within 1–3 months	—	12	2,562	703.82
Time of most recent related surgery—3+ months	—	34	1,949	256.67
Time of most recent related surgery - missing	—	†	†	†
Patient feels sad (never, rarely, sometimes, I do not know) (reference group)	—	*63*	*1,808*	*177.50*
Patient feels sad (often)	—	39	1,666	267.07
Patient feels sad (always)	—	17	2,356	568.80
Patient feels sad - missing	—	†	†	†
Pain has effect on activities	—	22	1,664	441.00
Pain has effect on sleep	—	12	1,581	534.40
Pain severity (0–2) (reference group)	—	*70*	*1,837*	*206.34*
Pain severity (3–7)	—	28	1,863	386.12
Pain severity (8–10)	—	†	†	†
Pain severity - missing	—	20	1,758	326.94
Duration of related health problem—0-1 months (reference group)	—	*15*	*2,181*	*644.85*
Duration of related health problem—1-3 months	—	30	2,223	410.43
Duration of related health problem—3+ months	—	74	1,724	162.62
Duration of related health problem - missing	—	†	†	†
Mobility device—none (reference group)	—	*53*	*2,038*	*273.52*
Mobility device—cane/crutch	—	18	2,027	509.08
Mobility device—walker	—	23	1,973	346.33
Mobility device—orthotics/prosthetic	—	—	—	—
Mobility device—wheelchair/scooter full-time	—	13	1,718	436.29

(continued)

Appendix Table 7-4 (continued)
CARE-C speech-language pathology demographic, payment, and comprehensive models of episode allowed charges

Variable	Variable range	Count	Mean episode expenditure	SE
Mobility device—wheelchair/scooter part-time	—	12	1,856	555.57
Mobility device—mechanical lift	—	—	—	—
Mobility device—other	—	†	†	†
Mobility device - missing	—	12	1,498	347.22
Patient has diet modification	—	22	1,307	263.43
Patient has swallowing assistance	—	26	1,708	370.18
Facility type				
Hospital outpatient department (reference group)	—	*81*	*1,393*	*130.34*
Assisted living facility	—	11	1,659	414.82
Comprehensive\outpatient rehabilitation facility	—	30	3,197	465.56
Private practice	—	†	†	†
Census division				
South Atlantic (reference group)	—	*27*	*1,800*	*275.39*
New England	—	43	2,737	358.25
Mid-Atlantic	—	†	†	†
East North Central	—	25	1,046	205.71
West North Central	—	†	†	†
East South Central	—	†	†	—
West South Central	—	†	†	†
Mountain	—	†	†	—
Pacific	—	†	†	†

NOTES:

† = Fewer than 11 cases.

1. ESRD in 2010-2012 - The beneficiary had ESRD any time in 2010, 2011, or 2012.
2. Medicaid in 2010-2012 - The beneficiary had at least one month of Medicaid eligibility during their therapy episode.
3. The count column refers to the number of beneficiaries where that variable = 1. If it is an ordinal/continuous variable, then it refers to the number of people where that variable > 0.
4. ICF is International Classification of Function.
5. Episode: Variable Length Episode with a 60-day terminating clean period.
6. Facility type as identified by CARE providers on the CARE assessment.
7. SE = Standard error of the mean

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims and CARE data.

Programs: PA021

Appendix Table 7-5
Percentile distribution of Rasch function estimates for episode therapy utilization: CARE-F nursing facility

Rasch function estimates	N	Mean	Minimum	1st	5th	10th	25th	Median	75th	90th	95th	99th	Maximum
Clinician-observed mobility	471	45.10	0.04	0.70	4.70	17.19	31.00	45.00	60.02	70.39	79.51	92.87	99.20
Clinician-observed self-care	454	42.65	0.04	0.04	0.51	10.64	31.28	44.27	56.13	65.79	75.72	95.83	99.97
Self-reported mobility	564	49.44	0.04	0.04	0.04	2.81	28.23	44.50	71.56	100.00	100.00	100.00	100.00
Self-reported wheelchair	552	53.99	0.05	0.05	0.05	0.05	22.21	53.38	93.38	100.00	100.00	100.00	100.00

NOTES:

1. Episode: Variable Length Episode with a 60-day terminating clean period.
2. There are 587 CARE-F nursing facility admission assessments used in the analyses. This distribution does not include assessments with missing Rasch estimates. A categorical variable was used to flag missing values in the regression estimates in order to retain all observations.
3. Rasch function estimates (0 = lowest ability; 100 = highest ability)

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims and CARE data.

Programs: PA021

Appendix Table 7-6
CARE-F nursing facility episode model, mean allowed charges of explanatory variables

Variable	Count	Mean episode expenditure	SE
Demographics			
Age 0 to 64	61	5,377	944
Age 65 to 74 (reference group)	*103*	*2,925*	*334*
Age 75 to 84	171	4,283	466
Age 85+	256	3,100	230
Male	162	4,168	443
Originally disabled	92	3,554	475
Medicaid in 2010–2012	361	3,554	228
ESRD in 2010–2012	15	5,750	1,167
Long term institutionalized	412	3,400	224
Primary diagnosis groups			
Musculoskeletal (reference group)	*94*	*3,714*	*533*
Circulatory (including lymphatic) and pulmonary/respiratory	75	3,906	693
Stroke	63	2,141	248
Parkinson's, other neurological, and swallowing disorders	79	2,883	435
Dementia/Alzheimer's disease	118	3,868	409
Unspecified and miscellaneous diagnoses	100	3,704	560
Multiple etiologies	40	5,094	1,083
No primary diagnosis	22	5,458	958
Secondary diagnosis groups			
Osteoarthritis	171	4,322	429
Osteoporosis, unspecified, and miscellaneous musculoskeletal	233	3,407	315
Circulatory (including lymphatic)	284	3,436	268
Hypertension	333	3,823	307
Diabetes mellitus	146	3,824	357
Pulmonary/respiratory	165	3,541	443
Stroke	47	3,316	654
Parkinson's, peripheral nervous system, and other neurological disorders	141	3,660	401
Dementia/Alzheimer's and other cognitive disorders	102	3,134	417

(continued)

Appendix Table 7-6 (continued)
CARE-F nursing facility episode model, mean allowed charges of explanatory variables

Variable	Count	Mean annual expenditure	SE
Mental health	325	3,626	294
Communication, voice, or speech disorders	139	3,682	450
Swallowing disorders	149	2,560	343
Gait or balance disorder	169	2,757	319
Pain	108	3,003	411
Generalized weakness	197	4,196	391
Vision impairment	89	3,320	528
Unspecified and miscellaneous diagnoses	377	3,484	270
No secondary diagnosis	24	2,840	550
ICF body function groups (primary reason for therapy)			
Motor functions	472	3,868	245
Mental functions	80	5,064	675
Pain	96	4,150	608
Other body functions	111	5,605	795
Body functions not reported	46	3,254	584
ICF body structure groups (primary reason for therapy)			
General/no specific body location	206	4,511	423
Spine	60	4,319	794
Hip and thigh	122	3,743	387
Knee	132	3,798	382
Calf/foot/ankle/toes	105	3,433	419
Shoulder/arm/elbow	124	4,574	423
Wrist/hand/fingers	113	3,780	408
Voice, speech, and swallowing	112	3,051	424
Other body structures	58	6,061	1,189
Body structures not reported	36	5,443	1,067
ICF activity groups (primary reason for therapy)			
Cognitive	100	4,293	616
Communication	28	3,823	595
Mobility	386	4,100	287
Daily activities	294	4,812	342
Activities not reported	56	2,958	486

(continued)

Appendix Table 7-6 (continued)
CARE-F nursing facility episode model, mean allowed charges of explanatory variables

Variable	Count	Mean annual expenditure	SE
Rasch functional ability estimates (0 = low ability; 100 = high ability)			
Clinician-observed mobility			
0 < Rasch estimate ≤ 30	104	3,504	457
30 < Rasch estimate ≤ 60	251	4,181	328
60 < Rasch estimate ≤ 90	106	3,726	502
Rasch estimate > 90 (reference group)	*12*	*2,754*	*1,300*
Rasch estimate - missing	44	3,811	578
Rasch estimate - not assessed	74	1,972	548
Clinician-observed self-care			
0 < Rasch estimate ≤ 30	113	3,885	446
30 < Rasch estimate ≤ 60	261	4,166	305
60 < Rasch estimate ≤ 90	74	3,938	768
Rasch estimate > 90 (reference group)	*†*	*†*	*†*
Rasch estimate - missing	48	3,393	446
Rasch estimate - not assessed	87	1,818	475
Self-reported mobility			
0 < Rasch estimate ≤ 30	188	3,479	346
30 < Rasch estimate ≤ 60	186	3,944	326
60 < Rasch estimate ≤ 90	98	4,120	618
Rasch estimate > 90 (reference group)	*96*	*2,775*	*509*
Rasch estimate - missing	23	4,240	1,087
Self-reported wheelchair function			
Wheelchair not used	117	3,306	457
0 < Rasch estimate ≤ 30	146	3,079	271
30 < Rasch estimate ≤ 60	169	4,131	450
60 < Rasch estimate ≤ 90	102	4,219	575
Rasch estimate > 90 (reference group)	*22*	*2,116*	*412*
Rasch estimate - missing	35	4,118	804
Additional function items			
Diet modifications needed	217	3,310	369
Rarely/never/sometimes understands verbal content	200	3,084	333
Cognitive function mildly impaired, not impaired, or not reported (reference group)	*324*	*3,750*	*284*

(continued)

Appendix Table 7-6 (continued)
CARE-F nursing facility episode model, mean allowed charges of explanatory variables

Variable	Count	Mean annual expenditure	SE
Cognitive function moderately impaired	117	3,428	418
Cognitive function severely impaired	150	3,595	409
CARE-F individual items			
Admitted from skilled nursing facility (reference group)	*257*	*2,925*	*315*
Admitted from long term nursing facility	250	4,034	272
Admitted from other facility	84	4,712	743
Acute care hospital use in the past 2 months	50	4,826	831
History of surgery for the presenting condition	28	4,344	1,034
Onset of presenting condition within past 3 months	209	4,033	416
Prior self-care function needed assistance	489	3,725	232
Prior mobility function impaired	307	3,977	281
Wheelchair use prior to presenting condition	418	3,389	198
Two or more falls in the past year	176	3,882	390
Expression of ideas/wants (rarely/never, frequently/some difficulty)	201	3,072	340
Inattention	184	3,756	345
Disorganized thinking	148	3,446	313
Altered level of consciousness/alertness	124	3,420	367
Cues for swallowing	216	3,289	265
Cognitive problems present	90	5,729	600
Respiratory impairments present	113	4,651	717
Endurance impairments present	393	3,876	278
Bladder/bowel impairments present	355	3,445	248
Felt sad in past two weeks (never, rarely, sometimes, unable to respond) (reference group)	*433*	*3,287*	*212*
Felt sad in past two weeks often	60	3,936	786
Felt sad in past two weeks always	27	5,384	1,402
Felt sad in past two weeks missing	71	4,940	692
Pain affects sleep	93	5,553	781
Pain affects activities	125	5,256	637
Mobility device—walker	158	4,386	507
Mobility device—wheelchair/scooter full-time	235	3,349	295

(continued)

Appendix Table 7-6 (continued)
CARE-F nursing facility episode model, mean allowed charges of explanatory variables

Variable	Count	Mean annual expenditure	SE
Mobility device—wheelchair/scooter part-time	93	3,696	696
Mobility device—other	73	3,070	492
Census division			
South Atlantic (reference group)	*76*	*2,916*	*485*
New England	49	7,149	1,443
Mid-Atlantic	163	1,315	138
East North Central	102	3,763	440
West North Central	35	2,234	310
East South Central	132	5,785	406
West South Central	†	†	†
Mountain	19	2,610	823
Pacific	14	6,610	1,279

NOTES:

† = Fewer than 11 cases.

1. Originally Disabled - The beneficiary's original reason for entitlement was disability, among beneficiaries currently entitled by age.
2. Medicaid in 2010-2012 - The beneficiary had at least one month of Medicaid eligibility during their therapy episode.
3. ESRD in 2010-2012 - The beneficiary had ESRD any time in 2010, 2011, or 2012.
4. Long Term Institutionalized - If the beneficiary had a 90-day MDS assessment at any point during 2011, then they were considered long-term institutionalized.
5. The count column refers to the number of beneficiaries where that variable = 1. If it is an ordinal/continuous variable, then it refers to the number of people where that variable > 0.
6. ICF is International Classification of Function.
7. The reference group (Admitted from skilled nursing facility) includes 242 beneficiaries admitted from a skilled nursing facility and 15 beneficiaries with missing admitted from facilities.
8. Episode: Variable Length Episode with a 60-day terminating clean period.
9. SE = Standard error of the mean

SOURCE: RTI analysis of 2011-2012 Outpatient Therapy Medicare Claims and CARE data.

Programs: PA021

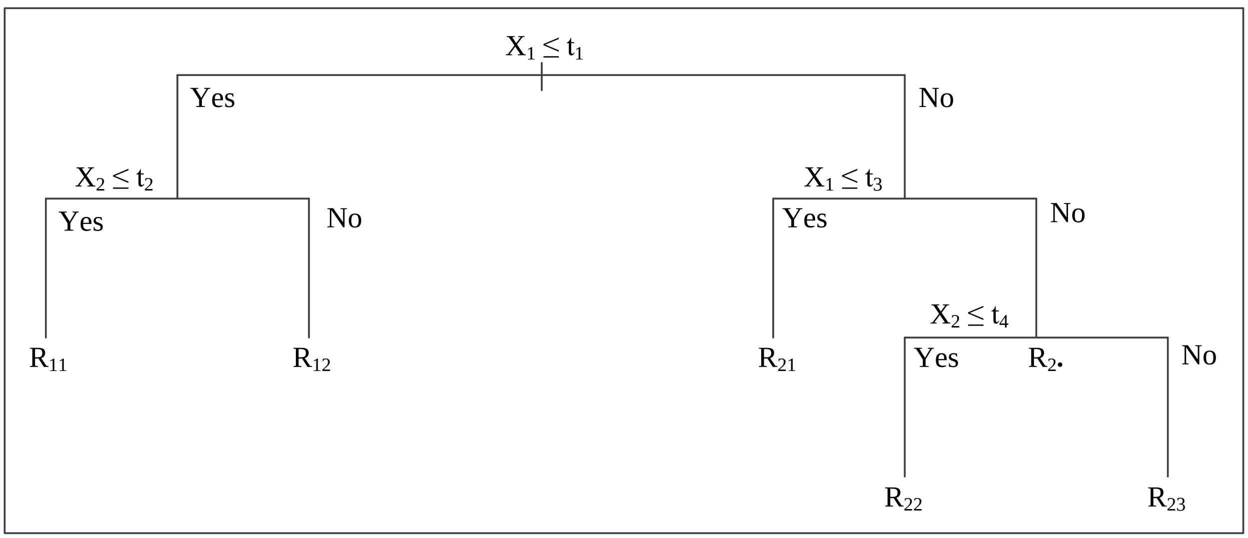
APPENDIX H:
CART PRIMER

[This page intentionally left blank.]

Classification and Regression Tree (CART) Methodology Explanatory Variables

CART uses recursive binary partitioning to develop regression trees. **Appendix Figure 8-1** illustrates this process through a hypothetical example. Two continuous variables, X_1 and X_2, are used to partition observations on a dependent variable (e.g., Medicare expenditures) contained in the root node. (The “root node” is the entire sample and “node” means “group of beneficiaries defined by the CART binary splitting algorithm,” i.e. candidate case-mix groups.). The root node is partitioned by X_1 at t_1—this is a binary split as the root node is subdivided into only two sub-regions at a time. Values of the root node associated with $X_1 \leq t_1$ are shown as the first branch to the left while those values of the root node associated with $X_1 > t_1$ are shown as the first branch on the right. The first branch on the left is then further partitioned (hence the term recursive) by X_2 at t_2 into R_{11} and R_{12}. The first branch on the right is then further partitioned by X_1 at t_3 into the R_{21} and $R_{2\cdot}$ nodes. Finally $R_{2\cdot}$ is then further partitioned by X_2 at t_4 into R_{22} and R_{23}. Overall, the root node is sub-divided into five sub-regions: R_{11}, R_{12}, R_{21}, R_{22}, and R_{23} and are the terminal (final) nodes in Figure 8-1.[45] Each sub-region is characterized by the mean and variation of the observations comprising it.

Appendix Figure 8-1
Regression tree based on partitioning of root node by X_1, and X_2



In the preceding example, X_1 rather than X_2 was first used to partition the root node. And, of all the possible values of X_1, t_1 was used to create the first partition. The way CART makes these choices is as follows. Starting at the top of the tree (root node), CART tries every possible splitting variable contained in the set of candidate explanatory variables. If an explanatory variable is continuous, CART considers splits at every value of the variable. CART chooses the best split by determining which split provides the best improvement to the explained sum of squares of the dependent variable (therapy expenditures), that is, the split that best improves the model fit. It partitions the data into right and left “child nodes.” It then repeats these steps for

[45] This example is due to Hastie, et al. (2009), pp. 305-6.

each successive node. CART continues to split the data until all observations in each child node have the identical distribution of predictor variables or through an external constraint set (e.g., minimum number of observations—beneficiaries—per node) by the user. When an explanatory (predictor) variable has a missing value for a given observation, CART uses surrogate rules to classify (split) the dependent variable. Surrogates mimic the splitting ability of the explanatory variable. A surrogate should also, to the extent possible, match the primary splitter on the specific cases that go to the left child and right child nodes. The surrogate rule is often based on a set of alternative explanatory variables rather than just one alternative explanatory variable.

The best way to explore the data is for CART to use a learning sample and then see how well the predicted structure fits a test sample. However, as is the case for the CARE-C data, there are often too few observations to create separate learning and test samples. Consequently, the entire data set is used for learning. This will result in a maximal tree with too many terminal nodes (over a thousand in some of our early runs). One reason there are too many terminal nodes is that CART is fitting a structure to the actual data and is thus, subject to “over-fitting” the data.

To avoid over-fitting the data, CART uses cross-validation to prune the maximal tree. The maximal tree will always fit the learning data better than any of the smaller trees. Using *k*-fold cross-validation to find the statistically “optimal” tree, CART divides the data into a number, *k*, of mutually exclusive subsets (typically 10) of approximately equal size. It then drops each subset in turn, builds a tree using data from the remaining subsets, and uses it to predict the responses (expenditures) for the omitted subset. CART then calculates the estimated error for each subset (e.g., for a sums of squares regression tree, the error is the sum of squared differences of the actual and predicted expenditures), and then sums over all subsets. It repeats the process for each size of the tree. The statistically optimal tree is the tree with the smallest cross-validated estimated error rate.

CART scores each tree by an estimated error rate it calls the “re-substitution error.” CART sets the re-substitution error equal to one for the root node and then calculates the re-substitution error for each subsequent tree produced relative to the root node. This *re-substitution relative error* can be converted into a conventional R^2 by subtracting the re-substitution relative error from one. Thus the terminal node’s conventional R^2 is equal to zero, while the maximal tree has the highest value. A similar set of calculations are performed during the cross-validation process, resulting in a cross-validated relative error and cross-validated R^2 for each tree. The tree with the lowest cross-validated relative error is called is the optimal tree though it may not be so for exploratory uses.