Modeling Alternative Designs for a Revised PPS for Skilled Nursing Facilities

Bowen Garrett
Douglas A. Wissoker

Urban Institute
2100 M Street, NW
Washington, DC 20037

•

MedPAC
601 New Jersey Avenue, NW
Suite 9000
Washington, DC 20001
(202) 220-3700
Fax: (202) 220-3759
www.medpac.gov

•

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

June 2008 • No. 08–5

Modeling Alternative Designs for a Revised PPS for Skilled Nursing Facilities

Final Report for the Medicare Payment Advisory Commission

Bowen Garrett, Ph.D.

Douglas A. Wissoker, Ph.D.

The Urban Institute

May 28, 2008

Acknowledgements

This work grew out of work with our colleague Korbin Liu who died in July 2007. We are deeply grateful to Korbin Liu for his friendship, leadership, and insightful research on post-acute and long term care. We greatly miss the depth and breadth of knowledge that he brought to his work.

This research benefited significantly from our close collaboration with Carol Carter at MedPAC, as well as interactions with our coauthors and CMS staff on a prior report on SNFs for CMS. We thank Mark Miller and Julian Pettengill for many helpful conversations. We thank Thy Dao for excellent programming assistance, and Paul Masi for skilled research assistance. Any errors are solely the responsibility of the authors. The views expressed are those of the authors and should not be attributed to the Urban Institute, its trustees, or its funders.

Introduction

The prospective payment system (PPS) for skilled nursing facilities (SNFs) is widely acknowledged to have two basic problems: it does not accurately pay for nontherapy ancillary services (NTA), such as drugs, IV medications, and respiratory services, and it encourages facilities to provide therapy services for financial, not clinical, reasons (CMS 2000; Fries et al 2000; GAO 1999; Kramer et al. 1999; MedPAC 2000, 2001, 2002, 2005, 2007; White 2003; White et al 2002).

In prior work funded by the Centers for Medicare and Medicaid Services (CMS) as part of a congressionally mandated study, a team of researchers headed by Korbin Liu at the Urban Institute examined ways to: separately pay for NTA services; base payments for therapy services on predicted care needs, not service provision; and defray the costs of exceptionally expensive stays using an outlier policy (Liu et al. 2007). This research concluded that a revised PPS could establish payments more accurately and afford SNFs some financial protection against exceptionally high-cost stays. If payments were more accurate, SNFs would have less incentive to avoid certain types of patients with high NTA care needs.

Last year, MedPAC contracted with the Urban Institute to further develop and evaluate alternative PPS designs to address the problems with the current system using more recent data from 2003. Using patient and stay characteristics (such as the physical status of the patient and the duration of the stay) that best predicted costs, we worked with MedPAC staff to design a separate NTA payment component to add to the SNF PPS. We also developed a predictive model of therapy costs for use in a revised therapy payment component. The relative weights for the NTA and therapy payment components are based on multivariate regression models relating NTA and therapy costs with patient and stay characteristics. We also developed an outlier policy based on exceptionally high ancillary costs per stay. To evaluate these changes, we assessed their accuracy in predicting NTA and therapy costs and their impact on facilities' payments.

In this report to MedPAC, we provide detail on the data and methods we used to estimate the NTA and therapy cost models, as a supplement to material that is presented in Chapter 7 of MedPAC's June 2008 Report to Congress (MedPAC 2008). We provide regression coefficients for NTA and therapy cost models with the best predictive ability. We also describe the methods we used in calculating payments under the current and reformed PPS designs and in conducting the outlier policy and impact analyses. Background on the SNF PPS, the motivation for the approaches to reform we examined, and the overall findings from the analyses we describe here are presented in the June 2008 Report to Congress chapter.

Data Sources

The principal data source for this study is the 2003 Data Analysis PRO (DataPRO) file of SNF stays. The DataPRO file is a national file, combining Medicare claims data on Medicare SNF stays with Minimum Data Set (MDS) patient assessments and Medicare claims data from the qualifying prior hospital stays. The file contains SNF stays with an admission date in calendar year 2003. We enhanced the DataPRO records with additional information from Medicare claims, including charges for specific types of services (e.g., respiratory therapy, prescription medicine) used during the DataPRO SNF stay and from the hospital stay preceding entry into the SNF. To ensure that hospital data were attached for SNF stays throughout 2003, we matched the DataPRO stays to Medicare hospital claims data for both 2002 and 2003.

Medicare claims are the source of data for each stay and its prior hospitalization on periods of service, types of procedures furnished, primary and secondary diagnoses of the patient, and the institution’s charges for services. These data are a compilation of claims for each SNF and prior hospital stay that were submitted by Medicare-certified providers to Medicare intermediaries for reimbursement of Medicare-covered services and subsequently sent to CMS.

The MDS assessments are the source of DataPRO information on a patient’s cognitive and functional status, use of specific services (such as ventilation, intravenous medication, and oxygen), and assignment to the RUG-53 category. The MDS is administered to patients on a specified schedule approximately 5, 14, 30, 60, and 90 days from the start of the Medicare-covered SNF stay.

We also used the cost report data that Medicare-participating SNFs submit annually to the fiscal intermediaries. We used data from 2003 reports whenever possible; if the 2003 cost report did not cover a year – defined as 10 to 14 months – we replaced it with a cost report covering 2002. These data were used to create ancillary service cost-to-charge ratios (CCRs) needed to convert claims data on ancillary service charges to estimated costs for those services. In addition, we used cost report data to construct total costs – the sum of routine and ancillary costs – for each stay. Charges for routine costs are not generally differentiated on claims for patients in the same facility. Therefore, we assigned each patient the average per diem routine cost of the facility based on its cost report data.

Editing and Selecting Stays

The basic observation units in the analysis file are Medicare SNF stays. For the analysis file, we included 2003 SNF stays that: (a) had cleanly matched MDS information on patient characteristics, (b) came from facilities for which a full 2003 or 2002 cost report was available, (c) had consistent claims information on SNF and hospital services not captured by DataPRO, and (d) had internally consistent information from the multiple sources of data. The edit screens we used and their effects on sample size can be seen in Table 1.

We used the DataPRO SNF and prior hospital stays as the starting point for creating the analysis file. We eliminated stays with potential integrity problems such as overlapping claims records, zero covered days, or missing prior hospital stay information, and stays with non-Medicare coverage. We examined the MDS assessments associated with each stay and eliminated cases missing any assessments, irregular patterns of assessments, or mismatches between MDS assessments in DataPRO and MDS assessments from the MDS core data files. We also eliminated stays for which we found inconsistent data when comparing DataPRO and supplemental raw claims data.

We excluded from the analysis file SNF stays without corresponding cost report data and evaluated several cost report fields. We eliminated facilities with any of the following three problems with cost reports:

- **Unreliable cost data.** Facilities with ratios of ancillary to routine costs of less than or equal to .005 or greater than 5.0 were dropped as were facilities with total ancillary costs that exceeded the sum of the costs of the ancillary cost components by a significant amount;

- **Inability to assign Medicare costs in a facility.** Facilities that were missing data necessary to assign Medicare costs (i.e., number of SNF beds, number of Medicare patient days, number of SNF participating unit days, and number of nursing facility unit days) were dropped;

- **Unreliable cost to charge Ratios.** Facilities for which the cost-to-charge ratios (CCRs) for rehabilitation therapy, drugs, respiratory, or other NTA were considered "out of range" were dropped. Reasonably accurate cost-to-charge ratios are needed to convert the charges to estimated costs for each stay. In defining whether a CCR was out of range, our goal was to be as inclusive as possible, while identifying particular SNFs that were likely to contribute erroneous data.

We allowed the acceptable range of CCRs to differ between hospital-based and freestanding SNFs. This is in keeping with the work of Newhouse et al. (1989) in which the acceptable ranges for departmental CCRs varied by the size of hospital.[1] Here the issue is not facility size, but differences between hospital-based and free-standing facilities. The hospital-based facilities have a much narrower range of CCRs than the free-standing facilities, presumably due to adoption of more standardized hospital procedures for setting charges. Free-standing facilities were dropped if they had CCRs outside of the range of .05 – 30.0 for total ancillary, rehabilitation therapy, total NTA, or drugs or outside the range of .05 – 100 for respiratory or other NTA. Hospital-based facilities were dropped if they had service-specific CCRs outside of the .05-10.0 range. These ranges allowed us to include virtually all of the stays in freestanding and hospital-based SNFs respectively.

Finally, we eliminated stays with extreme values for total ancillary costs and charges due to concern for the validity of the data. We dropped stays with logged per diem total ancillary costs or charges more than three standard deviations from the logged mean, similar to previous work on hospital costs.

More detail on the editing procedures is available in Liu et al. 2007.

---

[1] Newhouse, J.P., S. Cretin, and C.J. Witsberger. 1989. "Predicting Hospital Accounting Costs." *Health Care Financing Review* 11(1): 25–33.

Samples Used for Analysis

After data exclusions, the population contains approximately 1.7 million stays from 12,160 SNF providers. Because of the enormous size of this file, we selected a 10% random sample for developing our patient-level nta and therapy components. This sample contains 173,441 stays from 11,875 facilities. A second sample was drawn for evaluation of the proposed payment components and outlier policy across facilities. A random 30% of facilities was identified and all stays in those stays in those facilities were included in the second sample. This sample contains 532,552 stays from 3,647 facilities.

Measurement of NTA and Therapy Costs

NTA and therapy costs for each stay are estimated by combining data on charges for each stay with cost-to-charge ratios (CCRs) for each facility. Estimates are used because costs are not reported by stay. The charges per stay are from Medicare claims and the CCRs are from the SNF cost reports. The estimated costs are standardized for area wages using the wage index and the labor share in place in 2003.

For each facility, we calculated CCRs for four subsets of SNF ancillary services and then applied them to the total of all corresponding charges for each stay. The four components are: 1) drugs, 2) respiratory, 3) all other NTAs, and 4) rehabilitation therapy. For each component, the cost per stay is the product of the CCR and the amount charged for the stay for the component. These estimated costs are then summed across components to obtain NTA, rehabilitation therapy, and total ancillary costs for each stay.

In some instances, a CCR could not be constructed for a component (e.g., respiratory care) using a facility's cost report, although a claim was submitted for that service. In such cases, we applied the available CCR from the next higher level of service aggregation. For example, if a claim for respiratory therapy is submitted, but the SNF does not have a respiratory CCR, we applied the CCR for total NTA. Similarly, if a claim for rehabilitation therapy is submitted and no rehabilitation therapy CCR exists, we applied the CCR for total ancillary services.

In addition, as indicated above, we determined an "acceptable" range of CCRs that was broad enough to allow us to include virtually all of the stays in freestanding and hospital-based SNFs. A relatively small number of cases fell outside the ranges and were dropped from the analysis.

Predicting NTA and Therapy Costs Per Day for Each Stay Using Patient and Stay Characteristics

We used separate regression models to predict NTA and therapy costs per day with patient and stay-level data. The predictive models identify whether a factor influences cost per day and, if so, the magnitude of its effect. For example, an HIV diagnosis raises NTA costs per day, while a stroke diagnosis lowers them. The models estimate the relationship between costs and patient conditions and stay characteristics to generate a set of payment weights that, when applied against the component's base rate, raise or lower payments.

The SNF claims and MDS data present challenges to estimating costs on a per day basis. The data from the claims are reported monthly and do not include dates when individual services were furnished. The MDS data on conditions and services (e.g., IV use, functionality, and RUG category) are reported in the MDS assessments on days 5, 14, 30, 60, and 90 of the stay. The different reporting periods for costs and patient characteristics and the lack of day-specific information means that we cannot directly measure costs and patient characteristics on a given day. We calculated average cost per day as the total cost for the stay divided by the number of covered days. We assigned the patient characteristics for the stay as the proportion of the stay with a given condition as indicated by the MDS assessments. This is measured as the number of days in the stay for which the associated MDS assessment reported that a given characteristic was present divided by the total number of days in the stay.[2]

Using the 10% sample of SNF stays and alternative sets of explanatory variables (as we describe below), we estimate the regression models of NTA and therapy costs per day using Poisson regression. Both per day cost measures have a relatively small number of very large values, and both contain values of $0.[3] 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. The coefficient estimates are interpreted in the same way as the coefficients from a logged

[2] In at least one-fourth of stays, the patient's condition changes between assessments.
[3] About two percent of stays have zero NTA cost and about 12 percent of stays have zero therapy cost.

standard regression model. Unlike log models, however, Poisson regression easily handles dependent variables that contain many zeros.

We estimated several alternative predictive models of NTA and rehabilitation therapy costs. The "full model" design, which we present in detail below, includes patient characteristics, including age, use of IV therapy and respiratory therapy in the SNF, physical and mental status, ability to perform activities of daily living, hospital diagnosis, and 5 broad indicators of the type of RUG category into which the patient was placed (e.g., rehabilitation with extensive services). We considered two design alternatives that narrowed the set of explanatory variables. In the first, we removed several variables indicating use of IV medication and indicators of diagnoses from the hospital from both the NTA and therapy cost models. We examined this design to assess how the predictive ability changes if these variables were excluded. Policy makers may decide to exclude these variables if IV is considered too gameable or if hospitals are ultimately unable to transmit patient information to SNFs in a timely way. In the second, we removed the broad indicator of RUG category from the therapy model. Ideally, the model would not include any direct measure of therapy use in the therapy cost model. The results for these alternative designs provide insight into the predictability that can be achieved without these measures.

Explanatory Variables

In selecting explanatory variables for the NTA and therapy models, we drew upon the set of predictors examined in Liu et al. 2007. We used predictors if they 1) contributed to the explanatory power, and 2) were statistically significant, in either the NTA or therapy cost model.[4] Consistent with the prior work, some characteristics (such as keeping patients in bed or tube feeding patients) were excluded because their inclusion

---

[4] Certain variables (HIV or organ transplant diagnosis from the hospital stay) were kept in the models even though they describe few cases. Excluding them would lower the model's ability to predict resource use for those patients and the facilities that treat them. Many variables were examined but dropped because they did not contribute significantly to the explanatory power of the models or their inclusion could have an inappropriate incentive or overly complicate the payment system for little benefit. Dropped variables included: the activity of daily living (ADL) measuring a patient's ability to transfer to/from bed, chair, and standing position; the share of SNF stays with prior hospital stays with high severity of illness (scores of 3 or 4); high drug charges in the prior hospital stay; radiology charges in prior hospital stay; speech language pathology charges in prior hospital stay; rehabilitation therapy charges in prior hospital stay; and a composite ADL measure (the Barthel index score).

in a payment component could create inappropriate incentives. For example, providing high payments for patients receiving tube feeding could produce an incentive to administer tube feeding when it is unnecessary.[5]

One notable issue that affects several explanatory variables relates to the timing of the MDS assessments. The MDS assessment collects data on some service-use measures (e.g., intravenous medication) over the previous 14 days. To ensure that we do not mistakenly attribute to the SNF services provided during the prior hospital stay, our measures of service in the SNF requires that claim for this service was submitted in addition to an MDS indicator of the service.

The specific measures used are:

Patient Age

- Three measures of the patient's age are used: (Age-50), (Age – 50) squared, and an indicator of age>50. Ages below 50 are set to 50 and ages above 95 are set to 95. This keeps the older and younger cases from having too much influence and constrains payment differentials for those with very advanced age. The functional form yields a single payment adjustment for all patients under 50, and a quadratic pattern of payment adjustments from age 50 to 95, with no further adjustment beyond age 95;

SNF Care

- IV medication furnished. IV medication indicated on the MDS and intravenous medication or solution indicated on the SNF claim;
- Respiratory care. Oxygen linked to specific conditions, tracheotomy care, or use of a ventilator and a SNF claim for respiratory or pulmonary care. The specific conditions are either a) pneumonia or

[5] In this particular example, concerns about gameability may be overstated. A recent study of Medicaid patients concludes that casemix reimbursement was not associated with an increase in the prevalence of feeding tube use, despite higher average patient acuity and thus higher payments being tied to its use (Teno et al, 2008). If this finding holds for SNF patients, one might consider using a feeding tube indicator as part of the predictive models underlying the NTA and therapy weights.

respiratory infection with fever, or, b) pneumonia or respiratory infection, COPD, congestive heart failure, or coronary artery disease with shortness of breath;

- IV medication furnished and respiratory care. Both IV medication and respiratory care furnished in the SNF;
- IV medication furnished and respiratory condition in the SNF stay. Both IV medication furnished in the SNF and major diagnostic category from the SNF indicating a respiratory condition;

Physical and Mental Status in the SNF (from the MDS, except for Respiratory Condition in SNF) [6]

- Respiratory condition in SNF (indicated by Major Diagnostic Category on the SNF claim);
- No infection;
- Serious (stage 4) skin ulcer;
- Shortness of breath;
- Cognitive function. Cognitive Performance Scale score calculated from the 5-day MDS assessment, transformed into six indicators of impairment (with the omitted category indicating cognitive performance is intact);
- Chewing problem;
- Swallowing problem;
- Surgical wounds;

Ability to Perform Activities of Daily Living

- Locomotion on unit – i.e., ease in moving from patient's room to adjacent corridor on same floor (5 indicators);
- Assistance with eating (5 indicators);

---

[6] Research by Abt Associates (2000) led to a proposal to pay according to a Weighted Index Model (WIM) based on specific MDS items that could be appended to RUG classification system. Here we use a subset of the WIM variables: IV medication, use of oxygen with conditions, tracheotomy care, and stage 4 pressure ulcers.

- Transfer to/from bed, chair, wheelchair, or standing position (5 indicators);

Hospital diagnoses[7]

- Indicators based on hospital claims for sepsis, cellulitis, malnutrition, mental disorders, hip fracture, stroke, respiratory infection, chronic obstructive pulmonary disease (COPD), dementia, osteoarthritis, osteoporosis, renal failure, infectious and parasitic diseases, neoplasms, diseases of circulatory system, diseases of digestive system, diseases of the skin and subcutaneous tissue, diseases of the musculoskeletal system and connective tissue, injury and poisoning, myeloproliferative diseases;
- Solid organ transplant;
- HIV-AIDS;

SNF Stay

- Broad Resource Utilization Group (RUG) category. Indicators of 5 groups of RUG categories: Rehabilitation only, rehabilitation and extensive services, extensive services only; special care; and clinically complex. Based on grouping of RUG categories currently used for payment, calculated from the MDS;
- Prior nursing home stay. Indicator of a patient assessment from a non-PPS nursing home during the previous 6 months;
- Number of assessments. Indicators of one, two, three, and four assessments. This variable serves as a proxy for length of stay. One assessment indicates stays typically shorter than two weeks. The omitted group is those with a fifth assessment, which is typically conducted at 90 days. Including all cases with one assessment in a single group combines the extremely high-cost very short stays (fewer

[7] Our previous work reported that hospital-based SNFs tend to code diagnoses more completely than freestanding SNFs and that paying based on SNF diagnoses might favor hospital-based facilities. Using diagnoses from the prior hospital stay, allows us to avoid this potential source of differential treatment (Liu, K. et al. 2007).

than 5 days) with the moderately high cost longer stays (5 – 14 days). By combining these groups, one avoids a potential incentive to provide very short stays.

Summary Statistics

The sample means of the variables used in the regressions are reported in Table 2. To highlight just a few of the findings, the average NTA cost per day in the 10 percent random sample of stays is $68, with a standard deviation of $94. The current PPS is incapable of reflecting this large degree of variation in NTA costs. Therapy costs per day are higher on average than NTA costs ($74), but do not vary to the same extent, with a standard deviation of about $57. Fewer than 2 percent of SNF cases are of age less than 50. Fifteen percent of SNF patients had a prior nursing home stay.

Estimated Effects of Explanatory Variables on NTA and Therapy Costs Per Day

The relationship between each explanatory variable and NTA and therapy costs per day, as estimated by the regression models, are reported in Table 3. The estimated regression coefficients are reported in bold. We convert the coefficients into percent increases or decreases in per day costs that result from the presence or absence of the patient or stay characteristic. These percentages can be multiplied together to see the combined effect of all the patient and stay characteristics on the total NTA or therapy costs per day.[8]

We also report t-statistics that show the statistical significance of the effects in italics. Variables with t-statistics less than -2 or greater than 2 indicate effects that are statistically significant (different from zero) with a confidence level of more than 95 percent.

Two sets of variables stand out as highly predictive of NTA costs per day (column 1).[9] First, the SNF care variables (IV medication furnished, respiratory care, and the

---

[8] With the exception of the second and third age variables, which are continuous measures, the explanatory variables take the value of 1 (condition is present) or 0 (condition is not present). For such binary explanatory variables in Poisson regression models, the expected percent change in the outcome given that the condition is present (as compared to when it is not present) is computed as: 100%*[exp(regression coefficient) – 1].

[9] We focus on variables with high t-statistics, which relate to a variable's contribution to the model's explanatory power.

combination of receiving both IV medication and respiratory care) are strongly related to higher NTA costs per day. Having IV medication furnished (without also having respiratory care) increases expected NTA costs by 109 percent. Having respiratory care (without also having IV medication) increases expected NTA costs by 69 percent.[10] Receiving both IV medication and respiratory care reduces the combined effect on costs of having the two services individually by about 26 percent. In total, having both IV medication and respiratory care increases expected NTA costs by 162 percent compared to having neither.[11]

Second, the number of MDS assessments, used as a proxy for length of stay, are also very important predictors. NTA costs per day are highest for stays consisting of only one MDS assessment (111 percent higher than for stays consisting of five assessments), and decline with the number of assessments thereafter.

Other variables that notably predict higher NTA costs include having a respiratory condition in the SNF, patient did not walk within the SNF unit, having a disease of the circulatory system, and having a hospital diagnosis of COPD, renal failure, respiratory failure, infectious and parasitic disease, or neoplasms. Other variables that predict lower NTA costs include having no infection, being in a rehabilitation-only RUG category, and having had a prior nursing home stay.

Variables that strongly predict higher therapy costs per day include:

- having no infection, a swallowing problem, or a surgical wound,
- requiring supervision, limited, or extensive assistance in the transfer ADL (compared to being independent),
- having a hospital diagnosis of stroke or osteoarthritis, and
- being classified in the rehabilitation-only and rehabilitation and extensive services broad RUG categories.

---

[10] These percent changes would translate into payment weights that when applied against the therapy or NTA base rates would raise payments. For example, for a patient who received IV therapy, but no respiratory care, would have a payment weight of 2.09.

[11] The total percent change may be computed by taking the exponent of the sum of the individual coefficients, subtracting 1, and multiplying by 100%. For example, the change in payments for a patient day with IV and respiratory care (and both) is calculated as [exp(0.736+0.524-0.295)-1]*100% = 162%.

Variables that strongly predict lower therapy costs per day include having a serious skin ulcer (stage 4), very severe cognitive impairment, renal failure, and having a prior nursing home stay. The percent change estimates on the number of MDS assessments show a declining pattern of therapy costs per day with the number of assessments. This pattern is not as strong as for NTA costs.

Because the effects of age involve multiple variables, it is easier to see the pattern of expected costs by age in a graph. In Figure 1, we show how the regression models' predictions for NTA and therapy costs per day vary with the age of the patient (holding all other variables fixed at their average values). Predicted NTA costs generally decline with age, from about $82 for patients age 50 and below to $45 for patients age 95 and above. Predicted therapy costs rise from about $58 for patients age 50 and below, peak at about $63 for patients 72 years old, then fall to about $57 dollars for patients age 95 and above.

Evaluating the Relationship Between Costs and Payments Under the Current and Proposed PPS for NTA and Therapy

In this section, we describe the method for estimating the degree to which the various models of per-diem costs presented above yield facility-level payments that are proportional to costs. If payments are proportional to costs, facilities will not gain or lose by changing their casemix. We compare proportionality of payments and costs for NTA and therapy separately, comparing both for current payment weights and alternative approaches for computing payments. The analysis is based on the 30% facility evaluation sample and the average of the actual and predicted costs for all stays in those facilities.

For both NTA and therapy costs, we estimate a regression model relating average costs per day for a facility and its case mix index or CMI. The CMI is calculated as the average predicted cost (i.e., NTA or therapy) for the facility's cases divided by the average cost for all cases in the sample. Because payments for individual stays under a revised system are proportional to predicted costs, the CMI is a measure of both relative expected costliness and relative payments. For the current payment system, we base the CMI on the current payment weights.

The specific form of the regression is as follows: For both NTA and therapy facility-level costs per day, we estimated standard regressions using the natural log of the average cost per day as the outcome (i.e., dependent) variable and the following explanatory variables: the natural log of the CMI, the log of the area wage index, 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 for payment adjustment in the SNF PPS and does not include other facility characteristics that may also be related to costs (see Liu et al. 2007 for additional detail).

Two statistics from these facility-level models are reported in Tables 7-4 and 7-5 of MedPAC 2008. First, we report the facility-level percent of variation in costs explained, which is the R-squared statistic from the corresponding facility-level regression. Second, we report the regression coefficient on the log CMI variable and which we refer to as the "CMI coefficient". This coefficient, measures whether the relative expected costliness of a facility's cases (either its NTA or therapy costs) is proportional to the payments (either the NTA or therapy payments).[12]

Evaluation of Overall Predictive Ability

We used three criteria to evaluate the overall predictive ability of the regression models containing all the explanatory variables as well as the alternative designs for the NTA and therapy components that excluded some variables from the models.

- **Ability to explain cost differences across stays (the stay-level R-squared) and at the facility level (the facility-level R-squared)**. Without accounting for a reasonably high share of the cost variation, a revised design would retain financial incentives for facilities to admit certain types of patients and avoid others.[13]

---

[12] Because we estimate the regression having taken the natural log of both the average cost per day outcome variable and the CMI, the coefficient on the log CMI variable measures the percent change in average facility cost per day that is associated with a percent change in the CMI.

[13] Stay-level R-squared was computed from the 10% stay estimation sample. We computed the R-squared for the Poisson cost model by using the Poisson model to predict costs, using OLS to regress costs on the predicted value and then taking the R-squared from that regression (or, as would be equivalent, squaring the correlation between costs and predicted costs). To compute a comparable stay-level R-squared for the current payment system, we regressed NTA and therapy costs per day on the current payment weights for

- **Effectiveness in predicting high-cost cases.** An accurate model should be able to accurately predict that high-cost cases were high cost. We measure the share of stays in the top 10 percent of costs accurately predicted to be high cost.[14]

- **Proportionality between a facility's payments and its expected costs.** The CMI coefficient from the facility-level regressions measures the relationship between the actual average costs and the CMI used for payments (the predicted costs).[15] A CMI coefficient of one (1.0) indicates that a facility would be paid in proportion to its costs. There would be no gain from taking a more or less difficult case load because increased payments are offset by proportionate increases in costs. A coefficient greater than one indicates that a facility with a relatively costly case mix would tend to be underpaid, while one with a relatively inexpensive case mix would tend to be overpaid (Pettengill and Vertrees 1982; Cotteril 1986).[16] A CMI coefficient below one indicates that a facility with a relatively costly case mix would tend to be overpaid, while one with a less costly case mix would tend to be underpaid.

The findings regarding overall predictive ability are presented in MedPAC's June 2008 report chapter.

Calculating Payments under Current and Revised PPS Designs

We calculated per day SNF payments under current policy using 2003 base rates and adjusting payments for area wages. To reflect the current case-mix groups, we used the case-mix groups and relative weights from fiscal year 2006, the year the classification

---

the relevant costs. The facility-level R-squared was computed using the 30% facility evaluation sample. To compute a comparable facility-level R-squared (and CMI coefficient) for the current payment system, we created a CMI for each facility based on current payments for NTA and therapy costs and used that CMI in the facility-level regression model.

[14] This was computed from the 10% stay estimation sample. For a comparable figure under the current payment system, we computed the share of stays in the top 10 percent of costs that received high payments (i.e., top 10 percent of payments).

[15] We distinguish between the CMI coefficient of the payment system design from the particular value of the CMI for a given facility.

[16] A coefficient above one is sometimes referred to as CMI compression, while a CMI below one is known as CMI decompression.

system was expanded from 44 to 53 RUGs. Payments include the add-on payments for HIV cases.

In computing payments under a revised PPS, we used the full NTA and therapy model specifications, which included the hospital diagnoses, the rehabilitation indicator, and the IV medications predictors. Of the alternative designs evaluated, these models are the best predictors of NTA and therapy costs. To estimate NTA and therapy payments, we calculated new payment weights for the NTA and therapy components and applied them to the 2003 base rates.[17] To establish an NTA base rate, we allocated a portion of the 2003 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 revised PPS designs were calculated in the same manner as current payments, except that the estimated NTA costs were removed from the nursing base rate.

Modeling an Outlier Policy

For reasons discussed in MedPAC's June 2008 report chapter, we modeled an outlier policy focused on total ancillary cost losses per stay, with losses computed as the difference between per stay costs and per stay payments that we compute under the revised PPS. To determine a range of potential fixed-loss amounts to use for an outlier policy, we examined the distribution of ancillary losses per SNF stay under our revised PPS. As shown in Table 4, just over one percent of stays incur losses of $5,000 or more per stay.

In collaboration with MedPAC staff, we selected for evaluation an outlier policy with a $3,000 fixed loss amount on ancillary service. This fixed loss requires SNFs to incur a loss on ancillary services roughly equal to the average ancillary cost per stay. We evaluated three other outlier policies— a $5,000 fixed loss amount and two outlier pool sizes (2 and 3 percent). The 3 percent pool resulted in a pool that was sufficiently large that the fixed loss amount ($1,442 per stay) did not appear to warrant an outlier policy.

---

[17] To compute the new payment weights, we compute the model-predicted per diem ancillary cost for each stay. We convert these into raw payment weights for NTA and therapy by dividing by the average per diem cost for NTA and therapy services respectively.

The fixed loss of $5,000 resulted in a pool that we considered too small, affecting only about 1 percent of stays. The 2 percent outlier pool had fairly comparable results to the $3,000 fixed loss amount. By establishing a fixed loss, as opposed to one that varies by case mix group, outlier payments target stays with the largest ancillary losses.

After considering the several alternative configurations, the analyses focused on an outlier policy that included the following features:

- Outlier payments are based on per-stay losses on ancillary services (NTA and therapy services combined), where ancillary losses are defined as per-stay ancillary payments less per-stay ancillary costs;

- Payments are made to facilities that incur a loss on a stay of more than $3,000 (wage-adjusted) in ancillary services;

- Outlier payments cover 80 percent of the per stay ancillary costs above the $3,000 (wage-adjusted) fixed loss amount;[18]

- The outlier payment policy is budget-neutral and financed by a 1.7 percent reduction in the base payment amounts for ancillary services for all facilities.

Modeling the Impacts on Payments

In the impact analysis, we compared payments under a revised PPS to payments under current policy. Having computed payments under the current and revised systems, including outlier payments, we examined the shifts in payments across different types of cases and SNFs, as well as the distributions of the changes in payments across facilities. Tables of results are provided in MedPAC's June 2008 report chapter.

---

[18] Although consistent with outlier policies of other PPSs, the 80 percent loss sharing ratio may be high. MedPAC analysis of the outlier policy parameters for inpatient hospitals found that 80 percent was likely to overstate marginal costs. See www.medpac.gov/transcripts/1003-04medpac.govfinal.pdf for a discussion of MedPAC's analysis of inpatient hospital marginal costs. To more accurately reflect the lower daily costs of longer stays, another refinement to consider is a loss sharing ratio that declines after the median length of stay. The psychiatric hospital PPS outlier policy includes two loss sharing ratios that vary by day of stay.

Conclusion

The main findings from this analysis are presented in Chapter 7 of MedPAC's June Report to Congress. Based on the data and methods presented here, we found that a separate NTA component can be designed that substantially improves payment accuracy for SNF services provided to Medicare beneficiaries. A therapy payment component can be designed that predicts therapy costs as well as current policy, but bases its payments on the care needs of the patient, not therapy provision. An outlier policy targeting high ancillary costs would protect SNFs against extraordinary losses without paying for facility differences that may be unrelated to patients.

In considering reforms based on this research, it is useful to note that the overall PPS design (adding a new NTA component, revising the therapy component, and adding an outlier component) stands apart from the specific set of predictors used in the modeling to establish the payment weights. So long as the overall predictability of the models is not greatly reduced, variables could be added or removed from the set of predictors included in this study without altering the conclusion that a new PPS design would greatly improve upon the current system. Possible modifications to the set of variables we have used here might include using variables from the MDS 3.0, the CARE tool, or revised diagnostic categories that clinicians deem more appropriate. The number of variables might be reduced by collapsing selected categories of ADL scores.

Though the reform is designed to be budget neutral in aggregate, the impact analyses suggest that it would increase payments for some providers and decrease payments for others, depending on their mix of patients and treatment patterns. In particular, payments would tend to rise for facilities that treat a patient mix with high medical acuity, and fall for facilities that treat large shares of rehabilitation for patients who have less complex medical needs.

References

Abt Associates. 2000. Variation in prescribed medication and other non-therapy ancillary costs in skilled nursing facilities: Potential RUG-III refinements. Report to HCFA. Contract no. 500-96-0003/TO#7.

Centers for Medicare and Medicaid Services, Department of Health and Human Services. 2000. Medicare program.; prospective payment system and consolidated billing for skilled nursing facilities. Update; final rule. *Federal Register 65*, (69): 19188–19236.

Cotterill, P.G. 1986. Testing a diagnosis-related group index for skilled nursing facilities. *Health Care Financing Review* 7, (4): 75-85.

Fries, B. E., K. Lapane, T. Moore, et al. 2000. *Variation in prescribed medication and other non-therapy ancillary costs in skilled nursing facilities; Potentail RUG–III refinements.* Cambridge, MA: Abt Associates.

Kramer, A. M., T. B. Eilertsen, M. K. Ecord, et al. 1999. *A prospective study of new case-mix indices for sub-acute care.* Final report to National Subacute Care Association and the American Health Care Association. Denver, CO: Morrison Informatics and University of Colorado Health Sciences Center. June.

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*. Washington, DC: CMS. Report prepared for CMS under contract No. 500-00-0025, 2006. http://www.urban.org/UploadedPDF/411526_nursing_facilities.pdf

Medicare Payment Advisory Commission. 2008. *Report to the Congress: Reforming the delivery system.* Washington, DC: MedPAC.

Medicare Payment Advisory Commission. 2007. *Report to the Congress: Greater efficiency in Medicare.* Washington, DC: MedPAC.

Medicare Payment Advisory Commission. 2005. *Report to the Congress: Medicare payment policy.* Washington, DC: MedPAC.

Medicare Payment Advisory Commission. 2002. *Report to the Congress: Medicare payment policy.* Washington, DC: MedPAC.

Medicare Payment Advisory Commission. 2001. *Report to the Congress: Medicare payment policy.* Washington, DC: MedPAC.

Medicare Payment Advisory Commission. 2000. *Report to the Congress: Medicare payment policy.* Washington, DC: MedPAC.

Newhouse, J.P., S. Cretin, and C.J. Witsberger. 1989. “Predicting Hospital Accounting Costs.” *Health Care Financing Review* 11, (1): 25–33.

Pettengill, J. and J. Vertrees. 1982. “Reliability and validity in hospital case-mix measurement”. *Health Care Financing Review* 4, (2): 101-128.

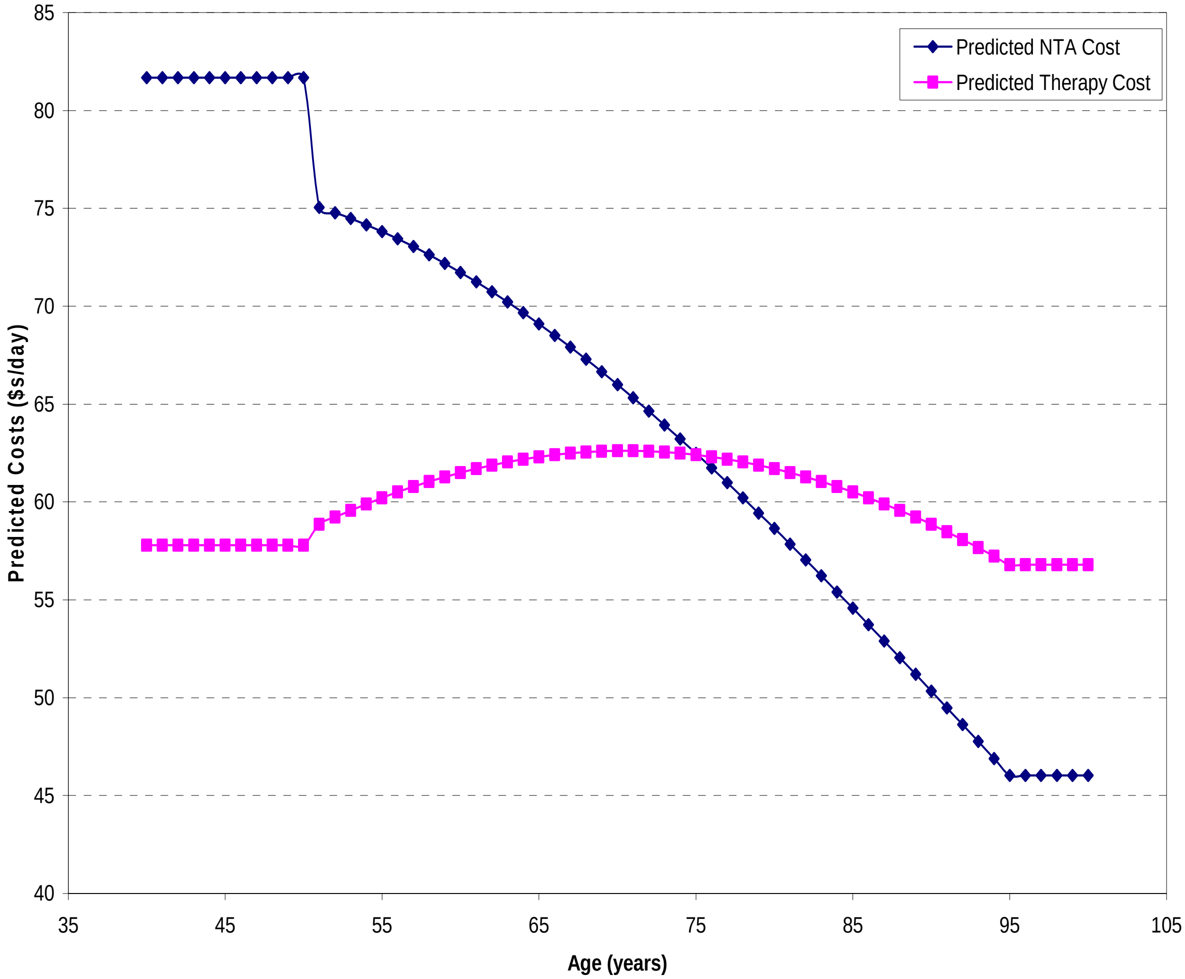
Teno, J., Z. Feng, S. Mitchell, S. Kuo, O. Intrator and V. Mor. 2008. “Do Financial Incentives of Introducing Case Mix Reimbursement Increase Feeding Tube Use in Nursing Home Residents?” *Journal of the American Geriatric Society* 56, (5): 887-890.

United States Government Accountability Office. 1999. *Skilled nursing facilities: Medicare payments need to better account for nontherapy ancillary cost variation*. GAO/HEHS–99–185. Washington, DC: GAO. September.

White, C. 2003. Rehabilitation therapy in skilled nursing facilities: Effects of Medicare’s new prospective payment system. *Health Affairs* 22, (3): 214–223.

White, C., S. D. Pizer, and A. J. White. 2002. Assessing the RUG–III resident classification system for skilled nursing facilities. *Health Care Financing Review* 24, (1): 7–15.

Figure 1. Predicted Per Diem Therapy and NTA Costs by Age



Source: Authors' analysis of 2003 skilled nursing facility claims, cost reports and DataPRO stays produced for MedPAC.

Table 1. Summary of Exclusions from Analytic File: Stay and Facility Counts by Reason for Exclusion

		Stays	Facilities
	All Stays in 2003 DataPRO	2,374,706	
1.	**After exclusions for integrity problems and Medicare coverage**	2,134,301	
	Overlapping SNF stays, fragmented SNF stays, overlapping claims records within stays, no Medicare payment, no covered days		
	No qualifying hospital stay, overlapping claims records for the qualifying hospital stay, no Medicare payments		
	Non-PPS stay or swing-bed stay or length of stay > Medicare covered days		
2.	**After exclusions because of unavailability of MDS assessments**	2,023,786	
	No MDS assessments, no 5-day assessment or missing complete Sequence of assessments		
3.	**After matching with patient assessment file**		
	Mismatch between SNF stay assessments and patient MDS dataset		
	Multiple stays with the same assigned MDS		
4.	**After exclusions due to mismatch of the DataPro stays and Urban Institute stays**	2,007,963	14,698
	No match to SNF or hospital stay or mismatch on covered days or charges		
5.	**After matching with FY2003 SNF Cost Reports and Wage Index Files**	1,866,284	12,947
	Non-match SNF Cost Report (429 providers)		
	SNFs with Cost reports < 10 months or > 14 month (220 providers)		
	No full cost report because of low or no Medicare utilization (1113 providers)		
	SNFs without wage-index (51 providers)		
6.	**After applying flags**	1,738,461	12,160
	Facilities missing information on cost reports for routine, ancillary, or NTA costs		
	Facilities with ratios of ancillary to routine costs <0.005 or >5.0)		
	Facilities with total ancillary costs more than 1.1 times the sum of components for for free-standing or 1.5 times for hospital-based facilities		
	SNFs with extreme values, missing data on SNF beds or Medicare days as a share of all days		
	Cost-charge ratio outside of reasonable range:		
	For freestanding: total ancillary, rehab, total NTA, drugs outside of .05 – 30; or respiratory or other NTA outside of .05 – 100		
	For hospital based: Total ancillary, rehab, total NTA, drug, respiratory, or ONTA outside .05-10		
	Individual cases with extreme values for either per diem total ancillary costs or Charges outside of plus or minus 3 standard deviations from the mean of log(y+1)		

Source: Urban Institute records of the construction of 2003 SNF file for MedPAC, based on DataPRO, Medicare claims, and Medicare Cost Reports, 2007.

Table 2. Summary Statistics of Variables Used in the Stay-Level Regression Models (Means give sample proportion with characteristic unless otherwise indicated)

	Mean
Per diem costs (wage-adjusted)	
Non-therapy ancillary costs	$68.0
Therapy ancillary costs	$73.7
Patient	
Age	
Age > 50 (indicator)	0.984
Age – 50 (capped at 45 = 95 – 50)	29.9 years
$(\text{Age} - 50)^2$, capped at $(45)^2$	986 years^2
SNF care – proportion of stay[a]	
IV medication furnished	0.071
Respiratory care	0.033
IV medication and respiratory care	0.008
IV medication and respiratory condition in SNF stay	0.029
Physical and mental status[a]	
Respiratory condition in SNF	0.296
No infection	0.591
Serious skin ulcer (stage 4)	0.049
Shortness of breath	0.192
Cognitive performance scale score	
Borderline	0.129
Mild Impairment	0.143
Moderate impairment	0.198
Moderate severe impairment	0.059
Severe impairment	0.037
Very severe impairment	0.061
Chewing problem	0.197
Swallowing problem	0.188
Surgical wounds	0.267

(table continues)

Table 2. Summary Statistics of Variables Used in the Stay-Level Regression Models, continued

	Mean
Ability to perform activities of daily living[a]	
Locomotion on unit	
Supervision	0.105
Limited assistance	0.242
Extensive assistance	0.176
Total dependence	0.286
Did not occur	0.064
Assistance with eating	
Supervision	0.203
Limited assistance	0.093
Extensive assistance	0.069
Total dependence	0.125
Did not occur	0.003
Transfer to/from bed, chair, wheelchair, or standing position	
Supervision	0.089
Limited assistance	0.313
Extensive assistance	0.340
Total dependence	0.161
Did not occur	0.018
Hospital Diagnoses	
Sepsis	0.059
Cellulitis	0.051
Malnutrition	0.062
Mental disorders	0.351
Hip fracture	0.080
Stroke	0.065
Respiratory infection	0.183
COPD	0.247
Dementia	0.216
Osteoarthritis	0.132
Osteoporosis	0.079
Renal failure	0.127
Respiratory failure	0.085
Infectious and parasitic diseases	0.186
Neoplasms	0.100
Diseases of the circulatory system	0.836
Diseases of the digestive system	0.280
Diseases of the skin and subcutaneous tissue	0.132

(table continues)

Table 2. Summary Statistics of Variables Used in the Stay-Level Regression Models, continued

	Mean
Diseases of the musculoskeletal system and connective tissue	0.327
Injury and poisoning	0.274
Myeloproliferative diseases	0.094
HIV	0.001
Solid organ transplant	0.000
Stay	
Broad RUG category[a]	
Rehabilitation only	0.529
Rehabilitation and extensive services	0.260
Extensive services only	0.107
Special care	0.049
Clinically complex	0.039
Prior nursing home stay	0.151
Length-of-stay proxy (number of assessments)	
One	0.384
Two	0.305
Three	0.213
Four	0.063
N	173,441

[a]Mean proportions calculated from MDS assessment data give the proportion of days with condition, averaged over all stays.

Source: Authors' analysis of 2003 skilled nursing facility claims, cost reports and DataPRO stays produced for MedPAC.

Table 3. Coefficients in NTA and Therapy Models, with Test Statistics in Italics

	NTA Costs		Therapy Costs	
	Coefficient	% change in NTA cost per day	Coefficient	% change in therapy cost per day
Patient				
Age				
Age > 50 (indicator)	**-0.0814**	-7.82%	**0.0119**	1.20%
	-2.68		*0.62*	
Age – 50, capped at 45 = 95 – 50	**-0.00312**	-0.31	**0.00667**	0.67
	-1.95		*7.51*	
(Age – 50) squared, capped at 45^2	**-0.000174**	-0.02	**-0.000163**	-0.02
	-6.13		*-10.6*	
SNF care				
IV medication furnished	**0.736**	109	**-0.00896**	-0.9
	48.5		*-0.67*	
Respiratory care	**0.524**	68.9	**0.0275**	2.8
	28.6		*1.94*	
IV medication and respiratory care	**-0.295**	-25.5	**0.00959**	1.0
	-10.9		*0.34*	
IV medication and respiratory condition in SNF stay	**-0.0699**	-6.7	**-0.00562**	-0.6
	-3.81		*-0.37*	
Physical and mental status				
Respiratory condition in SNF	**0.118**	12.5	**0.0039**	0.4
	12.7		*0.78*	
No infection	**-0.0903**	-8.6	**0.0316**	3.2
	-11.2		*7.43*	
Serious skin ulcer (stage 4)	**0.131**	14.0	**-0.0819**	-7.9
	8.72		*-8.06*	
Shortness of breath	**0.0777**	8.1	**-0.0349**	-3.4
	7.72		*-5.74*	
Cognitive performance scale score				
Borderline	**-0.0236**	-2.3	**0.000971**	0.1
	-2.22		*0.16*	
Mild impairment	**-0.0565**	-5.5	**-0.00333**	-0.3
	-5.43		*-0.57*	
Moderate impairment	**-0.0834**	-8.0	**-0.00682**	-0.7
	-7.57		*-1*	
Moderate severe impairment	**-0.144**	-13.4	**-0.0310**	-3.1
	-8.54		*-3.13*	
Severe impairment	**-0.0709**	-6.8	**-0.0702**	-6.8
	-3.51		*-5.93*	
Very severe impairment	**-0.166**	-15.3	**-0.168**	-15.5
	-8.28		*-9.66*	

(table continues)

Table 3. Coefficients in NTA and Therapy Models, continued

	NTA Costs		Therapy Costs	
	Coefficient	% change	Coefficient	% change
Chewing problem	**-0.0351**	-3.4	**0.00201**	0.2
	-3.85		*0.35*	
Swallowing problem	**0.0175**	1.8	**0.174**	19.1
	1.78		*29.9*	
Surgical Wounds	**0.0338**	3.4	**0.0801**	8.3
	3.94		*12.4*	
Ability to perform activities of daily living				
Locomotion on unit				
Supervision	**-0.00363**	-0.4	**0.0483**	4.9
	-0.23		*4.84*	
Limited assistance	**0.0349**	3.5	**0.0666**	6.9
	2.37		*6.72*	
Extensive assistance	**0.0811**	8.4	**0.0416**	4.2
	4.53		*4.08*	
Total dependence	**0.111**	11.8	**0.0189**	1.9
	6.61		*1.54*	
Did not occur	**0.306**	35.8	**0.00388**	0.4
	14.2		*0.24*	
Assistance with eating				
Supervision	**0.0315**	3.2	**-0.0108**	-1.1
	2.79		*-1.33*	
Limited assistance	**0.0871**	9.1	**0.000813**	0.1
	6.22		*0.09*	
Extensive assistance	**0.105**	11.1	**-0.0144**	-1.4
	6.26		*-1.46*	
Total dependence	**0.15**	16.2	**-0.0590**	-5.7
	8.91		*-5.49*	
Did not occur	**0.00739**	0.7	**-0.387**	-32.1
	0.14		*-4.39*	
Transfer to/from bed, chair, wheelchair, or standing position				
Supervision	**-0.0290**	-2.9	**0.0969**	10.2
	-1.7		*8.42*	
Limited assistance	**-0.0613**	-5.9	**0.127**	13.6
	-3.66		*12.5*	
Extensive assistance	**-0.0400**	-3.9	**0.121**	12.9
	-2.15		*10.8*	
Total dependence	**-0.00752**	-0.7	**0.0457**	4.7
	-0.35		*3.2*	
Did not occur	**-0.0181**	-1.8	**-0.195**	-17.7
	-0.56		*-4.9*	

(table continues)

Table 3. Coefficients in NTA and Therapy Models, continued

	NTA Costs		Therapy Costs	
	Coefficient	% change	Coefficient	% change
Hospital diagnoses				
Sepsis	**-0.00555**	-0.6	**0.00205**	0.2
	-0.38		*0.23*	
Cellulitis	**0.0541**	5.6	**-0.0225**	-2.2
	3.45		*-2.37*	
Malnutrition	**0.0772**	8.0	**-0.0122**	-1.2
	6.03		*-1.72*	
Mental disorders	**-0.0100**	-1.0	**-0.0189**	-1.9
	-1.18		*-4.41*	
Hip fracture	**0.0181**	1.8	**0.0603**	6.2
	1.36		*8.77*	
Stroke	**-0.0755**	-7.3	**0.198**	21.9
	-5.79		*30.3*	
Respiratory infection	**0.0371**	3.8	**0.00131**	0.1
	4.1		*0.25*	
COPD	**0.111**	11.7	**-0.0369**	-3.6
	13.7		*-8.44*	
Dementia	**-0.0776**	-7.5	**-0.0422**	-4.1
	-7.41		*-7.26*	
Osteoarthritis	**-0.0803**	-7.7	**0.0789**	8.2
	-7.4		*13.0*	
Osteoporosis	**-0.0223**	-2.2	**-0.0174**	-1.7
	-1.82		*-2.95*	
Renal failure	**0.0919**	9.6	**-0.0494**	-4.8
	9.52		*-9.44*	
Respiratory failure	**0.0865**	9.0	**0.0142**	1.4
	7.74		*2.41*	
Infectious and parasitic diseases	**0.0828**	8.6	**-0.0271**	-2.7
	9.02		*-5.56*	
Neoplasms	**0.0908**	9.5	**-0.0909**	-8.7
	8.61		*-15*	
Diseases of the circulatory system	**0.0780**	8.1	**0.00720**	0.7
	9.18		*1.61*	
Diseases of the digestive system	**0.0368**	3.7	**-0.0203**	-2.0
	5.39		*-5.66*	
Diseases of the skin and subcutaneous tissue	**0.0667**	6.9	**-0.0415**	-4.1
	5.88		*-6.14*	
Diseases of the musculoskeletal system and connective tissue	**0.0348**	3.5	**0.00825**	0.8
	4.04		*1.87*	

(table continues)

Table 3. Coefficients in NTA and Therapy Models, continued

	NTA Costs		Therapy Costs	
	Coefficient	% change	Coefficient	% change
Injury and poisoning	**0.0459**	4.7	**0.00620**	0.6
	5.79		*1.54*	
Myeloproliferative	**0.0361**	3.7	**-0.0208**	-2.1
	3.38		*-3.79*	
HIV	**0.48**	61.6	**-0.123**	-11.5
	5.53		*-2.22*	
Solid organ transplant	**0.753**	112.4	**0.247**	28.0
	2.59		*1.44*	
Stay				
Broad RUG Category				
Rehabilitation only	**-0.310**	-26.7	**1.816**	514.8
	-8.49		*35.2*	
Rehabilitation and extensive services	**-0.145**	-13.5	**1.806**	508.4
	-3.82		*34.4*	
Extensive services only	**0.0317**	3.2	**0.353**	42.3
	0.82		*5.78*	
Special care	**-0.0439**	-4.3	**0.0211**	2.1
	-1.13		*0.36*	
Clinically complex	**-0.108**	-10.3	**-0.0444**	-4.3
	-2.57		*-0.71*	
Prior nursing home stay	**-0.200**	-18.2	**-0.262**	-23.1
	-18.2		*-33.5*	
Length-of-stay proxy (number of assessments)				
One	**0.746**	111	**0.169**	18.5
	48.9		*15.6*	
Two	**0.341**	40.6	**0.0545**	5.6
	22.9		*5.46*	
Three	**0.170**	18.5	**0.0141**	1.4
	11.9		*1.47*	
Four	**0.0652**	6.7	**0.000760**	0.1
	4.3		*0.08*	
Constant	**3.94**	--	**2.40**	**--**
	85.4		*44.9*	
N	173,441		173,441	

Source: Authors' analysis of 2003 skilled nursing facility claims, cost reports and DataPRO stays produced for MedPAC.

Table 4. Percent of SNF Stays with Ancillary Losses Under a Revised PPS

	Ancillary loss per stay					
	Less than $1,000	$1,000 - $2,500	$2,500- $5,000	$5,000 - $10,000	$10,000- $25,000	More than $25,000
Percent of all stays	13.7%	4.7%	2.0%	0.8%	0.2%	<0.1%
Percent of stays with ancillary losses	64	22	9	4	1	0.2

Source: Authors' analysis of 2003 skilled nursing facility claims, cost reports and DataPRO stays produced for MedPAC.