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Post-Acute Care Payment Reform Demonstration: Final Report Volume 3 of 4

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Post-Acute Care Payment Reform Demonstration: Final Report

Volume 3 of 4

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CONTENTS SUMMARY

This document represents Volume 3 of 4 of the final report for the Post-Acute Care Payment Reform Demonstration (PAC-PRD). This project was conducted by RTI International under contract with the Centers for Medicare & Medicaid Services. The report has 12 sections, which are divided into four volumes.

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SECTION 5
FRAMEWORK FOR ANALYSIS

This section provides the conceptual framework for understanding the analytic approach in the next six sections. As discussed in Section 3, the Continuity Assessment Record and Evaluation (CARE) tool was designed to build on the current scientific knowledge base for case-mix measurement, including the approaches already used in the Medicare program's prospective payment systems (PPSs). All four post-acute care (PAC) PPSs use a case-mix measurement approach that measures patient complexity in terms of medical conditions and treatment procedures; three of the PPS (inpatient rehabilitation facilities [IRFs], skilled nursing facilities [SNFs], and home health agencies [HHAs]) also measure functional status and cognitive status to assess the patient's complexity at admission and to varying degrees during the treatment period.

This framework builds on the existing approaches for defining patient complexity to explain variation in costliness and outcomes. Much of the literature in this area has focused on medical, functional, and cognitive status as key drivers explaining resource use and outcomes (Campbell, Seymour, and Primrose, 2004), and these are the primary drivers in the Medicare PAC payment systems. This section of the report discusses the analytic framework used and the analytic variables constructed from the CARE items to control for patient complexity in examining discharge destinations and predicting routine/therapy resources intensity, functional change, and hospital readmission outcomes.

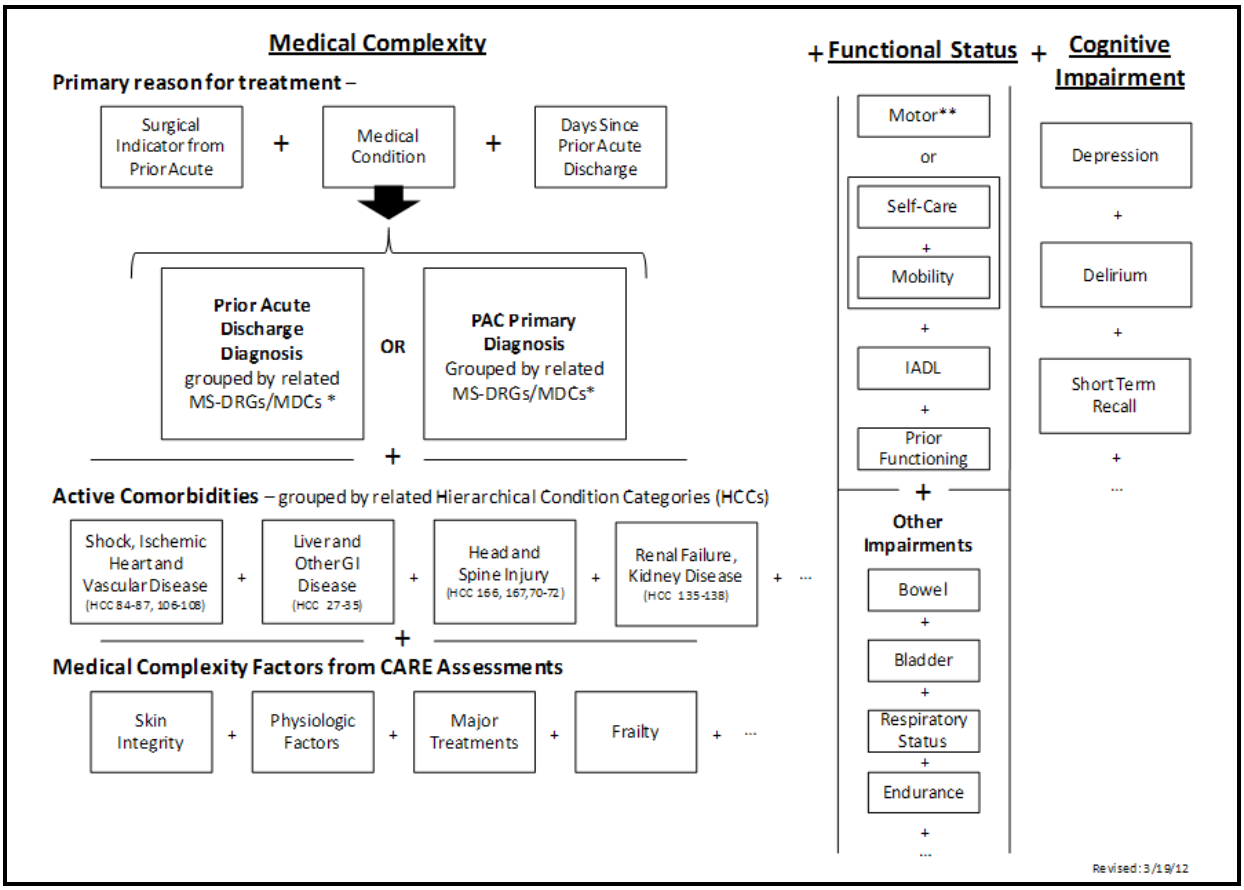
5.1 Development of a Case-Mix Classification Framework

One approach to thinking about patient clinical complexity is to examine patient severity within theoretically important subdomains and subsequently evaluate how these subdomains interact to create a complete picture of a patient. Building on the current case-mix measurement approaches for patients treated in PAC, we examined three domains of patient acuity: medical, functional, and cognitive status. Each of these components of health status is important for defining case-mix criteria and may affect the patient outcomes independently or by interacting with other patient characteristics. As the developers of the early Diagnostic Related Groups (DRG) system noted, a case-mix system should include "all available patient characteristics which … would be expected to consistently affect resource intensity" (3M, v.21).

Our approach assumes that each of these three domains may potentially predict resource needs and outcomes because they define severity of illness, difficulty of treatment, type of intervention needed, and the expected volume and types of routine or therapy resource intensity. This framework was used to guide the selection of patient acuity measures in the following sections of the report to test the extent to which each domain is important in each setting and to identify the best measures of each concept in terms of their potential contribution to explaining resource intensity and treatment outcomes. **Figure 5-1** shows the classification schema underlying our approach, which is described below.

Each of these three domains is currently represented in at least one of the four post-acute care (PAC) payment systems as factors that predict variation in resource intensity. Medicare classification systems vary in the extent of their recognition of medical, functional, and cognitive

Figure 5-1
CARE case-mix classification schema



*A modified MS-DRG/MDC system was used in the analysis (e.g., the neurologic major diagnostic category (MDC 01) is subdivided into neurologic, stroke (MS-DRGs: 020, 021,022,061-066), neurologic, surgical (MS-DRGs: 024-042), neurologic, medical (MS-DRGs: 052 -060, 067-103). Similarly, the HCC classification was modified slightly for use in this project.

** The motor scale combines the self-care and mobility scales that are listed separately in this section as well.

NOTE: Where the complete list of factors under each category is not presented in this chart, this is indicated by the notation: '+ …' .

factors in their populations. For example, the LTCHs' PPS uses Medical Severity-Diagnostic Related Groups (MS-DRG) to classify patients based on medical complexity. The MS-DRG system uses ICD-9 codes to define the primary condition, whether they were medical or surgical in nature, and assign a severity of illness level based on complicating comorbidities, because all those factors affect the relative complexity or costliness of patients at that level of illness. Although cognitive status may be impaired, it is generally assumed to affect the costliness of nursing care in each diagnostic group in a consistent manner and is not measured separately.

Within the MS-DRG system, the effect of a limited number of the cognitive conditions has been recognized as varying within a case-mix group. These specific conditions are indicated

as a complicating condition by including an ICD-9 code for the condition in the severity adjustment (e.g., Alzheimer's Dementia w/Behavioral Disturbance as a complicating severity factor within a DRG). Functional status is not used in classifying LTCH patient complexity for the purposes of payment, although many LTCHs provide specialized therapy services in addition to the medical treatments, and these effects may be variable within MS-DRG groups. This suggests separate recognition of function may be valuable for improving the predictive power of LTCH case-mix classification systems.

The IRF payment policies use medical, functional, and for some cases, cognitive factors to classify a patient's complexity. The primary reason for treatment is defined by diagnosis/impairment codes that specify the medical condition. In this system, the primary reason for treatment is used to classify the case, and the comorbidities are used to adjust payments. In addition to medical status, functional status and, for some cases, cognitive status are also used to assign patients to case-mix groups in the IRF PPS.

Similarly, SNF payment policies also use medical, functional, and cognitive factors in the resource utilization groups (RUGs) case-mix system. The primary reason for treatment is less important than the total constellation of medical factors in this setting. SNF medical conditions are identified by an indicator of whether a patient has certain medical conditions currently affecting treatment without distinguishing between primary and secondary diagnoses. Medical complexity is further refined by information on the presence of other medical factors such as pressure ulcers and the need for ventilators. Functional status also is reflected in the case-mix group assignment in SNFs and is based on hours of therapy provided. In addition, cognitive status is taken into account in the SNF system.

HHA policies also use medical, functional, and cognitive factors in their case-mix system. HHAs must report both primary reason and comorbid conditions using ICD-9 codes. HHA case-mix adjustment includes large groupings of medical conditions, some based on the primary diagnosis only, while others are based on all diagnoses listed. Like the SNF policies, medical conditions are further identified by additional complications such as pressure ulcers and other factors. Both HHA and SNF coding systems may use a procedure (or a V code) as the primary reason for admission. Like the SNF PPS, the HH PPS includes a measure based on the therapy services provided in their calculation of therapy payment rates.

5.1.1 Medical Complexity

Defining medical complexity in a consistent manner is key to understanding the extent to which severity drives resource use. First, as shown in Figure 5-1, the medical complexity domain includes patient conditions, both primary and comorbid, in addition to such factors as skin integrity, physiologic factors, major treatments, and measures of patient frailty. Medical complexity is relevant to all patients receiving Medicare services. For all the domains, including medical complexity, the impact of the individual components within each domain is tested rather than creating a composite measure of medical complexity.

As described above, each of the current PPSs have their own approach for including diagnoses or conditions. For example, some PPSs require identification of the primary diagnosis along with the comorbid or complicating conditions, while others do not distinguish between

primary and secondary conditions in defining the patient's medical complexity. A more complete discussion of how diagnosis information is used to derive a measure of "primary reason for treatment" is discussed in the next section.

A major area of concern with developing a measure of primary reason for treatment is deciding to what extent this measure should be defined by diagnoses in the initiating hospital or by diagnoses at the PAC setting. Medical condition will be related to the types of services that a patient will need in PAC, in addition to prognosis and severity. Defining the patient's condition is more complex in PAC than in hospital admissions. To understand the severity of the PAC case, certain pre-PAC admission medical factors must be considered, including whether the patient was admitted directly to PAC from a hospital and, if so, whether they had surgery in the hospital. The majority of cases treated in PAC sites initiated their episode with a prior hospital admission, although the reason for the hospital admission is not necessarily the same as the reason for PAC admission. Classification of PAC patients by medical condition should take into account both the reason for PAC admission and for the preceding hospitalization if the PAC episode initiated with a hospital stay. The medical condition listed as the reason for PAC services will frequently be closely related to the reason for the preceding hospitalization, but it may also be the case that a procedure code in the preceding hospital stay condition may be very important for identifying the type of precipitating medical condition.

Comorbidities in the PAC admission are also complex to define. Comorbidities important to PAC services are very frequently chronic illnesses that potentially affect the treatment needs in both the hospital and PAC setting. Other complicating conditions that occurred in the hospital, such as pressure ulcers, also have a high likelihood of being present in the PAC setting because the two services are usually sequential with very few, if any, intervening days between discharge from the hospital and admission to the PAC setting (Gage, Morley, Smith, et al., 2009).

Another aspect of medical complexity is whether the patient is receiving major treatments such as dialysis or ventilator use. Although receipt of major treatments may be highly correlated with severity and increased costs, some treatments, such as indwelling catheter use, are not ideal measures of medical complexity because they are resource based and potentially "gameable" and may increase in frequency in response to financial incentives. Less discretionary services, such as hemodialysis, are less likely to be initiated by the provider without indisputable need. A preferred measure is of the patient's condition that requires the resource, rather than the resource itself. As discussed in Section 3 describing the CARE tool, the major treatments targeted for collection were ones that are less discretionary in nature. Including nondiscretionary treatments that require more intensive nursing or physician care can still be helpful in understanding expected resource variation. Some of these are currently reflected in the MS-DRG system or RUGs system, although the items are collected in different ways. The IRF PPS incorporates these types of factors in the payment tier adjustment.

Physiologic or other biologic factors such as HbA1c levels and other laboratory values can be valuable in understanding severity of illness. Their inclusion in payment models would be less likely to create incentives for providers to provide unnecessary services, though it should be noted that including some physiologic factors could encourage unnecessary invasive or expensive testing. Physiologic factors were also included to see if resource measures included in

the form of major treatments could be replaced with certain physiologic measures of severity, an approach that is less gameable and preferable for payment policies.

Another potentially important component of the medical domain is integumentary status. Skin integrity conditions are used in most of the PPSs, although how the concept is measured in each system varies. Presence of skin ulcers and wounds can complicate treatment, affecting staffing needs, resource use, and patient outcomes in any setting.

5.1.2 Functional Status and Impairments

The second domain in this classification schema (Figure 5-1) is function, which was broken into two components: functional status and impairments. Separating the function domain from the medical domain, which may specify a physical rehabilitation condition as the primary diagnosis, allows one to measure the severity of functional limitations and how their improvement is related to treatment. Goals of treatment in PAC frequently include improvement in functional status (e.g., providing physical and occupational therapy to a patient to regain mobility or independence in activities of daily living so a patient can return to their prior living situation). Functional status and impairments at admission can directly drive resource utilization, patient length of stay, and discharge destination and also can affect patient risk for adverse outcomes, such as pressure ulcers. Functional improvement will be complicated by medical conditions and by premorbid functional status.

Impairments can be a key aspect of a patient's functional ability. Multiple types of impairments were assessed in the CARE tool, as described in Section 3, and include impairments in bowel and bladder management, swallowing, expression, sight and vision, ability to bear weight, grip strength, endurance, and respiratory status. Physical impairments reflect a reduction in one's ability in physical functioning, but are not direct measures of functional abilities. However, the presence of these impairments will affect the level of staff intensity required to care for a patient and can also affect patient outcomes.

Functional status scales were developed to measure level of independence across three subcomponents: self-care, mobility, and instrumental activities of daily living (IADLs). Each of these scales was tested in the analyses detailed in the subsequent sections to see if they had separate, independent effects on discharge destination, outcomes, or resource utilization. Additional analyses were conducted with these separate subscales on subsets of patients based on primary diagnosis. These models tested whether the effect of function on patient outcomes differed depending on the patient's primary condition (i.e., a patient with a lower limb amputation may have no deficits in self-care, while their mobility may be highly impaired). Measuring these components separately will allow these sorts of differences to be addressed in measuring resource use and outcomes, particularly for different patient populations. These subscales were found to be highly correlated when used to predict resource utilization and readmission, so a fourth scale was also tested—the motor scale, which combines the self-care and mobility scales into a single scale. The IADL scale was not included in final models because the scale largely only differentiated among patients in HHAs who were able to perform the more difficult CARE items that comprise the IADL scale. The development of the functional scales is described in greater detail later in this section.

5.1.3 Cognitive Status

Last, cognitive factors may play a complicating role in predicting resource intensity or outcomes because they reflect understanding, memory, or other problems that may impede medical or functional treatments related to the patient's ability to understand the directions being given. Additionally, patients who may be verbally or physically abusive to self or others may require additional staffing. For example, an inpatient who is pulling his or her IV lines will need more monitoring than a patient who is not. Similarly, a brain injury patient may need additional monitoring because his/her cognitive deficits may lead to concerns for safety and thus greater need for staff supervision. Mood disorders (e.g., depression) are also important measures of cognitive ability. Patient mood may play a role particularly in the case of patients needing therapy because depression can complicate treatment by affecting patient motivation and ability to participate in treatment. These types of issues underscore the need for a conceptual framework that is comprehensive, using standardized items that can be measured across settings and patient populations, but does not require all CARE items for every patient.

Cognitive status items are already included in the IRF and SNF PPSs. Cognitive factors may be less relevant for setting payment for HHA patients, but it may be a consideration in admitting patients to home health care or explaining variation in the outcomes achieved within home care; patients with cognitive deficits may be less likely to be admitted to home health care because of increased potential for harm.

5.2 Defining More Complex Concepts: An Operational Approach

As mentioned above, several of these concepts are more complex to operationalize. This section discusses our approach in more detail for defining patients' medical conditions, both primary medical condition and comorbidities, in addition to our approach for measuring patient functional status.

5.2.1 Medical Conditions

Primary Reason for Treatment. We considered multiple approaches for defining the primary reason for treatment. Typically, in each setting, the reason for treatment is based on four factors: 1) the reason for requiring treatment during this spell of illness, in particular, diagnoses related to their immediate prior service use or reason for prior hospital stay, 2) the type of chronic condition underlying the acute event, 3) the reason for admission to a specific care setting, and 4) any complicating or comorbid conditions that need to be monitored or treated while treating the primary condition. For the purposes of this analysis, we created a primary reason for treatment, which classified patients into one mutually exclusive category based on the diagnosis at the preceding hospital stay or, if no hospital stay occurred within the appropriate observation window, based on diagnosis in the PAC setting. If the primary reason for admission to the PAC setting is a different type of condition than the reason for the index hospitalization, this is taken into account through inclusion of the PAC diagnosis in the calculation of comorbidities. All secondary conditions on the prior acute and current PAC claim are considered candidates to be assessed as active comorbidities. The specific measurement of comorbidities is discussed in greater detail later in this section.

One issue in identifying why a person is being treated is that the current PPSs use different methodologies to define a medical condition. Although ICD-9 codes are useful for specifying the exact problem for the purposes of treatment, they are too small a unit for constructing payment groups. Our objective in formulating the primary diagnostic aggregation we propose below is to develop exhaustive sets of related conditions appropriate for understanding patients with similar resource utilizations and courses of illness in PAC settings.

We propose to build on the existing science in the medical communities and use the existing logic structures for aggregating ICD-9 codes. To do so, we suggest that because the treatment of ICD-9 codes in payment systems have been developed and modified over the years by physician experts focusing on aggregating ICD-9 codes into similar, related condition groups we should build on that expertise. The intention is to reflect back toward the acute DRG diagnostic classification while building on and incorporating diagnostic elements from the legacy SNF, IRF, HHA, and LTCH classifications. For all settings, one important observation is in considering the level of aggregation of diagnoses or level of specificity that is needed to define the concept of primary condition to identify groups that are relatively homogenous in terms of resource use.

Our approach built on the current systems for addressing diagnoses in the five settings. Acute hospitals and LTCHs use ICD-9 codes that are aggregated into MS-DRGs. The MS-DRG system uses the ICD-9 as a building block to specify groups of diagnoses associated with surgical or medical treatments. A worthwhile feature of this system is that the DRG-based system identifies whether the reason for treatments began with a surgery. At the same time, although the level of specificity present in the MS-DRG system is appropriate for the settings for which it was created, it may be overspecific for identifying the types of case in PAC settings.

In every system, the manner in which diagnosis is incorporated in the payment system influences both what is coded and how it is coded. The IRF system uses ICD-9 codes grouped into categories designated as impairment group codes. An important feature of how diagnosis is examined in IRFs is that it includes information identifying the primary reason for treatment as the underlying or etiologic condition precipitating this episode of care.

SNF PPSs and home health PPSs use condition indicators that were considered to be the appropriate level of aggregation of clinical conditions for these populations because many factors in addition to the medical diagnosis affect use and outcomes in these two groups. The home health PPS condition indicators, assessed at admission, are derived from ICD-9 codes, although they may reflect codes that are not used in the other settings such as V-codes. The SNF PPSs, to the extent they use condition information, base it on condition flags on the MDS, which are more aggregated than individual ICD-9 codes. In addition, ICD-9 codes are reported on the SNF claim, but because payment is not based on this information, it may not necessarily be completed by a professional coder.

Taking these issues into account, we present the following approach for classifying the type of medical conditions being treated. We are using a standard building block to unify classification across settings and encourage greater service equity and coordination. The MS-DRG represents the building block from which primary medical, surgicals or rehabilitative diagnoses are aggregated into groupings of clinically related diagnoses.

We proposed a combination of medical condition information obtained from the prior hospital claim and from the current PAC claim to define the primary reason for treatment. First, we considered prior hospitalization discharge diagnoses for every PAC admission and the diagnoses on the PAC claim corresponding to the CARE assessment. The prior hospitalization reason is important in understanding the medical complexity of the PAC patient and allows identification of patients whose reason for hospitalization was surgical or medical. In particular, using the prior acute hospitalization allows identification of patients with recent acute events, such as stroke and acute myocardial infarction (AMI) that may be important factors. It also allows identification of patients who have had recent orthopedic procedures, such as joint replacement, that are particularly relevant to subsequent need and intensity of PAC services but that may be difficult to identify on PAC claims because of current coding practices. And further, it provides a standard approach to coding that reduces the difficulties in using PAC claims data for these purposes. In creating the variable primary reason for treatment, we used the hospital diagnosis to classify the patient for patients with an acute stay within 100 days prior to their CARE stay. For patients that did not have an acute stay within 100 days, we used the medical diagnoses from the PAC claim.

Regardless of whether the major reason for PAC treatment came from the prior acute discharge diagnosis or the PAC claim, we used the same strategy for aggregating diagnoses into meaningful groups to allow prediction of our dependent variables. With the input of our clinical experts, we evaluated the current classification strategies for grouping medical conditions including the Major Diagnostic Categories (MDCs), which classify diagnoses by major body systems, and the MS-DRGs, which allow for more granular differentiation of patients within each MDC. A third system we considered was the hierarchical condition categories (HCCs), which was particularly useful for classifying PAC patients' diagnoses because the HCCs are not dependent on surgical or procedure codes to group patients. Our objective was to create a set of categories that were clinically meaningful in PAC settings that group patients of similar severity and resource needs, while taking into account sample size issues and current coding practices.

These considerations lead to using the set of conditions groupings in **Table 5-1** to identify the *underlying reason for treatment* in each setting. The classification system is primarily based on grouping ICD-9s into MDCs but uses the information from the MS-DRG and the specific ICD-9s to further specify cases if warranted. Reasons to subdivide MDCs include the need to distinguish between cases with medical or surgical diagnoses in the prior acute hospital stay. Some MDCs were reclassified based on whether a condition was major or minor. Comorbidity severity indicators generated by the MS-DRG grouper were not used because we are using the more specific CARE items and comorbidities from the PAC setting to define medical severity.

For MDCs that are not prevalent in the PAC population (e.g., 02 = diseases and disorders of the eye), we combined MDCs into two larger categories of "other medical" and "other surgical." Other types of cases that are highly prevalent in the PAC populations, such as stroke or chronic obstructive pulmonary disease (COPD), were broken out within their MDC. In Table 5-1, the first column shows the variable name or condition category name used in our models, the second column shows the MDC, and the third column shows the MS-DRGs included in that category. For example, we subdivided the Neurologic MDC (01) into three groups: stroke, "surgical," and other "medical." The respiratory-diagnosis-related groupings include

MDC (04) and the Pre-MDC category of tracheostomy. These conditions are divided into four groups: ventilator, surgical, COPD, and nonventilator, non-COPD medical categories. COPD is its own category ("Respiratory, COPD") because of its high prevalence in PAC. We also included a separate category for Pre-MDC MS-DRGs for ventilator and tracheostomy ("Respiratory, Ventilator, and Tracheostomy") because of their distinctness as a cost group. Cardiovascular conditions were subdivided by whether they were vascular or cardiac, surgical, or medical and included a more common, nonspecific "general" category composed of diagnoses such as atherosclerosis, hypertension, and chest pain. Orthopedic diagnoses were split into minor and major surgery, spinal, and minor and major medical categories. For infections, in addition to splitting out medical and surgical diagnoses, septicemia diagnoses have their own category. Major organ transplants were grouped together in a "Transplant" category, while gastrointestinal (GI) and hepatobiliary MDCs (06 and 07) were aggregated into larger categories that cut across the two MDCs, resulting in major and minor surgical, and major and minor medical groupings.

Active Comorbid Conditions. For each model, we tested whether there were key comorbid conditions active in the current PAC stay that affected the predicted outcomes. To identify these active comorbid conditions, we used the secondary diagnoses from the prior acute claim and all diagnoses from the PAC claims. These diagnoses were grouped using HCC logic that had been designed to predict program costs for beneficiaries enrolled in the capitated Medicare Advantage (MA) plans. The grouper was used to predict readmissions and mortality for quality measures as well. For these analyses, we used the diagnoses on the concurrent claims. The HCC methodology in the MA program uses the retrospective methodology to predict cost in the upcoming year based on diagnoses in the prior year. Both retrospective and concurrent HCCS have been used in this study and in prior work as a proxy for complexity and as a predictor of service utilization.

Comorbidity indicators were coded based on the diagnoses on the claim associated with either the prior acute stay or the stay for which the CARE data were collected. They were classified based on aggregations of HCCs that were slightly recategorized for the purposes of this analysis. The objective of the HCC recategorization, as with the primary reason for treatment, was to identify clinically meaningful groupings of related diagnoses predictive of our dependent variables and to optimize groupings to fit PAC populations, while taking into account small sample sizes. Given small cell sizes related to specific conditions in our sample, it was necessary in some cases to group conditions into larger categories. We aggregated clinically similar HCCs and focused particularly on grouping markers of more severe patients where possible.

Table 5-2 shows the final set of comorbidity groupings tested in our models in the first column and their component HCC categories in the second column. For example, the "cellulitis" grouping combines HCC 120 Major Eye Infections and HCC 164 Cellulitis, local skin infection. In some cases the HCCs, such as depression, were already being captured by items on the CARE tool; therefore, we did not include them separately as comorbidities in our models. We also excluded very prevalent, nonspecific HCCs such as Rehabilitation (HCC194). We hypothesized that with larger sample sizes more refined categories could be built on these HCCs that would allow one to break out the more severe categories into their own categories or to combine these markers with other CARE items to identify types of patients with constellations of related characteristics that have similar resource needs and outcomes.

In addition to the reconfigured HCC groupings, we created a single comorbidity index for the resource intensity index analysis sample (Sections 9 through 11) that was based on the more specific HCCs but was not identical to the current system. The estimated model used 87 HCC groups as predictors. The weights used were based on the version of the HCC model developed for predicting costs in the same year and based on secondary diagnoses reported in the acute hospital claim. The nondiagnosis component of the HCC score was not used in the creation of the comorbidity index. Instead, age, gender, and Medicaid status were examined separately. The calculation of the comorbidity index is additive. If any diagnoses were reported that were in a model HCC group, the total index for that beneficiary was incremented by the coefficient of that group. An index was created by dividing all the cost estimates by mean costs, resulting in the national average Medicare beneficiary having a comorbidity index of 1.0.

5.2.2 Functional Measures

Unlike medical conditions, such as pressure ulcers, functional status is difficult to directly observe in a consistent manner. As a result, functional status has been traditionally measured using a combination of several items to measure the concepts of self-care or mobility. When multiple items are used, it is important they are tested to determine whether they are all working together to measure the same concept, that is, does each item contribute meaningfully to document the concept of self-care or mobility. The following analysis suggests they do.

Within the CARE tool, function is represented through a series of items assessed using a 6-point rating scale that captures the concept of need for assistance, from independence to dependence where dependence is based on how much help a patient needs to complete everyday activities. This is consistent with existing Centers for Medicare & Medicaid Services (CMS) measures of function that capture a similar concept. The rating scale used in the CARE items describes how much help from a caregiver must be available for this person to complete everyday activities. This type of scale is a measure of how much skilled care needs to be available while a person is in PAC and should also be strongly related to support needs at the discharge location.

The current IRF payment system uses a single motor function scale that primarily measures physical disabilities. For example, the motor score in the FIM®-based IRF characterizes a patient's functioning on 12 physical activities, which was developed and verified by applying Rasch and classic analytic approaches (Stineman, 1996). This parallel use of both classical psychometric analyses along with Rasch techniques is being used increasingly in scale construction and measurement today (Jette, 2008) and is reflected in our current work on the CARE tool.

Within the CARE tool, functional status is conceptualized in three domains: self-care, mobility, and IADLs. The items chosen for collection were taken to create a tool with sufficient range of functional status to measure both very disabled and quite able individuals, capture change from admission to discharge, and at the same time not be overly burdensome to clinicians to complete.

Our approach is to maximize both discrimination and predictive power by dividing the single motor scale into two parts, mobility and self-care, using the CARE instrument items. The

two-subscale approach is consistent with the current literature, which suggests that the use of two scales will improve differentiation among patients with different types of impairments. Mobility and self-care scales have been used in prior work published by Haley, Jette, Coster and colleagues (2002) and also has clinical plausibility. Although not currently included in the IRF classification, mobility and self-care subscales have also been identified within the FIM® motor scale, which is a multilayered scale. Specifically, these form finer dimensions that are nested within its broader motor score (Stineman, 1997). The decision to use one layer over another depends on the question being asked. If the intent is to approximate total disability in one large metric, then more aggregated scales are appropriate, but details about the disability are obscured. Different types of conditions have particular effects on body functions, resulting in distinct patterns of disability. Self-care skills primarily depend on use of the arms and hands, while mobility depends mostly on general balance and use of the legs. Therefore, the functional ability for different conditions could be better captured by either the mobility or the self-care subscale, which might not be adequately measured by the combined motor scale.

In thinking about how to combine the patient's performance on individual items into a scale capturing the overall concept of functional ability, several issues must be addressed. One issue is the missing data due to issues such as environmental constraints or safety concerns. An approach where not all patients are administered the same items would pose a challenge to traditional psychometric approaches based on total scores. If a patient is not scored on an item, his/her total score must, by definition, be different and not comparable to others who were scored on more items. A Rasch-based approach, however, does not suffer the same problem because under this probabilistic model, all available data can be used to estimate a person's ability. This is a major advantage in such situations as the PAC-PRD where patients are changing in functional status over time such that certain items that are not relevant or not assessed at admission due to medical contraindications can be assessed at discharge.

This work uses Rasch measurement models to allow us to build a scale that uses the appropriate items for each person without using all items in the domain. Below we outline the basic description of the Rasch measurement approach and how it enables person-ability estimates to be obtained without requiring that everyone take all the same items. We also explain the basic analysis of the function items to examine whether they work as intended.

In creating the final item sets for the scales and in creating the Rasch scales, we examined the following analytic questions:

- **Does the 6-point rating scale that captures need for assistance operate as intended?** Does the pattern of responses to the rating scale steps (from dependent to independent) operate as is required by the model (e.g., monotonic progression of step thresholds, adequate use of each step)?

- **Do the items form two unidimensional hierarchies of function: self-care and mobility?** Do the core and supplemental items for the two scales cohere (e.g., have appropriate item fit statistics)? Factor analysis was used to confirm that these are indeed separate constructs.

- **How well do the items measure the patients?** How well do they examine the extent to which items sufficiently cover the range of patients measured both at admission and discharge, examine the extent to which patients are effectively measured (ceiling and floor effects) in each setting, examine the extent to which patient response patterns fit the assumptions of the measurement model, and examine the extent to which the addition of supplemental items improves measurement of range of patient function?

5.2.3 Basic Principles of Item Response Theory (IRT) Models

The Rasch model, a variant of IRT, calculates functional status measures (e.g., self-care measure, mobility measure, motor measure) for each patient regardless of the specific items that are reported. Using this technology enables comparisons from admission to discharge and between settings so that it is not necessary that the same function items be used in each setting or at each time point, only that the items capture the same construct. This crosswalk effect enables items to be appropriately targeted to the client needs in a given setting while maintaining the ability to compare across settings. The Rasch model is a probabilistic model that uses available data to estimate both item difficulty and person ability on the same dimension (Wright and Stone, 1979).

Most implementations of the Rasch model are robust to missing data (Linacre, 2006). In other words, it is not required that all patients take all items if the items are all in the same frame of reference. It can be useful to think of the analogy of a ruler. To measure a 10-inch object on a ruler, it is not necessary that the markings at 2, 3, or 4, inches be available, just that there are sufficient markings around the 10-inch level for accurately measuring the object. Similarly, when measuring a 2-inch object, markings around 9, 10, and 11 inches are not needed. The same is true for measuring the functional status of patients precisely. It is not necessary that a patient who can sit on the side of the bed with assistance be administered items about walking long distances or for a patient who can walk long distances to be scored on if they can sit up in bed.

Rasch began with the idea that any person's score (observation) on a test could be expressed as a ratio of probabilities. That is, the probability that the person succeeds on the item against the probability that he/she fails the item is $p/(1 - p)$. This relationship can take values between 0 and infinity (∞) and thus has a nonlinear relationship with the continuous underlying variable being measured. Taking the log of this relationship, $\log(p/(1 - p))$, creates values that go from $-\infty$ to $+\infty$, forming a linear relationship with the underlying variable. A unique feature of this model for determining the difference between the ability of two different people or items was that the item parameter could be removed from the equation. That is, the difference between two persons could be estimated without needing information about the difficulty of the items they took.

A person's ability is determined by the observed responses and by the ratio between the ability parameters of the two people; it is not influenced by which items are used. Exactly the same relationship can be shown for estimating item difficulty (i.e., they can be determined from observed responses and the ratio of the difficulty parameters of the items); they are not influenced by which people took the items. In recent years, IRT has become increasingly used in both test equating and item banking procedures. In item banking, items from multiple tests are

"combined" to form a single test, in which items are ordered from least to most challenging. Item banks are used because the combined set of items usually covers a greater range of the ability being measured than any of the individual tests alone, and because the bank can be used in computer adaptive testing where only that subset of the items in a bank most relevant to a person's level of ability is administered.

A. Does the 6-point rating scale of need for assistance operate as intended?

The first step is to establish that the 6 steps of the CARE rating scale are operating as intended both overall and for individual items. The probability that a person will be scored on a particular rating scale step varies depending on the functional ability of the person. That is, very able people will be more likely to be scored as 5s and 6s than as 1s and 2s. Looking empirically at these distributions, we should see the transitions from one step to the next (called thresholds) proceed monotonically and distinctly across the range of person abilities. Put another way, there should always be some point along the range at which each rating-scale step is more probable than another step. When a rating-scale step is not more probable at any point, it suggests that raters are not able to use that step to consistently distinguish patient ability at that level. Generally this lack of ability to distinguish between levels of ability introduces noise to the measurement model, and the approach is to combine ratings in one or two of the adjacent categories, effectively reducing the number of rating-scale steps. The test of the success of this approach is that reducing the number of rating-scale steps does not reduce the meaningfulness of other indicators of test precision such as separation and person reliability.

B. Do the items form two unidimensional hierarchies of function: self-care and mobility?

The next step is to look at overall performance of the items. This occurred in several steps. First, we examined the extent to which the items worked together to define a coherent construct. This was conducted separately for the self-care and mobility items. We examined the separation and person reliability statistics as indicators of measurement precision. Person reliability can be interpreted as analogous to Cronbach's alpha in traditional psychometric theory. Item fit statistics were examined as an indication of how well all items work together to describe the overall construct (self-care or mobility). Fit statistics are a type of chi-square statistic—the acceptable range is generally .6 to 1.4 although .8 to 1.2 is preferred. If the item values are above this range, it reflects that person response patterns are erratic, generally suggesting the item is not measuring the same construct as other items.

Second, principal component analysis was used to examine how well items form a single construct (self-care or mobility). In addition, we combined self-care and mobility items into a scale and examined overall precision of the scales and item. Rasch-residual-based Principal Components Analysis (PCAR) differs from traditional PCA in that with PCAR the components contrast opposing factors, rather than loadings on one factor. It should be noted that the purpose of PCAR is not to generate common factors as in traditional PCA but to explain variance in the residuals.

C. How well do the items measure the patients?

In this step we examined how well the items selected measure the persons in the data set for both self-care and mobility items. We examined the extent to which person response patterns

fit the assumptions of the measurement model using the same range of infit statistics identified above. We examined the extent to which persons are effectively measured (ceiling and floor effects) in each setting overall and for admission and discharge time points. Finally, we examined the extent to which the addition of supplemental items improves measurement of range of patient function. This is used as an indication of the increase in precision gained for the additional response burden of these items.

As a result of this analysis, a stable set of core items was identified that maintain general stability from admission to discharge and between settings. Overall, the mobility and self-care items were well targeted to the range of patient ability sampled within this PAC population. Four sets of function measures were included: self-care, mobility, IADL, and a motor scale that combines elements of the self-care and mobility scales. The variables were based on the CARE tool function items on the admission and discharge assessment forms. These items were used to construct Rasch function scales that are continuous, calibrated to a range from 0 to 100, and include the following:

- **Self-care scale**: constructed based on independence ratings in eight items, including eating, oral hygiene, toilet hygiene, dressing (upper and lower body), putting on and removing footwear, washing upper body, and showering/bathing self

- **Mobility scale**: constructed based on independence ratings on 13 items, including lying to sitting on side of bed; sit to stand; chair or bed-to-chair transfer; toilet transfer; car transfer; rolling left and right; sit to lying; picking up objects; taking one step or over a curb, up and down 4 exterior steps, and up and down 12 interior steps; walking 10 feet on uneven surfaces; and walking 50 feet with 2 turns

- **IADL scale**: constructed based on performance on 10 items: telephone answering, telephone-placing call, medication management (oral medications, inhalant/mist medications, injectible medications), making a light meal, wiping down surfaces, light shopping, laundry, and using public transportation

- **Motor scale**: constructed based on all items in the self-care and mobility scales

The Rasch measurement approach is important when building scales from ordinal level data as in the function rating scales. Although Rasch is not as transparent as the additive scoring method, it imposes the interval structure necessary for defensible quantitative analysis and modeling. Ordinal-level data are not appropriately analyzed using an additive sum score because they do not provide measures of equal units. The amount of ability needed to score 5 'Set-up Assistance' on eating is much less than the ability needed to score 5 on lower body dressing. The Rasch Measurement Model takes these differences into account when determining an individual's ability level where a simple summed score does not. The resulting person-ability estimates, although on a logit scale (i.e., the natural log-odds of success on the items chosen), can be used just as a sum of scores would be in quantitative analyses or modeling. **Tables 5-3, 5-4, and 5-5** show the relationship between the summed raw scores and the Rasch measures. To calculate the summed raw score, we added the numeric score reported for the patient. When a letter was recorded, we recoded those that were missing for M (medical reasons), S (safety concerns), or A (attempted but not completed) to Dependent (1), and those that were P (patient

refused), N (not applicable), and E (environmental constraints) to missing. In the summed scores, the presence of a missing is equivalent to adding 0 for that measure to the scale.

Table 5-3 shows the data for the motor scale used in the resource intensity sections (Sections 9, 10, and 11) and **Tables 5-4 and 5-5** are the self-care and mobility tables, respectively. Table 5-3 shows that the combined motor scale (mobility and self-care) ranges from a raw score of 25 on all 21 items associated with the motor score to a raw score of 147. Each raw score measure does not exactly match up with a single unique Rasch score value. Instead, the Rasch score considers that the responses to specific questions such as dependence on more basic tasks may indicate a higher level of disability than dependency on a more difficult-to-perform task. A raw mobility score of 90, for example, corresponds, on average, to a Rasch mobility score of 50.4 with a standard error of 1.7.

Table 5-4 shows the estimated relationship between the summed raw scores and Rasch measures for the self-care scale. The summed raw score for self-care ranges from 8 to 48, which corresponds to the corresponding Rasch measure values using a scale that was set to range from 0 to 100. The table shows the Rasch measures ranging from 7.64 to 85.57 due to the use of anchored item and rating scale values. The mean self-care Rasch measure for all patients was 46.4 units (see column 2), which is roughly equivalent to a total raw score of 29 (column 1) (when there are not missing data).

Table 5-5 shows the estimated relationship between the summed raw scores and Rasch measures for the mobility scale. For mobility, the summed raw scores range from 17 to 99. The mean admission Rasch measure for all patients was 45.1, which is approximately equivalent to a summed raw score of 45.

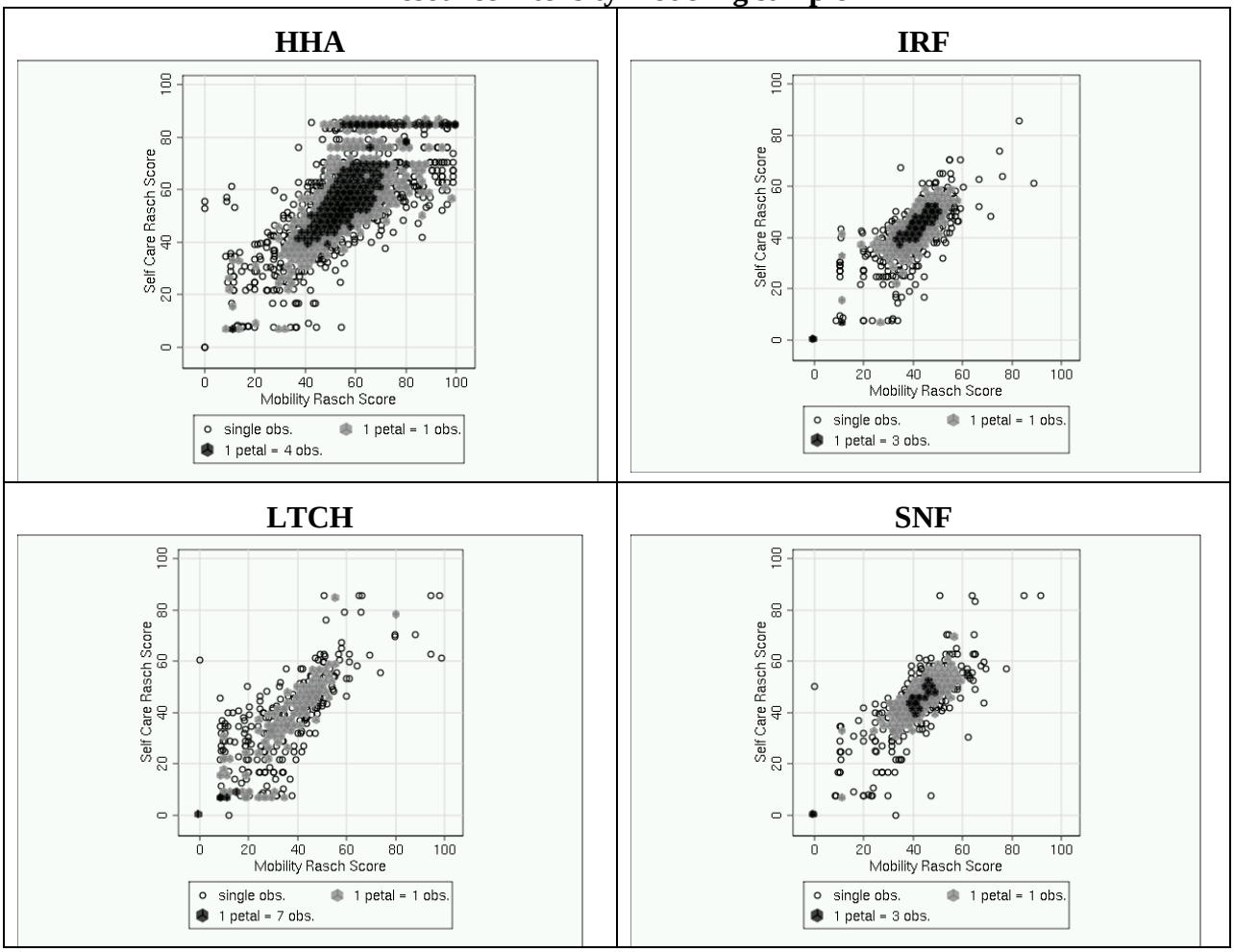
Tables 5-6 and **5-7** show the distribution of the self-care, mobility, motor, and IADL scales by provider type at admission (**Table 5-6**) and discharge (**Table 5-7**) for the initial sample of CARE assessments with valid responses at admission and discharge. The first column shows the mean score, the second the standard deviation, and the remaining columns the 5th, 10th, 25th, median, 75th, 90th, and 95th percentiles. LTCH patients, not surprisingly, had the lowest function scores across all the scales at both admission and discharge and across the distributions. LTCH patients have scores clustered at the low end of all of the scales, with similar scores at the 5th and 10th percentiles. HHA patients had the highest scores across the scales at both admission and discharge. IRF and SNF scores tended to be similar at admission and discharge on all scores and across the distributions. IRF patients have the smallest standard deviation in their scores at admission and discharge across all of the scales except IADLs at admission. Note that the sample sizes are lower for the IADL scales across all settings, given the difficulty in ascertaining scores for these items as described above.

As discussed in Section 3.6, all three measures demonstrated good reliability as measures of function. However, mobility and self-care measures are frequently highly correlated as shown in earlier work (Stineman, 1996). Despite this potential multicollinearity, the three measures were used separately in the analysis because they measure different aspects in different populations. Using the two subscales of mobility and self-care is consistent with the current literature, which suggests that using two subscales will improve differentiation among patients

with different types of impairments. Mobility and self-care scales have been used in prior work published by Haley, Jette, Coster, and colleagues (2002).

Figure 5-2 illustrates the density of observations of self-care Rasch scores with the mobility Rasch scores for the four settings using a "sunflower" plot. The sample shown in these figures corresponds to the sample used in the later sections on resource intensity. These plots show high correlation between the self-care and mobility Rasch measures, suggesting that the combined motor function measure may be a sufficient statistic for the information measured by the separate self-care and mobility measures depending on the analytic goal. As expected, the distribution of patients' functional status measures varied across the settings. HHA had the highest functioning patients, on average, but also had some lower functioning patients. IRF patients were predominantly in the middle of the chart, with about half in the lower quadrant and the other half in the middle upper quadrant but closer to the middle, indicating that these patients were fairly disabled. SNF patients were distributed similarly to IRF patients but with more patients in the higher functioning quadrant. LTCH patients had the lowest functional levels. These plots illustrate that the greatest volumes of patients in a narrow range of functional performance are the IRF and SNF settings. The HHA observations were more dispersed than the institutional settings, which were more tightly clustered. The second set of figures (in **Figure 5-3**) plots the IADL and motor Rasch scores for the settings. There also appears to be a strong positive association between the IADL and motor scores for all four settings. In addition, the discontinuities in the IADL measure distributions suggest some weaknesses with this measure being used in all settings. IADLs include activities such as medication administration, laundry, and use of public transportation. Accurate assessment may be challenging, because some activities, such as using public transportation, may not be relevant for every patient, and a full assessment of a patient's ability to plan and implement the entire activity would be very time consuming. Medication administration is also difficult to assess because of inpatient policies focused on avoiding medication errors, including not allowing patients to keep medications at the bedside.

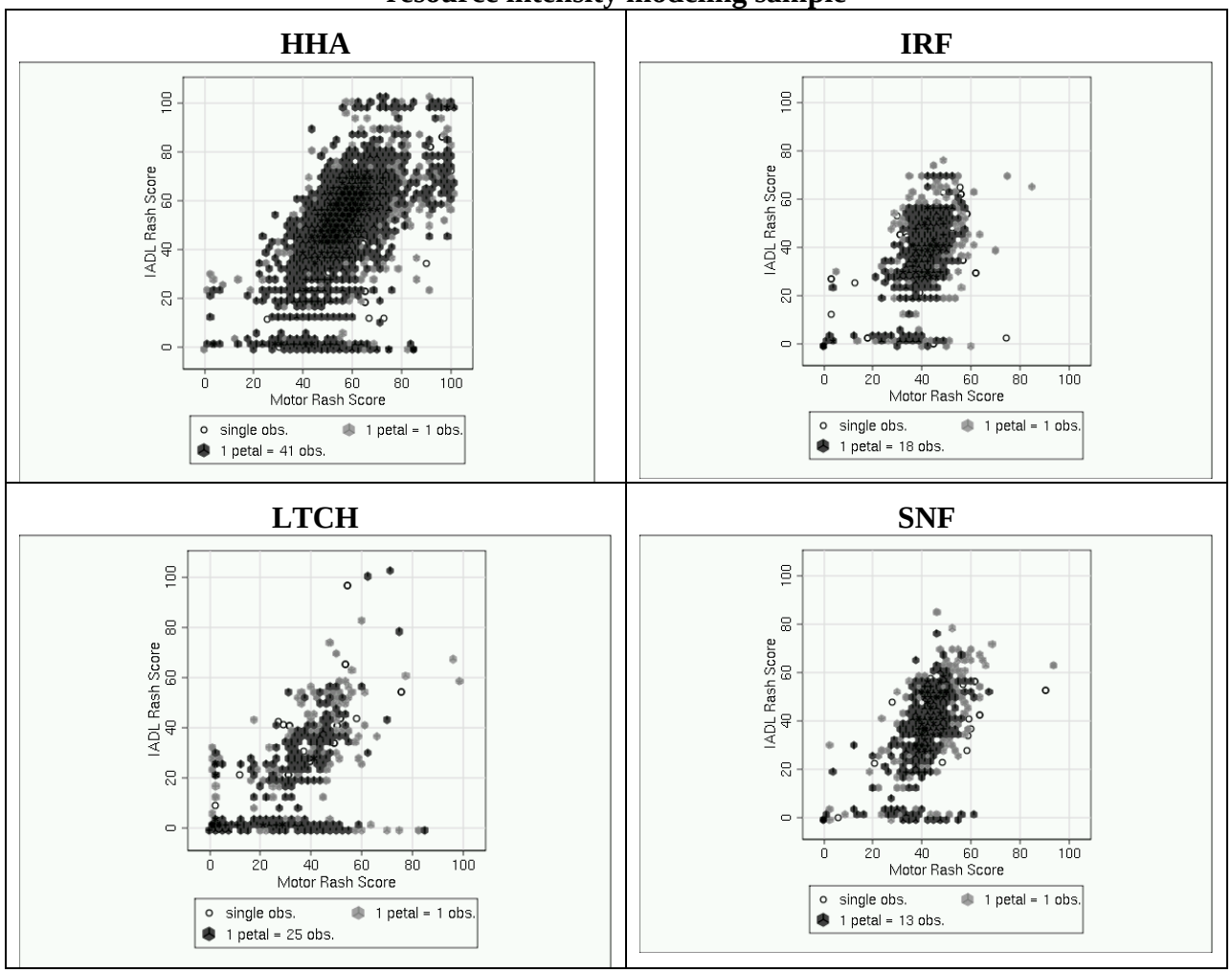
Figure 5-2
Self-care and mobility scales at admission by setting type, resource intensity modeling sample



NOTE: HHA = Home Health Agency; IRF = Inpatient Rehabilitation Facility; LTCH = Long-Term Care Hospital; SNF = Skilled Nursing Facility; CRU = Cost and Resource Utilization.

SOURCE: RTI International analyses of CARE tool data for the CARE+CRU sample: the set of CARE patients with matched claims and CRU data collection forms.

Figure 5-3
IADL and motor scales at admission by setting type, resource intensity modeling sample



NOTE: HHA = Home Health Agency; IRF = Inpatient Rehabilitation Facility; LTCH = Long-Term Care Hospital; SNF = Skilled Nursing Facility; CRU = Cost and Resource Utilization.

SOURCE: RTI International analyses of CARE tool data for the CARE+CRU sample: the set of CARE patients with matched claims and CRU data collection forms.

5.3 Covariate Specification

In addition to the diagnosis and function measures discussed above, a variety of other measures were used in the models presented in this report. Below is a listing of the covariates used in our analyses, including type of setting, patient demographics and premorbid factors, medical complexity, prior functioning, cognitive status, function at admission, and impairments. Variables were selected for analysis based on prior research. Not every variable is used in every model, but we include this listing here for reference for the models discussed in Sections 6 through 11. Below we note where items were recoded or reference categories varied by section.

5.3.1 Demographic Factors

- **Age at admission**: This variable was coded into four groups (younger than 65 years, 65 to 74 years, 75 to 84 years, 85 years or older). The reference group was 65 to 74 years in Section 6 (discharge destination) and 85 years or older in Sections 7 through 11 (readmissions, functional change, and resource intensity).

- **Race:** This variable was coded into two groups (Black, not Black). The latter was the reference group.

- **Gender:** This variable was coded into two groups (male, female). The latter was the reference group.

- **Medicaid as a secondary payer at admission:** This variable identifies whether the beneficiary had secondary insurance coverage under either Medicaid fee-for-service or Medicaid managed care as specified during admission (yes/no). The latter was the reference group. Medicare managed care patients were excluded from the sample.

5.3.2 Medical Complexity

Medical complexity is defined with several subdomains. Included are measures of prior health care use reflecting potential medical complexity of this admission, current medical conditions and comorbidities, major treatments, and skin integrity and wound complications.

5.3.2.1 Prior Service Use

Several items were used to control for prior health service use. The exact variables differed by section. Section numbers are provided after each definition to identify the sections in which an item was used in the analytic models.

- **Prior acute claim within past 2 months:** This variable identifies whether the patient was in an acute hospital in the 2 months prior to the observed PAC service admission. This measure was based on Medicare claims examinations (Sections 9 through 11).

- **Other acute claim within past 2 months:** This variable identifies whether the patient was in an acute hospital in addition to the hospital stay immediately prior to the PAC stay being studied in the 2 months prior to the start of this episode. This measure was based on Medicare claims examinations (Section 6).

- **ICU length of stay:** This variable specified the length of stay in the intensive care unit of the acute hospital prior to CARE stay. This was modeled as GT/LT 7 days in Section 6 and as a continuous variable and as the square of the continuous variable in Sections 9 through 11.

- **Days since prior acute discharge**: This variable was used to control for variation in the readmission analysis attributable to the timing of the PAC CARE admission. It is

defined as the number of days from the discharge date on the claim from the prior acute stay to the admission date on the PAC stay (Section 7).

- **Admitted from long-term nursing facility or short stay acute hospital**: This pair of variables identifies whether the patient was admitted from either the hospital or a long-term care facility immediately prior to the PAC setting (Section 8).

- **Any of the following medical service use in the last two months:** This set of variables identifies whether the patient used any of the following services in the 2 months prior to this admission: LTCH, home health, outpatient services, SNF, IRF, short-stay acute hospital, or none. This variable was included in the functional change analysis as a measure of related complexity (Section 8).

5.3.2.2 Medical Conditions and Complications

These items specify the reasons for the services, comorbidities, and any related complications such as skin integrity and major treatment needs.

- **Primary medical diagnosis groups (PMDG)**: As described in the introduction to this section, the PMDG was obtained from the short-stay acute claim prior to the PAC CARE admission or from the PAC claim if there was no prior admission within 100 days. Two versions of this variable were used. Both are based on a modified MDC/MS-DRG approach, but one approach uses 35 diagnostic groups that specify whether the prior acute diagnosis was medical or surgical and breaks out several larger subgroups, such as the stroke cases from the other neurological cases, the ventilator cases from other respiratory medical cases, to name a few (Sections 7 through 11). The second version aggregates the 35 PMDGs into 12 groups without specifying surgical or other subconditions (Section 6).

- **Surgical status:** This indicator variable (yes/no) was defined on the basis of whether the prior hospital stay included a surgical MS-DRG (Section 6).

- **Comorbidities:** This set of variables control for comorbidities in each setting. Several different approaches were used in this report. Sections 6, 9, 10, and 11 use a set of comorbidity indicator variables based on the secondary hospital diagnoses and the PAC diagnoses on the associated claims. ICD-9 codes were grouped into modified hierarchical condition categories: Examples include liver, diabetes, other endometrial conditions, orthopedic, stroke, other neurological, cardiovascular, respiratory, cellulitis, morbid obesity, head and spine, psychiatric, renal, and urinary tract infections. Sections 7 and 8 use the same approach but base these variables on the ICD-9 codes provided on the CARE assessment instead of claims. Persons filling out the CARE assessment diagnosis section were instructed to submit the same information as was coded on their claims.

- **HCC comorbidity index:** In addition to the comorbidity indicators, this variable is a modified version of the concurrent HCC weighting method. This measure was built

from the underlying HCCs and came from the type of risk models used to predict Medicare expenditures (Sections 9 through 11).

- **Major treatments**: Indicates whether the patient received any of a set of selected major treatments during the 2-day assessment period. The specific major treatments included in the models varied by section.

  - Total parenteral nutrition (TPN) (Sections 6, 9 through 11)
  - Mechanical ventilation (weaning and nonweaning) at admission/during stay/at discharge (Sections 8 through 11)
  - Mechanical ventilation (weaning and nonweaning) at time of transfer (Section 6)
  - Central line management (CLM) (Section 7, 9 through 11)
  - Hemodialysis (Sections 6, 8, 9 through 11)

  Other major treatments that were considered for the models but not found to be significant because of low prevalence in the sample include the use of a tracheostomy tube with suctioning, continuous cardiac monitoring, and intravenous vasoactive medications or anticoagulants.

- **Skin integrity**: Several skin integrity items were tested in these models. Most of the sections controlled for the presence of a severe pressure ulcer as defined below. The resource intensity models also controlled for a major wound item in addition to the severe pressure ulcer items. The functional change model controlled for whether any turning surfaces were not intact in addition to the presence of a severe pressure ulcer.

- **Severe pressure ulcer:** Indicates whether the patient had a severe (stage 3/4/unstageable) pressure ulcer or a stage 2 ulcer that was known to be present for more than 1 month at the time of transfer from the hospital or admission to the PAC setting (yes/no) (Sections 6, 8, 9 through 11).

- **Presence of a major wound:** Indicates whether the patient had a major wound present (yes/no). Major wounds were defined as delayed healing of surgical wounds; trauma-related wounds, such as burns; diabetic foot ulcers; and vascular ulcers (arterial or venous) (Sections 9 through 11).

- **Turning surfaces-at least one not intact:** Indicates whether the patient had at least one turning surface not intact. Turning surfaces include right or left hips, back or buttocks, and other turning surface (yes/no) (Section 8).

5.3.3 Cognitive Status

- **Cognitive status** (Brief Interview for Mental Status [BIMS] with observational assessment): Several cognitive status measures were created based on the BIMS or an observational assessment of cognitive status for patients for whom interviews were

not feasible. Thresholds for combined BIMS score are based on standards used for the MDS: cognitive status intact or borderline (13–15), moderately impaired (8–12), or severely impaired (≤7). This was used in combination with the observational assessment when the BIMS response was missing.

Patients assessed based on the observational assessment were classified as cognitively intact or borderline if they could recall all four observational items or three items including whether they were in a hospital, nursing home, or home. Patients were classified as having moderate impairment if two items were recalled or three were recalled but not whether the patient was in a hospital, nursing home, or home. Patients were classified as severely impaired if they recalled none or only one of the four items, or they recalled two but not whether they were in a hospital, nursing home, or home (Section 7). Sections 9 through 11 used a variant of this approach allowing cases previously categorized as missing to be further reassigned to severely impaired based on the number of items observed to be recalled, regardless of whether the patient knew where he/she was. Section 8 used a dichotomous measure of "severely impaired/not severely impaired" based on the variable in Section 7.

Section 6 only had a subset of the BIMS items assessed in the acute hospital population: month and year. These were used in combination with the observed assessment to develop a three-level variable indicating whether the patient had difficulty knowing the month or year at the time of transfer from the hospital or admission to the PAC stay. It is a composite variable based on a combination of the BIMS items "year" and "month," or if not answered, staff observation of how many of the following items the patient knows: season, room location, staff names/faces, or that they are in a hospital, nursing home, or home. The codes are:

- **Intact or borderline:** Both month and year were answered correctly (year is correct; month is accurate within 5 days) or observation showed at least 3 items were correct.

- **Severely impaired:** Missed two years or more or missed month by more than 1 month or could not answer (and did not have a communication deficit) or were observed to only know one or fewer of the observation items.

- **Moderately impaired:** Not missing and not in either of the above groups.

- **Symptoms of depression:** Indicates whether the patient may have been depressed during the discharge assessment window. This indicator variable is coded yes/no; the latter is the reference group. Symptoms of depression was defined as having scored any of the following at the time of transfer (Section 6):

  - Little interest or pleasure in doing things more than half of the days in the past 2 weeks (7 to 11 days) or nearly every day (12 to 14 days) in the last 2 weeks, or

  - Feeling down, depressed, or hopeless more than half of the days (7 to 11 days) or nearly every day (12 to 14 days) in the last 2 weeks, or

- Having an HCC comorbidity of depression on the associated acute or PAC claim.

- **Depression (feeling sad)**. During the 2-day assessment period, patients are asked, "during the past two weeks, how often would you say, 'I feel sad'?" They are given the following five choices: never, rarely, sometimes, often, and always. Patients are defined as depressed if they answer "often" or "always" (Sections 7, 8, 9 through 11).

5.3.4 Functional Status

- **History of falls**: Indicates whether the patient has had two or more falls in the past year or any fall with injury in the past year (yes or no/unable to assess). The latter is the reference group (Section 6).

- **Self-care status:** (See Section 5.2 for a complete discussion of Rasch scale construction and rating levels.) Rasch self-care scale based on independence in eight items, including eating, oral hygiene, toilet hygiene, dressing (upper and lower body), putting on and removing footwear, washing upper body, and showering/bathing self. Independence is based on a Rasch scale ranging from 0 units (total dependence) to 100 units (total independence). This item was included in its natural form and as a squared term because of its nonlinearity (Sections 6 and 8).

- **Mobility status**: (See Section 5.2 for a complete discussion of Rasch scale construction and rating levels.) Rasch mobility scale based on independence in 13 items including lying to sitting on side of bed; sit to stand; chair or bed-to-chair transfer; toilet transfer; car transfer; rolling left and right; sit to lying; picking up objects; taking one step or over a curb, up and down 4 exterior steps, and up and down 12 interior steps; walking 10 feet on uneven surfaces; and walking 50 feet with 2 turns. Independence is based on a Rasch scale ranging from 0 units (total dependence) to 100 units (total independence). This item was included in its natural form and as a squared term because of its nonlinearity (Sections 6 and 8).

- **Motor status:** (See Section 5.2 for a complete discussion of Rasch scale construction and rating levels.) Rasch motor scale constructed based on all items in the self-care and mobility scales. This factor was used in place of the two subscales (self-care and mobility) in models when the two subscales were highly correlated with each other. This effect varies by sample characteristics; patients having both types of disability had highly correlated subscales. The motor item was included in its natural form and as a squared term because of its nonlinearity (Sections 6, 7, 9 through 11).

5.3.5 Functional Impairments

- **Bladder incontinence frequency:** This is a three-level variable indicating level of incontinence. The first two are examined in the model; the third level includes those who are neither continent nor incontinent. The main comparison is on the effect of having greater incontinence (Section 6).

  - 0= continent or stress incontinence
  - 1= incontinent daily or always incontinent
  - 2= no output or incontinent less than daily or not applicable due to indwelling catheter.

- **Bladder device**: Indicates patients with an external or indwelling device or intermittent catheterization (yes/no) (Sections 7 and 8).

- **Bowel incontinence frequency**: A patient is defined as bowel incontinent if he or she is assessed as being either incontinent daily or always incontinent during the 2-day assessment period following PAC admission (Sections 9 through 11).

- **Bowel assistance needed with device:** Indicates patients who need assistance to manage equipment or devices (yes/no) (Sections 6, 7, and 8). The reference group is the latter.

- **Indwelling bowel catheter management system:** Indicates patients with a major treatment equal to 1 if an indwelling bowel catheter management system is reported during the 2-day assessment period and equal to 0 if it is not reported (Sections 9 through 11).

- **Swallowing NPO:** The patient had no intake by mouth (NPO) at the 2-day window associated with the assessment (yes/no). The reference group is the latter (Sections 6 through 11).

- **Swallowing-other signs of difficulty:** The patient had signs or symptoms of a possible swallowing disorder, including coughing or choking during meals or when swallowing medications, or holding food in mouth/cheeks or residual food in mouth after meals, or loss of liquids/solids from mouth when eating or drinking (yes/no). The reference group is the latter (Sections 6 through 11).

- **Communication:** This concept was measured in several ways. When measuring functional change, this concept included two separate items distinguishing between verbal communication and ability to understand. The discharge destination models collapsed these two areas into one measure of communication. For the purposes of the analysis, if no information was available on the impairment (due to missing or unable to assess responses), the variable was coded as not impaired.

- **Understanding verbal content**: Indicates patients who rarely or never understand verbal content (yes/no). The referent for understanding verbal content is "understands without cues or repetitions," "usually understands," or "sometimes understands" (Sections 7 through 8).

- **Expression of ideas and wants:** Indicates a patient who (1) rarely/never expresses self or speech, is very difficult to understand; (2) frequently exhibits difficulty with

expressing needs and ideas; (3) exhibits some difficulty with expressing needs and ideas (e.g., some words or finishing thoughts) or speech is not clear; or (4) expresses complex messages without difficulty and with speech that is clear and easy to understand (Sections 7 through 11).

- **Communication:** This set of indicator variables is a composite based on the patient's ability to understand verbal content and express ideas and wants. The three indicator variables are (Section 6):

  - **Not impaired**: if both understanding and expression are coded as "4" (clear comprehension without cues or repetitions and expresses complex messages without difficulty and with speech that is clear and easy to understand) or if both items are coded "8" (unable to assess) or "9" (unknown)

  - **Severely impaired:** if either item is coded "1" (rarely/never understands), or rarely/never expresses self, or speech is very difficult to understand

  - **Moderately impaired:** if either item is coded "2" (sometimes understands or frequently exhibits difficulty) or "3" (usually understands or exhibits some difficulty)

- **Ability to see in adequate light:** Indicates patients who are (1) severely impaired: no vision or object identification questionable; (2) mildly to moderately impaired: can identify objects; may see large print; (3) adequate: sees fine detail, including regular print in newspapers/books; and (4) not assessed due to medical restriction (Section 8).

- **Ability to hear:** Indicates patients who are (1) severely impaired: absence of useful hearing; (2) not severely impaired: mildly to moderately impaired, difficulty hearing in some environments or speaker may need to increase volume or speak distinctly; (3) adequate: hears normal conversation and TV without difficulty; (4) not assessed due to medical restriction (Section 8).

- **Respiratory status:** This set of variables in Section 6 is a composite variable based on the patient's respiratory status with supplemental oxygen and without supplemental oxygen. The three indicator variables are:

  - **Healthy respiratory status:** Reflected patients who were only short of breath when climbing stairs without oxygen or never short of breath on oxygen.

  - **Moderate respiratory status**: Reflected patients who were without oxygen, had shortness of breath climbing stairs AND with oxygen were either never out of breath (coded "0") or only when climbing stairs (coded "1") or with moderate exertion (coded "2"). Others in this category used no oxygen but had shortness of breath with moderate exertion (coded "2") or were missing data.

- **Severe respiratory status:** Reflected patients who were not on oxygen but were coded "3" (shortness of breath with minimal exertion), "4" (shortness of breath at rest), or "5" (severely struggling to breathe at rest). Others in this group all had oxygen and these included the following combinations:

    - with oxygen, shortness of breath on stairs (coded "1") AND without oxygen, shortness of breath with minimal exertion (coded "3) or mild shortness of breath at rest (coded "4"), or severely struggling to breathe at rest, or

    - with oxygen, shortness of breath with moderate exertion (coded "2") AND without oxygen, shortness of breath with minimal exertion (coded "3) or mild shortness of breath at rest (coded "4"), or severely struggling to breathe at rest, or

    - with oxygen, any difficulty with minimal exertion or at rest (coded as "3," "4," or "5"), regardless of rating without oxygen, or

    - with oxygen, coded as not assessed or not applicable but without oxygen, coded as any difficulty with minimal exertion or at rest (coded as "3," "4," or "5").

- **Respiratory status–impaired**: Patients were considered impaired if they were using supplemental oxygen; patients with no oxygen use reported were considered impaired if they were short of breath or dyspneic with minimal or less exertion (yes/no). Patients on ventilators are included in a separate category (Sections 7 through 11).

- **Respiratory status–any impairment:** Patients were considered to have any impairment if they answered yes to the statement "Does the patient have any impairments with respiratory status?" (Sections 10 and 11).

- **Sitting/mobility endurance:** This variable in Section 6 is a composite of the two endurance impairment variables—sitting for 15 minutes with/without support and walk/wheel 50 feet with/without rest. Having a code in either sitting or mobility will lead to an equal code for the combined variable. This variable is coded as follows:

    - No endurance: if either mobility OR sitting endurance were coded as "0" (could not do) or "8" (not assessed due to medical restriction)

    - Endurance with support/rest: if mobility OR sitting endurance were coded as "1" could do with support/rest and neither were coded as "0" or "8"

    - Endurance without support/rest: if mobility AND sitting endurance were coded as "2" could do with support/rest

- **Mobility endurance**: Patients who could not walk or wheel 50 feet without rest were considered impaired in mobility endurance (yes/no) (Sections 7 through 8).

- **Sitting endurance**: Patients were scored on whether they could safely sit for 15 minutes with support, without support, or not at all. Some models recoded this into a dichotomous measure: those who could not sit for 15 minutes unsupported were considered impaired (yes/no) (Sections 7 through 8).

5.3.6 Premorbid Status

- **Prior function:** Based on a composite of the five interview items on the patient's usual ability with everyday activities prior to this current illness, exacerbation, or injury. The five items include the following and each was scored on a 5-point scale: 3) independent, 2) needed some help, 1) dependent, 8) not applicable, or 9) unknown.
  - Self-care: Did the patient need help bathing, dressing, using the toilet, or eating?
  - Ambulation: Did the patient need assistance with walking from room to room (with or without cane, crutch, walker, etc.)?
  - Stairs: Did the patient need assistance with stairs (with or without cane, crutch, walker, etc.)?
  - Wheelchair: Did the patient need assistance with moving from room to room using a wheelchair, scooter, or other wheeled mobility device?
  - Cognition: Did the patient need help planning regular tasks, such as shopping or remembering to take medication?
- **Lived alone in community prior to admission:** This indicator variable identifies beneficiaries who lived in the community prior to this admission AND who lived alone (yes). Those who did not live in the community or who lived with others were the reference group (no) (Section 6).

5.3.7 Market Supply (Section 6)

This set of covariates identifies the market in which the data were collected. Each market was selected in the initial phase as representing a high or low PAC market based on whether they had an IRF or LTCH available within a 2-hour radius (High PAC) or did not and were reliant on SNFs and IRFs for PAC services within a 2-hour radius (see Section 4). The markets include:

- Rochester, NY
- Tampa/Lakeland, FL
- Louisville, KY
- Chicago, IL
- Dallas, TX

- Lincoln/Omaha, NE
- Seattle, WA/Portland, OR
- San Francisco, CA
- Columbia, MO
- Wilmington, NC
- Raleigh/Durham, NC
- Supplemental Regions 1 through 4, 6, 9: These areas are aggregated because they are each high PAC areas and do not represent markets but instead select providers.

The following sections use these variables in the discharge destination (Section 6), outcomes (Sections 7 and 8), and resource intensity (Sections 9 through 11) analyses.

Table 5-1
Classification for defining primary reason for treatment or "condition groups"

Primary Diagnosis Group	Major Diagnosis Category (MDC)	MS-DRG
Neurologic, Stroke	01	020: Intracranial Vascular Procedures with PDX Hemorrhage with MCC
Neurologic, Stroke	01	021: Intracranial Vascular Procedures with PDX Hemorrhage with CC
Neurologic, Stroke	01	022: Intracranial Vascular Procedures with PDX Hemorrhage without CC/MCC
Neurologic, Stroke	01	061: Acute Ischemic Stroke with Use of Thrombolytic Agent with MCC
Neurologic, Stroke	01	062: Acute Ischemic Stroke with Use of Thrombolytic Agent with CC
Neurologic, Stroke	01	063: Acute Ischemic Stroke with Use of Thrombolytic Agent without CC/MCC
Neurologic, Stroke	01	064: Intracranial Hemorrhage or Cerebral Infarction with MCC
Neurologic, Stroke	01	065: Intracranial Hemorrhage or Cerebral Infarction with CC
Neurologic, Stroke	01	066: Intracranial Hemorrhage or Cerebral Infarction without CC/MCC
Neurologic, Surgical	01	023: Cranio with Major Dev Impl/Acute Complex Cns PDX with MCC or Chemo Implant
Neurologic, Surgical	01	024: Cranio with Major Dev Impl/Acute Complex Cns PDX without MCC
Neurologic, Surgical	01	025: Craniotomy & Endovascular Intracranial Procedures with MCC
Neurologic, Surgical	01	026: Craniotomy & Endovascular Intracranial Procedures with CC
Neurologic, Surgical	01	027: Craniotomy & Endovascular Intracranial Procedures without CC/MCC
Neurologic, Surgical	01	028: Spinal Procedures with MCC
Neurologic, Surgical	01	029: Spinal Procedures with CC or Spinal Neurostimulators
Neurologic, Surgical	01	030: Spinal Procedures without CC/MCC
Neurologic, Surgical	01	031: Ventricular Shunt Procedures with MCC
Neurologic, Surgical	01	032: Ventricular Shunt Procedures with CC
Neurologic, Surgical	01	033: Ventricular Shunt Procedures without CC/MCC

(continued)

Table 5-1 (continued)
Classification for defining primary reason for treatment or "condition groups"

Primary Diagnosis Group	Major Diagnosis Category (MDC)	MS-DRG
Neurologic, Surgical	01	034: Carotid Artery Stent Procedure with MCC
Neurologic, Surgical	01	035: Carotid Artery Stent Procedure with CC
Neurologic, Surgical	01	036: Carotid Artery Stent Procedure without CC/MCC
Neurologic, Surgical	01	037: Extracranial Procedures with MCC
Neurologic, Surgical	01	038: Extracranial Procedures with CC
Neurologic, Surgical	01	039: Extracranial Procedures without CC/MCC
Neurologic, Surgical	01	040: Periph & Cranial Nerve & Other Nerv Syst Proc with MCC
Neurologic, Surgical	01	041: Periph/Cranial Nerve & Other Nerv Syst Proc with CC or Periph Neurostim
Neurologic, Surgical	01	042: Periph & Cranial Nerve & Other Nerv Syst Proc without CC/MCC
Neurologic, Surgical	24	955: Craniotomy for Multiple Significant Trauma
Neurologic, Medical	01	052: Spinal Disorders & Injuries with CC/MCC
Neurologic, Medical	01	053: Spinal Disorders & Injuries without CC/MCC
Neurologic, Medical	01	054: Nervous System Neoplasms with MCC
Neurologic, Medical	01	055: Nervous System Neoplasms without MCC
Neurologic, Medical	01	056: Degenerative Nervous System Disorders with MCC
Neurologic, Medical	01	057: Degenerative Nervous System Disorders without MCC
Neurologic, Medical	01	058: Multiple Sclerosis & Cerebellar Ataxia with MCC
Neurologic, Medical	01	059: Multiple Sclerosis & Cerebellar Ataxia with CC
Neurologic, Medical	01	060: Multiple Sclerosis & Cerebellar Ataxia without CC/MCC
Neurologic, Medical	01	067: Nonspecific CVA & Precerebral Occlusion without Infarct with MCC
Neurologic, Medical	01	068: Nonspecific CVA & Precerebral Occlusion without Infarct without MCC

(continued)

Table 5-1 (continued)
Classification for defining primary reason for treatment or "condition groups"

Primary Diagnosis Group	Major Diagnosis Category (MDC)	MS-DRG
Neurologic, Medical	01	069: Transient Ischemia
Neurologic, Medical	01	070: Nonspecific Cerebrovascular Disorders with MCC
Neurologic, Medical	01	071: Nonspecific Cerebrovascular Disorders with CC
Neurologic, Medical	01	072: Nonspecific Cerebrovascular Disorders without CC/MCC
Neurologic, Medical	01	073: Cranial & Peripheral Nerve Disorders with MCC
Neurologic, Medical	01	074: Cranial & Peripheral Nerve Disorders without MCC
Neurologic, Medical	01	075: Viral Meningitis with CC/MCC
Neurologic, Medical	01	077: Hypertensive Encephalopathy with MCC
Neurologic, Medical	01	078: Hypertensive Encephalopathy with CC
Neurologic, Medical	01	079: Hypertensive Encephalopathy without CC/MCC
Neurologic, Medical	01	080: Nontraumatic Stupor & Coma with MCC
Neurologic, Medical	01	081: Nontraumatic Stupor & Coma without MCC
Neurologic, Medical	01	082: Traumatic Stupor & Coma, Coma >1 Hr with MCC
Neurologic, Medical	01	083: Traumatic Stupor & Coma, Coma >1 Hr with CC
Neurologic, Medical	01	084: Traumatic Stupor & Coma, Coma >1 Hr without CC/MCC
Neurologic, Medical	01	085: Traumatic Stupor & Coma, Coma <1 Hr with MCC
Neurologic, Medical	01	086: Traumatic Stupor & Coma, Coma <1 Hr with CC
Neurologic, Medical	01	087: Traumatic Stupor & Coma, Coma <1 Hr without CC/MCC
Neurologic, Medical	01	088: Concussion with MCC
Neurologic, Medical	01	089: Concussion with CC
Neurologic, Medical	01	090: Concussion without CC/MCC

(continued)

Table 5-1 (continued)
Classification for defining primary reason for treatment or "condition groups"

Primary Diagnosis Group	Major Diagnosis Category (MDC)	MS-DRG
Neurologic, Medical	01	091: Other Disorders of Nervous System with MCC
Neurologic, Medical	01	092: Other Disorders of Nervous System with CC
Neurologic, Medical	01	093: Other Disorders of Nervous System without CC/MCC
Neurologic, Medical	01	094: Bacterial & Tuberculous Infections of Nervous System with MCC
Neurologic, Medical	01	095: Bacterial & Tuberculous Infections of Nervous System with CC
Neurologic, Medical	01	096: Bacterial & Tuberculous Infections of Nervous System without CC/MCC
Neurologic, Medical	01	097: Non-Bacterial Infect of Nervous Sys Exc Viral Meningitis with MCC
Neurologic, Medical	01	098: Non-Bacterial Infect of Nervous Sys Exc Viral Meningitis with CC
Neurologic, Medical	01	099: Non-Bacterial Infect of Nervous Sys Exc Viral Meningitis without CC/MCC
Neurologic, Medical	01	100: Seizures with MCC
Neurologic, Medical	01	101: Seizures without MCC
Neurologic, Medical	01	102: Headaches with MCC
Neurologic, Medical	01	103: Headaches without MCC
Respiratory, Ventilator and Tracheostomy	Pre	003: Ecmo or Trach with MV 96+ Hrs or PDX Exc Face, Mouth & Neck with Maj O.R.
Respiratory, Ventilator and Tracheostomy	Pre	004: Trach with MV 96+ Hrs or PDX Exc Face, Mouth & Neck without Maj O.R.
Respiratory, Ventilator and Tracheostomy	Pre	011: Tracheostomy for Face, Mouth & Neck Diagnoses with MCC
Respiratory, Ventilator and Tracheostomy	Pre	012: Tracheostomy for Face, Mouth & Neck Diagnoses with CC

(continued)

Table 5-1 (continued)
Classification for defining primary reason for treatment or "condition groups"

Primary Diagnosis Group	Major Diagnosis Category (MDC)	MS-DRG
Respiratory, Ventilator and Tracheostomy	Pre	013: Tracheostomy for Face, Mouth & Neck Diagnoses without CC/MCC
Respiratory, Ventilator and Tracheostomy	**04**	207: Respiratory System Diagnosis with Ventilator Support 96+ Hours
Respiratory, Ventilator and Tracheostomy	04	208: Respiratory System Diagnosis with Ventilator Support <96 Hours
Respiratory, Surgical	04	163: Major Chest Procedures with MCC
Respiratory, Surgical	04	164: Major Chest Procedures with CC
Respiratory, Surgical	04	165: Major Chest Procedures without CC/MCC
Respiratory, Surgical	04	166: Other Resp System O.R. Procedures with MCC
Respiratory, Surgical	04	167: Other Resp System O.R. Procedures with CC
Respiratory, Surgical	04	168: Other Resp System O.R. Procedures without CC/MCC
Respiratory, Medical	04	175: Pulmonary Embolism with MCC
Respiratory, Medical	04	176: Pulmonary Embolism without MCC
Respiratory, Medical	04	177: Respiratory Infections & Inflammations with MCC
Respiratory, Medical	04	178: Respiratory Infections & Inflammations with CC
Respiratory, Medical	04	179: Respiratory Infections & Inflammations without CC/MCC
Respiratory, Medical	04	180: Respiratory Neoplasms with MCC
Respiratory, Medical	04	181: Respiratory Neoplasms with CC
Respiratory, Medical	04	183: Major Chest Trauma with MCC
Respiratory, Medical	04	184: Major Chest Trauma with CC
Respiratory, Medical	04	185: Major Chest Trauma without CC/MCC

(continued)

Table 5-1 (continued)
Classification for defining primary reason for treatment or "condition groups"

Primary Diagnosis Group	Major Diagnosis Category (MDC)	MS-DRG
Respiratory, Medical	04	186: Pleural Effusion with MCC
Respiratory, Medical	04	187: Pleural Effusion with CC
Respiratory, Medical	04	188: Pleural Effusion without CC/MCC
Respiratory, Medical	04	189: Pulmonary Edema & Respiratory Failure
Respiratory, Medical	04	193: Simple Pneumonia & Pleurisy with MCC
Respiratory, Medical	04	194: Simple Pneumonia & Pleurisy with CC
Respiratory, Medical	04	195: Simple Pneumonia & Pleurisy without CC/MCC
Respiratory, Medical	04	196: Interstitial Lung Disease with MCC
Respiratory, Medical	04	197: Interstitial Lung Disease with CC
Respiratory, Medical	04	198: Interstitial Lung Disease without CC/MCC
Respiratory, Medical	04	199: Pneumothorax with MCC
Respiratory, Medical	04	200: Pneumothorax with CC
Respiratory, Medical	04	201: Pneumothorax without CC/MCC
Respiratory, Medical	04	202: Bronchitis & Asthma with CC/MCC
Respiratory, Medical	04	203: Bronchitis & Asthma without CC/MCC
Respiratory, Medical	04	204: Respiratory Signs & Symptoms
Respiratory, Medical	04	205: Other Respiratory System Diagnoses with MCC
Respiratory, Medical	04	206: Other Respiratory System Diagnoses without MCC
Respiratory, COPD	04	190: Chronic Obstructive Pulmonary Disease with MCC
Respiratory, COPD	04	191: Chronic Obstructive Pulmonary Disease with CC
Respiratory, COPD	04	192: Chronic Obstructive Pulmonary Disease without CC/MCC

(continued)

Table 5-1 (continued)
Classification for defining primary reason for treatment or "condition groups"

Primary Diagnosis Group	Major Diagnosis Category (MDC)	MS-DRG
Cardiovascular, Vascular Surgical	05	237: Major Cardiovasc Procedures with MCC or Thoracic Aortic Aneurysm Repair
Cardiovascular, Vascular Surgical	05	238: Major Cardiovascular Procedures without MCC
Cardiovascular, Vascular Surgical	05	239: Amputation for Circ Sys Disorders Exc Upper Limb & Toe with MCC
Cardiovascular, Vascular Surgical	05	240: Amputation for Circ Sys Disorders Exc Upper Limb & Toe with CC
Cardiovascular, Vascular Surgical	05	241: Amputation for Circ Sys Disorders Exc Upper Limb & Toe without CC/MCC
Cardiovascular, Vascular Surgical	05	252: Other Vascular Procedures with MCC
Cardiovascular, Vascular Surgical	05	253: Other Vascular Procedures with CC
Cardiovascular, Vascular Surgical	05	254: Other Vascular Procedures without CC/MCC
Cardiovascular, Vascular Surgical	05	255: Upper Limb & Toe Amputation for Circ System Disorders with MCC
Cardiovascular, Vascular Surgical	05	256: Upper Limb & Toe Amputation for Circ System Disorders with CC
Cardiovascular, Vascular Surgical	05	263: Vein Ligation & Stripping
Cardiovascular, Vascular Surgical	05	264: Other Circulatory System O.R. Procedures
Cardiovascular, Cardiac Surgical	05	216: Cardiac Valve & Oth Maj Cardiothoracic Proc with Card Cath with MCC
Cardiovascular, Cardiac Surgical	05	217: Cardiac Valve & Oth Maj Cardiothoracic Proc with Card Cath with CC
Cardiovascular, Cardiac Surgical	05	218: Cardiac Valve & Oth Maj Cardiothoracic Proc with Card Cath without CC/MCC
Cardiovascular, Cardiac Surgical	05	219: Cardiac Valve & Oth Maj Cardiothoracic Proc without Card Cath with MCC
Cardiovascular, Cardiac Surgical	05	220: Cardiac Valve & Oth Maj Cardiothoracic Proc without Card Cath with CC
Cardiovascular, Cardiac Surgical	05	221: Cardiac Valve & Oth Maj Cardiothoracic Proc without Card Cath without CC/MCC
Cardiovascular, Cardiac Surgical	05	222: Cardiac Defib Implant with Cardiac Cath with Ami/Hf/Shock with MCC

(continued)

Table 5-1 (continued)
Classification for defining primary reason for treatment or "condition groups"

Primary Diagnosis Group	Major Diagnosis Category (MDC)	MS-DRG
Cardiovascular, Cardiac Surgical	05	223: Cardiac Defib Implant with Cardiac Cath with Ami/Hf/Shock without MCC
Cardiovascular, Cardiac Surgical	05	224: Cardiac Defib Implant with Cardiac Cath without Ami/Hf/Shock with MCC
Cardiovascular, Cardiac Surgical	05	225: Cardiac Defib Implant with Cardiac Cath without Ami/Hf/Shock without MCC
Cardiovascular, Cardiac Surgical	05	226: Cardiac Defibrillator Implant without Cardiac Cath with MCC
Cardiovascular, Cardiac Surgical	05	227: Cardiac Defibrillator Implant without Cardiac Cath without MCC
Cardiovascular, Cardiac Surgical	05	228: Other Cardiothoracic Procedures with MCC
Cardiovascular, Cardiac Surgical	05	229: Other Cardiothoracic Procedures with CC
Cardiovascular, Cardiac Surgical	05	230: Other Cardiothoracic Procedures without CC/MCC
Cardiovascular, Cardiac Surgical	05	231: Coronary Bypass with Ptca with MCC
Cardiovascular, Cardiac Surgical	05	232: Coronary Bypass with Ptca without MCC
Cardiovascular, Cardiac Surgical	05	233: Coronary Bypass with Cardiac Cath with MCC
Cardiovascular, Cardiac Surgical	05	234: Coronary Bypass with Cardiac Cath without MCC
Cardiovascular, Cardiac Surgical	05	235: Coronary Bypass without Cardiac Cath with MCC
Cardiovascular, Cardiac Surgical	05	236: Coronary Bypass without Cardiac Cath without MCC
Cardiovascular, Cardiac Surgical	05	242: Permanent Cardiac Pacemaker Implant with MCC
Cardiovascular, Cardiac Surgical	05	243: Permanent Cardiac Pacemaker Implant with CC
Cardiovascular, Cardiac Surgical	05	244: Permanent Cardiac Pacemaker Implant without CC/MCC
Cardiovascular, Cardiac Surgical	05	245: AICD Lead & Generator Procedures
Cardiovascular, Cardiac Surgical	05	246: Perc Cardiovasc Proc with Drug-Eluting Stent with MCC or 4+ Vessels/Stents
Cardiovascular, Cardiac Surgical	05	247: Perc Cardiovasc Proc with Drug-Eluting Stent without MCC
Cardiovascular, Cardiac Surgical	05	248: Perc Cardiovasc Proc with Non-Drug-Eluting Stent with MCC or 4+ Ves/Stents

(continued)

Table 5-1 (continued)
Classification for defining primary reason for treatment or "condition groups"

Primary Diagnosis Group	Major Diagnosis Category (MDC)	MS-DRG
Cardiovascular, Cardiac Surgical	05	249: Perc Cardiovasc Proc with Non-Drug-Eluting Stent without MCC
Cardiovascular, Cardiac Surgical	05	250: Perc Cardiovasc Proc without Coronary Artery Stent or Ami with MCC
Cardiovascular, Cardiac Surgical	05	251: Perc Cardiovasc Proc without Coronary Artery Stent or Ami without MCC
Cardiovascular, Cardiac Surgical	05	258: Cardiac Pacemaker Device Replacement with MCC
Cardiovascular, Cardiac Surgical	05	259: Cardiac Pacemaker Device Replacement without MCC
Cardiovascular, Cardiac Surgical	05	260: Cardiac Pacemaker Revision Except Device Replacement with MCC
Cardiovascular, Cardiac Surgical	05	261: Cardiac Pacemaker Revision Except Device Replacement with CC
Cardiovascular, General	**05**	286: Circulatory Disorders Except Ami, with Card Cath with MCC
Cardiovascular, General	05	287: Circulatory Disorders Except Ami, with Card Cath without MCC
Cardiovascular, General	05	302: Atherosclerosis with MCC
Cardiovascular, General	05	303: Atherosclerosis without MCC
Cardiovascular, General	05	304: Hypertension with MCC
Cardiovascular, General	05	305: Hypertension without MCC
Cardiovascular, General	05	311: Angina Pectoris
Cardiovascular, General	05	312: Syncope & Collapse
Cardiovascular, General	05	313: Chest Pain
Cardiovascular, General	05	314: Other Circulatory System Diagnoses with MCC
Cardiovascular, General	05	315: Other Circulatory System Diagnoses with CC
Cardiovascular, General	05	316: Other Circulatory System Diagnoses without CC/MCC

(continued)

Table 5-1 (continued)
Classification for defining primary reason for treatment or "condition groups"

Primary Diagnosis Group	Major Diagnosis Category (MDC)	MS-DRG
Cardiovascular, Vascular Medical	**05**	294: Deep Vein Thrombophlebitis with CC/MCC
Cardiovascular, Vascular Medical	05	295: Deep Vein Thrombophlebitis without CC/MCC
Cardiovascular, Vascular Medical	05	299: Peripheral Vascular Disorders with MCC
Cardiovascular, Vascular Medical	05	300: Peripheral Vascular Disorders with CC
Cardiovascular, Vascular Medical	05	301: Peripheral Vascular Disorders without CC/MCC
Cardiovascular, Cardiac Medical	05	280: Acute Myocardial Infarction, Discharged Alive with MCC
Cardiovascular, Cardiac Medical	05	281: Acute Myocardial Infarction, Discharged Alive with CC
Cardiovascular, Cardiac Medical	05	282: Acute Myocardial Infarction, Discharged Alive without CC/MCC
Cardiovascular, Cardiac Medical	05	288: Acute & Subacute Endocarditis with MCC
Cardiovascular, Cardiac Medical	05	289: Acute & Subacute Endocarditis with CC
Cardiovascular, Cardiac Medical	05	291: Heart Failure & Shock with MCC
Cardiovascular, Cardiac Medical	05	292: Heart Failure & Shock with CC
Cardiovascular, Cardiac Medical	05	293: Heart Failure & Shock without CC/MCC
Cardiovascular, Cardiac Medical	05	296: Cardiac Arrest, Unexplained with MCC
Cardiovascular, Cardiac Medical	05	306: Cardiac Congenital & Valvular Disorders with MCC
Cardiovascular, Cardiac Medical	05	307: Cardiac Congenital & Valvular Disorders without MCC
Cardiovascular, Cardiac Medical	05	308: Cardiac Arrhythmia & Conduction Disorders with MCC
Cardiovascular, Cardiac Medical	05	309: Cardiac Arrhythmia & Conduction Disorders with CC
Cardiovascular, Cardiac Medical	05	310: Cardiac Arrhythmia & Conduction Disorders without CC/MCC

(continued)

Table 5-1 (continued)
Classification for defining primary reason for treatment or "condition groups"

Primary Diagnosis Group	Major Diagnosis Category (MDC)	MS-DRG
Orthopedic, Minor Surgical	**08**	463: Wnd Debrid & Skn Grft Exc Hand, for Musculo-Conn Tiss Dis with MCC
Orthopedic, Minor Surgical	08	464: Wnd Debrid & Skn Grft Exc Hand, for Musculo-Conn Tiss Dis with CC
Orthopedic, Minor Surgical	08	465: Wnd Debrid & Skn Grft Exc Hand, for Musculo-Conn Tiss Dis without CC/MCC
Orthopedic, Minor Surgical	08	477: Biopsies of Musculoskeletal System & Connective Tissue with MCC
Orthopedic, Minor Surgical	08	478: Biopsies of Musculoskeletal System & Connective Tissue with CC
Orthopedic, Minor Surgical	08	479: Biopsies of Musculoskeletal System & Connective Tissue without CC/MCC
Orthopedic, Minor Surgical	08	480: Hip & Femur Procedures Except Major Joint with MCC
Orthopedic, Minor Surgical	08	481: Hip & Femur Procedures Except Major Joint with CC
Orthopedic, Minor Surgical	08	482: Hip & Femur Procedures Except Major Joint without CC/MCC
Orthopedic, Minor Surgical	08	485: Knee Procedures with PDX of Infection with MCC
Orthopedic, Minor Surgical	08	486: Knee Procedures with PDX of Infection with CC
Orthopedic, Minor Surgical	08	487: Knee Procedures with PDX of Infection without CC/MCC
Orthopedic, Minor Surgical	08	488: Knee Procedures without PDX of Infection with CC/MCC
Orthopedic, Minor Surgical	08	489: Knee Procedures without PDX of Infection without CC/MCC
Orthopedic, Minor Surgical	08	492: Lower Extrem & Humer Proc Except Hip, Foot, Femur with MCC
Orthopedic, Minor Surgical	08	493: Lower Extrem & Humer Proc Except Hip, Foot, Femur with CC
Orthopedic, Minor Surgical	08	494: Lower Extrem & Humer Proc Except Hip, Foot, Femur without CC/MCC
Orthopedic, Minor Surgical	08	495: Local Excision & Removal Int Fix Devices Exc Hip & Femur with MCC
Orthopedic, Minor Surgical	08	496: Local Excision & Removal Int Fix Devices Exc Hip & Femur with CC
Orthopedic, Minor Surgical	08	497: Local Excision & Removal Int Fix Devices Exc Hip & Femur without CC/MCC

(continued)

Table 5-1 (continued)
Classification for defining primary reason for treatment or "condition groups"

Primary Diagnosis Group	Major Diagnosis Category (MDC)	MS-DRG
Orthopedic, Minor Surgical	08	498: Local Excision & Removal Int Fix Devices of Hip & Femur with CC/MCC
Orthopedic, Minor Surgical	08	499: Local Excision & Removal Int Fix Devices of Hip & Femur without CC/MCC
Orthopedic, Minor Surgical	08	500: Soft Tissue Procedures with MCC
Orthopedic, Minor Surgical	08	501: Soft Tissue Procedures with CC
Orthopedic, Minor Surgical	08	502: Soft Tissue Procedures without CC/MCC
Orthopedic, Minor Surgical	08	503: Foot Procedures with MCC
Orthopedic, Minor Surgical	08	504: Foot Procedures with CC
Orthopedic, Minor Surgical	08	505: Foot Procedures without CC/MCC
Orthopedic, Minor Surgical	08	506: Major Thumb or Joint Procedures
Orthopedic, Minor Surgical	08	510: Shoulder, Elbow or Forearm Proc, Exc Major Joint Proc with MCC
Orthopedic, Minor Surgical	08	511: Shoulder, Elbow or Forearm Proc, Exc Major Joint Proc with CC
Orthopedic, Minor Surgical	08	512: Shoulder, Elbow or Forearm Proc, Exc Major Joint Proc without CC/MCC
Orthopedic, Minor Surgical	08	513: Hand or Wrist Proc, Except Major Thumb or Joint Proc with CC/MCC
Orthopedic, Minor Surgical	08	515: Other Musculoskelet Sys & Conn Tiss O.R. Proc with MCC
Orthopedic, Minor Surgical	08	516: Other Musculoskelet Sys & Conn Tiss O.R. Proc with CC
Orthopedic, Minor Surgical	08	517: Other Musculoskelet Sys & Conn Tiss O.R. Proc without CC/MCC
Orthopedic, Major Surgical	08	461: Bilateral or Multiple Major Joint Procs of Lower Extremity with MCC
Orthopedic, Major Surgical	08	462: Bilateral or Multiple Major Joint Procs of Lower Extremity without MCC
Orthopedic, Major Surgical	08	466: Revision of Hip or Knee Replacement with MCC
Orthopedic, Major Surgical	08	467: Revision of Hip or Knee Replacement with CC
Orthopedic, Major Surgical	08	468: Revision of Hip or Knee Replacement without CC/MCC

(continued)

Table 5-1 (continued)
Classification for defining primary reason for treatment or "condition groups"

Primary Diagnosis Group	Major Diagnosis Category (MDC)	MS-DRG
Orthopedic, Major Surgical	08	469: Major Joint Replacement or Reattachment of Lower Extremity with MCC
Orthopedic, Major Surgical	08	470: Major Joint Replacement or Reattachment of Lower Extremity without MCC
Orthopedic, Major Surgical	08	474: Amputation for Musculoskeletal Sys & Conn Tissue Dis with MCC
Orthopedic, Major Surgical	08	475: Amputation for Musculoskeletal Sys & Conn Tissue Dis with CC
Orthopedic, Major Surgical	08	476: Amputation for Musculoskeletal Sys & Conn Tissue Dis without CC/MCC
Orthopedic, Major Surgical	08	483: Major Joint & Limb Reattachment Proc of Upper Extremity with CC/MCC
Orthopedic, Major Surgical	08	484: Major Joint & Limb Reattachment Proc of Upper Extremity without CC/MCC
Orthopedic, Major Surgical	08	507: Major Shoulder or Elbow Joint Procedures with CC/MCC
Orthopedic, Major Surgical	08	508: Major Shoulder or Elbow Joint Procedures without CC/MCC
Orthopedic, Major Surgical	24	956: Limb Reattachment, Hip & Femur Proc for Multiple Significant Trauma
Orthopedic, Spinal	**08**	453: Combined Anterior/Posterior Spinal Fusion with MCC
Orthopedic, Spinal	08	454: Combined Anterior/Posterior Spinal Fusion with CC
Orthopedic, Spinal	08	455: Combined Anterior/Posterior Spinal Fusion without CC/MCC
Orthopedic, Spinal	08	456: Spinal Fus Exc Cerv with Spinal Curv/Malig/Infec or 9+ Fus with MCC
Orthopedic, Spinal	08	457: Spinal Fus Exc Cerv with Spinal Curv/Malig/Infec or 9+ Fus with CC
Orthopedic, Spinal	08	458: Spinal Fus Exc Cerv with Spinal Curv/Malig/Infec or 9+ Fus without CC/MCC
Orthopedic, Spinal	08	459: Spinal Fusion Except Cervical with MCC
Orthopedic, Spinal	08	460: Spinal Fusion Except Cervical without MCC
Orthopedic, Spinal	08	471: Cervical Spinal Fusion with MCC
Orthopedic, Spinal	08	472: Cervical Spinal Fusion with CC
Orthopedic, Spinal	08	473: Cervical Spinal Fusion without CC/MCC

(continued)

Table 5-1 (continued)
Classification for defining primary reason for treatment or "condition groups"

Primary Diagnosis Group	Major Diagnosis Category (MDC)	MS-DRG
Orthopedic, Spinal	08	490: Back & Neck Proc Exc Spinal Fusion with CC/MCC or Disc Device/Neurostim
Orthopedic, Spinal	08	491: Back & Neck Proc Exc Spinal Fusion without CC/MCC
Orthopedic, Minor Medical	**08**	533: Fractures of Femur with MCC
Orthopedic, Minor Medical	08	534: Fractures of Femur without MCC
Orthopedic, Minor Medical	08	537: Sprains, Strains, & Dislocations of Hip, Pelvis & Thigh with CC/MCC
Orthopedic, Minor Medical	08	538: Sprains, Strains, & Dislocations of Hip, Pelvis & Thigh without CC/MCC
Orthopedic, Minor Medical	08	539: Osteomyelitis with MCC
Orthopedic, Minor Medical	08	540: Osteomyelitis with CC
Orthopedic, Minor Medical	08	545: Connective Tissue Disorders with MCC
Orthopedic, Minor Medical	08	546: Connective Tissue Disorders with CC
Orthopedic, Minor Medical	08	547: Connective Tissue Disorders without CC/MCC
Orthopedic, Minor Medical	08	548: Septic Arthritis with MCC
Orthopedic, Minor Medical	08	549: Septic Arthritis with CC
Orthopedic, Minor Medical	08	551: Medical Back Problems with MCC
Orthopedic, Minor Medical	08	552: Medical Back Problems without MCC
Orthopedic, Minor Medical	08	553: Bone Diseases & Arthropathies with MCC
Orthopedic, Minor Medical	08	554: Bone Diseases & Arthropathies without MCC
Orthopedic, Minor Medical	08	555: Signs & Symptoms of Musculoskeletal System & Conn Tissue with MCC
Orthopedic, Minor Medical	08	556: Signs & Symptoms of Musculoskeletal System & Conn Tissue without MCC
Orthopedic, Minor Medical	08	557: Tendonitis, Myositis & Bursitis with MCC
Orthopedic, Minor Medical	08	558: Tendonitis, Myositis & Bursitis without MCC

(continued)

Table 5-1 (continued)
Classification for defining primary reason for treatment or "condition groups"

Primary Diagnosis Group	Major Diagnosis Category (MDC)	MS-DRG
Orthopedic, Minor Medical	08	559: Aftercare, Musculoskeletal System & Connective Tissue with MCC
Orthopedic, Minor Medical	08	560: Aftercare, Musculoskeletal System & Connective Tissue with CC
Orthopedic, Minor Medical	08	561: Aftercare, Musculoskeletal System & Connective Tissue without CC/MCC
Orthopedic, Minor Medical	08	562: Fx, Sprn, Strn & Disl Except Femur, Hip, Pelvis & Thigh with MCC
Orthopedic, Minor Medical	08	563: Fx, Sprn, Strn & Disl Except Femur, Hip, Pelvis & Thigh without MCC
Orthopedic, Minor Medical	08	564: Other Musculoskeletal Sys & Connective Tissue Diagnoses with MCC
Orthopedic, Minor Medical	08	565: Other Musculoskeletal Sys & Connective Tissue Diagnoses with CC
Orthopedic, Minor Medical	08	566: Other Musculoskeletal Sys & Connective Tissue Diagnoses without CC/MCC
Orthopedic, Major Medical	08	535: Fractures of Hip & Pelvis with MCC
Orthopedic, Major Medical	08	536: Fractures of Hip & Pelvis without MCC
Orthopedic, Major Medical	08	542: Pathological Fractures & Musculoskelet & Conn Tiss Malig with MCC
Orthopedic, Major Medical	08	543: Pathological Fractures & Musculoskelet & Conn Tiss Malig with CC
Orthopedic, Major Medical	08	544: Pathological Fractures & Musculoskelet & Conn Tiss Malig without CC/MCC
Integumentary, Surgical	**09**	573: Skin Graft &/Or Debrid for Skn Ulcer or Cellulitis with MCC
Integumentary, Surgical	09	574: Skin Graft &/Or Debrid for Skn Ulcer or Cellulitis with CC
Integumentary, Surgical	09	575: Skin Graft &/Or Debrid for Skn Ulcer or Cellulitis without CC/MCC
Integumentary, Surgical	09	576: Skin Graft &/Or Debrid Exc for Skin Ulcer or Cellulitis with MCC
Integumentary, Surgical	09	577: Skin Graft &/Or Debrid Exc for Skin Ulcer or Cellulitis with CC
Integumentary, Surgical	09	578: Skin Graft &/Or Debrid Exc for Skin Ulcer or Cellulitis without CC/MCC
Integumentary, Surgical	09	579: Other Skin, Subcut Tiss & Breast Proc with MCC
Integumentary, Surgical	09	580: Other Skin, Subcut Tiss & Breast Proc with CC

(continued)

Table 5-1 (continued)
Classification for defining primary reason for treatment or "condition groups"

Primary Diagnosis Group	Major Diagnosis Category (MDC)	MS-DRG
Integumentary, Surgical	09	581: Other Skin, Subcut Tiss & Breast Proc without CC/MCC
Integumentary, Surgical	09	582: Mastectomy for Malignancy with CC/MCC
Integumentary, Surgical	09	583: Mastectomy for Malignancy without CC/MCC
Integumentary, Surgical	09	584: Breast Biopsy, Local Excision & Other Breast Procedures with CC/MCC
Integumentary, Surgical	09	585: Breast Biopsy, Local Excision & Other Breast Procedures without CC/MCC
Integumentary, Medical	09	592: Skin Ulcers with MCC
Integumentary, Medical	09	593: Skin Ulcers with CC
Integumentary, Medical	09	594: Skin Ulcers without CC/MCC
Integumentary, Medical	09	595: Major Skin Disorders with MCC
Integumentary, Medical	09	596: Major Skin Disorders without MCC
Integumentary, Medical	09	601: Non-Malignant Breast Disorders without CC/MCC
Integumentary, Medical	09	602: Cellulitis with MCC
Integumentary, Medical	09	603: Cellulitis without MCC
Integumentary, Medical	09	604: Trauma To the Skin, Subcut Tiss & Breast with MCC
Integumentary, Medical	09	605: Trauma To the Skin, Subcut Tiss & Breast without MCC
Integumentary, Medical	09	606: Minor Skin Disorders with MCC
Integumentary, Medical	09	607: Minor Skin Disorders without MCC
Endocrine, Surgical	**10**	616: Amputat of Lower Limb for Endocrine, Nutrit,& Metabol Dis with MCC
Endocrine, Surgical	10	617: Amputat of Lower Limb for Endocrine, Nutrit,& Metabol Dis with CC
Endocrine, Surgical	10	619: O.R. Procedures for Obesity with MCC
Endocrine, Surgical	10	620: O.R. Procedures for Obesity with CC

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Table 5-1 (continued)
Classification for defining primary reason for treatment or "condition groups"

Primary Diagnosis Group	Major Diagnosis Category (MDC)	MS-DRG
Endocrine, Surgical	10	621: O.R. Procedures for Obesity without CC/MCC
Endocrine, Surgical	10	622: Skin Grafts & Wound Debrid for Endoc, Nutrit & Metab Dis with MCC
Endocrine, Surgical	10	623: Skin Grafts & Wound Debrid for Endoc, Nutrit & Metab Dis with CC
Endocrine, Surgical	10	624: Skin Grafts & Wound Debrid for Endoc, Nutrit & Metab Dis without CC/MCC
Endocrine, Surgical	10	625: Thyroid, Parathyroid & Thyroglossal Procedures with MCC
Endocrine, Surgical	10	627: Thyroid, Parathyroid & Thyroglossal Procedures without CC/MCC
Endocrine, Surgical	10	628: Other Endocrine, Nutrit & Metab O.R. Proc with MCC
Endocrine, Surgical	10	629: Other Endocrine, Nutrit & Metab O.R. Proc with CC
Endocrine, Surgical	10	630: Other Endocrine, Nutrit & Metab O.R. Proc without CC/MCC
Endocrine, Medical	10	637: Diabetes with MCC
Endocrine, Medical	10	638: Diabetes with CC
Endocrine, Medical	10	639: Diabetes without CC/MCC
Endocrine, Medical	10	640: Nutritional & Misc Metabolic Disorders with MCC
Endocrine, Medical	10	641: Nutritional & Misc Metabolic Disorders without MCC
Endocrine, Medical	10	642: Inborn Errors of Metabolism
Endocrine, Medical	10	643: Endocrine Disorders with MCC
Endocrine, Medical	10	644: Endocrine Disorders with CC
Endocrine, Medical	10	645: Endocrine Disorders without CC/MCC
Kidney & Urinary, Surgical	**11**	653: Major Bladder Procedures with MCC
Kidney & Urinary, Surgical	11	654: Major Bladder Procedures with CC
Kidney & Urinary, Surgical	11	655: Major Bladder Procedures without CC/MCC

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Table 5-1 (continued)
Classification for defining primary reason for treatment or "condition groups"

Primary Diagnosis Group	Major Diagnosis Category (MDC)	MS-DRG
Kidney & Urinary, Surgical	11	656: Kidney & Ureter Procedures for Neoplasm with MCC
Kidney & Urinary, Surgical	11	657: Kidney & Ureter Procedures Forneoplasm with CC
Kidney & Urinary, Surgical	11	658: Kidney & Ureter Procedures for Neoplasm without CC/MCC
Kidney & Urinary, Surgical	11	659: Kidney & Ureter Procedures for Non-Neoplasm with MCC
Kidney & Urinary, Surgical	11	660: Kidney & Ureter Procedures for Non-Neoplasm with CC
Kidney & Urinary, Surgical	11	662: Minor Bladder Procedures with MCC
Kidney & Urinary, Surgical	11	663: Minor Bladder Procedures with CC
Kidney & Urinary, Surgical	11	665: Prostatectomy with MCC
Kidney & Urinary, Surgical	11	666: Prostatectomy with CC
Kidney & Urinary, Surgical	11	668: Transurethral Procedures with MCC
Kidney & Urinary, Surgical	11	669: Transurethral Procedures with CC
Kidney & Urinary, Surgical	11	670: Transurethral Procedures without CC/MCC
Kidney & Urinary, Surgical	11	673: Other Kidney & Urinary Tract Procedures with MCC
Kidney & Urinary, Surgical	11	674: Other Kidney & Urinary Tract Procedures with CC
Kidney & Urinary, Medical	**11**	682: Renal Failure with MCC
Kidney & Urinary, Medical	11	683: Renal Failure with CC
Kidney & Urinary, Medical	11	684: Renal Failure without CC/MCC
Kidney & Urinary, Medical	11	685: Admit for Renal Dialysis
Kidney & Urinary, Medical	11	686: Kidney & Urinary Tract Neoplasms with MCC
Kidney & Urinary, Medical	11	687: Kidney & Urinary Tract Neoplasms with CC
Kidney & Urinary, Medical	11	689: Kidney & Urinary Tract Infections with MCC

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Table 5-1 (continued)
Classification for defining primary reason for treatment or "condition groups"

Primary Diagnosis Group	Major Diagnosis Category (MDC)	MS-DRG
Kidney & Urinary, Medical	11	690: Kidney & Urinary Tract Infections without MCC
Kidney & Urinary, Medical	11	694: Urinary Stones without Esw Lithotripsy without MCC
Kidney & Urinary, Medical	11	695: Kidney & Urinary Tract Signs & Symptoms with MCC
Kidney & Urinary, Medical	11	696: Kidney & Urinary Tract Signs & Symptoms without MCC
Kidney & Urinary, Medical	11	698: Other Kidney & Urinary Tract Diagnoses with MCC
Kidney & Urinary, Medical	11	699: Other Kidney & Urinary Tract Diagnoses with CC
Kidney & Urinary, Medical	11	700: Other Kidney & Urinary Tract Diagnoses without CC/MCC
Infections, Surgical	**18**	853: Infectious & Parasitic Diseases with O.R. Procedure with MCC
Infections, Surgical	18	854: Infectious & Parasitic Diseases with O.R. Procedure with CC
Infections, Surgical	18	855: Infectious & Parasitic Diseases with O.R. Procedure without CC/MCC
Infections, Surgical	18	856: Postoperative or Post-Traumatic Infections with O.R. Proc with MCC
Infections, Surgical	18	857: Postoperative or Post-Traumatic Infections with O.R. Proc with CC
Infections, Surgical	18	858: Postoperative or Post-Traumatic Infections with O.R. Proc without CC/MCC
Infections, Medical	18	862: Postoperative & Post-Traumatic Infections with MCC
Infections, Medical	18	863: Postoperative & Post-Traumatic Infections without MCC
Infections, Medical	18	864: Fever of Unknown Origin
Infections, Medical	18	865: Viral Illness with MCC
Infections, Medical	18	866: Viral Illness without MCC
Infections, Medical	18	867: Other Infectious & Parasitic Diseases Diagnoses with MCC
Infections, Medical	18	868: Other Infectious & Parasitic Diseases Diagnoses with CC
Infections, Medical	18	869: Other Infectious & Parasitic Diseases Diagnoses without CC/MCC

(continued)

Table 5-1 (continued)
Classification for defining primary reason for treatment or "condition groups"

Primary Diagnosis Group	Major Diagnosis Category (MDC)	MS-DRG
Infections, Septicemia	18	870: Septicemia with MV 96+ Hours
Infections, Septicemia	18	871: Septicemia without MV 96+ Hours with MCC
Infections, Septicemia	18	872: Septicemia without MV 96+ Hours without MCC
Transplant	**Pre**	001: Heart Transplant or Implant of Heart Assist System with MCC
Transplant	Pre	005: Liver Transplant with MCC or Intestinal Transplant
Transplant	Pre	007: Lung Transplant
Transplant	Pre	009: Bone Marrow Transplant
Transplant	**11**	652: Kidney Transplant
GI & Hepatobiliary, Minor Surgical	**06**	335: Peritoneal Adhesiolysis with MCC
GI & Hepatobiliary, Minor Surgical	06	336: Peritoneal Adhesiolysis with CC
GI & Hepatobiliary, Minor Surgical	06	337: Peritoneal Adhesiolysis without CC/MCC
GI & Hepatobiliary, Minor Surgical	06	338: Appendectomy with Complicated Principal Diag with MCC
GI & Hepatobiliary, Minor Surgical	06	339: Appendectomy with Complicated Principal Diag with CC
GI & Hepatobiliary, Minor Surgical	06	340: Appendectomy with Complicated Principal Diag without CC/MCC
GI & Hepatobiliary, Minor Surgical	06	343: Appendectomy without Complicated Principal Diag without CC/MCC

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Table 5-1 (continued)
Classification for defining primary reason for treatment or "condition groups"

Primary Diagnosis Group	Major Diagnosis Category (MDC)	MS-DRG
GI & Hepatobiliary, Minor Surgical	06	344: Minor Small & Large Bowel Procedures with MCC
GI & Hepatobiliary, Minor Surgical	06	345: Minor Small & Large Bowel Procedures with CC
GI & Hepatobiliary, Minor Surgical	06	346: Minor Small & Large Bowel Procedures without CC/MCC
GI & Hepatobiliary, Minor Surgical	06	350: Inguinal & Femoral Hernia Procedures with MCC
GI & Hepatobiliary, Minor Surgical	06	351: Inguinal & Femoral Hernia Procedures with CC
GI & Hepatobiliary, Minor Surgical	06	352: Inguinal & Femoral Hernia Procedures without CC/MCC
GI & Hepatobiliary, Minor Surgical	06	353: Hernia Procedures Except Inguinal & Femoral with MCC
GI & Hepatobiliary, Minor Surgical	06	354: Hernia Procedures Except Inguinal & Femoral with CC
GI & Hepatobiliary, Minor Surgical	06	355: Hernia Procedures Except Inguinal & Femoral without CC/MCC
GI & Hepatobiliary, Minor Surgical	06	356: Other Digestive System O.R. Procedures with MCC
GI & Hepatobiliary, Minor Surgical	06	357: Other Digestive System O.R. Procedures with CC
GI & Hepatobiliary, Minor Surgical	06	358: Other Digestive System O.R. Procedures without CC/MCC

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Table 5-1 (continued)
Classification for defining primary reason for treatment or "condition groups"

Primary Diagnosis Group	Major Diagnosis Category (MDC)	MS-DRG
GI & Hepatobiliary, Minor Surgical	**07**	408: Biliary Tract Proc Except Only Cholecyst with or without C.D.E. with MCC
GI & Hepatobiliary, Minor Surgical	07	409: Biliary Tract Proc Except Only Cholecyst with or without C.D.E. with CC
GI & Hepatobiliary, Minor Surgical	07	410: Biliary Tract Proc Except Only Cholecyst with or without C.D.E. without CC/MCC
GI & Hepatobiliary, Minor Surgical	07	411: Cholecystectomy with C.D.E. with MCC
GI & Hepatobiliary, Minor Surgical	07	412: Cholecystectomy with C.D.E. with CC
GI & Hepatobiliary, Minor Surgical	07	414: Cholecystectomy Except by Laparoscope without C.D.E. with MCC
GI & Hepatobiliary, Minor Surgical	07	415: Cholecystectomy Except by Laparoscope without C.D.E. with CC
GI & Hepatobiliary, Minor Surgical	07	416: Cholecystectomy Except by Laparoscope without C.D.E. without CC/MCC
GI & Hepatobiliary, Minor Surgical	07	417: Laparoscopic Cholecystectomy without C.D.E. with MCC
GI & Hepatobiliary, Minor Surgical	07	418: Laparoscopic Cholecystectomy without C.D.E. with CC
GI & Hepatobiliary, Minor Surgical	07	419: Laparoscopic Cholecystectomy without C.D.E. without CC/MCC
GI & Hepatobiliary, Minor Surgical	07	420: Hepatobiliary Diagnostic Procedures with MCC

(continued)

Table 5-1 (continued)
Classification for defining primary reason for treatment or "condition groups"

Primary Diagnosis Group	Major Diagnosis Category (MDC)	MS-DRG
GI & Hepatobiliary, Minor Surgical	07	421: Hepatobiliary Diagnostic Procedures with CC
GI & Hepatobiliary, Minor Surgical	07	423: Other Hepatobiliary or Pancreas O.R. Procedures with MCC
GI & Hepatobiliary, Minor Surgical	07	424: Other Hepatobiliary or Pancreas O.R. Procedures with CC
GI & Hepatobiliary, Major Surgical	**06**	326: Stomach, Esophageal & Duodenal Proc with MCC
GI & Hepatobiliary, Major Surgical	06	327: Stomach, Esophageal & Duodenal Proc with CC
GI & Hepatobiliary, Major Surgical	06	328: Stomach, Esophageal & Duodenal Proc without CC/MCC
GI & Hepatobiliary, Major Surgical	06	329: Major Small & Large Bowel Procedures with MCC
GI & Hepatobiliary, Major Surgical	06	330: Major Small & Large Bowel Procedures with CC
GI & Hepatobiliary, Major Surgical	06	331: Major Small & Large Bowel Procedures without CC/MCC
GI & Hepatobiliary, Major Surgical	06	332: Rectal Resection with MCC
GI & Hepatobiliary, Major Surgical	06	333: Rectal Resection with CC
GI & Hepatobiliary, Major Surgical	06	334: Rectal Resection without CC/MCC

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Table 5-1 (continued)
Classification for defining primary reason for treatment or "condition groups"

Primary Diagnosis Group	Major Diagnosis Category (MDC)	MS-DRG
GI & Hepatobiliary, Major Surgical	06	347: Anal & Stomal Procedures with MCC
GI & Hepatobiliary, Major Surgical	06	348: Anal & Stomal Procedures with CC
GI & Hepatobiliary, Major Surgical	06	349: Anal & Stomal Procedures without CC/MCC
GI & Hepatobiliary, Major Surgical	**07**	405: Pancreas, Liver & Shunt Procedures with MCC
GI & Hepatobiliary, Major Surgical	07	406: Pancreas, Liver & Shunt Procedures with CC
GI & Hepatobiliary, Major Surgical	07	407: Pancreas, Liver & Shunt Procedures without CC/MCC
GI & Hepatobiliary, Minor Medical	**06**	383: Uncomplicated Peptic Ulcer with MCC
GI & Hepatobiliary, Minor Medical	06	384: Uncomplicated Peptic Ulcer without MCC
GI & Hepatobiliary, Minor Medical	06	385: Inflammatory Bowel Disease with MCC
GI & Hepatobiliary, Minor Medical	06	386: Inflammatory Bowel Disease with CC
GI & Hepatobiliary, Minor Medical	06	387: Inflammatory Bowel Disease without CC/MCC
GI & Hepatobiliary, Minor Medical	06	388: G.I. Obstruction with MCC

(continued)

Table 5-1 (continued)
Classification for defining primary reason for treatment or "condition groups"

Primary Diagnosis Group	Major Diagnosis Category (MDC)	MS-DRG
GI & Hepatobiliary, Minor Medical	06	389: G.I. Obstruction with CC
GI & Hepatobiliary, Minor Medical	06	390: G.I. Obstruction without CC/MCC
GI & Hepatobiliary, Minor Medical	06	391: Esophagitis, Gastroent & Misc Digest Disorders with MCC
GI & Hepatobiliary, Minor Medical	06	392: Esophagitis, Gastroent & Misc Digest Disorders without MCC
GI & Hepatobiliary, Minor Medical	06	393: Other Digestive System Diagnoses with MCC
GI & Hepatobiliary, Minor Medical	06	394: Other Digestive System Diagnoses with CC
GI & Hepatobiliary, Minor Medical	06	395: Other Digestive System Diagnoses without CC/MCC
GI & Hepatobiliary, Minor Medical	**07**	438: Disorders of Pancreas Except Malignancy with MCC
GI & Hepatobiliary, Minor Medical	07	439: Disorders of Pancreas Except Malignancy with CC
GI & Hepatobiliary, Minor Medical	07	440: Disorders of Pancreas Except Malignancy without CC/MCC
GI & Hepatobiliary, Minor Medical	07	441: Disorders of Liver Except Malig, Cirr, Alc Hepa with MCC
GI & Hepatobiliary, Minor Medical	07	442: Disorders of Liver Except Malig, Cirr, Alc Hepa with CC

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Table 5-1 (continued)
Classification for defining primary reason for treatment or "condition groups"

Primary Diagnosis Group	Major Diagnosis Category (MDC)	MS-DRG
GI & Hepatobiliary, Minor Medical	07	443: Disorders of Liver Except Malig, Cirr, Alc Hepa without CC/MCC
GI & Hepatobiliary, Minor Medical	07	444: Disorders of the Biliary Tract with MCC
GI & Hepatobiliary, Minor Medical	07	445: Disorders of the Biliary Tract with CC
GI & Hepatobiliary, Minor Medical	07	446: Disorders of the Biliary Tract without CC/MCC
GI & Hepatobiliary, Major Medical	**06**	368: Major Esophageal Disorders with MCC
GI & Hepatobiliary, Major Medical	06	369: Major Esophageal Disorders with CC
GI & Hepatobiliary, Major Medical	06	370: Major Esophageal Disorders without CC/MCC
GI & Hepatobiliary, Major Medical	06	371: Major Gastrointestinal Disorders & Peritoneal Infections with MCC
GI & Hepatobiliary, Major Medical	06	372: Major Gastrointestinal Disorders & Peritoneal Infections with CC
GI & Hepatobiliary, Major Medical	06	373: Major Gastrointestinal Disorders & Peritoneal Infections without CC/MCC
GI & Hepatobiliary, Major Medical	06	374: Digestive Malignancy with MCC
GI & Hepatobiliary, Major Medical	06	375: Digestive Malignancy with CC

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Table 5-1 (continued)
Classification for defining primary reason for treatment or "condition groups"

Primary Diagnosis Group	Major Diagnosis Category (MDC)	MS-DRG
GI & Hepatobiliary, Major Medical	06	377: G.I. Hemorrhage with MCC
GI & Hepatobiliary, Major Medical	06	378: G.I. Hemorrhage with CC
GI & Hepatobiliary, Major Medical	06	379: G.I. Hemorrhage without CC/MCC
GI & Hepatobiliary, Major Medical	06	380: Complicated Peptic Ulcer with MCC
GI & Hepatobiliary, Major Medical	06	381: Complicated Peptic Ulcer with CC
GI & Hepatobiliary, Major Medical	**07**	432: Cirrhosis & Alcoholic Hepatitis with MCC
GI & Hepatobiliary, Major Medical	07	433: Cirrhosis & Alcoholic Hepatitis with CC
GI & Hepatobiliary, Major Medical	07	435: Malignancy of Hepatobiliary System or Pancreas with MCC
GI & Hepatobiliary, Major Medical	07	436: Malignancy of Hepatobiliary System or Pancreas with CC
Hematologic, Surgical	**16**	799: Splenectomy with MCC
Hematologic, Surgical	16	800: Splenectomy with CC
Hematologic, Surgical	16	802: Other O.R. Proc of the Blood & Blood Forming Organs with MCC
Hematologic, Surgical	16	803: Other O.R. Proc of the Blood & Blood Forming Organs with CC
Hematologic, Surgical	**17**	820: Lymphoma & Leukemia with Major O.R. Procedure with MCC
Hematologic, Surgical	17	821: Lymphoma & Leukemia with Major O.R. Procedure with CC

(continued)

Table 5-1 (continued)
Classification for defining primary reason for treatment or "condition groups"

Primary Diagnosis Group	Major Diagnosis Category (MDC)	MS-DRG
Hematologic, Surgical	17	823: Lymphoma & Non-Acute Leukemia with Other O.R. Proc with MCC
Hematologic, Surgical	17	824: Lymphoma & Non-Acute Leukemia with Other O.R. Proc with CC
Hematologic, Surgical	17	825: Lymphoma & Non-Acute Leukemia with Other O.R. Proc without CC/MCC
Hematologic, Surgical	17	827: Myeloprolif Disord or Poorly Diff Neopl with Maj O.R. Proc with CC
Hematologic, Medical	**16**	808: Major Hematol/Immun Diag Exc Sickle Cell Crisis & Coagul with MCC
Hematologic, Medical	16	809: Major Hematol/Immun Diag Exc Sickle Cell Crisis & Coagul with CC
Hematologic, Medical	16	810: Major Hematol/Immun Diag Exc Sickle Cell Crisis & Coagul without CC/MCC
Hematologic, Medical	16	811: Red Blood Cell Disorders with MCC
Hematologic, Medical	16	812: Red Blood Cell Disorders without MCC
Hematologic, Medical	16	813: Coagulation Disorders
Hematologic, Medical	16	814: Reticuloendothelial & Immunity Disorders with MCC
Hematologic, Medical	16	815: Reticuloendothelial & Immunity Disorders with CC
Hematologic, Medical	16	816: Reticuloendothelial & Immunity Disorders without CC/MCC
Hematologic, Medical	**17**	834: Acute Leukemia without Major O.R. Procedure with MCC
Hematologic, Medical	17	836: Acute Leukemia without Major O.R. Procedure without CC/MCC
Hematologic, Medical	17	839: Chemo with Acute Leukemia As Sdx without CC/MCC
Hematologic, Medical	17	840: Lymphoma & Non-Acute Leukemia with MCC
Hematologic, Medical	17	841: Lymphoma & Non-Acute Leukemia with CC
Hematologic, Medical	17	842: Lymphoma & Non-Acute Leukemia without CC/MCC
Hematologic, Medical	17	843: Other Myeloprolif Dis or Poorly Diff Neopl Diag with MCC
Hematologic, Medical	17	844: Other Myeloprolif Dis or Poorly Diff Neopl Diag with CC

(continued)

Table 5-1 (continued)
Classification for defining primary reason for treatment or "condition groups"

Primary Diagnosis Group	Major Diagnosis Category (MDC)	MS-DRG
Hematologic, Medical	17	846: Chemotherapy without Acute Leukemia as Secondary Diagnosis with MCC
Hematologic, Medical	17	847: Chemotherapy without Acute Leukemia as Secondary Diagnosis with CC
Hematologic, Medical	17	849: Radiotherapy
Other, Surgical	**All**	981: Extensive O.R. Procedure Unrelated to Principal Diagnosis with MCC
Other, Surgical	All	982: Extensive O.R. Procedure Unrelated to Principal Diagnosis with CC
Other, Surgical	All	983: Extensive O.R. Procedure Unrelated to Principal Diagnosis without CC/MCC
Other, Surgical	All	984: Prostatic O.R. Procedure Unrelated to Principal Diagnosis with MCC
Other, Surgical	All	986: Prostatic O.R. Procedure Unrelated to Principal Diagnosis without CC/MCC
Other, Surgical	All	987: Non-extensive O.R. Proc Unrelated to Principal Diagnosis with MCC
Other, Surgical	All	988: Non-extensive O.R. Proc Unrelated to Principal Diagnosis with CC
Other, Surgical	All	989: Non-extensive O.R. Proc Unrelated to Principal Diagnosis without CC/MCC
Other, Surgical	**02**	113: Orbital Procedures with CC/MCC
Other, Surgical	**03**	129: Major Head & Neck Procedures with CC/MCC or Major Device
Other, Surgical	03	130: Major Head & Neck Procedures without CC/MCC
Other, Surgical	03	131: Cranial/Facial Procedures with CC/MCC
Other, Surgical	03	133: Other Ear, Nose, Mouth & Throat O.R. Procedures with CC/MCC
Other, Surgical	03	136: Sinus & Mastoid Procedures without CC/MCC
Other, Surgical	03	137: Mouth Procedures with CC/MCC
Other, Surgical	03	139: Salivary Gland Procedures
Other, Surgical	**05**	265
Other, Surgical	**12**	707: Major Male Pelvic Procedures with CC/MCC

(continued)

Table 5-1 (continued)
Classification for defining primary reason for treatment or "condition groups"

Primary Diagnosis Group	Major Diagnosis Category (MDC)	MS-DRG
Other, Surgical	12	711: Testes Procedures with CC/MCC
Other, Surgical	12	713: Transurethral Prostatectomy with CC/MCC
Other, Surgical	12	714: Transurethral Prostatectomy without CC/MCC
Other, Surgical	12	715: Other Male Reproductive System O.R. Proc for Malignancy with CC/MCC
Other, Surgical	**13**	734: Pelvic Evisceration, Rad Hysterectomy & Rad Vulvectomy with CC/MCC
Other, Surgical	13	735: Pelvic Evisceration, Rad Hysterectomy & Rad Vulvectomy without CC/MCC
Other, Surgical	13	737: Uterine & Adnexa Proc for Ovarian or Adnexal Malignancy with CC
Other, Surgical	13	739: Uterine, Adnexa Proc for Non-ovarian/Adnexal Malig with MCC
Other, Surgical	13	740: Uterine, Adnexa Proc for Non-ovarian/Adnexal Malig with CC
Other, Surgical	13	741: Uterine, Adnexa Proc for Non-ovarian/Adnexal Malig without CC/MCC
Other, Surgical	13	742: Uterine & Adnexa Proc for Non-malignancy with CC/MCC
Other, Surgical	13	743: Uterine & Adnexa Proc for Non-malignancy without CC/MCC
Other, Surgical	13	744: D & C, Conization, Laparoscopy & Tubal Interruption with CC/MCC
Other, Surgical	13	746: Vagina, Cervix & Vulva Procedures with CC/MCC
Other, Surgical	13	747: Vagina, Cervix & Vulva Procedures without CC/MCC
Other, Surgical	13	748: Female Reproductive System Reconstructive Procedures
Other, Surgical	**21**	901: Wound Debridements for Injuries with MCC
Other, Surgical	21	902: Wound Debridements for Injuries with CC
Other, Surgical	21	903: Wound Debridements for Injuries without CC/MCC
Other, Surgical	21	904: Skin Grafts for Injuries with CC/MCC
Other, Surgical	21	907: Other O.R. Procedures for Injuries with MCC

(continued)

Table 5-1 (continued)
Classification for defining primary reason for treatment or "condition groups"

Primary Diagnosis Group	Major Diagnosis Category (MDC)	MS-DRG
Other, Surgical	21	908: Other O.R. Procedures for Injuries with CC
Other, Surgical	21	909: Other O.R. Procedures for Injuries without CC/MCC
Other, Surgical	**22**	927: Extensive Burns or Full Thickness Burns with MV 96+ Hrs with Skin Graft
Other, Surgical	22	928: Full Thickness Burn with Skin Graft or Inhal Inj with CC/MCC
Other, Surgical	**23**	939: O.R. Proc with Diagnoses of Other Contact with Health Services with MCC
Other, Surgical	23	940: O.R. Proc with Diagnoses of Other Contact with Health Services with CC
Other, Surgical	23	941: O.R. Proc with Diagnoses of Other Contact with Health Services without CC/MCC
Other, Surgical	**24**	957: Other O.R. Procedures for Multiple Significant Trauma with MCC
Other, Surgical	24	958: Other O.R. Procedures for Multiple Significant Trauma with CC
Other, Medical	**02**	121: Acute Major Eye Infections with CC/MCC
Other, Medical	02	123: Neurological Eye Disorders
Other, Medical	02	125: Other Disorders of the Eye without MCC
Other, Medical	**03**	147: Ear, Nose, Mouth & Throat Malignancy with CC
Other, Medical	03	148: Ear, Nose, Mouth & Throat Malignancy without CC/MCC
Other, Medical	03	149: Dysequilibrium
Other, Medical	03	150: Epistaxis with MCC
Other, Medical	03	151: Epistaxis without MCC
Other, Medical	03	152: Otitis Media & Uri with MCC
Other, Medical	03	153: Otitis Media & Uri without MCC
Other, Medical	03	154: Nasal Trauma & Deformity with MCC

(continued)

Table 5-1 (continued)
Classification for defining primary reason for treatment or "condition groups"

Primary Diagnosis Group	Major Diagnosis Category (MDC)	MS-DRG
Other, Medical	03	155: Nasal Trauma & Deformity with CC
Other, Medical	03	156: Nasal Trauma & Deformity without CC/MCC
Other, Medical	03	157: Dental & Oral Diseases with MCC
Other, Medical	03	158: Dental & Oral Diseases with CC
Other, Medical	03	159: Dental & Oral Diseases without CC/MCC
Other, Medical	**12**	722: Malignancy, Male Reproductive System with MCC
Other, Medical	12	723: Malignancy, Male Reproductive System with CC
Other, Medical	12	725: Benign Prostatic Hypertrophy with MCC
Other, Medical	12	726: Benign Prostatic Hypertrophy without MCC
Other, Medical	12	727: Inflammation of the Male Reproductive System with MCC
Other, Medical	12	728: Inflammation of the Male Reproductive System without MCC
Other, Medical	12	729: Other Male Reproductive System Diagnoses with CC/MCC
Other, Medical	**13**	754: Malignancy, Female Reproductive System with MCC
Other, Medical	13	755: Malignancy, Female Reproductive System with CC
Other, Medical	13	760: Menstrual & Other Female Reproductive System Disorders with CC/MCC
Other, Medical	**14**	776: Postpartum & Post Abortion Diagnoses without O.R. Procedure
Other, Medical	**19**	880: Acute Adjustment Reaction & Psychosocial Dysfunction
Other, Medical	19	881: Depressive Neuroses
Other, Medical	19	882: Neuroses Except Depressive
Other, Medical	19	883: Disorders of Personality & Impulse Control
Other, Medical	19	884: Organic Disturbances & Mental Retardation

(continued)

Table 5-1 (continued)
Classification for defining primary reason for treatment or "condition groups"

Primary Diagnosis Group	Major Diagnosis Category (MDC)	MS-DRG
Other, Medical	19	885: Psychoses
Other, Medical	**20**	895: Alcohol/Drug Abuse or Dependence with Rehabilitation Therapy
Other, Medical	20	896: Alcohol/Drug Abuse or Dependence without Rehabilitation Therapy with MCC
Other, Medical	20	897: Alcohol/Drug Abuse or Dependence without Rehabilitation Therapy without MCC
Other, Medical	**21**	913: Traumatic Injury with MCC
Other, Medical	21	914: Traumatic Injury without MCC
Other, Medical	21	915: Allergic Reactions with MCC
Other, Medical	21	917: Poisoning & Toxic Effects of Drugs with MCC
Other, Medical	21	918: Poisoning & Toxic Effects of Drugs without MCC
Other, Medical	21	919: Complications of Treatment with MCC
Other, Medical	21	920: Complications of Treatment with CC
Other, Medical	21	921: Complications of Treatment without CC/MCC
Other, Medical	21	922: Other Injury, Poisoning & Toxic Effect Diag with MCC
Other, Medical	21	923: Other Injury, Poisoning & Toxic Effect Diag without MCC
Other, Medical	**23**	945: Rehabilitation with CC/MCC
Other, Medical	23	947: Signs & Symptoms with MCC
Other, Medical	23	948: Signs & Symptoms without MCC
Other, Medical	23	949: Aftercare with CC/MCC
Other, Medical	23	951: Other Factors Influencing Health Status
Other, Medical	**24**	963: Other Multiple Significant Trauma with MCC

(continued)

Table 5-1 (continued)
Classification for defining primary reason for treatment or "condition groups"

Primary Diagnosis Group	Major Diagnosis Category (MDC)	MS-DRG
Other, Medical	24	964: Other Multiple Significant Trauma with CC
Other, Medical	24	965: Other Multiple Significant Trauma without CC/MCC
Other, Medical	**25**	974: HIV with Major Related Condition with MCC
Other, Medical	25	975: HIV with Major Related Condition with CC
Other, Medical	25	976: HIV with Major Related Condition without CC/MCC
Other, Medical	25	977: HIV with or without Other Related Condition

Table 5-2
Comorbidities crosswalk of groupings to component Hierarchical Condition Categories[1]

Comorbidity Groups	Condition Category
Cellulitis (HCC120,164)	120: Major Eye Infections/Inflammations
Cellulitis (HCC120,164)	164: Cellulitis, Local Skin Infection
Shock, Ischemic HD, Vascular (HCC84,86,87,106,107,108)	106: Atherosclerosis of the Extremities with Ulceration or Gangrene
Shock, Ischemic HD, Vascular (HCC84,86,87,106,107,108)	107: Vascular Disease with Complications
Shock, Ischemic HD, Vascular (HCC84,86,87,106,107,108)	108: Vascular Disease
Shock, Ischemic HD, Vascular (HCC84,86,87,106,107,108)	84: Cardio-Respiratory Failure and Shock
Shock, Ischemic HD, Vascular (HCC84,86,87,106,107,108)	86: Acute Myocardial Infarction
Shock, Ischemic HD, Vascular (HCC84,86,87,106,107,108)	87: Unstable Angina and Other Acute Ischemic Heart Disease
Metabolic, Diabetes, Other Endocrine (HCC21,23,24,17, 18,19,20,26)	17: Diabetes with Acute Complications
Metabolic, Diabetes, Other Endocrine (HCC21,23,24,17, 18,19,20,26)	18: Diabetes with Chronic Complications
Metabolic, Diabetes, Other Endocrine (HCC21,23,24,17, 18,19,20,26)	19: Diabetes without Complication
Metabolic, Diabetes, Other Endocrine (HCC21,23,24,17, 18,19,20,26)	20: Type I Diabetes Mellitus
Metabolic, Diabetes, Other Endocrine (HCC21,23,24,17, 18,19,20,26)	21: Protein-Calorie Malnutrition
Metabolic, Diabetes, Other Endocrine (HCC21,23,24,17, 18,19,20,26)	23: Other Significant Endocrine and Metabolic Disorders
Metabolic, Diabetes, Other Endocrine (HCC21,23,24,17, 18,19,20,26)	24: Disorders of Fluid/Electrolyte/Acid-Base Balance
Metabolic, Diabetes, Other Endocrine (HCC21,23,24,17, 18,19,20,26)	26: Other Endocrine/Metabolic/Nutritional Disorders
Liver, Other GI (HCC27,28, 30,29, 31,32,33,34,35)	27: End-Stage Liver Disease
Liver, Other GI (HCC27,28, 30,29, 31,32,33,34,35)	28: Cirrhosis of Liver
Liver, Other GI (HCC27,28, 30,29, 31,32,33,34,35)	29: Chronic Hepatitis
Liver, Other GI (HCC27,28, 30,29, 31,32,33,34,35)	30: Acute Liver Failure/Disease
Liver, Other GI (HCC27,28, 30,29, 31,32,33,34,35)	31: Other Hepatitis and Liver Disease
Liver, Other GI (HCC27,28, 30,29, 31,32,33,34,35)	32: Gallbladder and Biliary Tract Disorders

(continued)

Table 5-2 (continued)
Comorbidities crosswalk of groupings to component Hierarchical Condition Categories[1]

Comorbidity Groups	Condition Category
Liver, Other GI (HCC27,28, 30,29, 31,32,33,34,35)	33: Intestinal Obstruction/Perforation
Liver, Other GI (HCC27,28, 30,29, 31,32,33,34,35)	34: Chronic Pancreatitis
Liver, Other GI (HCC27,28, 30,29, 31,32,33,34,35)	35: Inflammatory Bowel Disease
Head and Spine Injury (HCC166,167,70,71,72)	166: Severe Head Injury
Head and Spine Injury (HCC166,167,70,71,72)	167: Major Head Injury
Head and Spine Injury (HCC166,167,70,71,72)	70: Quadriplegia
Head and Spine Injury (HCC166,167,70,71,72)	71: Paraplegia
Head and Spine Injury (HCC166,167,70,71,72)	72: Spinal Cord Disorders/Injuries
Morbid Obesity (HCC22)	22: Morbid Obesity
Ortho—Bone/Joint/Muscle Infections, Rheumatoid Arthritis, Severe Skeletal, Musculoskeletal, Amputation (HCC39,40,41,42, 43,44,45,189)	189: Amputation Status, Lower Limb/Amputation Complications
Ortho—Bone/Joint/Muscle Infections, Rheumatoid Arthritis, Severe Skeletal, Musculoskeletal, Amputation (HCC39,40,41,42, 43,44,45,189)	39: Bone/Joint/Muscle Infections/Necrosis
Ortho—Bone/Joint/Muscle Infections, Rheumatoid Arthritis, Severe Skeletal, Musculoskeletal, Amputation (HCC39,40,41,42, 43,44,45,189)	40: Rheumatoid Arthritis and Inflammatory Connective Tissue Disease
Ortho—Bone/Joint/Muscle Infections, Rheumatoid Arthritis, Severe Skeletal, Musculoskeletal, Amputation (HCC39,40,41,42, 43,44,45,189)	41: Disorders of the Vertebrae and Spinal Discs
Ortho—Bone/Joint/Muscle Infections, Rheumatoid Arthritis, Severe Skeletal, Musculoskeletal, Amputation (HCC39,40,41,42, 43,44,45,189)	42: Osteoarthritis of Hip or Knee

(continued)

Table 5-2 (continued)
Comorbidities crosswalk of groupings to component Hierarchical Condition Categories[1]

Comorbidity Groups	Condition Category
Ortho—Bone/Joint/Muscle Infections, Rheumatoid Arthritis, Severe Skeletal, Musculoskeletal, Amputation (HCC39,40,41,42, 43,44,45,189)	43: Osteoporosis and Other Bone/Cartilage Disorders
Ortho—Bone/Joint/Muscle Infections, Rheumatoid Arthritis, Severe Skeletal, Musculoskeletal, Amputation (HCC39,40,41,42, 43,44,45,189)	44: Congenital/Developmental Skeletal and Connective Tissue Disorders
Ortho—Bone/Joint/Muscle Infections, Rheumatoid Arthritis, Severe Skeletal, Musculoskeletal, Amputation (HCC39,40,41,42, 43,44,45,189)	45: Other Musculoskeletal and Connective Tissue Disorders
Polyneuropathy, Seizure, Other Neuro (HCC75,79,73,74,76, 77,78)	73: Amyotrophic Lateral Sclerosis and Other Motor Neuron Disease
Polyneuropathy, Seizure, Other Neuro (HCC75,79,73,74,76, 77,78)	74: Cerebral Palsy
Polyneuropathy, Seizure, Other Neuro (HCC75,79,73,74,76, 77,78)	75: Polyneuropathy
Polyneuropathy, Seizure, Other Neuro (HCC75,79,73,74,76, 77,78)	76: Muscular Dystrophy
Polyneuropathy, Seizure, Other Neuro (HCC75,79,73,74,76, 77,78)	77: Multiple Sclerosis
Polyneuropathy, Seizure, Other Neuro (HCC75,79,73,74,76, 77,78)	78: Parkinson’s and Huntington’s Diseases
Polyneuropathy, Seizure, Other Neuro (HCC75,79,73,74,76, 77,78)	79: Seizure Disorders and Convulsions
Severe Psychiatric, Drug Alcohol Abuse w Dependence (HCC54,55,57,58,59,60)	54: Drug/Alcohol Psychosis
Severe Psychiatric, Drug Alcohol Abuse w Dependence (HCC54,55,57,58,59,60)	55: Drug/Alcohol Dependence
Severe Psychiatric, Drug Alcohol Abuse w Dependence (HCC54,55,57,58,59,60)	56: Drug/Alcohol Abuse, Without Dependence
Severe Psychiatric, Drug Alcohol Abuse w Dependence (HCC54,55,57,58,59,60)	57: Schizophrenia

(continued)

Table 5-2 (continued)
Comorbidities crosswalk of groupings to component Hierarchical Condition Categories[1]

Comorbidity Groups	Condition Category
Severe Psychiatric, Drug Alcohol Abuse w Dependence (HCC54,55,57,58,59,60)	58: Major Depressive, Bipolar, and Paranoid Disorders
Severe Psychiatric, Drug Alcohol Abuse w Dependence (HCC54,55,57,58,59,60)	59: Reactive and Unspecified Psychosis
Severe Psychiatric, Drug Alcohol Abuse w Dependence (HCC54,55,57,58,59,60)	60: Personality Disorders
Renal Failure, Kidney Disease (HCC135,136,137,138)	135: Acute Renal Failure
Renal Failure, Kidney Disease (HCC135,136,137,138)	136: Chronic Kidney Disease, Stage 5
Renal Failure, Kidney Disease (HCC135,136,137,138)	137: Chronic Kidney Disease, Severe (Stage 4)
Renal Failure, Kidney Disease (HCC135,136,137,138)	138: Chronic Kidney Disease, Moderate (Stage 3)
Pneumonia, Pleural Effusion and Other Respiratory (CF, COPD, Fibrosis) (HCC110,111,112,114,115,116,117)	110: Cystic Fibrosis
Pneumonia, Pleural Effusion and Other Respiratory (CF, COPD, Fibrosis) (HCC110,111,112,114,115,116,117)	111: Chronic Obstructive Pulmonary Disease
Pneumonia, Pleural Effusion and Other Respiratory (CF, COPD, Fibrosis) (HCC110,111,112,114,115,116,117)	112: Fibrosis of Lung and Other Chronic Lung Disorders
Pneumonia, Pleural Effusion and Other Respiratory (CF, COPD, Fibrosis) (HCC110,111,112,114,115,116,117)	114: Aspiration and Specified Bacterial Pneumonias
Pneumonia, Pleural Effusion and Other Respiratory (CF, COPD, Fibrosis) (HCC110,111,112,114,115,116,117)	115: Pneumococcal Pneumonia, Empyema, Lung Abscess
Pneumonia, Pleural Effusion and Other Respiratory (CF, COPD, Fibrosis) (HCC110,111,112,114,115,116,117)	116: Viral and Unspecified Pneumonia, Pleurisy
Pneumonia, Pleural Effusion and Other Respiratory (CF, COPD, Fibrosis) (HCC110,111,112,114,115,116,117)	117: Pleural Effusion/Pneumothorax
Stroke (HCC99,100,101,102,103,104)	100: Ischemic or Unspecified Stroke

(continued)

Table 5-2 (continued)
Comorbidities crosswalk of groupings to component Hierarchical Condition Categories[1]

Comorbidity Groups	Condition Category
Stroke (HCC99,100,101,102,103,104)	101: Precerebral Arterial Occlusion and Transient Cerebral Ischemia
Stroke (HCC99,100,101,102,103,104)	102: Cerebrovascular Atherosclerosis, Aneurysm, and Other Disease
Stroke (HCC99,100,101,102,103,104)	103: Hemiplegia/Hemiparesis
Stroke (HCC99,100,101,102,103,104)	104: Monoplegia, Other Paralytic Syndromes
Stroke (HCC99,100,101,102,103,104)	99: Cerebral Hemorrhage
UTI (HCC141,144)	141: Nephritis
UTI (HCC141,144)	144: Urinary Tract Infection

[1] Version 21.

NOTE: Not all available HCCs were included in the condition groupings used in current modeling. Categories excluded were those that were very common and nonspecific in the PAC population, conditions captured by other items on the CARE tool, or rare conditions that were not present in the sample.

Table 5-3
Motor scale: Raw score to Rasch measure equivalent

Raw score	Rasch measure	SE (Rasch measure)
25	0.40 (estimate)	15.92 (estimate)
26	10.37	8.43
27	15.76	5.82
28	18.81	4.71
29	20.95	4.07
30	22.61	3.65
31	23.98	3.35
32	25.16	3.13
33	26.19	2.95
34	27.12	2.80
35	27.96	2.68
36	28.73	2.58
37	29.45	2.49
38	30.12	2.41
39	30.76	2.34
40	31.36	2.28
41	31.93	2.23
42	32.47	2.18
43	33.00	2.14
44	33.50	2.10
45	33.99	2.07
46	34.46	2.04
47	34.92	2.01
48	35.37	1.98
49	35.80	1.96
50	36.23	1.94
51	36.65	1.92
52	37.06	1.90
53	37.46	1.89
54	37.85	1.87
55	38.24	1.86
56	38.63	1.85
57	39.01	1.84
58	39.39	1.83
59	39.76	1.82

(continued)

Table 5-3 (continued)
Motor scale: Raw score to Rasch measure equivalent

Score	Measure	SE (Measure)
60	40.13	1.81
61	40.50	1.80
62	40.86	1.80
63	41.22	1.79
64	41.58	1.79
65	41.94	1.78
66	42.29	1.78
67	42.65	1.77
68	43.00	1.77
69	43.35	1.77
70	43.70	1.76
71	44.05	1.76
72	44.39	1.76
73	44.74	1.76
74	45.09	1.75
75	45.43	1.75
76	45.78	1.75
77	46.12	1.75
78	46.46	1.75
79	46.80	1.74
80	47.14	1.74
81	47.48	1.74
82	47.83	1.74
83	48.16	1.74
84	48.50	1.74
85	48.84	1.74
86	49.18	1.74
87	49.52	1.74
88	49.86	1.74
89	50.20	1.74
90	50.54	1.74
91	50.87	1.74
92	51.21	1.74
93	51.55	1.74
94	51.89	1.74
95	52.23	1.74

(continued)

Table 5-3 (continued)
Motor scale: Raw score to Rasch measure equivalent

Score	Measure	SE (Measure)
96	52.57	1.74
97	52.91	1.74
98	53.25	1.75
99	53.60	1.75
100	53.94	1.75
101	54.29	1.76
102	54.63	1.76
103	54.98	1.77
104	55.34	1.77
105	55.69	1.78
106	56.04	1.79
107	56.40	1.79
108	56.77	1.80
109	57.13	1.81
110	57.50	1.82
111	57.88	1.83
112	58.25	1.84
113	58.64	1.85
114	59.02	1.87
115	59.42	1.88
116	59.82	1.90
117	60.23	1.92
118	60.64	1.93
119	61.07	1.95
120	61.50	1.98
121	61.94	2.00
122	62.40	2.02
123	62.86	2.05
124	63.34	2.08
125	63.83	2.11
126	64.34	2.15
127	64.87	2.18
128	65.41	2.23
129	65.98	2.27
130	66.57	2.32
131	67.19	2.37

(continued)

Table 5-3 (continued)
Motor scale: Raw score to Rasch measure equivalent

Score	Measure	SE (Measure)
132	67.83	2.43
133	68.51	2.49
134	69.23	2.57
135	69.99	2.65
136	70.80	2.74
137	71.68	2.84
138	72.62	2.97
139	73.66	3.11
140	74.81	3.29
141	76.10	3.51
142	77.60	3.81
143	79.40	4.22
144	81.68	4.84
145	84.87	5.93
146	90.39	8.49
147	100.41 (estimate)	15.93 (estimate)

NOTE: This crosswalk table is based on a sample with no missing cases.

Table 5-4
Self-care scale: Raw score to Rasch measure equivalent

Score	Measure	SE (Measure)
8	7.64 (estimate)	15.33 (estimate)
9	16.72	8.03
10	21.72	5.70
11	24.75	4.79
12	27.04	4.29
13	28.94	3.96
14	30.60	3.73
15	32.08	3.55
16	33.44	3.40
17	34.69	3.28
18	35.86	3.18
19	36.96	3.10
20	38.01	3.03
21	39.02	2.97
22	40.00	2.92
23	40.94	2.89
24	41.87	2.86
25	42.78	2.84
26	43.69	2.83
27	44.59	2.83
28	45.49	2.84
29	46.39	2.85
30	47.31	2.87
31	48.25	2.90
32	49.20	2.94
33	50.18	2.98
34	51.20	3.03
35	52.24	3.08
36	53.33	3.15
37	54.47	3.22
38	55.65	3.29
39	56.90	3.38
40	58.23	3.49
41	59.65	3.62
42	61.19	3.79
43	62.90	4.03
44	64.86	4.37
45	67.26	4.91
46	70.48	5.90
47	75.87	8.35
48	85.57	15.71

NOTE: This crosswalk table is based on a sample with no missing cases.

Table 5-5
Mobility scale: Raw score to Rasch measure equivalent

Score	Measure	SE (Measure)
17	5.79	15.91
18	15.75	8.43
19	21.14	5.82
20	24.18	4.71
21	26.33	4.07
22	28.00	3.66
23	29.38	3.37
24	30.57	3.15
25	31.62	2.99
26	32.58	2.86
27	33.46	2.75
28	34.29	2.67
29	35.06	2.60
30	35.80	2.54
31	36.51	2.49
32	37.20	2.45
33	37.86	2.42
34	38.51	2.39
35	39.14	2.37
36	39.77	2.35
37	40.38	2.33
38	40.99	2.32
39	41.59	2.30
40	42.18	2.29
41	42.76	2.28
42	43.34	2.27
43	43.92	2.26
44	44.49	2.25
45	45.05	2.24
46	45.61	2.23
47	46.16	2.21
48	46.71	2.20
49	47.25	2.19
50	47.78	2.18
51	48.31	2.17
52	48.84	2.15

(continued)

Table 5-5 (continued)
Mobility scale: Raw score to Rasch measure equivalent

Score	Measure	SE (Measure)
53	49.36	2.14
54	49.87	2.13
55	50.38	2.12
56	50.88	2.12
57	51.38	2.11
58	51.88	2.10
59	52.37	2.10
60	52.86	2.09
61	53.35	2.09
62	53.84	2.09
63	54.33	2.09
64	54.82	2.09
65	55.31	2.09
66	55.80	2.10
67	56.30	2.10
68	56.80	2.11
69	57.30	2.12
70	57.81	2.13
71	58.32	2.15
72	58.84	2.16
73	59.37	2.18
74	59.91	2.20
75	60.45	2.22
76	61.01	2.25
77	61.59	2.27
78	62.17	2.30
79	62.78	2.34
80	63.40	2.37
81	64.04	2.42
82	64.71	2.46
83	65.40	2.51
84	66.13	2.57
85	66.88	2.63
86	67.68	2.69
87	68.51	2.77
88	69.40	2.86

(continued)

Table 5-5 (continued)
Mobility scale: Raw score to Rasch measure equivalent

Score	Measure	SE (Measure)
89	70.35	2.95
90	71.36	3.07
91	72.47	3.21
92	73.68	3.37
93	75.03	3.58
94	76.58	3.86
95	78.42	4.25
96	80.72	4.85
97	83.90	5.90
98	89.34	8.41
99	99.20 (estimate)	15.83 (estimate)

NOTE: This crosswalk table is based on a sample with no missing cases.

Table 5-6
Descriptive information on Rasch score functional measures at admission, by facility type

Setting	Mean admission score	Standard deviation	5th %tile	10th %tile	25th %tile	50th %tile	75th %tile	90th %tile	95th %tile
Self-care									
Overall (n = 12,065)	46.68	15.89	9.79	28.91	39.98	46.39	53.33	64.87	78.97
HHA (n = 3,190)	59.58	15.82	35.83	41.86	49.20	58.23	70.50	85.58	85.58
IRF (n = 4,158)	43.64	9.65	27.01	33.41	39.98	44.58	49.20	53.33	55.65
LTCH (n = 1,968)	33.94	18.66	7.60	7.60	16.68	36.94	46.85	54.46	59.70
SNF (n = 2,749)	45.44	10.16	28.91	34.66	40.93	46.39	51.19	55.65	59.65
Mobility									
Overall (n = 12,080)	45.11	15.67	12.24	27.81	37.39	44.61	52.75	63.70	71.85
HHA (n = 3,186)	58.91	15.37	35.24	41.90	50.52	57.86	66.90	79.18	88.90
IRF (n = 4,161)	41.21	9.83	20.89	31.38	37.06	41.84	47.17	51.65	54.61
LTCH (n = 1,986)	33.53	16.90	8.92	9.66	19.57	34.07	45.06	52.40	58.49
SNF (n = 2,747)	43.40	10.47	27.98	32.97	38.69	43.24	48.43	54.61	58.63
Motor									
Overall (n = 12,093)	45.13	15.30	17.63	29.37	38.32	44.95	52.40	62.15	69.33
HHA (n = 3,191)	58.20	14.63	36.23	42.18	50.19	57.55	65.31	74.58	84.52
IRF (n = 4,161)	42.02	8.82	27.85	32.89	38.04	42.73	47.48	51.21	53.89
LTCH (n = 1,991)	32.55	18.24	2.10	2.86	20.85	35.03	44.81	52.51	57.68
SNF (n = 2,750)	43.79	9.70	29.44	34.35	39.32	44.09	48.74	53.62	57.20
IADL									
Overall (n = 10,863)	40.90	18.63	2.22	18.00	29.23	41.22	52.71	62.39	69.59
HHA (n = 2,816)	51.27	19.70	11.77	23.25	42.38	53.65	62.49	72.05	78.70
IRF (n = 3,980)	38.97	15.03	2.50	19.02	29.83	40.07	49.21	56.26	60.18
LTCH (n = 1,560)	26.84	19.75	1.83	1.83	2.44	26.71	38.12	52.71	58.77
SNF (n = 2,507)	41.06	14.75	17.85	23.28	33.45	40.74	52.71	56.77	63.58

SOURCE: RTI analysis of Phase 1 CARE assessments (jm_req077).

Table 5-7
Descriptive information on Rasch score functional measures at discharge, by facility type

Setting	Mean discharge score	Standard deviation	5th %tile	10th %tile	25th %tile	50th %tile	75th %tile	90th %tile	95th %tile
Self-care									
Overall (n = 12,065)	59.08	19.48	24.72	35.83	47.30	58.23	75.91	85.58	85.58
HHA (n = 3,190)	69.57	17.26	37.99	45.48	58.23	75.91	85.58	85.58	85.58
IRF (n = 4,158)	59.11	15.80	36.30	41.86	49.19	55.65	70.50	85.58	85.58
LTCH (n = 1,968)	43.79	22.43	7.60	7.89	28.91	43.67	58.23	78.97	85.58
SNF (n = 2,749)	57.82	16.92	32.05	39.00	47.30	56.90	70.50	85.58	85.58
Mobility									
Overall (n = 12,080)	59.70	19.83	26.98	35.24	48.12	59.26	71.79	87.25	96.36
HHA (n = 3,186)	71.00	18.79	39.40	48.52	59.20	70.79	83.49	96.36	98.74
IRF (n = 4,161)	57.91	14.80	35.24	41.19	49.27	57.25	66.43	76.06	83.49
LTCH (n = 1,986)	44.97	21.99	9.59	12.07	30.93	43.34	58.02	74.81	87.25
SNF (n = 2,747)	59.95	18.16	32.80	38.40	48.34	59.11	70.63	83.49	96.36
Motor									
Overall (n = 12,093)	58.90	19.94	27.07	35.32	47.62	58.20	70.27	84.54	96.58
HHA (n = 3,191)	70.73	19.21	38.83	47.33	58.49	70.05	84.54	98.06	100.01
IRF (n = 4,161)	57.50	14.20	36.12	41.54	49.17	56.38	66.16	74.81	81.30
LTCH (n = 1,991)	43.67	22.89	2.56	6.74	29.82	42.74	57.39	71.20	84.54
SNF (n = 2,750)	58.31	17.42	32.02	38.82	47.97	57.63	68.44	79.00	90.02
IADL									
Overall (n = 10,863)	53.67	23.25	2.76	23.49	39.73	54.99	68.80	83.01	95.48
HHA (n = 2,816)	62.69	24.84	11.79	27.45	48.18	65.43	77.95	97.86	99.53
IRF (n = 3,980)	53.69	18.95	22.38	30.71	42.38	54.27	65.29	78.70	85.13
LTCH (n = 1,560)	37.60	25.16	1.83	2.00	18.37	35.35	55.67	72.93	82.23
SNF (n = 2,507)	53.52	20.82	18.66	27.84	40.07	52.97	66.67	82.23	90.72

SOURCE: RTI analysis of Phase 1 CARE assessments (CARE_CS370).

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SECTION 6
FACTORS ASSOCIATED WITH FIRST SITES OF POST-ACUTE CARE

One of the key goals in this payment reform demonstration (PRD) is to better understand the types of patients treated in each of the four post-acute care (PAC) settings, including long-term care hospitals (LTCH), inpatient rehabilitation facilities (IRF), skilled nursing facilities (SNF), and home health agencies (HHA). The use of a standardized assessment tool allows examination of the populations admitted to each setting in greater detail than possible using claims data. It also allows populations to be compared across settings to identify factors that distinguish admissions to each setting as well as identify overlapping characteristics that may be useful for understanding whether the same patient is treated in more than one setting. This section will examine how patient complexity (medical, functional, and cognitive) factors are associated with hospital discharge home or to a PAC setting. The focus is on the use of a Medicare-covered PAC service during the first 30 days from acute discharge, and, if there was use, on the factors associated with the type of first PAC site used. It is important to note that these analyses are based on current practice patterns and do not necessarily reflect an "ideal" system of care or PAC decision.

The analyses presented in this chapter are important for understanding whether the types of patients treated in each setting overlap or are distinguishable. These issues are important because Medicare uses a different payment system with different payment units, case-mix groups, and payment amounts for each type of provider. Hence, Medicare may be paying different amounts for similar types of patients who may be treated in more than one setting. Furthermore, outcomes may differ depending on the type of PAC setting used. Understanding differences in the complexity of post-acute patients admitted to each type of setting and the outcomes associated with their treatment will be important for considering future payment reform. These issues are complicated by variations in the availability of the more specialized PAC settings, such as IRFs and LTCHs, compared with the widely available SNFs and HHAs. Understanding whether similar populations can effectively be treated in more than one setting, and the availability of those services, is important for ensuring that Medicare beneficiaries have access to appropriate care.

This analysis builds on much of our past work using Medicare claims to predict the discharge destinations of acute hospital patients. The claims data are useful as a first stage in measuring medical complexity, but they fail to measure more specific areas of medical, functional, and cognitive health status complexity. The standardized Continuity Assessment Record and Evaluation (CARE) items provide additional detailed information on these areas.

6.1 Literature Review

In examining the issue of discharge destination, there may be a number of different ways to consider factors associated with PAC use. Most prior analyses have been limited by data availability and rely on the patient factors available in the claims data, or, if studying one setting of care, the assessment data such as the Minimum Data Set (MDS), IRF-Patient Assessment Index (PAI), or Outcome and Assessment Information Set (OASIS) data associated with that type of setting (Gage et al., 2008; Wolfe and Meadow, 2008; Gage et al., 2005; Gage, 1999; Liu, Wissoker, and Rimes, 1998; Lee et al., 1997; Kane et al., 1996; Kramer, Shaughnessy, and

Pettigrew, 1985). The studies have varied in whether they looked specifically at the use of certain types of PAC, such as the choice of HHA use vs. discharge home without services (Kenney and Moon, 1994) or whether they looked across the range of PAC providers either in comparisons of dyads (SNF vs. IRF choice) or more generically (PAC service vs. no PAC service) or in multisetting models (predicting no service use vs. SNF use vs. IRF use (Gage et al., 2009, McCall et al., 2001, Lee et al., 1997).

Many studies have examined service use for specific types of cases, such as those with congestive heart failure (Li et al., 2004), joint replacements (DeJong et al., 2008), stroke (Sandel et al., 2009), or other types of populations commonly admitted to PAC (Morley et al., 2010). While the exact factors associated with the type of PAC used or length of stay may vary, most studies have found certain factors to be consistently important: age, gender, dual eligibility under Medicare and Medicaid, as well as precipitating medical conditions and comorbidities.

Functional status is another important factor in considering PAC use. Nguyen et al. (2007) found that stroke patients with relatively low functional status (empirically defined by a functional independence measure (FIM®) score of 75 or lower) were significantly more likely to be discharged to a SNF after acute hospitalization than home. Within the low functional status group, the likelihood of nursing home referral was relatively lower among those who were married. However, marital status did not influence the discharge to nursing home or home for patients with FIM® scores higher than 75. Ilett et al. (2010) also found functional status—here measured by Mobility Scale scores—to significantly predict discharge to home, IRF, or SNF after acute stroke treatment. History of falls and cognitive status also have been found to be important predictors of discharge setting. Bentler et al (2009) found that hip or knee replacement patients with falls or a secondary diagnosis of dementia were more likely to be discharged to a SNF than to inpatient rehabilitation. However, in general, patients with replacement surgeries were more likely to be discharged home than to a SNF after hospital discharge.

In addition to the patient's demographic and clinical factors, the availability of services is one of the most important predictors for determining actual service use (Gage et al., 2009; Beeuwkes-Buntin et al., 2005; Gage, 1999; Lee et al., 1997). After controlling for demographic factors, primary diagnoses, and comorbidities, the availability of a PAC bed or the affiliation with a hospital were both associated with a higher likelihood of using a respective PAC service (Gage et al., 2005).

Understanding which factors are associated with the choice of discharge destination is important for examining the mix of patients seen in a particular type of facility. Presumably, if there is strong differentiation in the types of patients referred to a particular type of setting, then the populations in those different settings will differ in their characteristics at admission and the degree of population overlap will be limited. While the argument has been made that patients treated in different PAC settings vary in terms of their acuity, little empirical evidence exists to support the hypothesis. The absence of consistent severity measures in the PAC assessment tools has contributed to the difficulties in examining severity as it relates to site of care choices, treatment intensity, and outcomes (Gage and Green, 2006). Adequately controlling for case-mix severity is key to understanding the differences in populations using each post-acute provider. Similarities in the types of services provided in these inpatient settings suggest that PAC

providers may be providing substitute services while receiving substantially different payments for those services (MedPAC, 2004).

6.2 Sample and Methods

This analysis presents four different approaches to examining factors associated with PAC use after discharge from an acute hospital stay. Each of these models controls for medical, functional, and cognitive status as well as certain market characteristics, such as the availability of PAC options. First, a logistic regression is used to predict the probability of any post-acute use within 30 days of hospital discharge (ANYPAC). Post-acute use in this model is broadly defined as receiving services in one of the four PAC settings examined in this project (LTCH, IRF, SNF, or HHA), any Part B therapy, or subsequent hospitalizations. The contrast is discharge home with no services in the 30-day window. Second, a multinomial logistic regression (FIRSTPAC) is presented to compare the relative odds of being discharged home without Medicare-covered inpatient or home health services to being discharged to (1) home health care or (2) a SNF (3) an IRF or (4) a LTCH.[1] Third, two additional logistic regressions examine the relative characteristics differentiating between hospital discharges to (1) SNFs versus IRFs (SNF/IRF) and (2) SNFs versus HHAs (SNF/HHA).

6.2.1 Sample

The sample for these analyses is based on 13,554 cases with a CARE assessment at the time of transfer from the inpatient prospective payment system to the PAC setting **(Table 6-1)**. CARE at time of transfer could originate from two sources: (1) the CARE assessment for patients at the time of discharge from acute hospitals (n = 4,412) or (2) the CARE assessment at the time of admission to the PAC setting (n = 9,142). The PAC admission sample was restricted to admissions occurring within 2 days of hospital discharge date.

The providers included in the sample were chosen on the basis of the purpose of examining Medicare PAC populations. Hospital units included in this study were selected on the basis of their likelihood of treating Medicare populations with the types of diagnosis that frequently are discharged to PAC (e.g., stroke, cardiac, chronic obstructive pulmonary disease [COPD]). As noted in Section 4, the acute care sample represents a higher proportion of PAC users than the national sample but it allows for a robust analysis of cases that had the potential to use PAC. This approach reflects the analytic focus on addressing payment equities across PAC systems. As a result of this sampling approach, the analyses presented here are useful for understanding the types of cases treated in each setting or going home without services, but they do not reflect the entire Medicare population likely to go home without PAC. Second, the markets were selected for having higher or lower options for PAC. The high-PAC markets have IRFs or LTCHs in addition to SNFs and HHAs, whereas the low-PAC markets reflect the absence of these more specialized services. These factors, and other market-level referral pattern variations, may influence discharge destinations.

[1] The FIRSTPAC model excludes claims from the "other" settings, including Part B therapy, Federal hospitals, and inpatient psychiatric hospitals.

Excluded from the 4,412 hospital assessments in this section were 208 CARE assessments completed on step-down units because these cases continued into subsequent medical/surgical units and were not true hospital discharges. The second assessment for these cases was used to identify patient complexity at time of hospital discharge. Also excluded were the small number of hospital transfer cases (i.e., discharges to another short-stay acute hospital), as transfer populations are assumed not to be equivalent to the populations ready for discharge from the acute hospital. Similarly, 496 discharges to other acute hospital inpatient settings, such as Federal hospitals, inpatient psychiatric hospitals, outpatient services, and hospice, were excluded from the models. Acute hospital stays in these analyses could be either the start of care or a readmission later in the episode. Among the cases from the acute hospital sample, 93 were discharged to LTCH, 248 to IRF, 1,071 to SNF, and 821 to HHA; 1,719 were discharged home without PAC services in the subsequent 30 days**.**

The sample derived from PAC admissions within 2 days of hospital discharge consisted of 9,142 cases, including 1,476 LTCH cases, 3,515 IRF cases, 2,786 SNF cases, and 1,365 HHA cases. This part of the sample contributes no "no PAC" cases, by definition.[2] The two samples were combined to increase sample size for the analysis, on the theory that assessments done at the time of transfer would be roughly equivalent. At the same time, the unique nature of the sample means that care needs to be taken to interpret the models correctly.

6.2.2 Methods

6.2.2.1 Dependent Variable Definitions

Several dependent variables are tested in the four models in this section. All of the outcomes are measuring the odds of admission to another service within 30 days of discharge from the acute hospital. If more than one service is used during that window, only the chronologically first type of service is considered the discharge destination. Service use is based on the first Medicare claim within 30 days of discharge from the short-stay acute hospital. We tested several different discharge destinations as the dependent variables.

- **Any PAC Model:** This outcome was defined as a yes/no indicator of whether the beneficiary had a Medicare claim (LTCH, IRF, SNF, HHA, Part B therapy, hospitalization) within 30 days after discharge from the hospital. Note that cases with a zero day transfer from an acute hospital to another acute hospital, as noted above, were excluded from the analysis.

- **First PAC Model:** This outcome was defined as one of five outcomes on the basis of the first site of PAC used within 30 days after discharge. The multinomial model predicts the odds of using one of the following settings relative to not having a claim for any of the following services. Cases discharged to "other" were excluded from this analysis. The settings were defined as follows:

[2] While the acute-based sample offers a 30-day window to be assigned to "no PAC" or any of the four PAC settings on the basis of claims identification, the subset of PAC cases included in the sample had to have started within 2 days of hospital discharge to be considered "near-equivalent" cases.

- Long-term care hospital (LTCH)
- Inpatient rehabilitation facility or hospital unit (IRF)
- Skilled nursing facility (SNF/transitional care unit)
- Home health agency (HHA)

- **IRF/SNF Outcomes:** This outcome selects only IRF and SNF admissions to examine more closely the factors associated with discharge to either of these services. This outcome was defined as having either a SNF or an IRF claim within 30 days after discharge from the hospital. The SNF group was the referent category.

- **SNF/HHA Outcomes:** This outcome selects only SNF and HHA admissions to examine more closely the factors associated with discharge to either of these services. This outcome was defined as having either a SNF or an HHA claim within 30 days after discharge from the hospital. The SNF group was the referent category.

The last two models both use SNF as the reference group. Together these models are useful for identifying the characteristics of patients treated in each setting, allowing comparison of both the similarities and differences associated with those using IRF or HHA relative to the odds of using SNF.

The models are designed to examine the characteristics of beneficiaries discharged to each setting. They have not been weighted for relative proportions in the Medicare population since the weights would reduce the ability to determine the factors related to discharge to IRFs and LTCHs because of the relatively low frequency of such stays in the national population. The goal of these analyses is to understand the medical, functional, and cognitive characteristics of beneficiaries treated in each setting. These models provide important information on the presence or absence of a characteristic and the relative direction of the associations. This is helpful for understanding whether a patient with "factor x" is more or less likely to be discharged to a certain setting, particularly relative to the reference group (non-PAC admissions, or in the last two models, SNF admissions), holding the other variables in the model constant.

6.2.2.2 Independent Variable Definitions

The analysis of discharge destination is primarily focused on examining the medical, functional, and cognitive factors associated with Medicare service use after hospital discharge. The independent variables used in this analysis include demographic, medical, and functional characteristics; mood and cognition; and indicators of premorbid functional status and premorbid living arrangements as noted in the classification schema presented in Section 5. While additional variables also were tested, some were omitted due to collinearity with others retained in the models. Others were kept in the models despite small numbers because of their expected contribution. The reference group for each health status factor is the "healthiest" characteristic, where appropriate.

This model included some variables unique to this examination and not included in the other sections of this report. Because of the importance of local patterns of referrals and the availability of services on discharge decisions, market identifiers were included in these models.

6.3 Discharge Destination Results

This section consists of two principal parts. First, the final discharge destination analysis sample is described with respect to the case-mix characteristics used in the models. These factors are displayed by discharge destination setting and can be used for each set of models.

- **Any-PAC Model:** For the descriptive statistics associated with this model, refer to the "home no services" compared with the combination of the other columns.

- **First PAC Model:** Refer to the LTCH, SNF, IRF, and HHA columns for sample description associated with those services used. The reference category is represented by the "home no services." "Other services" are excluded from the models.

- **SNF/IRF Model:** Refer to the SNF and the IRF columns for sample descriptions associated with this model.

- **SNF/HHA Model:** Refer to the SNF and the HHA columns for sample descriptions associated with this model.

6.3.1 Discharge Destination Sample Description

This section presents the descriptive statistics characterizing the distribution of patients in this discharge destination sample. **Tables 6-2 through 6-11** contain descriptive information about the overall sample of beneficiaries included in this discharge destination analysis and how their characteristics vary by discharge setting.

6.3.1.1 Demographics by Setting

Table 6-2 shows basic demographic information about the sample at time of admission.

Age. Over all settings, patients were distributed across the four age groups, with the smallest numbers in the groups "under 65" and "over 85" years of age. The largest groups of patients in our overall sample were 65-74 years (29 percent) or 75-84 years (36 percent). Differences were seen across the discharge destination sites. Those who went home without additional services tended to have a high proportion of the under 65 years (26 percent) or the 65-74 years (31 percent), while those who were discharged to SNFs had a larger share of the oldest populations (33 percent were 85 years or older). Home health users were distributed across the four age groups, while IRF admissions tended to be in the middle two age groups (65-74 and 75-84 years old). LTCHs tended to have a relatively high proportion of cases in the under 65 years old (20 percent) compared with other types of PAC users in our sample.

Race. About 8 percent of the cases were Black/African American. A slightly higher proportion of Blacks were treated by HHAs (9 percent), IRFs (9 percent), and LTCHs (12 percent) than in SNFs (7 percent).

Gender. Overall, like the Medicare population in general, the sample had a higher proportion of females (58 percent). This held true in all settings except LTCHs (48 percent), although the proportion varied across settings, with SNFs having the highest proportion (67 percent).

Medicaid as Secondary Payer. About 11 percent of the sample had Medicaid as a secondary payer. The greatest proportions of dually eligible were among those who went home with no services (18 percent) and those discharged to LTCHs (15 percent) or "other services" (27 percent).

6.3.1.2 Medical Status by Setting

Table 6-3 shows the distribution in our sample of the primary condition in the acute hospital stay associated with each discharge destination. Medicaid Severity Diagnosis-Related Groups (MS-DRGs) have been aggregated as discussed in Section 5 (Table 5-1). The four largest groups of cases in this sample include orthopedic (28 percent of all cases), respiratory (17 percent), cardiovascular (15 percent), and neurologic (14 percent). Medical cases ranged from gastrointestinal (GI) and hepatobiliary (8 percent) to kidney and urinary (4 percent) to infections (4 percent), followed by integumentary (2 percent), endocrine (2 percent), and hematologic (1 percent) cases.

Differences are seen in the proportions using PAC and the type of PAC used. The groups with the largest proportions going home without services were the respiratory (20 percent) and the GI/hepatobiliary (20 percent) cases. However, within those groups there was wide variation. **Table 6-4** disaggregates these cases into subcategories distinguishing between medical and surgical cases and some of the more likely "crossover" cases, or cases that may be treated in more than one setting. Among the respiratory cases, four subgroups—those with ventilators or tracheostomies; those hospitalized for surgical respiratory issues, such as major chest procedures or other surgical procedures; those with medical respiratory issues, such as respiratory infections; and those with COPD—were not in any of the other 3 groups. The ventilator cases were largely associated with LTCH use (74 percent of these cases) and they constituted 42 percent of the LTCH admissions, whereas those who went home without services tended to have been hospitalized for medical respiratory issues, such as respiratory infections (12 percent of those who went home without services). If they used PAC, the medical respiratory cases were likely to go home with home health (8 percent of the HHA cases) or SNF (7 percent of the SNF cases). In addition to the medical respiratory cases, COPD cases also were a larger share of the respiratory cases going home without services (6 percent of their cases); others were transferred to HHA (4 percent of HHA cases) or to LTCHs (4 percent of their cases).

Over all cases, the orthopedic/musculoskeletal cases constitute the largest group in this sample (3,707 cases). These cases included two surgical groups: minor and major. Minor includes hip and femur procedures except major joints; knee procedures with and without primary diagnosis of infections; lower extremity and humerus procedures except hip, foot, femur; local incisions; soft tissue procedures; and shoulder, elbow, and other musculoskeletal procedures. Major includes bilateral or multiple major joint procedures, hip/knee revisions, major joint replacements and reattachments, amputations for musculoskeletal systems, major shoulder or elbow joint procedures, and limb reattachments. The third group of orthopedic cases is spinal in nature and included many of the spinal fusion cases and back and neck procedures

other than spinal fusions. The final two groups of orthopedic cases are major and minor medical cases. Minor medical orthopedic cases included fractures, sprains, medical back problems, septic arthritis, tendonitis, and aftercare of musculoskeletal system and connective tissue. Major medical orthopedic included hip and pelvis fractures and pathological fractures (see Section 5, Table 5-1, for complete descriptions of the groups).

The two largest orthopedic groups were the surgical cases, particularly the major surgical cases such as those with multiple joint procedures, hip/knee revisions, and other joint replacement and revision cases. The major surgical cases were frequently found in all three settings, including HHA (16 percent of HHA cases), IRF (15 percent of IRF cases) and SNF (20 percent of SNF cases). The minor surgical cases accounted for a larger share of the IRF and SNF cases in our sample (10 percent and 9 percent, respectively).

Cardiovascular cases are the third largest group in the sample. These include two surgical groups (vascular surgical and cardiac surgical) as well as general circulatory disorders and vascular medical conditions, such as acute myocardial infarction cases. The relative distributions across PAC settings vary. Cases transferred to the SNFs and HHAs tended to be either post-surgical or medical in nature, while IRFs had more of the post-surgical cases.

The fourth largest group in the sample is the neurological cases. These include cases admitted to the acute hospital for a stroke; other neurological surgical issues, such as intracranial procedures or ventricular shunt procedures; or neurological medical issues, such as a range of nervous system disorders, multiple sclerosis, and related conditions. The majority of cases in all three groups in our sample are discharged to IRF. However, the first site of PAC was clearly differentiated, with IRFs admitting the highest proportion of cases that had been hospitalized for a stroke, while SNF neurological admissions were as likely to have been neurological/medical cases as stroke cases in the prior hospital stay.

Comorbidities. Comorbidities are another important factor in predicting discharge destination. **Table 6-5** shows the sample distribution of comorbid conditions by PAC setting. The two most common types of comorbidities in our sample are orthopedic/musculoskeletal (found in 49 percent of the cases in this sample) and metabolic/endocrine (48 percent of the sample). Liver patients follow closely behind, with 40 percent of the patients having comorbid liver conditions.

The presence of a comorbidity in patients transferred to different PAC settings varied. Comorbidities of liver disease are quite common in this sample, especially in the LTCH patient population (50 percent) and at a slightly lower percentage across home health (41 percent), IRF (36 percent), and SNF (41 percent). Metabolic/endocrine comorbidities are also common among these cases, found in 74 percent of the LTCH sample, as well as noticeably present in the SNF and IRF settings at 50 percent and 48 percent, respectively.

Cardiovascular is another common comorbidity in the LTCH patients (74 percent), compared with only about 25 percent in the other PAC settings and 15 percent of those going home without services. Respiratory comorbid conditions were also quite common in the PAC population, especially in the LTCH group (73 percent) although also frequently found in the other PAC settings: HHA (39 percent), SNF (34 percent), and IRF (32 percent).

In contrast, having a comorbidity of an orthopedic/musculoskeletal condition, such as orthopedic infections, rheumatoid arthritis, and amputation, was more commonly associated with discharge to a SNF (63 percent), IRF (59 percent), or HHA (49 percent) in our sample.

Comorbidities that were commonly treated in settings other than LTCH and SNF include diabetes (35 percent in home health), other neurological (19 percent in IRF), stroke (34 percent in IRF), and head and spine (10 percent in IRF). Thus, while LTCH admissions tended to have the most comorbidities, IRFs hold the next highest number of comorbidity groups.

Major Treatments at Discharge. Another factor affecting medical status was whether the patient was being transferred with particular treatment needs that may require higher levels of nursing or other specialized treatment, such as respiratory therapy **(Table 6-6)**. One factor was whether the patient required hemodialysis at discharge or at any time during the stay. These patients require additional resources in settings that do not commonly have hemodialysis equipment, such as SNFs. In our sample, these cases were most common in LTCHs (10 percent of LTCH cases compared with 4 percent overall). Being discharged with a ventilator was another intensive treatment examined. Most of these cases were found in the LTCH sample (30 percent), although small numbers were found in the other settings, as well. Total parenteral nutrition (TPN) was a third resource-intensive treatment at discharge, again primarily found in those discharged to the LTCHs (8 percent).

Length of stay in the intensive care unit (ICU) during the acute hospital stay is associated with case complexity. In this sample, LTCH admissions were most likely to have had an ICU stay of at least 7 days (15 percent).

Skin Integrity. Skin integrity is another major factor associated with different treatment needs. Included in this analysis is a measure of having a severe pressure ulcer (stage 3, 4, unstageable or a stage 2 present for more than 1 month). In this sample, the severe pressure ulcers tended to be found in the LTCH (15 percent of these cases).

6.3.1.3 Cognitive Status by Setting

Depression. About 22 percent of the sample population had a symptom of depression **(Table 6-7)**. Depression was most frequently associated with cases discharged to IRFs and SNFs (26 percent of patients in each setting). About 20 percent of the LTCH cases also reported signs of depression. It appears that these patients were distributed fairly evenly across settings, but generally were less likely to go home, either with no services (14 percent) or with home health (19 percent).

Temporal Orientation. While the majority of patients had no or minimal/borderline impairment in terms of temporal orientation (70 percent), 16 percent suffered from moderate impairment and 15 percent from severe impairment. Among patients discharged home with no services, 50 percent were categorized as least impaired, while 46 percent may have moderate impairments. Those discharged home with home health had a higher proportion in the healthiest group (79 percent), while those discharged to LTCHs were the most impaired (41 percent in the severely impaired category compared with about 15 percent of those discharged to SNFs and IRFs).

6.3.1.4 Impairments/Function

Impairments. **Table 6-8** shows patient functional impairment at the time of discharge from acute care. Forty-two percent of the patient sample had a history of falls, and these patients were common in discharge to both the SNF setting, at 52 percent, and the IRF setting, at 46 percent. Bladder incontinent patients were notably higher in proportion in the LTCH (69 percent) than in comparable settings. This is also true of patients with an indwelling bowel device, with a 16 percent LTCH representation in comparison with 2-7 percent in other settings. While 45 percent of the LTCH patients had swallowing impairments that required no oral intake (NPO) at transfer, only 6 percent of the LTCH cases had swallowing difficulties such as coughing or choking; patients at this level of impairment were most commonly seen in an IRF (11 percent). This difference in impairment level highlights the differences seen across settings.

When comparing communication, respiratory status, and sitting/mobility endurance, the most severely impaired patients in all three categories were most likely to appear in the LTCH setting (29 percent, 60 percent, and 80 percent, respectively). Furthermore, having oxygen at discharge was more frequently associated with a higher proportion of cases in the LTCH group than in any other setting (14 percent). Again, this highlights the more complicated nature of patients found in LTCHs.

Functional Status. **Table 6-9** illustrates functional status in terms of self-care, mobility, and motor Rasch scores by setting. Self-care, mobility, and motor status, over all cases, have similar means, at 44.78, 44.71, and 44.81, and medians of 45.06, 44.02, and 44.57, respectively. Patients who went home without services after acute care consistently score the highest means at time of transfer across the three functional statuses. These patients also have some of the highest scores across the 95th percentile. Similarly, patients who were discharged to home health have higher mean and median functional scores at admission compared to patients discharged to other settings.

While patients discharged to the IRF settings have the lowest scores at admission in the 95th percentile across settings, patients in the LTCHs have the lowest overall mean and median scores, with means ranging from 28.06 (self care) to 29.69 (mobility), and medians ranging from 29.31 (self care) to 30.59 (mobility). LTCH cases also have the lowest motor Rasch 5th percentile score across settings, at just 1.77. Comparatively, 5th percentile functional scores for other settings span from 15.13 (mobility; SNF) to 35.72 (motor; home health). This illustrates the range of patients admitted to each setting. On an unadjusted basis, functional scores in IRFs and SNFs are similar, although IRF patients are slightly lower. LTCH patients clearly have the lowest average functional scores at transfer; those who are discharged home, either with services or without, have the highest functional scores.

6.3.2 Multivariate Results

Four sets of multivariate models were examined to consider the relative contributions of different factors in predicting the probability of using any service within 30 days (Any PAC) compared with receiving no services; the relative odds of being discharged to each of the four PAC settings compared with the odds of being discharged home without a PAC services; and the odds of using IRF or HHA relative to using SNF. This section presents the results of those analyses.

The three bivariate models predicting (Any PAC model, IRF/SNF model, and SNF/HHA model) are based on logistic regression models to predict the probability of use within 30 days of an acute discharge. The fourth model in this analysis, the First PAC model, is a multinomial logistic regression predicting the relative odds of discharge to each type of PAC service compared with no inpatient PAC or HHA services.

We used the SAS command PROC SURVEYLOGISTIC, which fits linear logistic regression models for data on the basis of complex sample design using pseudomaximum likelihood methods and incorporates the sample design into the analysis. Because patients in the same facility or receiving services from the same provider are likely to be more similar and receive more similar services than patients receiving services from different providers, the analyses took into account clustering at the provider level.

The samples differed in each of the models. The first logistic model predicting ANYPAC contrasted those discharged home without services to those using any of the four PAC services or those listed in the "other" category. The multinomial model excluded the "other" cases and used the rest of the patients in our sample. The two setting-specific comparisons were based on cases discharged to one of the two relevant settings.

Model results are reported below as odds ratios (OR), which are the ratio of the odds of PAC use for patients with a characteristic over the ratio of the odds of PAC use for patients with the referent characteristic. ORs have been interpreted here as risk. An OR greater than 1.00 for a particular characteristic is associated with a greater likelihood and an odds ratio of less than 1.00 is associated with a lesser likelihood of using the service.

Pseudo R-squares are presented as model fit statistics to help explain the proportion of the variance explained by the model. The scales range from 0 to 1, with higher numbers indicating more explanatory power. **Table 6-12** shows the pseudo-R-squares for the four models. Notably, the ANYPAC model explains 34 percent of the variation in predicting whether PAC services are used. The multinomial model predicting which, if any, PAC services are used explained the most variation (47 percent). The other two models, which examined the factors associated with IRF or HHA use relative to SNF use, explained almost as much variation (38 percent and 40 percent, respectively).

6.3.2.1 Multivariate Results Associated With the Any PAC Model

Table 6-13 shows the results from the two models analyzing the odds of PAC use (ANYPAC) and the odds of using each type of PAC relative to no PAC at discharge (FIRSTPAC). The first two columns show findings related to the Any PAC model, which predicts the probability of PAC use (LTCH, IRF, SNF, HHA, or other service) relative to not using one of those services within 30 days for all patients. About 34 percent of the variation in Any-PAC models was explained by the variables included in the models.[3]

[3] Note that for the purposes of the discussion of the Any PAC model, the phrase "any PAC" may refer to services within 30 days, including rehospitalization and Part B therapy.

Demographics/Insurance Status. Three demographic factors were tested for their association with the use of any PAC relative to not receiving services within 30 days after discharge. The odds of using PAC or other services increased with age after 75 years of age but were relatively lower for the younger-than-65 population. No significant differences were found between Black/African Americans and others in their odds of using PAC. Similarly, no gender differences were significant in the odds of using PAC. Having Medicaid as a secondary payer was associated with lower odds of using PAC (OR: 0.50, $p \leq 0.0001$).

Medical Status. The odds of using PAC also varied by several medical status factors. Each of the 11 primary diagnosis groups in the model was significantly less likely to use PAC than the referral category of orthopedic/musculoskeletal cases, with the exception of cardiovascular and transplant cases, which were not significantly different from orthopedic cases. In other words, the odds of a cardiovascular or transplant case using PAC was similar to the odds of an orthopedic case. Having had a surgery in the hospital before discharge was associated with significantly lower odds of using PAC (OR: 0.44, $p \leq 0.0001$). This may be due to healthier patients undergoing surgery, all else equal.

Comorbid conditions, as noted by the hierarchical condition category (HCC) groups, were also largely significant. Having one of the specified comorbid conditions was generally associated with much higher odds of being discharged to PAC than someone without this comorbid condition.

Those discharged from the acute hospital on a ventilator had significantly higher odds of using PAC.

Mood/Cognitive Status. Mood/cognitive status factors were included in the models. Having signs or symptoms of depression as noted by the Patient Health Questionnaire (PHQ-2) items on sadness or the presence of a comorbid diagnosis of depression was associated with higher odds of using PAC.

Functional Status and Impairments. The model also controls for numerous impairments in considering the odds of discharge to each PAC setting. NPO status was associated with somewhat high odds of using PAC. Having a moderate communication problem, in either expression or understanding verbal content, was associated with almost 2 times greater odds of being discharged to PAC.

Premorbid Status: Lived Alone in Community Before Illness. Living alone in the community before this hospital admission was also associated with higher odds of being discharged to PAC.

Provider Market. The last section of the model controlled for each of the market areas to examine whether market "richness" and variations in referral patterns had an effect after controlling for patient characteristics. The reference market was Boston, which has a high level of availability for types of PAC. The results show that after controlling for patient characteristics, the market area was not significantly associated with whether to use any PAC.[4]

[4] Seattle was an exception because all patients in the sample went to a PAC setting.

This may reflect the availability of some PAC in each market, although the types of PAC services varied across markets.

6.3.2.2 Multivariate Results Associated With the First PAC Model

Table 13 also shows the results from the multinomial model that separately examines the odds of being admitted to HHA, SNF, IRF, or LTCH within 30 days after leaving the hospital compared with the reference group of being discharged without a referral to one of these four services. About 47 percent of the variation in the FirstPAC model was explained by the variables included in the model.

The odds ratios presented in the tables show the odds of a patient with that characteristic being discharged to a given setting relative to going home with no services, holding all other variables in the model constant. While the odds are expressed in comparison to no services, the relative odds between the PAC settings can be examined by first noting whether a factor was significantly associated with that setting and, if so, examining the direction and relative magnitude of the factor compared with other settings.

In examining the results associated with the First PAC model, it is important to keep in mind that these factors are indicative of the types of cases discharged (or admitted) to each setting within our sample. They are not conclusive, but they highlight similarities and differences among the populations admitted to each setting after acute hospital discharge. Most notably, many of the factors are significantly associated with more than one setting. This suggests that the types of cases treated in each setting are not mutually exclusive. The odds of a patient being admitted with a particular characteristic may differ by setting but where significant, the factor is associated with that setting.

Demographics/Insurance Status. Three demographic factors were tested for their association with using each type of PAC relative to going home without services. As found in the model predicting ANYPAC, older patients have higher odds of using HHA, SNF, and IRF services, but there was no significant difference in age across the LTCH admissions relative to the non-PAC users in this sample. This likely reflects the two groups' both having higher numbers of the youngest and oldest populations in addition to the two middle age groups.

No significant differences were associated with being Black/African American relative to others in their odds of using each type of PAC. Males were more likely than females to be discharged to an IRF or an LTCH than go home without services (OR: 1.52, $p \leq 0.0001$, (OR: 1.37, $p \leq 0.01$, respectively). Having Medicaid as a secondary payer was associated with lower odds of using any of the four settings.

Medical Status. The odds of using each type of PAC also varied by several medical status factors. The odds of using each type of service for each condition relative to the orthopedic/musculoskeletal cases' odds differed across primary conditions. Neurologic cases were less likely than orthopedic cases to use HHA and SNF services, although the odds of using IRFs and LTCHs were not significantly different from the orthopedic cases. Respiratory cases had odds that were over 3 times greater for using LTCHs and significantly lower for using the other three services. Cases with a primary diagnosis of infections also had much higher odds of using LTCH and a significantly lower likelihood of using IRFs (OR: 3.10, $p \leq 0.01$, OR: 0.31,

$p \leq 0.001$, respectively.) Having had a surgery in the hospital before discharge was also associated with significantly lower odds of using any of the PAC settings. This may be due to healthier patients undergoing surgery, after controlling for all the other patient characteristics.

Comorbid conditions, as noted by the HCC groups, were also largely significant. Having one of the specified comorbid conditions was generally associated with almost 2 times (or higher) greater odds of being discharged to any one of the PAC settings than someone without this comorbid condition. Interesting to note is the difference in the relative odds of using each service given a specific comorbidity. While people with comorbid liver conditions had odds that were over 2 times greater for their use of HHA (OR: 2.48, $p \leq 0.0001$), SNF (OR: 2.85, $p \leq 0.0001$), or IRF services (OR: 2.89, $p \leq 0.0001$), the odds were nearly double that to be discharged to LTCHs (OR: 4.50, $p \leq 0.0001$).

The comorbid conditions with the highest odds of being discharged to HHA were diabetes (OR: 2.74, $p \leq 0.0001$), orthopedic (OR: 4.27, $p \leq 0.0001$), and stroke (OR: 3.89, $p \leq 0.0001$). Those with the highest odds of being discharged to SNF include the orthopedic comorbidities (OR: 6.98, $p \leq 0.0001$), stroke (OR: 4.54, $p \leq 0.0001$), and cellulitis (OR: 3.89, $p \leq 0.0001$). Among the IRF admissions, the comorbid conditions with the highest odds of use included orthopedic (OR: 6.61, $p \leq 0.0001$), stroke (OR: 11.33, $p \leq 0.0001$), head and spine conditions (OR: 5.35, $p \leq 0.0001$), and cellulitis (OR: 4.90, $p \leq 0.0001$). For those discharged to the LTCH, the odds were higher than the odds for other PAC settings for most types of comorbidities in the list. The exceptions were for those with orthopedic comorbidities, where the odds were comparable to HHA (OR: 4.18, $p < 0.0001$) but lower than SNF or IRF and other neurological comorbidities (OR: 1.70, $p \leq 0.01$), which was lower than the odds of using any of the other PAC settings. Comorbidities of stroke were slightly higher odds for LTCH (OR: 4.20, $p \leq 0.0001$) than HHAs (OR: 3.89, $p \leq 0.0001$), equivalent to SNF (OR: 4.54, $p \leq 0.0001$) but much lower than the odds of being discharged to IRF (OR: 11.33, $p \leq 0.0001$). Patients with a comorbidity of psychiatric conditions had higher odds of being discharged to SNFs (OR: 2.14, $p \leq 0.0001$) or LTCHs (OR: 2.64, $p \leq 0.0001$).

Having certain types of high-intensity treatments during the acute hospital stay was also associated with higher odds of using the various types of PAC compared with no services. Those discharged from the acute hospital on a ventilator had significantly higher odds of LTCH use (OR: 11.67, $p \leq 0.002$). Being on TPN at time of transfer was significant only in the odds of discharge to LTCHs (OR: 8.09, $p \leq 0.01$). Having been in the ICU for at least 7 days during the hospital stay was associated with lower odds of being discharged to IRF: (OR: 0.26, $p \leq 0.03$). However, it had no significant association with the odds of being discharged to an LTCH after controlling for other patient characteristics.

Severe pressure ulcers also were associated with higher odds of using certain services. Those who had a stage 3 or stage 4 pressure ulcer, or a stage 2 pressure ulcer that was over a month old, had odds that were 3 times greater of using LTCHs than going home without services. No significant differences showed across the other settings after controlling for the factors in the model.

Mood/Cognitive Status. Mood/cognitive status factors were included in the components of the first PAC model. Having signs or symptoms of depression as noted by the PHQ-2 items

on sadness or the comorbid diagnosis of depression was associated with about 2 times the odds of discharge to SNF, IRF, and LTCH, although the odds of using HHA were slightly lower (OR: 1.59, $p < .0001$).

Temporal orientation was also included in the models to test the association between knowing the month and year during the hospital stay. Those with a moderate impairment were significantly less likely to use each of the four PAC settings than those without impairments.

Functional Status and Impairments. Having a history of falls is associated with increasing the odds of discharge to SNF (OR: 1.60, $p \leq 0.001$). Two functional status subscales were also included in the model. Because of nonlinearity, the scales were entered both in their natural form and squared. The first scale on self-care was positively associated with discharges to both SNFs and IRFs and somewhat negatively associated in the squared term, highlighting the nonlinear but significant effect on discharge to these two settings. The second scale was mobility, and it also had a positive relationship with HHA and IRF, as well as a significant but minor effect on the squared term associated with these two settings. This suggests that after controlling for the other patient characteristics, self-care at hospital discharge and mobility at discharge are significantly associated with the odds of using these types of PAC.

The model also controls for numerous impairments in considering the odds of discharge to each PAC setting. Bladder and bowel impairments were positively associated with discharge to LTCHs. The use of an indwelling bowel catheter was associated with 3 times greater odds of being discharged to an LTCH (OR: 3.24, $p \leq 0.0001$) and nearly as high an odds of going to IRF (OR: 2.41, $p \leq 0.01$). Bladder incontinence was associated with slightly higher odds of being discharged to an LTCH.

Not taking food by mouth (NPO) at time of transfer was associated with discharge to a SNF or IRF, with odds 2 times greater for those with this impairment (OR: 2.007, $p \leq 0.01$ and OR: 2.42, $p \leq 0.01$, respectively) and over 6 times greater for discharge to an LTCH (OR: 6.44, $p \leq 0.0001$).

Having a moderate communication problem, in either expressing or understanding verbal content, was associated with almost 2 times greater odds of being discharged to the HHA, IRF, and LTCH settings, although it was slightly lower but still positive odds for discharge to SNF. Relatively speaking, these types of cases had the highest odds of being discharged to an IRF (OR: 2.68 $p \leq 0.0001$).

Respiratory status was also significant in predicting PAC use. A moderate impairment was associated with a 3 times higher odds of using HHA (OR: 3.14, $p \leq 0.0001$), while severe impairment status was not significantly different in predicting HHA discharge compared with no services. In contrast, for LTCHs, patients with moderate levels of respiratory impairment were only half as likely to use LTCH (OR: 0.44, $p \leq 0.01$). However, being severely impaired was associated with higher odds of being discharged to an LTCH (OR: 1.62, $p \leq 0.04$), even after controlling for primary medical diagnosis and comorbid conditions.

Sitting and mobility endurance were also examined as factors associated with discharge to different PAC settings. The reference group was having no impairment in being able to sit

without support or walk or wheel 50 feet. Having no endurance at time of transfer was associated with higher odds of using LTCH (OR: 3.32, $p \leq 0.0001$). Having some endurance limitations was associated with HHA use after controlling for the other factors in the model (OR: 1.89, $p \leq 0.0001$).

Premorbid Function. Two measures of self-reported prior functioning were included in the models. Those with severe limitations before this spell of illness had higher odds of using HHA, while having some limitations was associated with slightly lower but positive odds of using HHA (OR: 2.22,$p \leq 0.0001$, and OR: 1.55, $p \leq 0.0001$, respectively.) The severe prior functional limitations cases had lower relative odds of being discharged to IRFs and LTCHs. Having some limitations was associated with SNF use (OR: 1.56, $p \leq 0.0076$), but severe limitations were not significant in this population.

Premorbid Status: Lived Alone in Community Before Illness. Living alone in the community before this hospital admission was also associated with higher odds of using SNF and IRF (OR: 1.70, $p \leq 0.0001$, and OR: 1.70, $p \leq 0.0001$, respectively).

Provider Market. The last section of the model controlled for each of the market areas to examine whether market "richness" and other market factors had an effect after controlling for patient characteristics. We will not interpret the coefficients in **Table 6-13** because they are market level effects capturing many differences between the markets including availability of providers of each type in the sample, referral patterns, and the characteristics of the specific providers.

6.3.2.3 Patient Characteristics Associated With IRF Use and HHA Use Relative to SNF

Table 6-14 shows the results of two logistic regressions related to the SNF/IRF model and SNF/HHA model. The models are useful for identifying the patient characteristics that may be disproportionately associated with one setting or the other. For example, the population of patients with moderate impairment in communication is treated and "common" in both IRFs (35 percent) and SNFs (26 percent). At the same time, while these types of patients are treated in both settings, after controlling for the other variables in the model, a patient with this status is statistically more likely to be treated in an IRF than a SNF. The same medical, functional, cognitive, and supply factors are included in these two models as in the earlier models. As in all regression models, the coefficient associated with each variable represents the impact of that factor, holding all other factors constant.

The first model (SNF/IRF) predicts whether a patient having each characteristic has significantly different odds of using IRF (coded as 1) than using SNF (coded as 0). This model had a pseudo R-square of 0.37, explaining 37 percent of the variation in this model. The second model predicts whether a patient having each characteristic has a significantly different odds of using HHA (coded as 1) than using SNF (coded as 0). This model had a pseudo R-square of 0.40, explaining 40 percent of the variation in this model. The analysis focuses on the first site of care within 30 days after hospital discharge. Discharge patterns associated with community entrant or PAC-to-PAC transfers were not examined.

Demographics/Insurance Status. Age showed significant differences in the odds of being discharged to an IRF relative to a SNF. The under-65-year-old group was significantly more

likely than the 65- to 74-year-old population to be discharged to the IRF than to the SNF (OR: 1.43, $p \leq 0.01$). However, the older populations (75-84 and 85 years and above) were significantly less likely to be discharged to either an IRF or HHA than to a SNF (OR: 0.66, $p < 0.0001$, OR: 0.44, $p < 0.0001$). Males were more likely than females to be discharged to an IRF instead of a SNF (OR: 1.48, $p \leq 0.0001$), although there were no significant differences in their relative probability of being discharged to a HHA rather than a SNF. Similarly, no significant differences in discharge to a SNF versus IRF or HHA were found for patients with Medicaid as a secondary payer source.

Medical Status. The relative probability of being discharged to an IRF compared with a SNF varied somewhat by primary diagnosis group. In general, the only patients with a higher probability of being discharged to an IRF than the reference orthopedic group were those with a primary diagnosis in the acute hospital of a neurologic condition (OR: 2.61, $p \leq 0.0001$). The rest of the condition groups were less likely than orthopedic groups to go to an IRF than a SNF, all else equal. This includes cases that had been hospitalized with integumentary conditions (OR: 0.33, $p \leq 0.01$), kidney and urinary conditions (OR: 0.31, $p \leq 0.0001$), infections (OR: 0.51, $p \leq 0.01$), GI and hepatobiliary conditions (OR: 0.38, $p \leq 0.0001$), and hematologic conditions (OR: 0.43, $p \leq 0.07$). This highlights the differences in the types of cases discharged to SNFs compared with IRFs, with the former being more medical in nature. No significant differences in the odds of use between IRF and SNF appeared for the cardiovascular populations.

In contrast, many of the primary conditions showed no significant difference between being discharged to a HHA rather than a SNF. The exceptions were those with respiratory conditions (OR: 1.49, $p \leq 0.033$), transplant cases (OR: 8.65, $p \leq 0.02$), GI and hepatobiliary diagnoses (OR: 1.67, $p \leq 0.01$), and other types of cases not otherwise categorized that had higher odds of being discharged to a HHA than a SNF.

Surgery in the prior hospital stay did not differentiate a significant difference in the probability of being discharged to either IRF or HHA relative to SNF.

Interestingly, certain comorbid conditions were associated either positively or negatively with the use of SNF relative to IRF or HHA. Most comorbid conditions that were positively associated with IRF use relative to SNF use were also negatively related to HHA use relative to SNF use, suggesting a hierarchy in the likelihood with which these settings may be treating cases with certain comorbid conditions, after controlling for primary conditions. The one case where this did not hold was in comorbid liver conditions. These patients were less likely to use HHA than SNF (OR: 0.81, $p \leq 0.0255$), but there were no significant differences in their probability of being discharged to an IRF compared with a SNF. Diabetes had no significant effect on the probability of using either the IRF relative to the SNF or the HHA relative to the SNF, although other endocrine comorbidities were associated with a higher probability of being discharged to IRF (OR: 1.18, $p \leq 0.0246$) and a lower probability of being discharged to HHA (OR: 0.68, $p \leq 0.0001$) than to SNF. Having comorbid orthopedic or musculoskeletal conditions was associated with a lower probability of using HHA than SNF (OR: 0.69, $p \leq 0.0009$) but had no effect on the relative use of IRF to SNF.

Cases with a comorbidity of other neurological conditions had a higher probability of being discharged to an IRF than a SNF (OR: 1.70, $p \leq 0.0001$), while cases with a comorbidity

of stroke were almost 2.5 times more likely to be discharged to an IRF than a SNF (OR: 2.41, $p \leq 0.0001$). Similarly, cases with a comorbidity of cardiovascular conditions were more likely to be discharged to an IRF than a SNF (OR: 1.45, $p \leq 0.0001$) and less likely to be discharged to a HHA rather than a SNF (OR: 0.76, $p \leq 0.0045$). Those with a comorbidity of cellulitis were also less likely to be discharged to HHA relative to SNF (OR: 0.57, $p \leq 0.01$). Comorbidities of head and spine conditions were also associated with a higher probability of being discharged to an IRF than a SNF (OR: 3.26, $p \leq 0.0001$), and those with comorbid psychiatric conditions were significantly less likely to be discharged to HHA than SNF (OR: 0.78, $p \leq 0.05$).

Patients varied in the odds of their being discharged to SNFs relative to IRFs and HHAs if they were discharged with certain major treatment needs. Receiving hemodialysis treatments was associated with a lower odds of HHA use (OR: 0.33, $p \leq 0.0057$) but had no significant effect on the relative use of IRF and SNF care. Ventilator use (weaning or nonweaning) at transfer also had no effect on the difference between IRF and SNF, but patients with these needs were much more likely to be discharged to HHA than SNF, although the significance level was marginal (OR: 3.2, $p = 0.08$).

Cognitive Status. No significant differences were observable in the odds of being discharged to an IRF relative to a SNF for patients who had signs or symptoms of depression. However, patients with these symptoms were significantly less likely to be discharged to a HHA (OR: 0.65, $p \leq 0.000$).

Temporal orientation also had an effect in some cases. Knowing the month and year was a distinguishing factor in predicting discharge destination. Those with any impairment (moderate or severe) were significantly less likely to be discharged to an IRF than a SNF (OR: 0.31, $p \leq 0.0057$, OR: 0.604, $p \leq 0.0357$, respectively). However, those with moderate impairments were much more likely to be discharged to HHA than to SNF (OR: 3.72, $p \leq 0.0298$), although the severely impaired were significantly less likely to be discharged to HHA than SNF (OR: 0.70, $p \leq 0.05$).

Functional Status and Impairments. As noted in the earlier models, patients with a history of falls were significantly more likely to be discharged to a SNF than to other settings. These cases had lower odds of being discharged to an IRF (OR: 0.73, $p \leq 0.02$) or to HHA (OR: 0.61, $p \leq 0.0001$) than to SNF, all else equal.

Because of greater likelihood of functional limitations in both self-care and mobility in the more impaired rehabilitation patients, a motor scale was used to test the difference between SNF and IRF patients. The motor scale and the squared term on the motor scale were both significant. The results suggest that those with a higher motor scale are more likely to be discharged to an IRF and that effect is mildly curvilinear, suggesting it may change at different levels of impairment. Comparisons of HHA to SNF patients show that patients with higher self-care scores are less likely to be discharged to HHA (OR: 0.90, $p \leq 0.0001$) and that those with higher mobility scores are more likely to be discharged to HHA than SNF (OR: 1.08, $p \leq 0.0035$).

The effect of impairments varied across the two models. Having an indwelling bowel device was associated with much higher odds of being discharged to an IRF than to a SNF (OR:

2.42, $p \leq 0.01$) but had no effect on the odds of being discharged to HHA relative to SNF. Similarly, having signs of difficulty swallowing was associated with a somewhat higher odds of being discharged to an IRF than to a SNF (OR: 1.41, $p \leq 0.0616$) but was not significant between HHA and SNF use. Having a moderate communication impairment was also associated with a higher odds of being discharged to an IRF than a SNF (OR: 1.64, $p \leq 0.01$), but severe impairment was not significant. Neither level of communication impairment was significant in being discharged to HHA rather than SNF.

Respiratory status impairments varied in whether they affected the odds of discharge to IRF or HHA relative to SNF. Those with a moderate respiratory impairment had a much higher odds of being discharged to HHA than SNF (OR: 3.27, $p \leq 0.0001$) and were moderately significant for severe impairment (OR: 1.31, $p \leq 0.07$). In the IRF/SNF model, moderate respiratory impairment was not a statistically significant predictor, but the severe respiratory impairment population had higher odds of being discharged to an IRF than a SNF (OR: 1.54, $p \leq 0.001$).

Endurance also had differing effects. Those with the greatest impairments (no endurance) had lower odds of being discharged to an IRF than a SNF (OR: 0.70, $p \leq 0.03$), although there was no significant difference in the odds of their being discharged to an HHA relative to SNF. Those who could sit with support or walk 50 feet with rest had higher odds of being discharged to a HHA than a SNF (OR: 1.46, $p \leq 0.02$) and no significant difference in their odds of being discharged to IRF relative to SNF. Again, these factors suggest overlaps in the populations using these services although the groups that overlap between the IRF and the SNF may be different from those that overlap between the HHA and the SNF.

Premorbid Function. The results suggest that patients with severe premorbid limitations had lower odds of being discharged to an IRF than to a SNF (OR: 0.21; $p < 0.0001$) and higher odds of being discharged to HHA than to a SNF (OR: 1.75, $p \leq 0.000$). Those with some limitations before this admission had lower odds of being discharged to an IRF than to a SNF (OR: 0.57, $p \leq 0.01$).

Premorbid Status: Lived Alone in Community Before Illness. Those who lived alone in the community before their admission for this illness were less likely to be discharged to HHA than to SNF (OR: 0.57, $p \leq 0.0001$) than those who did not live alone in the community before this illness.

Provider Market. Market area had few effects on the odds of using IRF or HHA relative to SNF after controlling for patient characteristics. The two exceptions were in the Dallas market where, all else equal, patients were almost 19 times more likely to be discharged to an IRF than a SNF (OR: 18.96, $p \leq 0.01$) and seven times more likely to use HHA than a SNF (OR: 7.76, $p \leq 0.01$). There were differences in the Columbia market as well between the odds of IRF and SNF use, with IRF use being not observed because there were no IRFs in the Columbia market sample. The only other market-level difference after controlling for patient characteristics was in Wilmington, North Carolina, where patients had a higher odds of being discharged to HHA than SNF, all else equal, although the significance level is marginal on this variable (OR: 3.76, $p \leq 0.09$).

6.4 Conclusions

These results provided important information on the types of cases being treated in each PAC setting or going home without PAC. As shown in earlier work (Gage et al., 2009), the majority of hospital discharges go home without PAC (65 percent of admissions). However, among those who are transferred to PAC, it has been difficult to compare the cases because of limited information on primary diagnoses and comorbidities. Earlier work has suggested that the medical complexity (or in the case of rehabilitation patients, the functional/medical complexity) of cases admitted to each setting differs, but data allowing empirical analysis of these issues across settings have been missing. While the results of this study reflect the oversampling of the PAC populations, particularly the types of cases treated in LTCHs and IRFs, the information about the relative significance of each factor, and the direction of the impact as increasing or decreasing the odds of using each service, are important findings.

These analyses do not answer the question of where patients should go, but instead examine the existing patterns of care given the regulations and incentives currently in the marketplace. The models showed the types of patients treated at each setting. On average, after controlling for receiving services in a high or low PAC area, the types of patients treated in each of the four settings had areas of overlap in their characteristics. Notably, the results showed that medical cases were more likely to be discharged to HHA, SNF, and LTCH while postsurgical cases typically needing physical rehabilitation tended to be discharged to IRFs, SNFs, and HHAs. While the complexity of patients using each PAC setting tended to differ across settings, the results suggest that the populations using PAC also appeared to overlap in the types of conditions and impairments being treated. Medical factors, such as primary diagnosis in the acute hospital, were important but not sufficient for predicting subsequent PAC use. Comorbidities played an important role in identifying the difference in the potential complexity of cases treated in each setting. For example, the odds were greatest for the LTCH setting when more medical comorbidities were present. However, when the comorbidities were the type that required therapy services, such as orthopedic/musculoskeletal conditions and the neurological conditions, patients had higher odds of IRF use or SNF use. Patients with a comorbidity of stroke had significantly higher odds of going to PAC than going home without services at discharge, and substantially higher odds of being transferred to an IRF than to any of the other PAC settings. Similarly, cases with higher medical resource needs—such as being discharged on a ventilator, requiring hemodialysis, or being discharged with TPN—were all associated with greater odds of being discharged to an LTCH. Interestingly, after controlling for the other factors in the model, having had an intensive care unit stay longer than 7 days did not increase the odds of going to an LTCH. This suggests that these better measures of medical complexity may be useful in replacing resource use in the models.

Most importantly, each of the PAC settings had a higher probability of admitting most of these cases than having them be discharged home without further services. This underscores the importance of examining treatment outcomes and resource intensity associated with treating these cases in the different PAC settings.

Functional status was also an important factor in explaining site of care. While IRF patients frequently have falls problems, the models suggest that after controlling for the other patient characteristics, patients with a history of falls have no higher likelihood of being

discharged to an IRF. However, falls history is significantly associated with higher odds of being discharged to a SNF, all other patient characteristics equal. This is consistent with the self-care and mobility score results being curvilinear in nature. In other words, while the SNF and IRF have significantly higher odds of taking patients with higher self-care scales, the scale is curvilinear and negative, suggesting that patients have a lower likelihood of being discharged to these settings once the self-care score is too high. Similar results are shown with mobility scores, although the two settings with the higher odds of accepting patients with higher scores at admission are HHA and IRF—but again, these scales reach a point where the patient is significantly less likely to be admitted to these settings as the mobility scale increases. And as with the medical characteristics, these factors are significant in more than one setting, underscoring the overlap in patients admitted to the different sites of care.

Cognitive impairments were also significantly associated with PAC use. Depression was associated with higher odds of using all four PAC settings, although HHA to a lesser degree.

The last two comparisons allowed better drilling down of the characteristics associated with treatment at each setting. It was notable that IRF patients had significantly different primary diagnosis and comorbidities but similar odds for receiving a patient with the more complicated medical resource needs. However, the models also showed that many of the primary diagnoses may not be significantly different, either being absent in both, or overlapping between the IRF and SNF. Similarly, SNF-to-HHA comparisons showed the opposite, with HHA patients having lower odds than SNF patients for having patients with many of the more medical complex factors, although this is a relative finding and not suggestive that these cases are not also treated in HHAs. Functional status clearly differed as well after controlling for all other factors. These results were consistent with those in the multinomial FirstPAC results.

The role of HHA in treating some of the more chronic populations was also notable. After controlling for primary diagnosis and comorbidities, the cases with severe respiratory status impairments and those with limited endurance (could endure with support or rest) had higher odds of being discharged to HHA than SNF. However, cases with a history of falls had higher odds of being discharged to a SNF than HHA, supporting the concern over patient safety when discharging them to the home environment.

Together, these results present a picture of the constellation of factors affecting patients in these settings. Medicare patients are complex. Unlike the younger, nondisabled populations, Medicare beneficiaries tend to have multiple factors affecting their general health status. These analyses were useful for identifying some of the overlapping characteristics and beginning to consider the ways in which PAC populations may differ.

Table 6-1
Data source for discharge destination sample

First Destination Setting	Total	IPPS Discharge Sample	PAC Admission Sample[1]
Total	13,554	4,412	9,142
LTCH	1,569	93	1,476
IRF	3,763	248	3,515
SNF	3,857	1,071	2,786
HHA	2,186	821	1,365
Home/No PAC[2]	1,719	1,719	N/A

NOTE: N = 13,432.

[1] Cases in the PAC Admission Sample were restricted to cases admitted within 2 days of the Acute discharge.

[2] Home/No PAC= absence of LTCH, IRF, SNF, or HHA within 30 days discharge from hospital. May include other services such as Part B therapy or Hospital readmissions.

SOURCE: RTI analysis of CARE assessments and Medicare claims

Table 6-2
Demographics for discharge destination sample

Variable	Overall N	Overall %	Home no services n	Home no services %	Home Health n	Home Health %	IRF n	IRF %	LTCH n	LTCH %	SNF n	SNF %	Other n	Other %
Demographics														
Age														
64 years and under	1,803	13	449	26	285	13	382	10	304	20	278	7	105	21
65-74 years	3,885	29	526	31	708	33	1,191	32	542	35	811	21	107	22
75-84 years	4,774	36	472	28	761	35	1425	38	501	32	1,470	39	145	29
85 years and above	2,970	22	251	15	414	19	702	19	208	13	1,256	33	139	28
Total	13,432	100	1,698	100	2,168	100	3,700	100	1,555	100	3,815	100	496	100
Race/ethnicity														
Non Black or African American	12,310	92	1,577	93	1,977	91	3,363	91	1,372	88	3,548	93	473	95
Black or African American	1,122	8	121	7	191	9	337	9	183	12	267	7	23	5
Gender														
Female	7,810	58	898	53	1,239	57	2,093	57	752	48	2,541	67	287	58
Male	5,622	42	800	47	929	43	1,607	43	803	52	1,274	33	209	42
Medicaid as secondary payer (FFS or HMO)														
No	11,975	89	1,384	82	1,989	92	3,392	92	1,320	85	3,526	92	364	73
Yes	1,457	11	314	18	179	8	308	8	235	15	289	8	132	27

NOTE: N = 13,432

Age at acute hospital admission: this variable was coded into four groups (younger than 65 years, 65-74 years, 75-84 years, 85 years or older). The reference group was 65-74 years.

Race: this variable was coded into two groups (Black, not Black). The latter was the reference group.

Gender: this variable was coded into two groups (Male, Female). The latter was the reference group.

Medicaid as a secondary payer at Admission: this variable identifies whether the beneficiary had secondary insurance coverage under either Medicaid fee-for-service or managed care as specified during admission (yes/no). The latter was the reference group.

Home with no services= absence of any of these services within 30 days discharge from hospital.

Other= rehospitalization to an acute care hospital, psychiatric hospital, federal hospitals, and Part B therapy services, including physical, occupational, or speech and language pathology services within 30 days of discharge from hospital.

SOURCE: RTI analysis of CARE assessments and Medicare claims

Table 6-3
Primary diagnostic groups for discharge destination sample (12 groups)

Variable	Overall N	Overall %	Home no services n	Home no services %	Home Health n	Home Health %	IRF n	IRF %	LTCH n	LTCH %	SNF n	SNF %	Other n	Other %
Medical Status														
Primary Diagnostic Group														
Neurologic	1,925	14	146	9	143	7	1,193	32	102	7	309	8	32	6
Respiratory	2,259	17	338	20	318	15	249	7	810	52	417	11	127	26
Cardiovascular	1,991	15	219	13	548	25	463	13	168	11	523	14	70	14
Orthopedic	3,707	28	209	12	511	24	1,353	37	94	6	1,500	39	40	8
Integumentary	284	2	53	3	61	3	24	1	40	3	98	3	†	0
Endocrine	282	2	59	3	52	2	33	1	20	1	100	3	18	4
Kidney & Urinary	543	4	105	6	84	4	59	2	21	1	233	6	41	8
Infections	560	4	66	4	80	4	71	2	124	8	169	4	50	10
Transplant	34	0	15	1	†	0	†	0	†	0	†	0	†	0
GI & Hepatobiliary	1,114	8	346	20	226	10	94	3	110	7	270	7	68	14
Hematologic	147	1	36	2	35	2	16	0	†	1	38	1	13	3
Other	586	4	106	6	101	5	141	4	54	3	157	4	27	5

† Indicates sample size of less than 11.

NOTE: N = 13,432

Primary Diagnosis Group: this variable was defined as the MS-DRG from the acute care claim corresponding to the CARE acute discharge assessment. For cases included because of a PAC CARE assessment within 2 days of discharge from acute, the MS-DRG was derived from the claim for the acute hospital stay immediately before PAC admission. (See Section 5, Table 5-1, for specific details on the PDG (Primary Diagnosis Groups).

Home with no services= absence of any of these services within 30 days discharge from hospital.

Other= rehospitalization to an acute care hospital, psychiatric hospital, federal hospitals, and Part B therapy services, including physical, occupational, or speech and language pathology services within 30 days of discharge from hospital.

SOURCE: RTI analysis of CARE assessments and Medicare claims

Table 6-4
Primary diagnostic groups for discharge destination sample (35 groups)

Variable	Overall N	Overall %	Home no services n	Home no services %	Home Health n	Home Health %	IRF n	IRF %	LTCH n	LTCH %	SNF n	SNF %	Other n	Other %
Primary Diagnosis Group (35 Groups)														
Neurologic, Stroke	992	7	32	2	49	2	736	20	48	3	113	3	14	3
Neurologic, Surgical	344	3	29	2	17	1	227	6	35	2	32	1	†	1
Neurologic, Medical	589	4	85	5	77	4	230	6	19	1	164	4	14	3
Respiratory, Ventilator and Tracheostomy	884	7	23	1	27	1	109	3	656	42	51	1	18	4
Respiratory, Surgical	121	1	11	1	29	1	30	1	19	1	27	1	†	1
Respiratory, Medical	896	7	203	12	182	8	80	2	80	5	264	7	87	18
Respiratory, COPD	358	3	101	6	80	4	30	1	55	4	75	2	17	3
Cardiovascular, Vascular Surgical	304	2	30	2	61	3	93	3	41	3	72	2	†	1
Cardiovascular, Cardiac Surgical	828	6	49	3	264	12	266	7	73	5	168	4	†	2
Cardiovascular, General	256	2	57	3	63	3	30	1	11	1	72	2	23	5
Cardiovascular, Vascular Medical	63	0	15	1	16	1	†	0	†	0	19	0	†	1
Cardiovascular, Cardiac Medical	540	4	68	4	144	7	66	2	42	3	192	5	28	6
Orthopedic, Minor Surgical	898	7	49	3	66	3	362	10	48	3	361	9	12	2
Orthopedic, Major Surgical	1,783	13	67	4	344	16	553	15	22	1	778	20	19	4
Orthopedic, Spinal	475	4	36	2	36	2	283	8	10	1	109	3	†	0
Orthopedic, Minor Medical	395	3	52	3	50	2	104	3	†	1	172	5	†	2
Orthopedic, Major Medical	156	1	†	0	15	1	51	1	†	0	80	2	—	—

(continued)

Table 6-4 (continued)
Primary diagnostic groups for discharge destination sample (35 groups)

Variable	Overall N	Overall %	Home no services n	Home no services %	Home Health n	Home Health %	IRF n	IRF %	LTCH n	LTCH %	SNF n	SNF %	Other n	Other %
Integumentary, Surgical	74	1	†	0	26	1	†	0	14	1	16	0	†	1
Integumentary, Medical	210	2	46	3	35	2	17	0	26	2	82	2	†	1
Endocrine, Surgical	35	0	†	0	†	0	†	0	11	1	†	0	†	1
Endocrine, Medical	247	2	55	3	49	2	27	1	†	1	92	2	15	3
Kidney & Urinary, Surgical	69	1	17	1	14	1	†	0	†	0	22	1	†	1
Kidney & Urinary, Medical	474	4	88	5	70	3	54	1	15	1	211	6	36	7
Infections, Surgical	162	1	14	1	23	1	26	1	57	4	29	1	13	3
Infections, Medical	43	0	11	1	12	1	†	0	†	0	12	0	†	0
Infections, Septicemia	355	3	41	2	45	2	43	1	63	4	128	3	35	7
Transplant	34	0	15	1	†	0	†	0	†	0	†	0	†	0
GI & Hepatobiliary, Minor Surgical	174	1	32	2	39	2	27	1	18	1	52	1	†	1
GI & Hepatobiliary, Major Surgical	255	2	44	3	50	2	33	1	62	4	64	2	†	0
GI & Hepatobiliary, Minor Medical	390	3	167	10	78	4	18	0	20	1	83	2	24	5
GI & Hepatobiliary, Major Medical	295	2	103	6	59	3	16	0	10	1	71	2	36	7
Hematologic, Surgical	30	0	†	0	†	0	†	0	†	0	†	0	—	—
Hematologic, Medical	117	1	31	2	27	1	†	0	†	1	30	1	13	3
Other, Surgical	248	2	23	1	49	2	83	2	39	3	49	1	†	1
Other, Medical	338	3	83	5	52	2	58	2	15	1	108	3	22	4

† Indicates sample size of less than 11.

NOTE: N = 13,432

Home with no services= absence of any of these services within 30 days discharge from hospital.

Other= rehospitalization to an acute care hospital, psychiatric hospital, federal hospitals, and Part B therapy services, including physical, occupational, or speech and language pathology services within 30 days of discharge from hospital.

SOURCE: RTI analysis of CARE assessments and Medicare claims

Table 6-5
Comorbidities for discharge destination sample

Variable	Overall N	Overall %	Home no services n	Home no services %	Home Health n	Home Health %	IRF n	IRF %	LTCH n	LTCH %	SNF n	SNF %	Other n	Other %
HCC: Liver														
No	8,123	60	1,147	68	1,269	59	2,366	64	777	50	2,255	59	309	62
Yes	5,309	40	551	32	899	41	1,334	36	778	50	1,560	41	187	38
HCC: Diabetes														
No	9,733	72	1,380	81	1,417	65	2,665	72	1,134	73	2,766	73	371	75
Yes	3,699	28	318	19	751	35	1,035	28	421	27	1,049	27	125	25
HCC: Other EndoMet														
No	7,012	52	1,190	70	1,347	62	1,924	52	409	26	1,901	50	241	49
Yes	6,420	48	508	30	821	38	1,776	48	1,146	74	1,914	50	255	51
HCC: Ortho														
No	6,913	51	1,349	79	1,109	51	1,525	41	1,175	76	1,409	37	346	70
Yes	6,519	49	349	21	1,059	49	2,175	59	380	24	2,406	63	150	30
HCC: Other Neuro														
No	11,716	87	1,592	94	1,941	90	2,989	81	1,367	88	3,384	89	443	89
Yes	1,716	13	106	6	227	10	711	19	188	12	431	11	53	11
HCC: Cardiovascular														
No	9,336	70	1,445	85	1,575	73	2,647	72	410	26	2,896	76	363	73
Yes	4,096	30	253	15	593	27	1,053	28	1,145	74	919	24	133	27
HCC: Stroke														
No	11,118	83	1,612	95	1,972	91	2,428	66	1,295	83	3,373	88	438	88
Yes	2,314	17	86	5	196	9	1,272	34	260	17	442	12	58	12
HCC: Respiratory														
No	8,318	62	1,256	74	1,333	61	2,514	68	420	27	2,517	66	278	56
Yes	5,114	38	442	26	835	39	1,186	32	1,135	73	1,298	34	218	44
HCC: Acute/chronic renal														
No	10,397	77	1,432	84	1,768	82	3,040	82	816	52	2,985	78	356	72
Yes	3,035	23	266	16	400	18	660	18	739	48	830	22	140	28

(continued)

Table 6-5 (continued)
Comorbidities for discharge destination sample

Variable	Overall N	Overall %	Home no services n	Home no services %	Home Health n	Home Health %	IRF n	IRF %	LTCH n	LTCH %	SNF n	SNF %	Other n	Other %
HCC: Morbid Obesity														
No	12,805	95	1,655	97	2,068	95	3,521	95	1,426	92	3,651	96	484	98
Yes	627	5	43	3	100	5	179	5	129	8	164	4	12	2
HCC: UTI														
No	10,369	77	1,544	91	1,889	87	2,565	69	1,054	68	2,940	77	377	76
Yes	3,063	23	154	9	279	13	1,135	31	501	32	875	23	119	24
HCC: Cellulitis														
No	12,709	95	1,648	97	2,062	95	3,533	95	1,374	88	3,615	95	477	96
Yes	723	5	50	3	106	5	167	5	181	12	200	5	19	4
HCC: Head and Spine														
No	12,766	95	1,669	98	2,125	98	3,331	90	1,449	93	3,714	97	478	96
Yes	666	5	29	2	43	2	369	10	106	7	101	3	18	4
HCC: Psych														
No	11,856	88	1,515	89	1,943	90	3,228	87	1,337	86	3,384	89	449	91
Yes	1,576	12	183	11	225	10	472	13	218	14	431	11	47	9

NOTE: N = 13,432

Comorbidities: this includes a set of comorbidity indicator variables based on the secondary hospital diagnoses and the PAC diagnoses on the associated claims. ICD-9s were grouped into modified hierarchical condition categories: Examples include Liver, Diabetes, other endometrial, orthopedic, stroke, other neuro, cardiovascular, respiratory, cellulitis, morbid obesity, head and spine, psychiatric, renal, and urinary tract infections. (See Section 5, Table 5-2 for an explanation of the modified HCC groupings).

Home with no services= absence of any of these services within 30 days discharge from hospital.

Other= rehospitalization to an acute care hospital, psychiatric hospital, federal hospitals, and Part B therapy services, including physical, occupational, or speech and language pathology services within 30 days of discharge from hospital.

SOURCE: RTI analysis of CARE assessments and Medicare claims

Table 6-6
Other medical factors for discharge destination sample

Variable	Overall N	Overall %	Home no services n	Home no services %	Home Health n	Home Health %	IRF n	IRF %	LTCH n	LTCH %	SNF n	SNF %	Other n	Other %
Major Treatments at Transfer														
Any Hemodialysis														
No Hemodialysis	12,918	96	1,590	94	2,133	98	3,625	98	1,403	90	3,703	97	464	94
Hemodialysis, Stay/ Discharge	514	4	108	6	35	2	75	2	152	10	112	3	32	6
Any vent (wean or nonwean) at transfer														
No	12,928	96	1,690	100	2,163	100	3,692	100	1,090	70	3,807	100	486	98
Yes	504	4	†	0	†	0	†	0	465	30	†	0	10	2
TPN at transfer														
No	13,258	99	1,690	100	2,164	100	3,682	100	1,432	92	3,800	100	490	99
Yes	174	1	†	0	†	0	18	0	123	8	15	0	†	1
IPPS ICU Days >= 7 /<7 days														
No	12,808	95	1,645	97	2,032	94	3,658	99	1,322	85	3,701	97	450	91
Yes	624	5	53	3	136	6	42	1	233	15	114	3	46	9
Other Acute Claim within Past 2 Months														
No	12,310	92	1,437	85	2,002	92	3,603	97	1,498	96	3,473	91	297	60
Yes	1,122	8	261	15	166	8	97	3	57	4	342	9	199	40

Table 6-6 (continued)
Other medical factors for discharge destination sample

Variable	Overall N	Overall %	Home no services n	Home no services %	Home Health n	Home Health %	IRF n	IRF %	LTCH n	LTCH %	SNF n	SNF %	Other n	Other %
Pressure Ulcers														
Severe Pressure Ulcer														
No	12,913	96	1,673	99	2,139	99	3,639	98	1,315	85	3,699	97	448	90
Yes	519	4	25	1	29	1	61	2	240	15	116	3	48	10

† Indicates sample size of less than 11.

NOTE: N = 13,432

Major Treatments: Indicates whether the patient had certain major treatments at discharge from the hospital or within two days of discharge from the hospital. The specific treatments included hemodialysis (this also included those who received hemodialysis at any time during the stay), ventilator use (weaning or nonweaning), or TPN.

ICU Days Greater Than 7 Days: Indicates whether the patient had an ICU stay of at least 8 days during the hospital stay.

Other Acute Claim within Past 2 Months: this variable identifies whether the patient was in an acute hospital (other than the hospital stay being studied) in the prior two month window. This measure was based on Medicare claims examinations.

Pressure Ulcer: Indicates whether the patient had a severe (stage 3/4/unstageable) pressure ulcer or a stage 2 ulcer that was known to be present for more than 1 month at the time of discharge from the hospital or admission to the PAC setting.

Home with no services= absence of any of these services within 30 days discharge from hospital.

Other= rehospitalization to an acute care hospital, psychiatric hospital, federal hospitals, and Part B therapy services, including physical, occupational, or speech and language pathology services within 30 days of discharge from hospital.

SOURCE: RTI analysis of CARE assessments and Medicare claims

Table 6-7
Cognitive status for discharge destination sample

Variable	Overall N	Overall %	Home no services n	Home no services %	Home Health n	Home Health %	IRF n	IRF %	LTCH n	LTCH %	SNF n	SNF %	Other n	Other %
Cognitive Status														
Depression Diagnosis														
No	10,466	78	1,468	86	1,757	81	2,752	74	1,246	80	2,831	74	412	83
Yes	2,966	22	230	14	411	19	948	26	309	20	984	26	84	17
Temporal Orientation														
Intact/Borderline Impairment	9,342	70	848	50	1,723	79	3,029	82	862	55	2,748	72	132	27
Moderate	2,111	16	773	46	321	15	143	4	59	4	512	13	303	61
Severely Impaired	1,979	15	77	5	124	6	528	14	634	41	555	15	61	12

NOTE: N = 13,432

Depression diagnosis: Indicates whether the patient was depressed during the discharge assessment window. Depressed was defined as having scored any of the following on the discharge assessment: 1) little interest or pleasure in doing things more than half of the days (7-11 days) or nearly every day (12 -14 days) in the last two weeks, or 2) feeling down, depressed or hopeless more than half of the days (7-11 days) or nearly every day (12 -14 days) in the last two weeks, or having a comorbid diagnosis on the associated acute or PAC claim. This indicator variable is coded yes/no; the latter is the reference group.

Temporal Orientation: this three level variable indicates whether the patient had difficulty knowing the month or year at discharge from the hospital or admission to the PAC stay. It is a composite variable based on a combination of the Brief Interview for Mental Status (BIMS) items year and month, or if not answered, the observation of patient knowing a subset of the following: season, room location, staff names/faces, or that they are in a hospital, nursing home, or home. The codes are:

Intact or borderline: both month and year were answered correctly (year is correct; month is accurate within 5 day) or observation showed at least 3 items were correct

Severely impaired: missed two years or more or missed month by more than one month or couldn't answer (and did not have a communication deficit) or were observed to only know one or fewer of the observation items

Moderately impaired: not missing and not in either of the above groups

Home with no services= absence of any of these services within 30 days discharge from hospital.

Other= rehospitalization to an acute care hospital, psychiatric hospital, federal hospitals, and Part B therapy services, including physical, occupational, or speech and language pathology services within 30 days of discharge from hospital.

SOURCE: RTI analysis of CARE assessments and Medicare claims

Table 6-8
Functional impairments for discharge destination sample

Variable	Overall N	Overall %	Home no services n	Home no services %	Home Health n	Home Health %	IRF n	IRF %	LTCH n	LTCH %	SNF n	SNF %	Other n	Other %
Functional Impairments														
History of Falls														
No	7,810	58	1,229	72	1,559	72	1,990	54	887	57	1,831	48	314	63
Yes	5,622	42	469	28	609	28	1,710	46	668	43	1,984	52	182	37
Bladder Incontinence Frequency														
No	8,429	63	1,364	80	1,682	78	2,201	59	481	31	2,441	64	260	52
Yes	5,003	37	334	20	486	22	1,499	41	1,074	69	1,374	36	236	48
Indwelling Bowel catheter														
No	12,778	95	1,664	98	2,127	98	3,512	95	1,305	84	3,711	97	459	93
Yes	654	5	34	2	41	2	188	5	250	16	104	3	37	7
Swallowing: NPO														
No	12,370	92	1,657	98	2,143	99	3,571	97	848	55	3,721	98	430	87
Yes	1,062	8	41	2	25	1	129	3	707	45	94	2	66	13
Swallowing: sign/symptoms														
No	12,507	93	1,640	97	2,093	97	3,286	89	1,463	94	3,583	94	442	89
Yes	925	7	58	3	75	3	414	11	92	6	232	6	54	11
Communication														
No Impairment	8,903	66	1,411	83	1,673	77	2,199	59	670	43	2,650	69	300	60
Moderately Impaired	3,514	26	225	13	458	21	1,305	35	438	28	977	26	111	22
Severely Impaired	1,015	8	62	4	37	2	196	5	447	29	188	5	85	17
Respiratory Status														
Severe	3,207	24	307	18	459	21	658	18	938	60	712	19	133	27
Moderate	990	7	105	6	395	18	211	6	33	2	211	6	35	7
Healthy	9,235	69	1,286	76	1,314	61	2,831	77	584	38	2,892	76	328	66
Oxygen at Discharge														
No	13,126	98	1,685	99	2,158	100	3,678	99	1,334	86	3,788	99	483	97
Yes	306	2	13	1	10	0	22	1	221	14	27	1	13	3

(continued)

Table 6-8 (continued)
Functional impairments for discharge destination sample

Variable	Overall N	Overall %	Home no services n	Home no services %	Home Health n	Home Health %	IRF n	IRF %	LTCH n	LTCH %	SNF n	SNF %	Other n	Other %
Sitting/Mobility Endurance														
No Endurance	5,444	41	302	18	431	20	1,534	41	1,251	80	1,706	45	220	44
Endurance with support/rest	3,493	26	388	23	874	40	951	26	169	11	992	26	119	24
Endurance w/out support/rest	4,400	33	975	57	851	39	1,199	32	132	8	1,097	29	146	29

NOTE: N = 13,432

History of falls: Indicates whether the patient has had two or more falls in the past year or any fall with injury in the past year (yes or no/unable to assess). The latter is the reference group.

Bladder incontinence frequency: This is a three level variable indicating level of incontinence. The first two are examined in the model; the third level includes those who are neither continent nor incontinent.

0= continent or stress incontinence

1= incontinent daily or always incontinent

Bowel device: The patient used an external or indwelling device for bowel care (yes/no). The reference group is the latter.

Swallowing NPO: The patient had no intake by mouth at discharge or within 2 days of discharge (yes/no). The reference group is the latter.

Swallowing- other signs of difficulty: The patient had signs or symptoms of a possible swallowing disorder including coughing or choking during meals or when swallowing medications, or holding food in mouth/cheeks or residual food in mouth after meals, or loss of liquids/solids from mouth when eating or drinking (yes/no). The reference group is the latter.

Communication: This set of variables is a composite variable based on the patient's ability to understand verbal content and express ideas and wants. The three indicator variables are:

not impaired: if both understanding and expression are coded as "4" (clear comprehension without cues or repetitions and expresses complex messages without difficulty and with speech that is clear and easy to understand)

severely impaired: if either item is coded "8" (unable to assess) or "9" (unknown)

moderately impaired: if either item is coded "2" (sometimes understands or frequently exhibits difficulty) or "3"(usually understands or exhibits some difficulty)

(continued)

Table 6-8 (continued)
Functional impairments for discharge destination sample

Respiratory status: This set of variables is a composite variable based on the patient's respiratory status with supplemental oxygen and without supplemental oxygen. The three indicator variables are:

Healthy respiratory status reflected patients who were only short of breath when climbing stairs without oxygen or never short of breath on oxygen.

Moderate respiratory status reflected patients who with oxygen, had shortness of breath climbing stairs AND without oxygen were either never out of breath (coded "0") or only when climbing stairs (coded "1") or with moderate exertion (coded "2"). Others in this category used no oxygen but had shortness of breath with moderate exertion (coded "2") or were missing data.

Severe respiratory status reflected patients who were not on oxygen but were coded "3" (shortness of breath with minimal exertion), "4" (shortness of breath at rest), or "5" (severely struggling to breathe at rest).

With oxygen, shortness of breath on stairs (coded "1") AND without oxygen, shortness of breath with minimal exertion (coded "3) or mild shortness of breath at rest (coded "4"), or severely struggling to breathe at rest, or

With oxygen, shortness of breath with moderate exertion (coded "2") AND without oxygen, shortness of breath with minimal exertion (coded "3) or mild shortness of breath at rest (coded "4"), or severely struggling to breathe at rest, or

With oxygen, any difficulty with minimal exertion or at rest (coded as "3", "4" , or "5"), regardless of rating without oxygen, or

With oxygen, coded as not assessed or not applicable but without oxygen, coded as any difficulty with minimal exertion or at rest (coded as "3", "4" , or "5").

Sitting/Mobility endurance: This variable is a composite of the two endurance impairment variables – sitting for 15 minutes with/without support and walk/wheel 50 feet with/without rest. Having a code in either sitting or mobility will lead to an equal code for the combined variable. This variable is coded as follows:

No endurance: if either mobility OR sitting endurance were coded as "0" (could not do) or "8" (not assessed due to medical restriction)

Endurance with support/rest: if mobility OR sitting endurance were coded as "1" could do with support/rest and neither were coded as "0" or "8"

Endurance without support/rest: if mobility AND sitting endurance were coded as "2" could do with support/rest

Home with no services= absence of any of these services within 30 days discharge from hospital.

Other= rehospitalization to an acute care hospital, psychiatric hospital, federal hospitals, and Part B therapy services, including physical, occupational, or speech and language pathology services within 30 days of discharge from hospital.

SOURCE: RTI analysis of CARE assessments and Medicare claims

Table 6-9
Functional status for discharge destination sample

Functional Status	Total	Home no services	Home Health	SNF	IRF	LTCH
Self Care Rasch						
Mean	44.78	57.51	56.05	42.41	41.81	28.06
Median	45.06	58.22	54.28	43.52	42.26	29.31
5th percentile	6.76	20.51	34.55	15.54	23.51	6.49
95th percentile	77.75	81.93	84.53	58.30	54.28	55.54
Mobility Rasch						
Mean	44.71	59.61	57.01	41.27	40.48	29.69
Median	44.02	60.13	55.69	41.63	41.49	30.59
5th percentile	10.09	15.34	34.59	15.13	19.49	8.38
95th percentile	79.36	85.27	86.58	58.51	53.72	54.68
Motor Rasch						
Mean	44.81	59.69	56.25	41.87	41.3	28.19
Median	44.57	57.72	55.49	42.78	42.36	30.20
5th percentile	6.84	22.39	35.72	22.21	26.49	1.77
95th percentile	81.19	84.29	83.98	57.07	52.98	53.78

NOTE: N = 13,432

SOURCE: RTI analysis of CARE assessments and Medicare claims

Table 6-10
Premorbid/Social factors for discharge destination sample

Variable	Overall N	Overall %	Home no services n	Home no services %	Home Health n	Home Health %	IRF n	IRF %	LTCH n	LTCH %	SNF n	SNF %	Other n	Other %
Prior Functioning														
Severe Limitations	1,996	15	177	10	333	15	266	7	290	19	755	20	175	35
Some Limitations	5,308	40	650	38	837	39	1,292	35	637	41	1,689	44	203	41
Independence	6,128	46	871	51	998	46	2,142	58	628	40	1,371	36	118	24
Lived alone before admission														
No	9,387	70	1,281	75	1,567	72	2,493	67	1,188	76	2,463	65	395	80
Yes	4,045	30	417	25	601	28	1,207	33	367	24	1,352	35	101	20
Lived in community before admission														
Yes with Assistance	6,091	45	758	45	1,187	55	1,378	37	698	45	1,800	47	270	54
Yes without Assistance	6,458	48	792	47	955	44	2,293	62	727	47	1,598	42	93	19
No	883	7	148	9	26	1	29	1	130	8	417	11	133	27

NOTE: N = 13,432

Prior function: Based on a composite of the five interview items on the patient's usual ability with everyday activities before this current illness, exacerbation, or injury. The five items include the following and each was scored on a 5-point scale: 3) independent, 2) needed some help, 1) dependent, 8) not applicable, or 9) unknown. The items were used to create a 3-level scale of prior functioning:

Severe limitations: If self-care OR wheelchair mobility OR stairs ambulation were coded "1" (dependent)

Some limitations: those who were not completely dependent in one area or completely independent across both self-care and mobility items.

Independence: If self-care AND wheelchair mobility AND stairs ambulation were coded "3" (independent)

Lived alone in community before admission: This indicator variable identifies beneficiaries who lived in the community before this admission AND who lived alone (yes). Those who did not live in the community or who lived with others were the reference group (no).

Home with no services= absence of any of these services within 30 days discharge from hospital.

Other= rehospitalization to an acute care hospital, psychiatric hospital, federal hospitals, and Part B therapy services, including physical, occupational, or speech and language pathology services within 30 days of discharge from hospital.

SOURCE: RTI analysis of CARE assessments and Medicare claims

Table 6-11
Discharge destination sample by provider market

Variable	Overall N	Overall %	Home no services n	Home no services %	Home Health n	Home Health %	IRF n	IRF %	LTCH n	LTCH %	SNF n	SNF %	Other n	Other %
PAC Provider Market														
Boston, MA	1,281	10	98	6	146	7	222	6	370	24	407	11	38	8
Rochester, NY	501	4	126	7	149	7	28	1	0	0	186	5	12	2
Tampa, FL	1,007	7	39	2	359	17	306	8	159	10	137	4	†	1
Louisville, KY	1,308	10	87	5	116	5	461	12	100	6	535	14	†	2
Chicago, IL	1,646	12	89	5	152	7	715	19	302	19	369	10	19	4
Dallas, TX	1,125	8	74	4	152	7	595	16	229	15	60	2	15	3
Lincoln, NE	898	7	161	9	153	7	147	4	48	3	335	9	54	11
Seattle, WA	308	2	0	0	68	3	32	1	44	3	164	4	0	0
San Francisco, CA	772	6	87	5	59	3	233	6	0	0	386	10	†	1
Columbia, MO	281	2	†	0	152	7	0	0	0	0	115	3	10	2
Wilmington, NC	871	6	173	10	299	14	215	6	†	0	158	4	25	5
Non-high PAC (Region 5 Supp)	592	4	212	12	81	4	18	0	†	1	190	5	82	17
High PAC (Region 1-4,6,9 Supp)	2,842	21	548	32	282	13	728	20	293	19	773	20	218	44

† Indicates sample size of less than 11.

NOTE: N = 13,432

Provider Market: This set of covariates identifies the market in which the data were collected. Each market was selected in the first phase as representing a high or low PAC market on the basis of whether they had an IRF or LTCH available within a 2 hour radius (High PAC) or did not and were reliant on SNFs and HHAs for PAC services within a 2 hour radius. (See Section 4, Table 4-1).

Home with no services= absence of any of these services within 30 days discharge from hospital.

Other= rehospitalization to an acute care hospital, psychiatric hospital, federal hospitals, and Part B therapy services, including physical, occupational, or speech and language pathology services within 30 days of discharge from hospital.

* 'No services' is defined as no Medicare claim for LTCH, IRF, SNF, HHA, Part B therapy, or hospitalization within 30 days of hospital discharge.

SOURCE: RTI analysis of CARE assessments and Medicare claims

Count data tabulated in /vol1/project/0209853/005 pac prd/001/pgm/jdever/programs/PACPRD_JD052_DD_XTabs.sas.

Table 6-12
Pseudo R-square for discharge destination models

Model	Pseudo R-Square
Any PAC	0.34
FirstPAC	0.47
SNF/IRF	0.38
SNF/HHA	0.40

NOTE: N = 13,432

SNF= Skilled Nursing Facility

IRF= Inpatient Rehabilitation Facility

HHA= Home Health

SOURCE: RTI analysis of CARE assessments and Medicare claims

Table 6-13
Discharge destination models: AnyPAC and FirstPAC

Variable	PAC vs. no PAC Odds ratio estimate	PAC vs. no PAC Pr> chi sq	FirstPAC HHA Odds Ratio Estimate	FirstPAC HHA Pr > ChiSq	FirstPAC SNF Odds Ratio Estimate	FirstPAC SNF Pr > ChiSq	FirstPAC IRF Odds Ratio Estimate	FirstPAC IRF Pr > ChiSq	FirstPAC LTCH Odds Ratio Estimate	FirstPAC LTCH Pr > ChiSq
Demographics										
Age										
64 years and under	0.71	<0.01	0.66	<0.01	0.60	0.01	0.75	0.17	1.25	0.31
65-74 years (referent)	1.00	—	1.00	—	1.00	—	1.00	—	1.00	—
75-84 years	1.30	<0.01	1.33	<0.01	2.02	<.0001	1.28	0.01	1.11	0.43
85 years and above	1.48	<.0001	1.70	<.0001	3.03	<.0001	1.31	0.09	0.93	0.70
Race/ethnicity										
Non Black or African American (referent)	1.00	—	1.00	—	1.00	—	1.00	—	1.00	—
Black or African American	1.07	0.86	1.16	0.65	1.16	0.72	0.86	0.74	1.06	0.91
Gender										
Female	1.00	—	1.00	—	1.00	—	1.00	—	1.00	—
Male	1.11	0.11	0.99	0.94	1.01	0.93	1.52	<.0001	1.37	<0.01
Medicaid as secondary payer (FFS or HMO)										
Yes	0.50	<.0001	0.54	<0.01	0.43	<.0001	0.57	0.02	0.62	0.09
Other acute claim within past 2 months										
Yes	0.44	<.0001	0.69	0.03	1.00	1.00	0.44	<0.01	0.20	<.0001
Medical status										
Primary diagnosis group										
Neurologic	0.57	0.03	0.38	<0.01	0.34	<0.01	0.84	0.60	1.70	0.20
Respiratory	0.41	<.0001	0.49	0.01	0.43	<0.01	0.33	<0.01	3.13	<0.01
Cardiovascular	0.64	0.05	0.88	0.66	0.74	0.27	0.61	0.20	1.77	0.19
Orthopedic (referent)	1.00	—	1.00	—	1.00	—	1.00	—	1.00	—
Integumentary	0.57	0.05	0.71	0.27	0.56	0.11	0.18	<.0001	2.17	0.12
Endocrine	0.34	<.0001	0.42	0.01	0.39	0.01	0.21	<0.01	0.99	0.98
Kidney & Urinary	0.28	<.0001	0.32	<0.01	0.37	<0.01	0.11	<.0001	0.18	<0.01
Infections	0.47	<0.01	0.68	0.27	0.65	0.19	0.31	<0.01	3.10	<0.01
Transplant	0.49	0.11	0.65	0.46	0.14	0.05	0.79	0.82	1.98	0.53
GI & Hepatobiliary	0.21	<.0001	0.26	<.0001	0.19	<.0001	0.07	<.0001	0.46	0.01
Hematologic	0.55	0.05	0.83	0.50	0.73	0.48	0.32	0.02	2.76	0.11
Other	0.50	<0.01	0.63	0.11	0.43	<0.01	0.38	<0.01	1.50	0.34

(continued)

Table 6-13 (continued)
Discharge destination models: AnyPAC and FirstPAC

Variable	PAC vs. no PAC Odds ratio estimate	PAC vs. no PAC Pr> chi sq	FirstPAC HHA Odds Ratio Estimate	FirstPAC HHA Pr > ChiSq	FirstPAC SNF Odds Ratio Estimate	FirstPAC SNF Pr > ChiSq	FirstPAC IRF Odds Ratio Estimate	FirstPAC IRF Pr > ChiSq	FirstPAC LTCH Odds Ratio Estimate	FirstPAC LTCH Pr > ChiSq
Surgical indicator										
Yes	0.44	<.0001	0.35	<.0001	0.35	<.0001	0.31	<.0001	0.24	<.0001
HCC: Liver										
Yes	2.41	<.0001	2.48	<.0001	2.85	<.0001	2.89	<.0001	4.50	<.0001
HCC: Diabetes										
Yes	2.37	<.0001	2.74	<.0001	2.54	<.0001	2.32	<.0001	3.16	<.0001
HCC: Other EndoMet										
Yes	2.08	<.0001	1.82	<.0001	2.75	<.0001	3.25	<.0001	5.41	<.0001
HCC: Ortho										
Yes	4.19	<.0001	4.27	<.0001	6.98	<.0001	6.61	<.0001	4.18	<.0001
HCC: Other neuro										
Yes	2.16	<.0001	2.33	<.0001	2.24	<.0001	3.94	<.0001	1.70	0.01
HCC: Cardiovascular										
Yes	2.09	<.0001	1.62	<0.01	2.17	<.0001	3.11	<.0001	4.38	<.0001
HCC: Stroke										
Yes	3.32	<.0001	3.89	<.0001	4.54	<.0001	11.33	<.0001	4.20	<.0001
HCC: Respiratory										
Yes	2.30	<.0001	2.30	<.0001	2.77	<.0001	2.97	<.0001	4.25	<.0001
HCC: Acute/chronic renal										
Yes	1.88	<.0001	1.98	<.0001	2.18	<.0001	2.20	<.0001	4.21	<.0001
HCC: UTI										
Yes	1.96	<.0001	1.63	<0.01	2.26	<.0001	4.22	<.0001	4.05	<.0001
HCC: Cellulitis										
Yes	2.94	<.0001	2.36	<0.01	3.89	<.0001	4.90	<.0001	11.15	<.0001
HCC: Head and Spine										
Yes	2.29	<0.01	1.85	0.08	1.55	0.22	5.35	<.0001	1.95	0.09
HCC: Psych										
Yes	1.67	<.0001	1.42	0.04	2.14	<.0001	1.94	<.0001	2.64	<.0001

(continued)

Table 6-13 (continued)
Discharge destination models: AnyPAC and FirstPAC

Variable	PAC vs. no PAC Odds ratio estimate	PAC vs. no PAC Pr> chi sq	FirstPAC HHA Odds Ratio Estimate	FirstPAC HHA Pr > ChiSq	FirstPAC SNF Odds Ratio Estimate	FirstPAC SNF Pr > ChiSq	FirstPAC IRF Odds Ratio Estimate	FirstPAC IRF Pr > ChiSq	FirstPAC LTCH Odds Ratio Estimate	FirstPAC LTCH Pr > ChiSq
Treatments										
Any hemodialysis										
No Hemodialysis (referent)	1.00	—	1.00	—	1.00	—	1.00	—	1.00	—
Hemodialysis, Stay/Discharge	0.59	0.01	0.27	<.0001	0.69	0.20	0.53	0.07	1.48	0.31
Any vent (wean or nonwean) at discharge										
Yes	2.94	0.04	2.94	0.10	1.17	0.85	1.18	0.87	11.67	<0.01
TPN at discharge										
Yes	1.56	0.21	0.55	0.55	0.97	0.97	1.14	0.87	8.09	0.01
IPPS ICU Days >= 7 /<7 days										
Yes	0.77	0.35	1.07	0.87	1.02	0.98	0.26	0.03	1.63	0.50
Severe pressure ulcer										
Yes	0.72	0.05	1.10	0.76	1.17	0.58	0.72	0.31	3.05	<0.01
Cognitive status										
Depression diagnosis										
Yes	1.77	<.0001	1.59	<.0001	2.23	<.0001	2.20	<.0001	2.00	<0.01
Temporal orientation										
Intact/Borderline Impairment (referent)	1.00	—	1.00	—	1.00	—	1.00	—	1.00	—
Moderate	0.07	<.0001	0.22	<0.01	0.06	<.0001	0.02	<.0001	0.01	<.0001
Severely impaired	0.79	0.13	0.70	0.14	0.99	0.96	0.62	0.12	0.77	0.36
Functional status										
History of falls										
Yes	1.19	0.07	0.90	0.37	1.60	<0.01	1.21	0.24	1.03	0.88
Self care Rasch	1.05	<.0001	0.99	0.58	1.08	<.0001	1.13	<.0001	1.04	0.14
Self care Rasch squared	1.00	<.0001	1.00	0.56	1.00	<.0001	1.00	<.0001	1.00	0.02
Mobility Rasch	1.01	0.34	1.09	<.0001	1.01	0.44	1.05	0.07	0.98	0.43
Mobility Rasch squared	1.00	<0.01	1.00	<.0001	1.00	<0.01	1.00	<0.01	1.00	0.37

(continued)

Table 6-13 (continued)
Discharge destination models: AnyPAC and FirstPAC

Variable	PAC vs. no PAC Odds ratio estimate	PAC vs. no PAC Pr> chi sq	FirstPAC HHA Odds Ratio Estimate	FirstPAC HHA Pr > ChiSq	FirstPAC SNF Odds Ratio Estimate	FirstPAC SNF Pr > ChiSq	FirstPAC IRF Odds Ratio Estimate	FirstPAC IRF Pr > ChiSq	FirstPAC LTCH Odds Ratio Estimate	FirstPAC LTCH Pr > ChiSq
Motor Rasch	na	—	—	—	—	—	—	—	—	—
Motor Rasch squared	na	—	—	—	—	—	—	—	—	—
Bladder incontinence frequency										
Yes	1.15	0.20	1.21	0.22	1.02	0.91	1.15	0.40	1.35	0.08
Bowel device										
Yes	1.28	0.21	1.38	0.36	1.03	0.92	2.41	0.01	3.24	<0.01
Swallowing: NPO										
Yes	1.38	0.06	1.40	0.37	2.01	0.01	2.42	0.01	6.44	<.0001
Swallowing: sign/symptoms b-d										
Yes	1.06	0.69	0.97	0.88	1.05	0.81	1.41	0.10	1.34	0.40
Communication										
No Impairment (referent)	1.00	—	1.00	—	1.00	—	1.00	—	1.00	—
Moderately Impaired	1.95	<.0001	2.26	<.0001	1.67	<0.01	2.68	<.0001	2.43	<.0001
Severely Impaired	1.36	0.12	1.53	0.16	1.25	0.50	1.80	0.12	2.08	0.06
Respiratory status										
Healthy (referent)	1.00	—	1.00	—	1.00	—	1.00	—	1.00	—
Moderate	1.82	<0.01	3.14	<.0001	0.88	0.60	1.26	0.40	0.44	0.01
Severe	1.17	0.25	1.33	0.08	0.91	0.59	1.38	0.10	1.62	0.04
Sitting/mobility endurance										
Endurance w/out support/rest (referent)	1.00	—	1.00	—	1.00	—	1.00	—	1.00	—
No Endurance	1.44	0.03	1.45	0.08	1.29	0.22	0.88	0.60	3.32	<.0001
Endurance with support/rest	1.42	0.06	1.89	<0.01	1.25	0.32	0.88	0.64	1.20	0.57
Premorbid/social factors										
Prior functioning										
Independence (referent)	1.00	—	1.00	—	1.00	—	1.00	—	1.00	—
Severe Limitations	0.85	0.17	2.22	<.0001	1.29	0.16	0.29	<.0001	0.59	0.04
Some Limitations	1.16	0.17	1.55	<0.01	1.56	0.01	0.88	0.51	1.40	0.15

(continued)

Table 6-13 (continued)
Discharge destination models: AnyPAC and FirstPAC

Variable	PAC vs. no PAC Odds ratio estimate	PAC vs. no PAC Pr> chi sq	FirstPAC HHA Odds Ratio Estimate	FirstPAC HHA Pr > ChiSq	FirstPAC SNF Odds Ratio Estimate	FirstPAC SNF Pr > ChiSq	FirstPAC IRF Odds Ratio Estimate	FirstPAC IRF Pr > ChiSq	FirstPAC LTCH Odds Ratio Estimate	FirstPAC LTCH Pr > ChiSq
Lived alone in community before illness										
Yes	1.26	<0.01	0.97	0.76	1.70	<.0001	1.70	<.0001	1.25	0.10
PAC provider market										
Boston, MA (referent)	1.00	—	1.00	—	1.00	—	1.00	—	1.00	—
Rochester, NY	0.68	0.70	0.77	0.79	0.57	0.60	0.16	0.25	<0.01	<.0001
Tampa, FL	2.92	0.28	4.00	0.14	0.73	0.76	3.30	0.42	0.22	0.33
Louisville, KY	1.10	0.92	0.72	0.76	1.15	0.91	1.64	0.75	0.06	0.07
Chicago, IL	1.20	0.86	0.86	0.88	0.66	0.71	2.66	0.51	0.08	0.07
Dallas, TX	0.99	0.99	1.03	0.97	0.12	0.01	2.44	0.51	0.38	0.50
Lincoln, NE	0.42	0.19	0.56	0.33	0.39	0.26	0.35	0.43	0.04	0.02
Seattle, WA	>999.999	<.0001	>999.999	<.0001	>999.999	<.0001	>999.999	<.0001	>999.999	<.0001
San Francisco, CA	0.82	0.83	0.45	0.38	0.80	0.83	0.61	0.74	<0.01	<.0001
Columbia, MO	4.17	0.29	21.12	0.01	6.52	0.20	<0.01	<.0001	<0.01	<.0001
Wilmington, NC	0.65	0.61	1.17	0.85	0.28	0.20	0.71	0.81	<0.01	<.0001
Non-high PAC (Region 5 Supp)	1.81	0.29	0.96	0.95	1.74	0.44	3.40	0.29	0.20	0.14
High PAC (Region 1-4,6,9 Supp)	1.69	0.40	1.18	0.78	1.99	0.41	0.60	0.72	0.05	0.01

NOTE: PAC vs. no PAC N = 13432; Pseudo R-Square Any PAC= .34; N FirstPAC= 12936; Pseudo R-Square Which PAC= .47

Any PAC Model: this outcome was defined as a yes/no indicator of whether the beneficiary had a Medicare claim (LTCH, IRF, SNF, HHA, Part B therapy, hospitalization) within 30 days after discharge from the hospital. Note that cases with a zero day transfer from an acute hospital to another acute hospital, as defined above, were excluded from the analysis.

No PAC Care (reference category) this category is defined as not having one of the above services types. This group may include patients with no services within 30 days (other than physician services) or it may include patients who received services within 30 days including re-hospitalizations, hospice, long-term nursing facility, psychiatric hospital, federal hospitals, and Part B therapy services, including physical, occupational, or speech and language pathology services

Other types of medical services including psychiatric hospital, federal hospitals, and Part B therapy services, including physical, occupational, or speech and language pathology services were excluded from all models except ANYPAC where they were included in the PAC group. These services each had small numbers; however, each type of service in this category reflects a continued medical need that is different from no service use.

SOURCE: RTI analysis of CARE assessments and Medicare claims; PACPRD_JD053_DD_Model1_4Diag_PACnoPAC1.xls; PACPRD_JD054_DD_Model2_4Diag_MultiPAC1.xls

Table 6-14
Discharge destination models: IRF/SNF and HHA/SNF

Variable	IRF vs. SNF Odds ratio estimate	IRF vs. SNF Pr> chi sq	HHA vs. SNF Odds ratio estimate	HHA vs. SNF Pr> chi sq
Demographics				
Age				
64 years and under	1.43	0.01	1.11	0.48
65-74 years (referent)	1.00	—	1.00	—
75-84 years	0.66	<.0001	0.64	<.0001
85 years and above	0.44	<.0001	0.54	<.0001
Race/ethnicity				
Non Black or African American (referent)	1.00	—	1.00	—
Black or African American	0.76	0.31	0.98	0.94
Gender				
Female	1.00	—	1.00	—
Male	1.48	<.0001	0.94	0.40
Medicaid as secondary payer (FFS or HMO)				
Yes	1.31	0.19	1.20	0.44
Other acute claim within past 2 months				
Yes	0.44	<.0001	0.73	0.06
Medical status				
Primary diagnosis group				
Neurologic	2.61	<.0001	1.27	0.32
Respiratory	0.71	0.15	1.49	0.03
Cardiovascular	0.80	0.44	1.24	0.35
Orthopedic (referent)	1.00	—	1.00	—
Integumentary	0.33	<0.01	1.43	0.27
Endocrine	0.57	0.08	1.19	0.52
Kidney & Urinary	0.31	<.0001	0.99	0.95
Infections	0.51	0.01	1.12	0.69
Transplant	4.63	0.13	8.65	0.02
GI & Hepatobiliary	0.38	<.0001	1.67	0.01
Hematologic	0.43	0.07	1.15	0.76
Other	0.94	0.80	1.86	<0.01

(continued)

Table 6-14 (continued)
Discharge destination models: IRF/SNF and HHA/SNF

Variable	IRF vs. SNF Odds ratio estimate	IRF vs. SNF Pr> chi sq	HHA vs. SNF Odds ratio estimate	HHA vs. SNF Pr> chi sq
Surgical indicator				
Yes	0.86	0.24	0.99	0.92
HCC: Liver				
Yes	1.01	0.86	0.81	0.03
HCC: Diabetes				
Yes	0.91	0.23	1.15	0.12
HCC: Other EndoMet				
Yes	1.18	0.02	0.68	<.0001
HCC: Ortho				
Yes	0.92	0.42	0.69	<0.01
HCC: Other neuro				
Yes	1.70	<.0001	1.13	0.32
HCC: Cardiovascular				
Yes	1.45	<0.01	0.76	0.01
HCC: Stroke				
Yes	2.41	<.0001	0.93	0.60
HCC: Respiratory				
Yes	1.08	0.31	0.82	0.03
HCC: Acute/chronic renal				
Yes	1.00	0.96	0.95	0.66
HCC: UTI				
Yes	1.81	<.0001	0.75	<0.01
HCC: Cellulitis				
Yes	1.24	0.17	0.57	0.01
HCC: Head and Spine				
Yes	3.26	<.0001	1.21	0.52
HCC: Psych				
Yes	0.84	0.13	0.78	0.05

(continued)

Table 6-14 (continued)
Discharge destination models: IRF/SNFand HHA/SNF

Variable	IRF vs. SNF Odds ratio estimate	IRF vs. SNF Pr> chi sq	HHA vs. SNF Odds ratio estimate	HHA vs. SNF Pr> chi sq
Treatments				
Any hemodialysis				
No Hemodialysis (referent)	1.00	—	1.00	—
Hemodialysis, Stay/Discharge	0.69	0.14	0.33	0.01
Any vent (wean or nonwean) at discharge				
Yes	1.19	0.84	3.20	0.08
TPN at discharge				
Yes	0.97	0.95	0.22	0.11
IPPS ICU Days >= 7 /<7 days				
Yes	0.20	0.11	0.82	0.71
Severe pressure ulcer				
Yes	0.68	0.11	0.85	0.50
Cognitive status				
Depression diagnosis				
Yes	0.96	0.77	0.65	<0.01
Temporal orientation				
Intact/Borderline Impairment (referent)	1.00	—	1.00	—
Moderate	0.31	0.01	3.72	0.03
Severely impaired	0.60	0.04	0.70	0.05
Functional status				
History of falls				
Yes	0.73	0.02	0.61	<.0001
Self care Rasch	na	—	0.90	<.0001
Self care Rasch squared	na	—	1.00	<.0001
Mobility Rasch	na	—	1.09	<0.01
Mobility Rasch squared	na	—	1.00	—
Motor Rasch	1.08	<0.01	na	—
Motor Rasch squared	1.00	<0.01	na	0.59

(continued)

Table 6-14 (continued)
Discharge destination models: IRF/SNF and HHA/SNF

Variable	IRF vs. SNF Odds ratio estimate	IRF vs. SNF Pr> chi sq	HHA vs. SNF Odds ratio estimate	HHA vs. SNF Pr> chi sq
Bladder incontinence frequency				
Yes	1.15	0.26	1.03	0.82
Bowel device				
Yes	2.42	<0.01	1.17	0.73
Swallowing: NPO				
Yes	1.27	0.33	0.67	0.12
Swallowing: sign/symptoms b-d				
Yes	1.41	0.06	0.97	0.88
Communication				
No Impairment (referent)	1.00	—	1.00	—
Moderately Impaired	1.64	<0.01	1.24	0.18
Severely Impaired	1.32	0.29	1.10	0.77
Respiratory status				
Healthy (referent)	1.00	—	1.00	—
Moderate	1.49	0.11	3.27	<.0001
Severe	1.54	<0.01	1.31	0.07
Sitting/mobility endurance				
Endurance w/out support/rest (referent)	1.00	—	1.00	—
No Endurance	0.70	0.03	1.14	0.44
Endurance with support/rest	0.71	0.11	1.46	0.02
Premorbid/social factors				
Prior functioning				
Independence (referent)	1.00	—	1.00	—
Severe Limitations	0.21	<.0001	1.75	<0.01
Some Limitations	0.57	0.01	0.94	0.66
Lived alone in community before illness				
Yes	0.95	0.55	0.57	<.0001

(continued)

Table 6-14 (continued)
Discharge destination models: IRF/SNFand HHA/SNF

Variable	IRF vs. SNF Odds ratio estimate	IRF vs. SNF Pr> chi sq	HHA vs. SNF Odds ratio estimate	HHA vs. SNF Pr> chi sq
PAC provider market				
Boston, MA (referent)	1.00	—	1.00	—
Rochester, NY	0.21	0.25	1.18	0.84
Tampa, FL	4.26	0.26	3.98	0.12
Louisville, KY	1.23	0.84	0.55	0.48
Chicago, IL	3.41	0.22	1.03	0.97
Dallas, TX	18.96	<0.01	7.76	0.01
Lincoln, NE	0.72	0.78	1.23	0.78
Seattle, WA	0.16	0.16	0.73	0.79
San Francisco, CA	0.65	0.68	0.46	0.38
Columbia, MO	<0.01	<.0001	2.82	0.33
Wilmington, NC	2.40	0.42	3.76	0.09
Non-high PAC (Region 5 Supp)	1.61	0.60	0.48	0.38
High PAC (Region 1-4,6,9 Supp)	0.28	0.31	0.57	0.46

NOTE: SNF/IRF N = 7515; Pseudo R-Square SNF/IRF= .38; SNF/HHA N = 5983; Pseudo R-Square SNF/HHA= .40

IRF/SNF outcomes: this outcome selects only IRF and SNF admissions to examine more closely the factors associated with discharge to either of these services. This outcome was defined having either a SNF or an IRF claim within 30 days after discharge from the hospital. The SNF group was the referent category.

SNF/HHA outcomes: this outcome selects only SNF and HHA admissions to examine more closely the factors associated with discharge to either of these services. This outcome was defined having either a SNF or an HHA claim within 30 days after discharge from the hospital. The SNF group was the referent category.

Other types of medical services including psychiatric hospital, federal hospitals, and Part B therapy services, including physical, occupational, or speech and language pathology services were excluded from all models except ANYPAC where they were included in the PAC group. These services each had small numbers; however, each type of service in this category reflects a continued medical need that is different from no service use.

SOURCE: RTI analysis of CARE assessments and Medicare claims; PACPRD_JD055_DD_Model3_4Diag_SNFvIRF1.xls; PACPRD_JD056_DD_Model4_4Diag_SNFvHHA1.xls