Equalizing Medicare Payments for Select Patients in IRFs and SNFs

A report by staff from the Urban Institute for the Medicare Payment Advisory Commission

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1. Overview

Recent Administration budget proposals have proposed that Medicare move toward paying similar rates for similar patients across post-acute settings. In this study, we investigate the appropriateness and potential for savings to Medicare if reimbursement rates for select patient types in inpatient rehabilitation facilities (IRFs) are set equal to those paid for similar patients in skilled nursing facilities (SNFs).

Our analysis focuses on all 2011 hospital patients in selected diagnoses related groups (DRGs) who went into either a SNF or an IRF for post-acute care. For hospital patients in the select DRGs who went into an IRF, we compare current payments with an estimate of what patients with their observed comorbidities and functional status would be paid in a SNF. The estimated SNF payment is based on applying a per-diem rate as is used in the SNF prospective payment system for the average length of stay observed for SNF patients in their diagnosis group.

The diagnoses analyzed are: stroke (DRGs 64, 65, and 66); major joint replacement or reattachment of a lower extremity (DRGs 469 and 470, analyzed separately for partial hip replacement, total hip replacement, knee replacement, and whether they are obese or age 85+); and other hip and femur procedures (DRGs 480, 481, and 482). These diagnoses are commonly treated in both IRFs and SNFs, and meet other criteria MedPAC has developed for selecting services and conditions for site-neutral payments.[1] Table I provides counts of patients in our analytic sample for each diagnosis group within each setting. Among the IRF patients in the sample, stroke patients are 38 percent, joint replacement patients are 40 percent; and other hip and femur procedures are the remaining 22 percent.

We use two measures of SNF per diem payments: 1) current (2014) payment rates; and 2) an alternative SNF per diem payment based on a model described in prior work.[2] The model underlying the alternative payment is updated here to reflect more recent practice patterns for the SNF population and to remove or adapt any predictors that are not well measured for patients in IRFs. Details of the re-estimation of the alternative model are provided in Section 3 below.

The results show that reimbursement to IRFs for patients with strokes or joint replacements is higher than would be paid to SNFs for similar patients. Reimbursement for those with hip and femur procedures is similar for patients in IRFs and SNFs. These findings hold whether we estimate SNF payments using the current payment rates or with the alternative payment model.

To address whether qualifying IRF patients can reasonably be treated in a SNF, we compare patient diagnoses and functionality across settings for patients in each hospital diagnosis group. When

[1] Medicare Payment Advisory Commission. "Chapter 6: Site-neutral payments for select conditions treated in inpatient rehabilitation facilities and skilled nursing facilities." *Report to the Congress: Medicare and the Health Care Delivery System*. Washington, DC: Author. June 2014.

[2] Carter, C., A. B. Garrett, and D. Wissoker. "Reforming Medicare payments to skilled nursing facilities to cut incentives for unneeded care and avoiding high-cost patients." *Health Affairs.* 31(6):1303-13. June 2012.

comparing patients based on their diagnoses and functionality as measured in the post-acute settings, the patient populations show a number of differences. We believe that this results in large part from differences in both measurement and coding practices across the two settings. In contrast, when we compare patients using their hospital diagnoses and hierarchical condition categories (HCCs) indicating prior year diagnoses, we find that the patients are quite similar in the two settings. These results are similar when examining all facilities and only those facilities in health service areas with both IRFs and SNFs.

In Section 2 of this memo, we discuss the data and methods for the analysis of paying IRF patients SNF rates and provide a quick overview of the findings. Details of the findings are reported in MedPAC's June 2014 Report to the Congress. In Section 3, we describe the update to the SNF alternative PPS design. Finally, in Section 4, we compare the characteristics of patients treated in IRFs and SNFs, within each selected DRG, to inform whether the patients are sufficiently similar in comorbidities and other factors to warrant site-neutral payments.

2. Data and Methods for the Analysis of Select IRF and SNF Patients

Data for the analysis of select patients

The analysis of alternative payments for IRF reimbursement is based on data for patients with a hospital stay and a DRG indicating stroke, lower limb or joint replacement, or other hip and femur procedures that is followed by an IRF or a SNF stay within 30 days. Patients are assigned to the SNF or IRF sample, according to the setting they entered first after their hospital stay. The sample is limited to 2011 stays.

The analysis requires data from several sources. We combined claims data from MedPAR for each stay with the associated patient assessment data (from the SNF MDS 3.0 or IRF-PAI). The assessments are the primary source of information on diagnoses and measures of patient functionality. These data were then combined with data from the Standard Analytic Files (claims data), risk scores and the component HCC indicators, and indicators of diagnoses from the qualifying prior hospital stay. The facility's location was used to incorporate the area wage index, whether the facility is in an urban or rural area, and the health service area for the facility.

A stay was excluded from our analytic sample if the data were incomplete, the patient died within 30 days of the stay, or the stay lasted 3 or fewer days (and thus would be paid separately in the IRF). We also excluded stays in the SNF sample with outliers on the nontherapy ancillary or therapy costs.

The analysis of SNF patients began with 2,561,298 stays in the full population. After eliminating stays with missing or extreme data, short stays, and stays associated with a death, the analytic sample of stays was reduced to 1,552,122. The most common reasons for the sample reduction were deaths within 30 days of the stay, problems merging MedPAR records and the patient assessments, stays that were only partially covered, and spells that were in progress or did not have an end date recorded (see page 8 for details). This is the sample used to update the SNF alternative (model-based) PPS design. Of the

1,552,122 stays, 234,044 stays had a prior hospital stay with one of the selected DRGs and are eligible to be compared with the selected IRF patients. We provide more detail on the reasons for excluding SNF stays in Section 3, below.

For IRF patients, the analysis began with the population of IRF stays with one of the qualifying diagnoses. This group consisted of 116,379 stays. Stays were eliminated from the analysis for the following reasons: 12,563 stays could not be matched to the Patient Assessment Instrument; 890 stays could not be matched to claims or the IRF payment group; 411 stays had no data for charges, in 2,721 stays the patients died within 30 days; 4,489 stays lasted fewer 3 or fewer days; and 26 were missing data on the detailed hospital diagnosis. The final sample used for the analysis was 95,279 stays.

Table 2 reports the average 2011 SNF and IRF payments for stays in each qualifying diagnosis group based on total payment amount reported in MedPAR, as well as IRF base rates. With two exceptions (DRGs 481 and 482), IRF payments exceed SNF payments. In several instances, IRF payments exceed SNF payments by 30 percent or more.

Calculation of payments for select patients with select conditions

To examine the effects of paying IRF patients at SNF rates, we constructed current policy IRF payments for each qualifying IRF stay. For each diagnosis group, the average current IRF payment is then compared with the estimated average SNF payment, under SNF current policy payments and alternative (model-based) SNF payments. The alternative payments are based on the updated version of the model developed for MedPAC. Some background and our approach to each calculation are described in the next several subsections.

IRF payments under current policy. IRFs are reimbursed according a schedule of base rates and the relative weights for a patient's rehabilitation impairment category (RIC), case-mix group (CMG), and comorbidity tier.[3] The RIC, CMG, and tier were obtained from the Standard Analytic File records for the stay. The IRF payment for the stay is the product of the 2014 base rates and the relative payment weight. The payment was adjusted for the area wage index and the payment differential for rural areas. Adjustments to payments for disproportionate share, teaching hospitals, and high-cost outliers were not made, since the SNF PPS does not include these adjustments.

Construction of current SNF payments. SNF patients are reimbursed on a per diem basis according to the 2014 schedule of base rates and relative weights for a patient's Resource Utilization Group (RUG).[4] The RUG classification system assigns patients to groups according to therapy and other service use (such as ventilator care), presence of certain medical conditions, and ability to perform activities of daily living (ADL) as reported on the MDS 3.0 assessment form.

For SNF patients, the calculation of the current policy payment is straightforward. The daily payment is assigned based on the patient's RUG category (or categories) provided on the claim record for the stay

[3] The RIC indicates the primary reason the patient entered the facility; the case-mix group indicates the patient's functional motor and cognitive scores and age; and tier indicates the costliness of the patient's comorbidities.
[4] Each daily payment is the sum of three payments: nursing, therapy, and room and board plus overhead.

and base rates that differ by whether the facility is in an urban or rural location. The payment includes the add-on payment for HIV and is adjusted for variation in area wages. The payment for the stay is calculated as the daily payment multiplied by the covered length of stay (or for stays with multiple RUG assignments, the payment is the sum of each RUG daily rate multiplied by the number of days assigned to the RUG.)

For IRF patients, calculation of the payment requires that each stay be assigned to a RUG category. We assume that all IRF patients receive enough therapy to qualify for one of the five "ultrahigh" rehabilitation therapy SNF RUG categories since IRF patients generally must be able to tolerate and benefit from intensive therapy, often considered three hours of therapy per day, to be eligible for treatment.[5] The IRF patients are assigned to a specific "ultrahigh" group according to whether they receive extensive services and their ability to perform activities of daily living (ADL). Receipt of extensive services is based on observation of diagnosis codes on the IRF-PAI indicating tracheostomy care or ventilator/respirator care. The ADL score is based on functionality data from the IRF-PAI.[6] The assignment of the ADL score required some adjustments to account as well as possible for differences in the measures on the IRF-PAI and MDS. Complete details on the assignment of patients to RUG categories are reported in the Appendix.

For our set of IRF patients, 99.9 percent were classified as not receiving extensive services (48.6 percent were classified into the category for relatively functional patients, Ultra A; 45.4 percent are in the medium functionality category, Ultra B; and 5.9 percent are in the low functionality category, Ultra C). The remaining 0.08 percent of the population was assigned to the two categories that also received extensive services.

For IRF patients, the reimbursement per stay under current SNF policy equals the 2014 daily payment for the assigned RUG category times the average length of stay for "ultrahigh" patients in the SNF sample who had the same hospital diagnosis. Base rates differ by whether the facility is in an urban or rural facility. The payments incorporate the add-on for HIV and are adjusted for area wage differentials using the 2014 SNF labor share. SNF stays in these diagnosis groups tend to be twice as long as IRF stays and thus the per diem payment reflects a less intensive treatment regime. In our simulation, we pay the lower SNF rate for the average length of a SNF stay.

Construction of payments under the alternative SNF PPS design. The SNF alternative payment is designed to alleviate two major flaws of the SNF prospective payment system (PPS). First, the current SNF PPS pays for therapy services with relative weights based on the level of use. This is believed to encourage overprovision of therapy. Second, nontherapy ancillary (NTA) services are paid with relative weights based on nursing time, leading to poor targeting of payments. The alternative system replaces each of these components with relative weights based on a model of predicted costs. The predictors of payments include patient age, type of care in the facility (e.g., IV medication, ulcers, and respiratory

[5] In all five ultrahigh RUG categories, patients receive at least 720 minutes of therapy over seven days.
[6] SNF patients also qualify for an extensive services category if they require isolation for an infectious disease. IRF patients are assumed not to require isolation for infectious diseases.

care), measures of cognitive ability and functionality, diagnoses, a length of stay proxy, and an indicator for receipt of therapy.[7]

The SNF alternative payment model was updated for this study to ensure that the relative payment weights for therapy and NTA depend only on measures that can be reasonably approximated using data from the IRF, as well as to update the model coefficients to reflect the relationships found in more recent data. The data used for the analysis, model parameters, shares of variance explained and proportionality to costs are discussed in detail in Section 3.

For SNF patients, the predictors of relative payment weights are obtained from the Minimum Data Set (MDS 3.0) assessment, MedPAR, and the Standard Analytic File of claims. Patient diagnoses, cognitive measures, and measures of SNF care are taken primarily from specific items on the MDS assessment, with ICD-9 codes from SNF claims used as a second source for diagnoses. An indicator of use of intravenous medication comes directly from claims. Indicators of mobility and self-care are based on the MDS measures of activities of daily living and assigned with a crosswalk designed for comparison across settings.[8] As a proxy for length of stay, we include indicators of the specific assessments (14 day, 30 day, reentry, etc.) conducted for that stay.

For IRF patients, the predictors of relative payment weights are obtained from parallel sources: the IRF-PAI, MedPAR, and Standard Analytic File of claims. In contrast to SNF patients, IRF patient diagnoses, cognitive measures, and measures of type of care (other than IV medication) are based on the ICD-9 codes for primary and secondary diagnoses reported on the PAI. The indicators of mobility and self-care are assigned based on the IRF-PAI. Finally, the proxies for length of stay (indicators for which MDS assessments are observed) are based on a comparison of the length of stay reported on MedPAR to the covered day of the stay when the MDS assessment usually occurs in a SNF. The indicator for whether the stay is a readmission is based on admission class code found on the IRF-PAI.[9]

Under the alternative SNF payment model, facilities would continue to be reimbursed on a per diem basis as is done with current payment policy. The alternative design per diem payments combine the current policy relative nursing weights with model-based relative weights for NTA and therapy. The NTA and therapy payments are calibrated so that the total payments for the full population would be revenue neutral with respect to the current payment system. Base rates are appropriate for 2014. Payments are adjusted for area wage differentials.

To obtain the payment for each IRF stay, the model-based daily payment is multiplied by the average length of stay for those "ultrahigh" rehabilitation patients in the SNF sample with the same hospital

[7] Details of the alternative payment model can be found in Carter, Garrett, and Wissoker (2012).
[8] N. I. Goldfield, R. Fuller, J. S. Hughes, "Appendix C: Incorporating the Use of Functional Health Status Within a Diagnosis Driven Clinical Risk Adjustment Model" in J. Vertrees, et al., "The Ability of Event-Based Episodes to Explain Variation in Charges and Medicare Payments for Various Post Acute Service Bundles", Report for Medicare Payment Advisory Commission, August 2013.
[9] The indicator of whether the patient receipt of IV medications was reported on both claims and the MDS is approximated in the IRF data by whether the charge for IV is greater than $100.

diagnosis. The payment for each SNF stay is the product of the model-based daily payment and the covered length of stay.

This approach to creating the model-based payment for IRF patients has some limitations. To an unknown extent, differences in the assessment instruments and the coding practices (and incentives for coding) lead to differences in many of these measures across settings. For example:

- Incontinence rates of SNF patients are considerably lower than those of IRF patients;
- Rates of infectious diseases are reported at much lower levels in SNFs;
- Musculoskeletal problems are reported at much higher rates in SNFs; and
- The distributions of low and high mobility and self-care problems are very different across settings. The differences are far beyond those seen when using the same instrument in both settings.

We believe that such differences in coding or measurement are not a likely source of the difference in average payments between the SNF alternative design and IRF payment rates, since similar-sized SNF-IRF differences in payment levels are observed when using the SNF current payments.

Comparison of average payments using IRF and SNF payment rates

The results of paying IRFs at SNF payment rates are reported by hospital diagnosis group in Table 3. Using the current payment rates, we find that reimbursement to IRFs would drop by roughly 20 percent for stroke and joint replacements, but would remain the same or increase slightly for those with other hip and femur procedures. These differences vary somewhat among the diagnosis groups, with a particularly small reduction in payments for elderly and obese patients. These results are generally similar when we use the alternative payment (model-based) design.

3. Estimation of the Alternative SNF Payment Model

In this section, we describe our update to the alternative SNF PPS design in more detail. The alternative design relies on the predictions of models relating nontherapy ancillary and therapy costs per day to patient- and stay-level characteristics. The predictions of each model are used to create payment weights that would raise or lower payments for therapy and NTA relative to the base payment rate. These payments are then combined with the current nursing and room and board rates to generate an alternative payment.

The analysis combines the 2011 Medicare MedPAR file (supplemented by the Standard Analytic File) aggregating claims data for skilled nursing facility stays with the associated patient assessment information from the Minimum Data Set, and Medicare cost reports for skilled nursing facilities.

- The MedPAR and Medicare claim files are the source of data for each stay on periods of service, Resource Utilization Group for payment, the institution's charges for services, and, as a supplementary data source, diagnoses for patients.

- The patient assessments (MDS 3.0) are the source for information on a patient's cognitive and functional status, the use of specific services (such as ventilator support, intravenous medication, and oxygen), and as the primary source of diagnoses for patients treated in skilled nursing facilities. Assessments are administered to beneficiaries on a specified schedule—approximately 5, 14, 30, 60, and 90 days from the start of the Medicare stay. For simplicity, in this analysis, we used reports from the first observed assessment.

- Cost reports were used to convert charges from the skilled nursing facility stay to costs. The cost report data were used to create ancillary service cost-to-charge ratios needed to convert claims data on ancillary service charges to estimated costs for those services.

The analysis sample began with the full population of 2,561,298 SNF stays from 2011. Stays were excluded from the analysis for the following reasons: Could not merge to assessment data (227,122 stays), death within 30 days of the stay (277,923 stays), no covered charges (12,503 stays), partially-covered stays (169,952 stays), in progress/no "thru date" recorded (144,344 stays), zero total charges (11,597 stays), total charge outliers (28,841 stays), no claims (3,486 stays), no cost-charge ratio on the cost report (40,526 stays), length of stay of three or fewer days (80,786 stays), NTA or therapy costs per day in the top .05 percent of their distribution (1,559 stays). Deaths are removed so that the cost modeling does not include costs that represent atypical end-of-life service provision. Short stays are removed here to enhance the applicability of the model to the IRF stays that are paid PPS rates. The final sample size, after excluding a relatively small number of cases with missing data, is 1,552,122.

Predictive models of therapy and nontherapy costs

The case-mix adjustments for the model-based payments are based on the predictions of multivariate models of nontherapy ancillary (NTA) costs and therapy costs. The models are estimated using Poisson regression.[10] The coefficient estimates are interpreted in the same way as those from a standard logged regression model.

The dependent variables for the models are wage-adjusted per diem NTA and therapy costs. The unadjusted per diem costs were calculated by combining data on charges for each stay with cost-to-charge ratios (CCRs) for each facility. The charges per stay are from Medicare claims and the CCRs are from the SNF cost reports. Separate CCRs for NTA and therapy were used wherever possible. The estimated costs are standardized for area wages using the 2011 wage index (pre-floor and pre-reclassification) and the labor share in place in 2011.

The model predictors are those described in the appendix to Carter, Garrett and Wissoker (2012), with adjustments to allow prediction using both the SNF and IRF assessment data. The NTA and therapy cost models have the same set of predictors so that increases in one cost can be offset by decreases in the other. Predictors include patient age, indicators of SNF care, cognition, ability to perform activities of

[10] Poisson regression, like standard regression using a logged dependent variable, produces estimates that give less emphasis to the relatively rare very costly cases, better reflecting the center of the distribution.

daily living, diagnoses, nursing case-mix index, RUG category indicating rehabilitation, and a length-of-stay proxy.

The most important changes to the predictors as compared with our earlier work are as follows:

- The Cognitive Performance Scale (based on the SNF assessment elements) was replaced with specific cognitive diagnoses that could be measured in both settings. The model now includes RXHCC categorical indicators based on diagnoses reported on the claims for schizophrenia, other major psychiatric problems, and along with the two indicators of dementia that were already in the model;

- The indicator of swallowing problem (helpful for predicting speech therapy), was removed from the model, because the IRF-PAI does not have a measure that is comparable to that on the MDS;

- The nursing case-mix index is based on the 2012 reweighted case-mix index, reported by White and Rowan (2013);[11]

- Indicators of ability to perform specific activities of daily living (locomotion on unit, assistance with eating, and transfer to/from bed, chair, wheel chair, and standing) were removed from the model because of difficulty in creating comparable measures for IRF patients. These measures are replaced by more aggregated measures of functionality and self-care designed to enable comparison across settings. The measures of medium and high mobility impairment are based on the activities of daily living scores for walk in room, walk in corridor, locomotion on unit, locomotion off unit, transfer, and bed mobility. The measures of the need for medium and high levels of assistance with self-care combines the MDS measures for dressing, bathing, toilet use, personal hygiene, and eating;

- The length-of-stay proxy previously measured the portion of the stay associated with a given assessment; the current proxy indicates all assessments (14 day, 30 day, 60 day, 90 day, reentry, and change in status) were conducted during the stay.

More minor changes from previous iterations of the model occurred simply because of the changes in information collected under MDS 3.0. For example, the conditions on receipt of oxygen changed because the diagnosis indicators changed.

The mean and data source for each predictor in the model are reported in Table 4. Model coefficients, their test statistics, and the percentage change in costs associated with a unit change in each predictor are presented in Table 5.

[11] White, A. and P. Rowan. "Differences in Resident Case-mix Between Medicare and Non-Medicare Nursing Home Residents." Report to Medicare Payment Advisory Commission, March 2013.

Comparison of ability of current policy and the alternative PPS design to predict costs

We report the share of variance in costs per stay explained by current policy and the alternative PPS design in Table 6.

Prediction of NTA costs. Payments under the alternative design provide a substantial improvement over current policy in the share of the variation explained. Relative payments based on our model of NTA costs explain 19.5 percent of the variation in NTA costs – modestly lower than the 20.8 percent share found when using 2007 data.[12] The current policy Medicare nursing payments explain only 0.1 percent of the variation in NTA costs – modestly lower than the 1.2 percent share found using the earlier data.

To better understand the role of the payment categories in the performance of the Medicare payment weights, we defined a recalibrated set of weights to equal the average NTA cost within each RUG category (as opposed to the payment weight based on nursing costs). The NTA-cost-based weights for RUG-IV categories explain 6.6 percent of the variation in NTA costs. This suggests that the weakness of the relationship is due in no small part to the weights attached to the case-mix categories. The predictive power of the Medicare payment groups could be improved substantially if relative weights were set based on NTA costs rather than nursing costs, but the predictive power of such weights would still be modest.

Prediction of therapy costs. Payments under the alternative design and current policy explain similar shares of the variation in therapy costs explained. Relative payments based on the model of therapy costs explain 19.0 percent of the variation in costs. This is close to the 19.4 percent share of variance explained by the current policy therapy payment rates. The updated models explain a smaller share of the variance of therapy costs than found in the 2007 data using alternative model (25.7 percent) and the 2007 current policy therapy weights (21.0 percent). The recalibrated therapy-cost-based weights substantially outperform the current payment weights, explaining 22.5 percent of the variance in therapy costs.

Calculating payments under current policy and an alternative PPS design

To calculate current payments per day, we applied the current case-mix weights and base rates from the final rule for 2014 (Federal Register, August 6, 2013) to the RUG-IV categories for our sample. Payments include the add-on payment for HIV and were adjusted for variation in area wages. The payment per discharge is equal to the daily payment multiplied by the covered length of the stay.

Payments per day under an alternative PPS design are calculated by multiplying the model-based payment weights for the NTA and therapy components by the components' 2014 base rates.[13] To

[12] Wissoker, D. and S. Zuckerman. "Impacts of a revised payment system for SNFs." Memo to Medicare Payment Advisory Commission, March 2012. http://medpac.gov/documents/Mar12_Impacts_RevisedPaymentSystemSNFs_CONTRACTOR.pdf.

[13] The alternative design PPS weight for NTA is equal to the model-prediction of per diem NTA costs for each stay divided by the average per diem NTA cost. The alternative design weight for therapy equals the model-prediction of per diem therapy costs for each stay divided by the average per diem therapy cost.

establish an NTA base rate, we allocated a portion of the 2014 nursing base rate to NTA services using information from CMS on the share of nursing payments attributable to NTA services (43.4 percent of the urban nursing base rate and 42.7 percent of the rural nursing base rate). Adjustments were made to ensure budget neutrality within each payment category (NTA and therapy). Nursing payments in the alternative PPS design were calculated in the same manner as the current policy, except that the estimated NTA costs were removed from the nursing base rate. The payment per discharge is again equal to the daily payment multiplied by the covered length of the stay.

Assessing whether facility-level NTA and therapy payments are proportional to these services' costs

To assess whether facilities receive payments for NTA and therapy that are proportional to their costs, we estimate models relating facility costs per day to the facility case-mix index (CMI). The CMI measures the average payments that would be made to a facility for a component, relative to the average payment that would be made for all facilities. Payments under the alternative PPS design would be based on the predicted costs, so the CMI is calculated as the average predicted cost for the facility's stays in the sample divided by the average predicted cost for all stays.

For both NTA and therapy, we estimated standard regressions using the natural log of the wage-deflated facility average cost per day as the outcome (i.e., dependent) variable and the following explanatory variables: the natural log of the CMI and whether the facility is in a rural area. This regression model is referred to as a "payment model" because it contains only variables that are used to adjust payments in the SNF PPS and does not include other facility characteristics that may also be related to costs.[14]

The focus of this analysis is the estimated relationship between facility costs per day and the CMI. The regression coefficient on the log CMI variable, which we refer to as the "CMI coefficient", measures whether the relative expected costliness of a facility's cases (for NTA or therapy) is proportional to the payments (for NTA or therapy).[15] A coefficient of one indicates that the cost of a facility's cases is proportional to its payments. A coefficient above one indicates that payments are compressed relative to costs. That is, costs increase faster than payments and result in underpayment of facilities with high values of the case-mix index. A coefficient below one indicates that costs are compressed relative to payments. That is payments increase faster than costs and result in overpayment of facilities with high values of the case-mix index. The former situation is known as "compression of payments", while the latter situation is known as "decompression of payments".

Analysis of the proportionality of payments and costs of nontherapy ancillaries. Analysis of facility payments and costs indicates that the alternative PPS design would substantially improve the targeting

[14] For additional detail, see Liu, K., B. Garrett, S. Long, S. Maxwell, Y.C. Shen, D. Wissoker, B. Fries, T. Eilertsen, A. Epstein, A. Kramer, S.J. Min, R. Schlenker, and J. Buchanan. 2007. *Final Report to CMS: Options for Improving Medicare Payment for Skilled Nursing Facilities.* Report prepared for Center for Medicare and Medicaid Services, 2006. http://www.urban.org/UploadedPDF/411526_nursing_facilities.pdf

[15] Because the regression is specified as the relationship between the natural log of the average cost per day and the natural log of the CMI, the coefficient on the log CMI variable measures the percent change in average facility cost per day that is associated with one percent change in the CMI.

of payments to costs as compared with current (RUG-IV) payments. Under the alternative PPS design, NTA payments would be nearly proportional to costs, with a CMI coefficient of 0.929 indicating that a ten percent increase in the case-mix index of a facility is associated with a 9.29 percent increase in costs (Table 7). This payment equation explains 9.7 percent of the variation in costs across facilities. In contrast, for the current Medicare payments, the CMI coefficient is 0.08. This indicates that the facilities receiving the highest payments tend to be substantially overpaid and the facilities receiving the lowest payments tend to be substantially underpaid. For discussion purposes, this means that payments are decompressed relative to costs. The equation explains virtually none of the variation in costs across facilities.[16]

Analysis of the proportionality of payments and costs of therapy. The therapy CMI analysis indicates that therapy payments based on the alternative PPS design would substantially improve the extent to which case-mix-adjusted therapy payments would mirror facilities' therapy costs. Under the alternative PPS, therapy payments show only minor compression (CMI coefficient=1.11), with a ten percent increase in the therapy case-mix index of a facility associated with an 11.1 percent increase in costs. In contrast, the CMI based on current (RUG-IV) payment rates shows substantial decompression: The CMI coefficient of 0.42 indicates that facilities with high therapy payments are overpaid for therapy in the current system. This is expected to provide an incentive for facilities to overprovide therapy.[17]

4. Comparing characteristics of patients treated in IRFs and SNFs

In establishing site-neutral payments between SNFs and IRFs, patients in each setting should be similar. In this section, we compare the characteristics of patients treated in the two settings within the same DRG in three ways. First, we compare on the basis of average hierarchal condition category (HCC) risk score, demographics, rates of Medicare/Medicaid dual eligibility, and individual HCC comorbidities. Second, we examine the extent of overlap in the distribution of risk scores, age, and other characteristics. Third, we examine the ability of patient characteristics to predict whether patients go to IRFs or SNFs.

Differences in mean characteristics of SNF and IRF patients by DRG

Table 8 shows the average HCC risk score, age, and rates of several health conditions for each DRG for SNF and IRF patients across all markets. Table 9 provides similar information, but for markets where both SNF and IRF settings are available. If SNF treated different types of patients than IRF within each DRG, we would expect to see the most sorting, and therefore differences in patient characteristics, when there is a choice between the two settings.

[16] Our earlier work found a more proportional relationship between NTA costs and 2007 nursing payment weights with a CMI coefficient of 0.61.

[17] The therapy CMI coefficients in our earlier work were 1.11 for the alternative PPS and 0.43 for the 2007 (RUG-IV) payment weights.

Results are similar across Tables 8 and 9. Average patient characteristics are very similar for the orthopedic DRGs. Some differences appear for stroke patients who tend to be somewhat older and higher risk in the SNF setting.

Differences in distributions of characteristics of SNF and IRF patients by DRG

Observing differences in mean characteristics between patients in IRF and SNF settings in the same DRG does not necessarily imply that IRF patients cannot have their treatment needs well met in a SNF. Comparing the distributions of characteristics across the two settings, and how they overlap, provides a better indicator of the extent to which the two settings are treating similar patients. Table 10 shows the overlap in the distribution of characteristics for patients treated in SNFs and IRFs across all markets. Table 11 provides similar information, but limited to patients and markets where both SNF and IRF. The four characteristics are HCC risk score, age, predicted cost for nontherapy ancillary services, and predicted cost for therapy services. The predicted costs are based on regression models as described in section 3 above and summarize the influence of many variables as they relate to the need for NTA and therapy services.

Across all measures and DRGs, the distribution of these characteristics in SNF and IRF settings greatly overlap. The 10th and 90th percentiles were computed for SNF patients, and then the tables report the percent of SNF and IRF cases that fall between the two values. For SNF patients, 80 percent should fall between the 10th and 90th percentiles by design.[18] If there were complete overlap on a measure, we would expect to see 80 percent of the IRF cases fall between the 10th and 90th percentiles of the distribution of SNF cases. The degree of overlap is generally very high. We find the least amount of overlap for DRGs 480, 481, and 482 with respect to the predicted therapy cost measure, but even in these cases, there remains considerable overlap.

Predicting whether patients go to IRFs or SNFs based on their characteristics

Another way to assess the similarity of the patients who go to SNFs and IRFs is to see how well we can predict their setting based on a patient's clinical conditions and demographics. If we cannot reasonably predict whether the hospital patients will be admitted to an IRF or a SNF, this is an indication that the patients are similar. In this case, the distribution of the model's predicted probability of being an SNF patient will be quite similar for SNF and IRF patients. If, however, we can reasonably predict a patient's destination, this is an indication that the two settings differ in their patients' clinical conditions and demographics. Comorbidities associated with a much lower probability of admission to an SNF stay might be considered inappropriate for payment under the SNF scale.

[18] The share of SNF patients between the 10th and 90th percentiles will differ from 80 percent for outcomes for which many stays have the same value at the 10th and 90th percentiles. For example, 1.17 percent of the selected SNF stays have a risk score equal to the 10th percentile value (0.497).

We estimated of the probability of a patient going to a SNF in markets with both types of facilities using a patient's comorbidities measured prior to the stay (their HCCs and a subset of hospital diagnoses), and age.[19] We report findings for three DRGs in Table 12.

About two-thirds of orthopedic patients are admitted to SNFs and one-third of patients are admitted to IRFs. For patients with the orthopedic conditions, the regression models had little ability to predict whether a patient would go to a SNF (the R-squared values were 2 percent and 3 percent, for joint replacement and hip/femur procedures, respectively), indicating relatively few differences across settings in the shares of patients with each HCC. Reflecting the overlap, IRF and SNF patients had very similar probabilities of going to a SNF. For the joint replacement patients in an IRF, the average predicted probability of being a SNF patient – based just on prior diagnoses – is 66.6 percent, as compared with joint replacement patients in SNFs who have a 69.2 percent predicted probability of being in a SNF. Hip and femur procedure patients who went to IRFs had a 60.5 percent probability of going to a SNF compared with a 64.1 percent chance for SNF patients.

There appears to be more sorting of stroke patients compared with patients with orthopedic conditions. Overall, one-third of stroke patients go to SNFs; two-thirds go to IRFs. The model was better able to predict patients going to a SNF (the R-squared value was 6 percent). Stroke patients who went to IRFs had a predicted probability of 30.4 percent of going to a SNF, as compared with 37.7 percent for those who ended up in SNFs. Because systematic differences in stroke patients across settings could reflect that patients with certain comorbidities are more likely to use SNFs (and thus flag conditions that can be easily cared for in a SNF), we also examined a model that excluded variables associated with higher SNF use. This second model retained the variables associated with a higher likelihood of treatment in an IRF (i.e., the variables that could potentially flag cases where IRF care is most appropriate). This model had little ability to predict use of SNF versus IRF (the model R-squared is 0.2 percent, results not shown in table), suggesting that patients in the two settings are similar with respect to the conditions likely to raise the probability of using an IRF.

Table 12 also reports the 5^{th} and 95^{th} percentiles of the distribution of the propensity to use a SNF by actual setting. For joint replacement patients, the values for the 5^{th} and 95^{th} percentiles of the distribution indicate that 90 percent of IRF patients have a probability of being in a SNF between 52.4 and 76.3 percent. A comparison to the SNF patients shows a similar range of values. On average, 90 percent of the SNF patients have a predicted probability between 55.3 and 76.6 percent. The similarity of the predicted probabilities of being a SNF patient across the IRF and SNF patients indicates considerable overlap in the patient comorbidities across the two settings.

The results also provide strong evidence of overlap in the hip and femur patients (DRG 681) across settings. IRF patients range from a 46.2 to a 75.1 percent probability of being a SNF patient, while SNF patients range from a 48.9 to a 78.6 percent probability of being a SNF patients.

[19] One might prefer to predict the probability of going to a SNF using diagnoses measured upon admission to the SNF or IRF. Using such a model, we found larger differences between SNF and IRF patients, but were unable to distinguish whether such differences resulted from meaningful differences or differences in measurement across the two settings.

For stroke w/CC (DRG 65), where the degree of overlap is the least, the amount of overlap is still high. The chance of IRF patients using a SNF (between 15.7 and 52.0 percent probability), is almost entirely within the range observed of probabilities observed for SNF patients (17.8 to 61.1 percent).

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Table 1. Definitions and Numbers of Stays for Selected Hospital Diagnostic Related Groups

DRG	Definition	SNF Stays	IRF Stays
64	Intracranial hemorrhage or cerebral infarct, with MCC	10,618	7,714
65	Intracranial hemorrhage or cerebral infarct, with CC	19,006	21,310
66	Intracranial hemorrhage or cerebral infarct, w/o MCC or CC	7,007	7,283
469	Major joint replacement or reattachment of lower extremity, with MCC	10,085	3,695
	1. Total hip replacement, under age 85 and non-obese	1,609	707
	2. Partial hip replacement, under age 85 and non-obese	2,870	1,156
	3. Knee replacement, under age 85 and non-obese	2,219	860
	4. Age 85+ or obese	3,387	972
470	Major joint replacement or reattachment of lower extremity, w/o MCC	127,503	34,724
	1. Total hip replacement, under age 85 and non-obese	29,531	7,842
	2. Partial hip replacement, under age 85 and non-obese	11,545	5,667
	3. Knee replacement, under age 85 and non-obese	63,079	13,134
	4. Age 85+ or obese	23,348	8,081
480	Hip and femur procedures except major joint repl. w/ MCC	10,183	2,902
481	Hip and femur procedures except major joint repl. w/ CC	38,012	12,573
482	Hip and femur procedures except major joint repl. w/o MCC or MCC	11,630	5,078

Note: SNF (skilled nursing facility), IRF (inpatient rehabilitation facility), DRG (diagnosis related group), MCC (major complication or comorbidity), CC (complication or comorbidity).

Source: Urban Institute analysis of 2011 MedPAR data, cost reports, and assessments for skilled nursing facilities and inpatient rehabilitation facilities.

Table 2. Average Medicare Payments per Discharge in SNFs and IRFs, All Facilities

DRG	Definition	Total SNF payments (MedPAR)	IRF base payments (MedPAR)	Total IRF payments (MedPAR)	Ratio of total IRF to SNF payments
64	Stroke with MCC	$15,627	$19,897	$22,159	1.42
65	Stroke CC	15,873	19,022	20,864	1.31
66	Stroke w/o MCC, CC	13,788	16,866	18,300	1.33
469	Joint replacement. w/ MCC	13,738	15,627	17,000	1.24
	1. Total hip, < 85 & non-obese	11,953	14,603	13,821	1.34
	2. Partial hip, <85 & non-obese	14,948	17,218	18,903	1.26
	3. Knee, <85 & non-obese	9,521	13,546	17,406	1.54
	4. Age 85+ or obese	16,325	16,320	16,588	1.08
470	Joint replacement w/o MCC	9,843	12,936	13,821	1.40
	1. Total hip, < 85 & non-obese	8,859	12,171	13,048	1.47
	2. Partial hip, <85 & non-obese	14,084	15,545	16,623	1.18
	3. Knee, <85 & non-obese	8,143	11,388	12,152	1.49
	4. Age 85+ or obese	13,584	14,366	15,319	1.13
480	Hip and femur proc. w/ MCC	17,523	17,197	18,903	1.08
481	Hip and femur proc. w/ CC	17,646	16,167	17,406	0.99
482	Hip and femur proc. w/o MCC or CC	16,643	15,440	16,588	1.00

Note: SNF (skilled nursing facility), IRF (inpatient rehabilitation facility), DRG (diagnosis related group), MCC (major complication or comorbidity), CC (complication or comorbidity). Total payments include the additional payments many IRF receive for having teaching programs, treating low-income patients, or having high-cost outlier cases. Base payments exclude the additional payments.

Source: Urban Institute analysis of 2011 MedPAR data, cost reports, and assessments for skilled nursing facilities and inpatient rehabilitation facilities.

Table 3. Payments per Discharge to SNFs and IRFs Using Alternative Payment Policies, All Facilities

		Payments to SNFs		Payments to IRFs			% Difference in Payments to IRFs	
DRG	Definition	2014 SNF Policy	Modeled 2014 Policy	2014 IRF Policy	2014 SNF Policy	Modeled 2014 Policy	2014 SNF Policy to 2014 IRF Policy	Modeled SNF Policy to 2014 IRF Policy
64	Stroke with MCC	$17,501	$16,325	$24,213	$17,868	$17,810	-26%	-26%
65	Stroke CC	17,693	16,296	22,391	17,440	17,321	-22%	-23%
66	Stroke w/o MCC, CC	15,174	14,151	19,320	15,078	15,196	-22%	-21%
469	Joint replacement, with MCC	14,973	14,726	18,232	14,849	15,876	-19%	-13%
	1. Total hip, < 85 & non-obese	12,729	12,620	16,837	13,091	14,035	-22%	-17%
	2. Partial hip, <85 & non-obese	16,606	16,627	20,158	16,967	18,365	-16%	-9%
	3. Knee, <85 & non-obese	9,646	9,947	15,610	10,168	11,409	-35%	-27%
	4. Age 85+ or obese	18,146	17,247	19,275	17,752	18,207	-8%	-6%
470	Joint replacement w/o MCC	10,159	10,285	14,648	11,218	12,206	-23%	-17%
	1. Total hip, < 85 & non- obese	8,972	9,255	13,709	9,419	10,522	-31%	-23%
	2. Partial hip, <85 & non-obese	15,400	15,284	17,724	15,063	16,167	-15%	-9%
	3. Knee, <85 & non-obese	8,101	8,464	12,758	8,664	9,839	-32%	-23%
	4. Age 85+ or obese	14,628	14,038	16,472	14,418	14,911	-12%	-9%
480	Hip and femur proc. w/ MCC	19,810	19,232	20,583	20,147	20,962	-2%	2%
481	Hip and femur proc. w/ CC	19,883	19,040	18,774	19,788	20,298	5%	8%
482	Hip and femur proc. w/o MCC or CC	18,543	17,731	17,799	18,240	19,002	2%	7%

Note: SNF (skilled nursing facility), IRF (inpatient rehabilitation facility), DRG (diagnosis related group), MCC (major complication or comorbidity), CC (complication or comorbidity). The average SNF length of stay by condition was used to convert the day-based payments to discharge-based payments.

Source: Urban Institute analysis of 2011 MedPAR data, cost reports, and assessments for skilled nursing facilities and inpatient rehabilitation facilities.

Table 4. Variables Used in the SNF Nontherapy Ancillary and Therapy Cost Regression Models

Measure	SNF Mean	Data Source
Patient age		
Age - 50, capped at 45 = 95 – 50	29.48	MedPAR
Age - 50, capped at 45 = 95 – 50, squared	972.2	MedPAR
SNF care		
IV medication furnished, reported on claims or MDS	0.115	SAF, MDS
IV medication furnished, reported on both claims and MDS	0.039	SAF, MDS
Oxygen (linked to conditions) or tracheotomy care or ventilator and claim for respiratory or pulmonary	0.021	MedPAR, MDS
IV medication and respiratory care	0.005	SAF,MDS
Chemotherapy	0.004	MDS
Serious skin ulcer (stage 4)	0.009	MDS
Hospice Program	0.001	MDS
Urinary obstruction, incontinence, or impaired renal function	0.053	MedPAR
Ability to perform activities of daily living		
Mobility score		
High (i.e., highly immobile)	0.675	MDS
Medium mobility	0.310	MDS
Low (i.e., highly mobile)	0.015	MDS
Self-care score		
High need for assistance	0.624	MDS
Medium need for assistance	0.365	MDS
Low need for assistance	0.011	MDS
Diagnoses		
Cerebral hemorrhage and effects of stroke	0.162	MedPAR, MDS
Chronic obstructive pulmonary disease	0.254	MDS
Diabetes	0.347	MDS
Dementia with depression or behavioral disturbance	0.016	MedPAR
Dementia, cerebral degeneration	0.119	MedPAR
Hemiplegia	0.044	MedPAR
HIV	0.002	MedPAR
Infectious and parasitic diseases	0.068	MedPAR
Joint replacement, aftercare	0.055	MedPAR
Malnutrition	0.031	MDS
Mononeuropathy, other abnormal movement disorders	0.013	MedPAR
Musculoskeletal and connective tissue disorders, other	0.458	MedPAR
Parkinson’s disease	0.040	MDS

Measure	SNF Mean	Data Source
Pelvic fracture	0.009	MedPAR
Pneumonia	0.111	MDS
Polyneuropathy, except diabetic	0.020	MedPAR
Psychiatric disorder, major other	0.031	MedPAR
Quadriplegia, other extensive paralysis and spinal cord injuries	0.002	MDS
Renal failure	0.095	MDS
Respiratory failure	0.025	MDS
Schizophrenia	0.011	MedPAR
Vertebrae and spinal disk disorders	0.040	MedPAR
Vertebral fractures without spinal cord injury	0.010	MedPAR
Nursing Case Mix	1.314	SAF
RUG category indicates rehab. or rehab. + extensive services	0.933	SAF
Length-of-stay proxy (MDS assessments reported)		
14-day	0.717	MDS
30-day	0.355	MDS
60-day	0.098	MDS
90-day	0.028	MDS
Readmission	0.090	MDS
Unscheduled assessment used for PPS	0.082	MDS
N	1,552,122	

Note: SNF (skilled nursing facility), IV (intravenous), PPS (prospective payment system), MDS (Minimum Data Set), SAF (Standard Analytic File).

Source: Urban Institute analysis of 2011 MedPAR data, cost reports, and assessments for skilled nursing facilities and inpatient rehabilitation facilities.

Table 5. Coefficients in SNF Nontherapy Ancillary and Therapy Cost Models

Variable	NTA Costs		Therapy Costs	
	Coefficient	% change	Coefficient	% change
Patient age				
Age - 50, capped at 45 = 95 – 50	-0.009	-0.86	0.006	0.57
	-15.98		*18.50*	
Age - 50, capped at 45 = 95 – 50, squared	-0.00002	0.00	-0.00012	-0.01
	-1.85		*-23.24*	
SNF care				
IV medication furnished, MDS or claims	0.54	72.10	-0.04	-4.21
	77.61		*-10.28*	
IV medication furnished, MDS and claims	0.30	34.43	0.00	0.04
	30.20		*0.07*	
Respiratory care	0.41	50.85	-0.05	-5.34
	28.31		*-6.99*	
IV medication and respiratory care	-0.15	-13.63	-0.02	-1.70
	-8.58		*-1.57*	
Chemotherapy	0.25	28.11	-0.06	-5.50
	15.48		*-8.03*	
Serious skin ulcer (stage 4)	0.22	25.11	-0.15	-14.30
	19.69		*-23.08*	
Hospice Program	-0.04	-3.56	-0.14	-12.86
	-1.28		*-9.64*	
Incontinence	0.02	2.29	0.00	-0.17
	4.11		*-0.59*	
Ability to perform activities of daily living				
Mobility score				
High (i.e., highly immobile)	-	-	-	-
Medium mobility	-0.06	-5.53	0.04	3.59
	-11.17		*9.71*	
Low (i.e., highly mobile)	-0.05	-4.90	-0.04	-4.27
	-4.15		*-4.33*	
Self-care score				
High need for assistance	-	-	-	-
Medium need for assistance	0.01	0.85	0.06	5.68
	1.53		*14.98*	
Low need for assistance	0.06	6.33	0.03	2.70
	4.23		*2.86*	
Diagnoses				
Cerebral hemorrhage and effects of stroke	-0.04	-3.74	0.01	0.93
	-10.55		*4.84*	

	NTA Costs		Therapy Costs	
Variable	Coefficient	% change	Coefficient	% change
Chronic obstructive pulmonary disease	0.23	25.53	-0.01	-0.58
	76.02		*-3.87*	
Diabetes	0.19	21.52	-0.01	-0.70
	75.67		*-5.70*	
Dementia with depression or behavioral disturbance	0.04	4.39	-0.06	-5.72
	4.55		*-10.32*	
Dementia, cerebral degeneration	-0.03	-2.67	-0.04	-3.81
	-6.18		*-14.49*	
Hemiplegia	-0.02	-2.24	0.00	-0.37
	-3.64		*-1.16*	
Hip fracture	0.07	6.81	0.05	5.17
	15.26		*21.65*	
HIV	0.58	79.31	0.00	0.14
	25.85		*0.11*	
Infectious and parasitic diseases	0.13	13.98	-0.02	-2.14
	24.00		*-6.52*	
Joint replacement, aftercare	-0.03	-3.28	0.12	13.22
	-3.03		*14.32*	
Malnutrition	0.07	6.77	-0.03	-2.74
	6.83		*-3.84*	
Mononeuropathy, other abnormal movement disorders	0.04	4.17	0.02	2.11
	4.78		*4.45*	
Musculoskeletal and connective tissue disorders, other	-0.01	-0.53	0.03	2.67
	-0.99		*6.86*	
Parkinson’s disease	0.04	3.92	-0.01	-1.12
	7.43		*-4.84*	
Pelvic fracture	-0.06	-5.75	0.03	3.20
	-5.61		*6.08*	
Pneumonia	0.08	8.53	-0.02	-2.18
	21.01		*-11.80*	
Polyneuropathy, except diabetic	0.09	9.23	0.02	2.47
	11.50		*6.32*	
Psychiatric disorder, other major	0.06	5.83	-0.01	-1.05
	12.70		*-3.57*	
Quadriplegia, other extensive paralysis and spinal cord injuries	0.08	8.61	-0.19	-16.89
	1.88		*-9.95*	
Renal failure	0.00	0.19	0.00	-0.45
	0.42		*-1.75*	
Respiratory failure	0.11	12.01	-0.01	-1.25

Variable	NTA Costs		Therapy Costs	
	Coefficient	% change	Coefficient	% change
	11.35		*-2.72*	
Schizophrenia	0.06	5.77	-0.05	-4.84
	4.23		*-4.65*	
Vertebrae and spinal disk disorders	0.00	-0.08	0.01	1.32
	-0.14		*4.29*	
Vertebral fractures without spinal cord injury	0.01	0.76	0.01	0.62
	0.74		*1.32*	
Nursing Case Mix	-0.03	-2.98	0.17	18.80
	-3.69		*31.39*	
Broad RUG Category				
Rehabilitation only or rehab. plus extensive services	-0.28	-24.50	1.16	219.92
	-39.38		*88.89*	
Length-of-stay proxy (assessment number)				
14-day	-0.36	-30.53	-0.10	-9.20
	-92.31		*-33.80*	
30-day	-0.18	-16.31	-0.04	-3.67
	-52.88		*-20.12*	
60-day	-0.13	-11.89	-0.01	-0.96
	-31.88		*-4.41*	
90-day	-0.06	-5.69	-0.01	-0.90
	-9.04		*-2.45*	
Readmission	-0.03	-2.48	-0.08	-8.00
	-4.46		*-25.77*	
Unscheduled assessment used for PPS	-0.03	-3.09	-0.04	-3.80
	-6.59		*-13.44*	
Constant	4.65		3.47	
	317.06		*216.12*	
Number of stays	1,552,122		1,552,122	

Note: IV (intravenous), SNF (skilled nursing facility), NTA (nontherapy ancillary). Model estimated using Poisson regression of 2011 SNF stays. Regression coefficients reported with z-statistics in italics.

Source: Urban Institute analysis of 2011 MedPAR data, cost reports, and assessments for skilled nursing facilities and inpatient rehabilitation facilities.

Table 6. Ability to Predict Per-Day Costs for Stays Using Alternative and Current PPS Designs

	NTA Model R-squared	Therapy Model R-squared
Alternative PPS design	0.195	0.190
Current case-mix groups (RUG-IV)		
Payment rates of each case-mix group	0.001	0.194
Average cost of each case-mix group	0.066	0.225
N=1,552,122 stays		

Note: PPS (prospective payment system), NTA (nontherapy ancillary), RUG-IV (Resource Utilization Group, Version 4). R-squared indicates the share of the variation in NTA or therapy costs per stay explained by the regression model.

Source: Urban Institute analysis of 2011 MedPAR data, cost reports, and assessments for skilled nursing facilities.

Table 7. CMI Coefficients in Models of NTA and Therapy Costs for Skilled Nursing Facilities Under Alternative and Current (RUG-IV) PPS Designs

	Alternative PPS Design	Current (RUG-IV)
Nontherapy ancillaries		
Coefficient on CMI	0.929	0.079
p-value	0.006	<0.000
R-squared	0.097	0.0002
Number of facilities	14,194	14,194
Therapy		
Coefficient on CMI	1.108	0.424
p-value	0.074	<0.000
R-squared	0.136	0.151
Number of facilities	14,255	14,255

Note: CMI (case-mix index), PPS (prospective payment system), NTA (nontherapy ancillary). A CMI coefficient of 1.0 indicates that facility payments are proportional to facility costs. p-value corresponds to the statistical test that payments are proportional to costs (i.e., coefficient=1). R-squared indicates the share of the variation in average facility costs explained by the prediction from a log-cost regression model.

Source: Urban Institute analysis of 2011 skilled nursing facility MedPAR data, cost reports and MDS assessment records.

Table 8. Characteristics of Medicare Beneficiaries Treated in IRFs and SNFs for Selected Conditions (All Markets)

	DRG 64		DRG 65		DRG 66		DRG 469	
Characteristic	**SNF**	**IRF**	**SNF**	**IRF**	**SNF**	**IRF**	**SNF**	**IRF**
Mean beneficiary risk score in 2011	2.1	1.8	1.8	1.5	1.6	1.3	1.9	2.0
Beneficiary mean age	79	75	81	76	82	78	79	77
Share of beneficiaries:								
Under 65 years old	8%	14%	5%	11%	4%	8%	6%	9%
85+ years old	35%	20%	41%	24%	46%	27%	34%	25%
Dual-eligible	32%	24%	28%	22%	23%	18%	20%	17%
Minority	23%	23%	19%	22%	15%	18%	10%	13%
Female	60%	51%	64%	55%	62%	54%	65%	61%
Share of beneficiaries with condition during prior year:								
Septicemia/Shock	5%	3%	3%	2%	2%	1%	4%	4%
Breast, Prostate, Colorectal and Other Cancers and Tumors	8%	8%	8%	8%	8%	9%	9%	9%
Diabetes with Renal or Peripheral Circulatory Manifestation	11%	10%	8%	7%	7%	5%	8%	9%
Diabetes with Neurologic or Other Specified Manifestation	7%	6%	7%	6%	6%	6%	5%	6%
Diabetes without Complication	18%	18%	19%	19%	19%	20%	16%	16%
Rheumatoid Arthritis and Inflammatory Connective Tissue Disease	6%	5%	6%	6%	6%	5%	8%	8%
Major Depressive, Bipolar, and Paranoid Disorders	7%	4%	7%	4%	5%	4%	8%	6%
Polyneuropathy	11%	10%	10%	9%	10%	9%	11%	13%
Parkinsons and Huntingtons Diseases	3%	2%	3%	2%	4%	3%	4%	3%
Seizure Disorders and Convulsions	7%	5%	6%	4%	4%	4%	4%	4%
Cardio-Respiratory Failure and Shock	9%	7%	6%	5%	5%	3%	10%	10%
Congestive Heart Failure	31%	25%	26%	20%	20%	14%	27%	28%
Acute Myocardial Infarction	4%	3%	2%	2%	2%	1%	2%	2%
Unstable Angina and Other Acute Ischemic Heart Disease	4%	4%	4%	3%	3%	2%	3%	3%
Angina Pectoris/Old Myocardial Infarction	8%	8%	8%	7%	7%	6%	8%	9%
Specified Heart Arrhythmias	31%	26%	29%	22%	26%	21%	26%	26%
Cerebral Hemorrhage	3%	2%	2%	1%	2%	1%	1%	1%
Ischemic or Unspecified Stroke	16%	12%	16%	13%	14%	13%	7%	7%
Hemiplegia/Hemiparesis	7%	5%	7%	6%	4%	4%	2%	2%

Characteristic	DRG 64		DRG 65		DRG 66		DRG 469	
	SNF	IRF	SNF	IRF	SNF	IRF	SNF	IRF
Vascular Disease with Complications	5%	4%	4%	3%	3%	3%	5%	5%
Vascular Disease	24%	21%	24%	19%	24%	18%	24%	25%
Chronic Obstructive Pulmonary Disease	20%	17%	18%	15%	16%	13%	24%	25%
Aspiration and Specified Bacterial Pneumonias	3%	2%	2%	1%	1%	1%	2%	2%
Proliferative Diabetic Retinopathy and Vitreous Hemorrhage	2%	3%	1%	2%	1%	2%	1%	2%
Dialysis Status	6%	6%	0%	0%	0%	0%	5%	9%
Renal Failure	21%	17%	19%	15%	14%	10%	20%	20%
Decubitus Ulcer of Skin	4%	2%	3%	1%	2%	1%	3%	2%
Chronic Ulcer of Skin, Except Decubitus	5%	4%	4%	3%	4%	3%	4%	5%
Major Head Injury	2%	1%	2%	1%	2%	1%	1%	1%
Vertebral Fractures without Spinal Cord Injury	2%	1%	3%	2%	2%	2%	3%	3%
Hip Fracture/Dislocation	3%	2%	3%	2%	3%	1%	6%	6%
Major Complications of Medical Care and Trauma	7%	6%	4%	3%	3%	3%	8%	9%

(Table continues)

Table 8 (continued). Characteristics of Medicare Beneficiaries Treated in IRFs and SNFs for Selected Conditions (All Markets)

	DRG 470		DRG 480		DRG 481		DRG 482	
Characteristic	**SNF**	**IRF**	**SNF**	**IRF**	**SNF**	**IRF**	**SNF**	**IRF**
Mean beneficiary risk score in 2011	1.3	1.4	2.2	2.3	1.7	1.7	1.5	1.4
Beneficiary mean age	76	77	80	77	83	80	82	80
Share of beneficiaries:								
Under 65 years old	7%	9%	6%	11%	4%	6%	4%	5%
85+ years old	18%	22%	44%	31%	50%	38%	46%	35%
Dual-eligible	15%	15%	25%	21%	21%	17%	20%	17%
Minority	10%	11%	9%	11%	7%	8%	8%	9%
Female	74%	72%	69%	63%	79%	74%	76%	71%
Share of beneficiaries with condition during prior year:								
Septicemia/Shock	1%	1%	5%	5%	3%	2%	2%	1%
Breast, Prostate, Colorectal and Other Cancers and Tumors	9%	10%	8%	9%	8%	9%	8%	9%
Diabetes with Renal or Peripheral Circulatory Manifestation	4%	4%	10%	12%	5%	5%	4%	4%
Diabetes with Neurologic or Other Specified Manifestation	4%	5%	6%	6%	5%	5%	4%	4%
Diabetes without Complication	17%	17%	15%	17%	15%	16%	14%	16%
Rheumatoid Arthritis and Inflammatory Connective Tissue Disease	9%	10%	7%	7%	7%	8%	7%	7%
Major Depressive, Bipolar, and Paranoid Disorders	6%	6%	7%	6%	7%	5%	6%	5%
Polyneuropathy	8%	10%	11%	13%	9%	10%	8%	9%
Parkinsons and Huntingtons Diseases	2%	3%	4%	3%	4%	3%	4%	3%
Seizure Disorders and Convulsions	2%	3%	5%	4%	4%	4%	3%	3%
Cardio-Respiratory Failure and Shock	4%	4%	12%	13%	7%	6%	4%	3%
Congestive Heart Failure	13%	15%	31%	31%	22%	20%	14%	13%
Acute Myocardial Infarction	1%	1%	3%	4%	2%	2%	1%	1%
Unstable Angina and Other Acute Ischemic Heart Disease	2%	2%	4%	4%	3%	2%	2%	2%
Angina Pectoris/Old Myocardial Infarction	5%	6%	8%	8%	6%	7%	5%	5%
Specified Heart Arrhythmias	16%	17%	28%	27%	23%	21%	18%	17%
Cerebral Hemorrhage	0%	1%	1%	1%	1%	1%	1%	1%
Ischemic or Unspecified Stroke	3%	5%	8%	7%	7%	6%	5%	5%
Hemiplegia/Hemiparesis	1%	1%	3%	2%	2%	2%	1%	1%

Characteristic	DRG 470		DRG 480		DRG 481		DRG 482	
	SNF	IRF	SNF	IRF	SNF	IRF	SNF	IRF
Vascular Disease with Complications	3%	3%	5%	5%	3%	3%	3%	2%
Vascular Disease	16%	18%	26%	26%	24%	20%	21%	18%
Chronic Obstructive Pulmonary Disease	13%	15%	27%	29%	19%	19%	16%	17%
Aspiration and Specified Bacterial Pneumonias	1%	1%	3%	3%	2%	1%	1%	1%
Proliferative Diabetic Retinopathy and Vitreous Hemorrhage	1%	1%	2%	3%	1%	1%	1%	1%
Dialysis Status	0%	0%	8%	11%	0%	0%	0%	0%
Renal Failure	11%	12%	20%	21%	16%	15%	10%	9%
Decubitus Ulcer of Skin	1%	1%	4%	3%	3%	2%	2%	1%
Chronic Ulcer of Skin, Except Decubitus	3%	3%	5%	5%	5%	4%	4%	3%
Major Head Injury	1%	1%	2%	2%	1%	1%	1%	1%
Vertebral Fractures without Spinal Cord Injury	2%	2%	6%	4%	5%	4%	4%	4%
Hip Fracture/Dislocation	3%	4%	9%	7%	8%	7%	7%	6%
Major Complications of Medical Care and Trauma	4%	5%	8%	10%	5%	5%	4%	4%

Note: SNF (skilled nursing facility), IRF (inpatient rehabilitation facility), DRG (diagnosis related group).

Source: Urban Institute analysis of 2011 MedPAR data, cost reports, and assessments for skilled nursing facilities and inpatient rehabilitation facilities.

Table 9. Characteristics of Medicare Beneficiaries Treated in IRFs and SNFs for Selected Conditions (Markets with IRFs and SNFs)

	DRG 64		DRG 65		DRG 66		DRG 469	
Characteristic	**SNF**	**IRF**	**SNF**	**IRF**	**SNF**	**IRF**	**SNF**	**IRF**
Mean beneficiary risk score in 2011	2.1	1.8	1.8	1.5	1.6	1.3	1.9	2.0
Beneficiary mean age	79	75	81	76	82	78	79	77
Share of beneficiaries:								
Under 65 years old	9%	14%	5%	11%	4%	8%	7%	9%
85+ years old	35%	20%	42%	24%	48%	27%	34%	25%
Dual-eligible	32%	24%	28%	22%	23%	18%	20%	17%
Minority	25%	23%	21%	22%	16%	18%	11%	13%
Female	60%	51%	65%	55%	64%	54%	66%	61%
Share of beneficiaries with condition during prior year:								
Septicemia/Shock	5%	3%	3%	2%	2%	1%	4%	4%
Breast, Prostate, Colorectal and Other Cancers and Tumors	8%	8%	8%	8%	8%	9%	9%	9%
Diabetes with Renal or Peripheral Circulatory Manifestation	11%	10%	8%	7%	7%	5%	7%	9%
Diabetes with Neurologic or Other Specified Manifestation	7%	6%	6%	6%	6%	6%	6%	6%
Diabetes without Complication	18%	18%	18%	19%	18%	20%	16%	16%
Rheumatoid Arthritis and Inflammatory Connective Tissue Disease	6%	5%	6%	6%	6%	5%	8%	8%
Major Depressive, Bipolar, and Paranoid Disorders	8%	4%	7%	4%	6%	4%	8%	6%
Polyneuropathy	11%	10%	10%	9%	10%	9%	12%	13%
Parkinsons and Huntingtons Diseases	3%	2%	4%	2%	4%	3%	4%	3%
Seizure Disorders and Convulsions	7%	5%	6%	4%	4%	4%	4%	4%
Cardio-Respiratory Failure and Shock	9%	7%	7%	5%	5%	3%	10%	10%
Congestive Heart Failure	31%	25%	26%	20%	20%	14%	27%	28%
Acute Myocardial Infarction	4%	3%	2%	2%	2%	1%	2%	2%
Unstable Angina and Other Acute Ischemic Heart Disease	4%	4%	4%	3%	3%	2%	3%	3%
Angina Pectoris/Old Myocardial Infarction	8%	8%	7%	7%	7%	6%	7%	9%
Specified Heart Arrhythmias	30%	26%	29%	22%	26%	21%	26%	26%
Cerebral Hemorrhage	3%	2%	2%	1%	2%	1%	1%	1%
Ischemic or Unspecified Stroke	16%	12%	17%	13%	14%	13%	7%	7%
Hemiplegia/Hemiparesis	7%	5%	8%	6%	5%	4%	2%	2%

Characteristic	DRG 64		DRG 65		DRG 66		DRG 469	
	SNF	IRF	SNF	IRF	SNF	IRF	SNF	IRF
Vascular Disease with Complications	5%	4%	4%	3%	3%	3%	5%	5%
Vascular Disease	25%	21%	25%	19%	25%	18%	24%	25%
Chronic Obstructive Pulmonary Disease	20%	17%	18%	15%	16%	13%	22%	25%
Aspiration and Specified Bacterial Pneumonias	3%	2%	2%	1%	1%	1%	2%	2%
Proliferative Diabetic Retinopathy and Vitreous Hemorrhage	2%	3%	2%	2%	1%	2%	1%	2%
Dialysis Status	5%	6%	0%	0%	0%	0%	5%	9%
Renal Failure	21%	17%	19%	15%	15%	10%	20%	20%
Decubitus Ulcer of Skin	4%	2%	3%	1%	2%	1%	3%	2%
Chronic Ulcer of Skin, Except Decubitus	4%	4%	4%	3%	4%	3%	4%	5%
Major Head Injury	2%	1%	2%	1%	1%	1%	1%	1%
Vertebral Fractures without Spinal Cord Injury	2%	1%	3%	2%	2%	2%	4%	3%
Hip Fracture/Dislocation	3%	2%	3%	2%	3%	1%	7%	6%
Major Complications of Medical Care and Trauma	7%	6%	4%	3%	4%	3%	8%	9%

(Table continues)

Table 9 (continued). Characteristics of Medicare Beneficiaries Treated in IRFs and SNFs for Selected Conditions (Markets with IRFs and SNFs)

Characteristic	DRG 470		DRG 480		DRG 481		DRG 482	
	SNF	IRF	SNF	IRF	SNF	IRF	SNF	IRF
Mean beneficiary risk score in 2011	1.3	1.4	2.2	2.3	1.7	1.7	1.5	1.4
Beneficiary mean age	76	77	81	77	83	80	82	80
Share of beneficiaries:								
Under 65 years old	7%	9%	6%	11%	4%	6%	4%	5%
85+ years old	18%	22%	45%	31%	50%	38%	46%	35%
Dual-eligible	15%	15%	25%	21%	21%	17%	21%	17%
Minority	11%	11%	10%	11%	8%	8%	9%	9%
Female	74%	72%	70%	63%	79%	74%	77%	71%
Share of beneficiaries with condition during prior year:								
Septicemia/Shock	1%	1%	5%	5%	3%	2%	2%	1%
Breast, Prostate, Colorectal and Other Cancers and Tumors	9%	10%	8%	9%	8%	9%	8%	9%
Diabetes with Renal or Peripheral Circulatory Manifestation	4%	4%	10%	12%	5%	5%	4%	4%
Diabetes with Neurologic or Other Specified Manifestation	4%	5%	5%	6%	5%	5%	4%	4%
Diabetes without Complication	16%	17%	14%	16%	14%	16%	14%	16%
Rheumatoid Arthritis and Inflammatory Connective Tissue Disease	9%	10%	7%	7%	7%	8%	7%	7%
Major Depressive, Bipolar, and Paranoid Disorders	6%	6%	8%	6%	7%	5%	7%	5%
Polyneuropathy	8%	10%	11%	13%	9%	10%	9%	9%
Parkinsons and Huntingtons Diseases	2%	3%	4%	3%	4%	3%	4%	3%
Seizure Disorders and Convulsions	2%	3%	6%	4%	4%	4%	3%	3%
Cardio-Respiratory Failure and Shock	4%	4%	12%	13%	7%	6%	5%	3%
Congestive Heart Failure	13%	15%	31%	31%	22%	20%	14%	13%
Acute Myocardial Infarction	1%	1%	3%	4%	2%	2%	1%	1%
Unstable Angina and Other Acute Ischemic Heart Disease	2%	2%	4%	4%	3%	2%	2%	2%
Angina Pectoris/Old Myocardial Infarction	5%	6%	7%	8%	6%	7%	5%	5%
Specified Heart Arrhythmias	15%	17%	27%	27%	23%	21%	17%	17%
Cerebral Hemorrhage	0%	1%	1%	1%	1%	1%	1%	1%
Ischemic or Unspecified Stroke	3%	5%	8%	7%	7%	6%	6%	5%
Hemiplegia/Hemiparesis	1%	1%	3%	2%	2%	2%	1%	1%

Characteristic	DRG 470		DRG 480		DRG 481		DRG 482	
	SNF	IRF	SNF	IRF	SNF	IRF	SNF	IRF
Vascular Disease with Complications	3%	3%	5%	5%	3%	3%	3%	2%
Vascular Disease	16%	18%	27%	26%	24%	20%	21%	18%
Chronic Obstructive Pulmonary Disease	13%	15%	26%	29%	19%	19%	16%	17%
Aspiration and Specified Bacterial Pneumonias	1%	1%	3%	3%	2%	1%	1%	1%
Proliferative Diabetic Retinopathy and Vitreous Hemorrhage	1%	1%	2%	3%	1%	1%	1%	1%
Dialysis Status	0%	0%	8%	11%	0%	0%	0%	0%
Renal Failure	11%	12%	20%	21%	17%	15%	11%	9%
Decubitus Ulcer of Skin	1%	1%	5%	3%	3%	2%	2%	1%
Chronic Ulcer of Skin, Except Decubitus	3%	3%	5%	5%	5%	4%	4%	3%
Major Head Injury	1%	1%	2%	2%	2%	1%	1%	1%
Vertebral Fractures without Spinal Cord Injury	2%	2%	6%	4%	5%	4%	5%	4%
Hip Fracture/Dislocation	3%	4%	9%	7%	8%	7%	7%	6%
Major Complications of Medical Care and Trauma	4%	5%	8%	10%	5%	5%	4%	4%

Note: SNF (skilled nursing facility), IRF (inpatient rehabilitation facility), DRG (diagnosis related group).

Source: Urban Institute analysis of 2011 MedPAR data, cost reports, and assessments for skilled nursing facilities and inpatient rehabilitation facilities.

Table 10: Overlap in Distributions of Risk Measures of Medicare Beneficiaries Treated in IRFs and SNFs for Selected Conditions (All Markets)

Measure	DRG	SNF mean	Share of SNF cases between SNF 10th and 90th percentiles	IRF mean	Share of IRF cases between SNF 10th and 90th percentiles
2011 risk score	64	2.06	0.78	1.76	0.74
	65	1.79	0.80	1.50	0.74
	66	1.60	0.80	1.33	0.74
	469	1.95	0.78	2.00	0.77
	470	1.26	0.82	1.39	0.82
	480	2.19	0.80	2.27	0.77
	481	1.72	0.77	1.66	0.74
	482	1.45	0.79	1.37	0.78
Age	64	78.8	0.83	74.8	0.83
	65	80.9	0.82	76.4	0.79
	66	82.1	0.82	77.7	0.79
	469	79.0	0.85	76.5	0.87
	470	76.4	0.81	76.6	0.78
	480	80.5	0.85	77.0	0.86
	481	82.9	0.82	80.2	0.81
	482	82.2	0.81	79.8	0.81
Predicted NTA cost	64	1.40	0.80	1.67	0.83
	65	1.25	0.80	1.55	0.80
	66	1.21	0.80	1.53	0.78
	469	1.48	0.80	1.93	0.78
	470	1.47	0.80	1.77	0.79
	480	1.44	0.80	1.94	0.77
	481	1.25	0.80	1.69	0.72
	482	1.25	0.80	1.71	0.70
Predicted therapy cost	64	1.47	0.80	1.62	0.74
	65	1.51	0.80	1.63	0.74
	66	1.52	0.80	1.65	0.71
	469	1.64	0.80	1.80	0.70
	470	1.73	0.80	1.89	0.80
	480	1.52	0.80	1.69	0.63
	481	1.55	0.80	1.72	0.54
	482	1.57	0.80	1.74	0.55

Note: SNF (skilled nursing facility), IRF (inpatient rehabilitation facility), DRG (diagnosis related group), NTA (nontherapy ancillary). The share of SNF cases between the 10^{th} and 90^{th} percentiles for SNF may not be exactly 80 percent due to ties.

Source: Urban Institute analysis of 2011 MedPAR data, cost reports, and assessments for skilled nursing facilities and inpatient rehabilitation facilities.

Table 11: Overlap in Distributions of Risk Measures of Medicare Beneficiaries Treated in IRFs and SNFs for Selected Conditions (Markets with IRFs and SNFs)

Measure	DRG	SNF mean	Share of SNF cases between SNF 10th and 90th percentiles	IRF mean	Share of IRF cases between SNF 10th and 90th percentiles
2011 risk score	64	2.09	0.79	1.76	0.75
	65	1.83	0.78	1.50	0.72
	66	1.62	0.80	1.33	0.73
	469	1.94	0.78	2.01	0.77
	470	1.25	0.82	1.39	0.82
	480	2.20	0.80	2.27	0.78
	481	1.74	0.77	1.66	0.74
	482	1.47	0.79	1.37	0.78
Age	64	78.7	0.82	74.8	0.83
	65	81.0	0.82	76.4	0.79
	66	82.5	0.82	77.7	0.77
	469	79.0	0.85	76.5	0.87
	470	76.3	0.81	76.6	0.78
	480	80.7	0.85	77.0	0.86
	481	83.0	0.82	80.2	0.81
	482	82.2	0.81	79.8	0.81
Predicted NTA cost	64	1.40	0.80	1.67	0.83
	65	1.25	0.80	1.55	0.79
	66	1.21	0.80	1.53	0.78
	469	1.48	0.80	1.93	0.78
	470	1.47	0.80	1.77	0.79
	480	1.44	0.80	1.94	0.77
	481	1.24	0.80	1.69	0.73
	482	1.24	0.80	1.71	0.69
Predicted therapy cost	64	1.47	0.80	1.62	0.74
	65	1.50	0.80	1.63	0.73
	66	1.51	0.80	1.65	0.69
	469	1.64	0.80	1.79	0.70
	470	1.74	0.80	1.89	0.80
	480	1.53	0.80	1.69	0.63
	481	1.54	0.80	1.72	0.53
	482	1.57	0.80	1.74	0.52

Note: SNF (skilled nursing facility), IRF (inpatient rehabilitation facility), DRG (diagnosis related group), NTA (nontherapy ancillary). The share of SNF cases between the 10^{th} and 90^{th} percentiles for SNF may not be exactly 80 percent due to ties.

Source: Urban Institute analysis of 2011 MedPAR data, cost reports, and assessments for skilled nursing facilities and inpatient rehabilitation facilities.

Table 12. Ability to Predict SNF Use among SNF and IRF Patients and Propensity to Use SNF by Actual Post-Acute Setting

	Stroke w/CC (DRG 65)		Joint replacement w/MCC (DRG 470)		Hip and femur proc. w/ CC (DRG 481)	
Pseudo R-squared	0.057		0.020		0.028	
Actual setting	IRF	SNF	IRF	SNF	IRF	SNF
Propensity to use SNF						
Mean	0.304	0.377	0.666	0.692	0.605	0.641
5th percentile	0.157	0.178	0.524	0.553	0.462	0.489
95th percentile	0.520	0.611	0.763	0.766	0.751	0.786

Note: SNF (skilled nursing facility), IRF (inpatient rehabilitation facility), DRG (diagnosis related group), MCC (major complication or comorbidity), CC (complication or comorbidity). Propensity to use a SNF estimated using a logit model based on SNF and IRF stays with the listed DRG in the prior hospital stay. The pseudo R-squared is a measure of the improvement in the fit of the model due to the model predictors.

Source: Urban Institute analysis of 2011 MedPAR data, cost reports, and assessments for skilled nursing facilities and inpatient rehabilitation facilities.

Appendix. Assigning SNF RUG Categories to IRF patients

The SNF RUG categories depend on the amount of therapy a patient is expected to receive. We assume that all IRF patients qualify for one of five "ultrahigh" categories, which have the following requirements:

- 720 minutes per week of physical, occupational, or speech therapy;
- 1 rehab discipline 5 days/week; and
- A second discipline 3 days/week.

The assignment of patients among the 5 ultrahigh categories depends on a) the patient's activities of daily living (ADL) score and b) whether the patient receives extensive services (tracheostomy care, ventilator/respirator, or are isolated for an infectious disease). Those beneficiaries with a higher ADL score receive higher therapy payments, and those with extensive services receive a higher payment for nursing care.

Defining the ADL score. The SNF ADL is based on four measures: Bed mobility; toilet use (including toileting and transfer to toileting); transfer to or from bed, chair, wheelchair, and standing position; and eating (including tube feeding). For SNF patients, each measure contributes between 0 and 4 points to the ADL score.

- 0 if the patient is independent or supervised or the activity doesn't occur;
- 1 if the patient has limited assistance;
- 2 if the patient has extensive assistance with no more than one person providing physical assistance;
- 3 if the patient is totally dependent on staff with no more than one person providing physical assistance; and
- 4 if the patient has extensive assistance or total dependence and two or more persons providing physical assistance.

The number of persons providing physical assistance is the most needed over the past seven days.

To create an ADL score for IRF patients, we use data from the PAI. The PAI has direct measures for three of the four SNF elements:

- Bed mobility. We assume all patients are mobile in bed – either independently or with supervision.
- Toilet use. We combine TOILT_ADMSN_CD (39Ja: Transfers - Toilet: Admission) and TOILTG_ADMSN_CD (39Fa: Self-Care: Toileting: Admission). We first recode each element to approximate the categories of dependence for the SNF measures, and then assign the code indicating more dependence.
- Transfer. We use BED_CHR_WC_ADMSN_CD (39Ia: Transfers - Bed, chair, wheelchair: Admission). This differs from the SNF measure by excluding transfer to standing position.
- Eating. We use EATG_ADMSN_CD (39Aa: Self-Care: Eating: Admission).

For each measure, we recode as follows:

- 0 if the PAI variable indicates complete or modified independence (6 or 7) or activity does not occur (0);
- 1 if they have minimal assistance (4);
- 2 if they have moderate assistance (3);
- 3 if they have maximal assistance (2);
- 4 if they have total assistance (1).

Note that the information from the PAI cannot exactly match that from the SNF MDS. For example, the PAI does not record the number of people giving a physical assistance. However, the PAI does distinguish between maximal and total assistance, a distinction not made on the MDS. Also, the assessments vary in the time period covered by the assessment (the SNF assessment looks back over the last 7 days and records the most dependent state of the patient, the PAI assesses the patient at one point in time) and when the assessment is conducted (IRF PAI is conducted at admission, SNF on day five with some flexibility—the most frequent day of assessment is day 8).

Defining extensive services. As noted above, some beneficiaries are assigned to a payment category indicating both ultrahigh therapy and receipt of extensive services. SNF patients qualify as receiving extensive services if they received tracheostomy care, ventilator/respirator care, or have an infectious disease that requires isolation. Each of these measures is reported directly on the patient assessment.

For the IRF, we identify tracheostomy care or tracheostomy care using an ICD-9 code of V44.0 (tracheostomy status) or V46.1X (dependence on respirator (ventilator)) or an impairment code of 17.51 (Respiratory disorders – ventilator dependent). The ICD-9 codes come from the Etiologic Diagnosis (Q22) and the comorbid conditions (Q24) and the Impairment Group is based on condition at admission (Q21). We assume that none of our rehab patients are isolated for an infectious disease. Overall, we find .08% of our IRF sample qualifies for an extensive services RUG category.

Assigning the RUG Category. All IRF patients are assigned to one of the ultrahigh RUG categories as follows:

- Ultra A – ADL score between 0 and 5 and no extensive services;
- Ultra B – ADL score between 6 and 10 and no extensive services
- Ultra C – ADL score between 11 and 16 and no extensive services;
- Ultra L – ADL score between 2 and 10 and tracheostomy or use of ventilator;
- Ultra X – ADL score between 11 and 16 and tracheostomy or use of ventilator.

Because we assume that everyone has bed mobility, the effective cap on the ADL score for Ultra C and Ultra X is 12.