

"The Centers for Medicare & Medicaid Services' Office of Research, Development, and Information (ORDI) strives to make information available to all. Nevertheless, portions of our files including charts, tables, and graphics may be difficult to read using assistive technology. Persons with disabilities experiencing problems accessing portions of any file should contact ORDI through e-mail at ORDI_508_Compliance@cms.hhs.gov."

Analysis of 2006-2007 Home Health Case-mix Change

Final Report

August 20, 2009

Prepared for
Ann Meadow, Sc.D.
Centers for Medicare & Medicaid
Services
ORDI/REG/DRTM
7500 Security Boulevard
Baltimore, MD 21244-1850

Prepared by
Alan White
Henry Goldberg
Deborah Deitz
Carolyn Robinson

Contents

1.0 Overview.....	1
2.0 Data.....	2
2.1 Baseline Period Data.....	2
2.2 PPS Period Data.....	3
3.0 Methodology.....	3
3.1 Models to Examine Relationship Between Patient Characteristics and Case-Mix.....	5
3.2 Calculating Real Case-Mix Change.....	9
4.0 Results.....	10
4.1 Changes in Patient Characteristics.....	10
4.2 Statistical Performance of Regression Models.....	21
4.3 Regression Coefficients.....	21
4.4 Analysis of Case-Mix Change.....	40
4.5 Drivers of Case-Mix Change.....	41
5.0 Discussion.....	50

1.0 Overview

The Medicare home health prospective payment system (PPS) was implemented in October 2000. Under the PPS in place between October 2000 and December 2007, Medicare payment for each 60-day episode of care is made based on the location of service and on the episode's classification into one of 80 case-mix groups, also called "home health resource groups" (HHRGs). This classification is based on the patient's characteristics at the start of the episode, as well as the patient's use of rehabilitation therapy services (physical therapy, occupational therapy, or speech language pathology) during the episode. Each HHRG has an associated case-mix weight, which determines how much the payment for the specific episode is adjusted from the standardized base payment established for the current payment year.

Since implementation of the prospective payment system, there has been a steady increase in the average case-mix of home health patients. The overall observed case-mix increased by 15.03% between 2000 and 2007. Given that case-mix assignment is based on patient assessments completed by home health agencies, there are questions about the extent to which this increase reflects nominal case-mix changes attributable to changes in coding practices that lead to case-mix "creep" vs. real case-mix change that is due to true changes in patient characteristics. Measuring the proportion of total case-mix change that is due to nominal vs. real factors has important implications for home health payment rates.

In this paper, we examine how consistently the home health case-mix system was applied in grouping patients into case-mix groups over time. We examine the changes in case-mix that occurred in 2006 and 2007, updating analyses that were originally conducted using data from 2005 (see Chapter 8 of the 2008 report).¹

Our results since the 2008 report are summarized in the following tabular "Summary of real and nominal case-mix change estimates." The table also presents CMS estimates from its original Notice of Proposed Rulemaking (NPRM) setting forth for public comment a payment adjustment to account for nominal case-mix change (May 4, 2007, 72 FR 25356) .

Table 1 shows that, based on a large beneficiary sample of initial episodes, CMS originally estimated that nominal case-mix growth increased the national average case-mix weight by 8.70% between the year 2000 and 2003. Following updating of the national sample file to 2005, inclusion of initial and subsequent sample episodes, and use of a multivariate model of case-mix (used to estimate "real" case-mix change), we estimated nominal case-mix growth of 11.75% by 2005. This estimate was based on isolating the portion of the total change in the national average case-mix weight that was due to changes in the patient characteristics measured in the multivariate model. For 2005, out of an increase of 0.1401 in the national average case-mix weight, only 0.0104, or 8.03%, of the increase, was predicted by changes in patient characteristics. As a result, CMS reduced by 8.03% a total increase in case-mix of 12.78%, to account for "real" increase in case-mix. These figures implied that

¹ http://www.cms.hhs.gov/Reports/downloads/Coleman_Final_April_2008.pdf

nominal change in case-mix was 11.75% (12.78% minus 8.03% times 12.78% leaves 11.75%). This was the nominal case-mix change that was the basis for rate reductions implemented in CMS rulemaking (August 29, 2007, 72 FR 49762). We subsequently revised the multivariate-model-based estimates, finding that nominal case-mix growth was slightly lower by 2005. (Reasons for the revisions are discussed later in this report.) Our estimate of nominal case-mix growth by 2005 was revised to 10.71%. Applying the same methodology to 2006 data, our estimate of nominal case-mix growth by 2006 was 12.46%. The latest estimate, continuing with the same methodology but based on 2007 data, indicates that nominal case-mix growth by 2007 was 13.56%.

-Table 1 Summary of Real and Nominal Case-mix Change Estimates					
	2008	2008	Revised	2010	2010
	NPRM	Final Rule		NPRM	NPRM
Follow-up year	2003	2005 *	2005	2006	2007
IPS Baseline average case-mix weight	1.134	1.0960	1.0959	1.0959	1.0952
Follow-up year average case-mix weight	1.233	1.2361	1.2326	1.2501	1.2606
Total change in average case-mix weight (follow-up minus baseline)	0.099	0.1401	0.1367	0.1542	0.1647
Total percentage increase	8.70%	12.78%	12.47%	14.07%	15.03%
Estimated real portion of total change in average case-mix weight	n/a	0.0104	0.0193	0.0177	0.0161
Percent of total change estimated as real	n/a	8.03%	14.15%	11.48%	9.77%
Percentage points (of total percentage increase) estimated as nominal	8.70%	11.75%	10.71%	12.46%	13.56%

*Note: The 2008 NPRM analysis used initial episodes of the beneficiary sample to compute the national averages. Beginning with the analysis presented in the 2008 Final Rule, both initial and all subsequent episodes of the sample were included.

2.0 Data

2.1 Baseline Period Data

The baseline period data are from Federal Fiscal Year (FY) 2000 (October 1, 1999 to September 30, 2000), a period when the Home Health Interim Payment System (IPS) was in effect. Since home health services were not yet paid on the per-episode basis used under PPS, we used Medicare home health claims to construct an analysis file of simulated 60-day episodes, applying rules based on the anticipated design of the impending prospective payment system.

To assign case-mix weights to the simulated episodes, we needed the appropriate patient characteristics variables. While the collection of the Outcomes and Assessment Information Set (OASIS) variables on all Medicare and Medicaid home health patients began in July 1999, the data

collection time points for each patient did not always match the starting points of our simulated payment episodes. This is because, at that time, OASIS assessments were conducted solely for outcomes monitoring purposes. When matching OASIS assessments to simulated payment episodes, we accepted any assessment within 14 days of the episode start date. If there were multiple qualifying assessments, we chose the closest start/resumption of care assessment for initial episodes, and the closest start/resumption or followup/recertification assessments for subsequent episodes. In approximately 18% of cases, no suitable OASIS assessment (close enough to a simulated payment episode start date) was available, and those episodes had to be excluded from the analysis.

Episodes with fewer than five visits were also excluded from the analysis because they would be considered low utilization payment adjustment (LUPA) episodes under PPS, and would not be paid using home health resource groups (HHRGs) in any case. The analysis file for the base period included episodes for a 10% sample of beneficiaries and included 313,447 episodes. For episodes with OASIS assessments, an HHRG was assigned using the OASIS information, even though the actual claims for the services in the episodes were not paid (in 1999) using HHRGs.

2.2 PPS Period Data

The PPS period data consisted of analogous files from Calendar Years 2006 and 2007. These data were drawn from the Home Health Datalink file, which was created for CMS by Fu Associates, Ltd., of Arlington, Virginia. This database includes 100% of home health episode claims from the start of PPS linked to matched OASIS assessments, data on other Medicare service use by the beneficiary, and additional data on provider and beneficiary characteristics. We used data for a 20% sample of Medicare home health users, selected based on beneficiary Medicare (HIC) number digits. This analysis file contained 917,415 episodes for 2006 and 974,974 episodes for 2007. Since these were records from the PPS period, the actual paid HHRGs were available. However, in preparing the file, we corrected the HHRG and its associated case-mix relative weight in situations where claims-based information on therapy visits during the episode was inconsistent with the HHRG on the claim.

3.0 Methodology

The basic method is the same used in Chapter 8 of the Final Report. We used data from the IPS period to estimate a regression-based, predictive model of individual case-mix scores (relative weights) based on measures of patients' demographic characteristics, clinical status, inpatient history, and Medicare costs in the time period leading up to their home health episodes.

The regression coefficients from the IPS period model were applied to episodes from 2006 and 2007, allowing one to estimate how much of the change in observed case-mix is attributable to variations in patient characteristics over time. We classify the sources of case-mix change into two major types: predicted and unpredicted.

- ***Real (predicted) change:*** This is change that is based on the relationship between patient characteristics and case-mix (i.e., coefficients from the regression model) and

changes in the characteristics of patients over time (i.e., the change in mean values of the model covariates).

- **Nominal (unpredicted) change:** This is the portion of case-mix change that cannot be explained by changes in patient characteristics. Nominal case-mix change is assumed to reflect differences over time in agency coding practices.

The analyses described in this paper incorporate refinements to the data files, sample creation, and variable construction relative to the results included in the 2008 report. We re-estimated the IPS period models using a file that included only episodes ending from October 1999 through September 2000 (Federal fiscal year 2000). In addition, we applied a consistent four-year look-back period for hospitalizations that preceded the home health episode for both the IPS and 2006 and 2007 periods. As a result of these refinements, the average case-mix for the baseline (IPS) was estimated to be 1.0959 (versus the 1.0998 that was reported in Exhibit 8.4 of the 2008 report). The regression coefficients for the IPS period model also differ slightly from those in the report.² We also made a change in the methods used to determine the mean values for the living arrangement variables that are derived from OASIS item M0340. After 2002, this item was not required on recertification or follow-up assessments. It is thus missing for a substantial portion of our 2006 and 2007 data. In the IPS sample, this item is available for almost all assessments.

In our previous analyses, we set all of the living arrangement variables equal to zero for observations in which M0340 was missing. This resulted in a substantial decrease in the estimated mean of the M0340 items between the IPS period and later periods. For the analyses described in this report, we impute the living arrangement variables for observations missing item M0340. The basic method was to calculate the percentage difference in mean values of the living arrangement variables for the subset of IPS records that have both a SOC/ROC and recertification/follow-up assessment and use this as the basis for imputing the mean value of recertification/follow-up assessments in 2006 and 2007. The overall estimated mean for the living arrangement variables is based on the observed mean for SOC/ROC assessments, weighted by the proportion of SOC/ROC assessments, plus the imputed mean for recertification/follow-up assessments, weighted by the proportion of recertification/follow-up assessments. The imputed living arrangement variables for 2006 are shown in Table 2.

² In the development of the 2006/2007 sample file, we made some additional, but minor, refinements to the sample selection procedures that were used to create the original, 2005 sample file described in the Final Report and used for the CY 2008 Final Rule. These refinements were also implemented in a revised version of the 2005 sample file. The original 2005 sample file inadvertently included 7,212 RAP records, as well as some records with apparent date inconsistencies that were not included in the 2006/2007 sample file used to calculate the latest official estimates of case-mix increase. This would have had some lowering effect on the average case-mix weight for the sample, since the average case-mix weight for these cases was lower than that of other cases. In addition, in the original 2005 file SCICs were assigned the case-mix weight at episode start, while in the 2006/2007 sample file and the revised 2005 sample file they were assigned an average of all case-mix weights that were submitted on the claim (weighted by the proportion of paid days for each one.) This would also have had a slight lowering effect on the overall average case-mix weight in the original 2005 sample file. However, we believe these differences are unlikely to have had any systematic impact on the findings of the nominal case-mix prediction analysis, which were based on the regression using the IPS data and the claims history and demographic variables of patients in the 2005 data.

Table 2 Imputed Means for Patient Living Arrangement Variables (M0340): 2006						
Patient living arrangement	Baseline Period			2006		
	SOC/ROC mean	Recert/FU Mean	% difference: SOC/ROC and Recert/FU	SOC Mean	Imputed mean for Recert/FU	Estimated Overall Mean
Patient Lives Alone	0.30426	0.29626	-0.02629	0.29349	0.28578	0.29083
Patient Lives with Other (Not Family, Friends, Paid Help or Spouse)	0.01595	0.01439	-0.09781	0.00980	0.00884	0.00947
Patient Lives with Other Family	0.28761	0.29089	0.01140	0.28271	0.28593	0.28382
Patient Lives with Paid Help	0.06828	0.07778	0.13913	0.08639	0.09841	0.09054
Patient Lives with Spouse	0.35279	0.35279	-0.00001	0.36468	0.36468	0.36468

Notes:
1) 2006 estimated overall mean for Recert/Fu equals SOC mean * (1+ % difference in SOC/ROC and Recert/FU mean in the baseline period).
2) Estimated overall mean equals 2006 SOC mean multiplied by the percent of SOC/ROC assessments in 2006 (0.6553) plus the 2006 imputed mean for recert/FU multiplied by the percent of Recert/FU assessments for 2006 (0.3447).
3) The instructions for M0340 say to check all that apply, so the sum of the living arrangement variables is greater than 100%.

3.1 Models to Examine Relationship Between Patient Characteristics and Case-Mix

Using data from the baseline (IPS) period, we estimated a regression model of the following basic functional form:

$$\text{Relative Payment Weight}_i = \alpha + \beta * \text{Personal Characteristics}_i + \varepsilon_i$$

where:

Relative Payment Weight for individual i is the relative payment weight for that individual's 60-day home health episode (based on the then-current 80 HHRGs);

α is a constant term (to be estimated);

β is a vector of coefficients (to be estimated);

Personal Characteristics is the vector of demographic and clinical variables for each individual; and

ε is an error term.

Our goal in estimating the model was to predict the case-mix weights, using variables that could be created using the available administrative data. As a result, we were not particularly concerned about redundancy among variables, as long as groups of variables make sense broadly as correlates of case-mix. Our interest was in achieving as much predictive power as possible from the variables taken together.

The model used in this paper has the same specifications as Model 6 in the 2008 report. It included these types of independent variables:

- **Demographic variables:** The demographic variables were included to control for any differences in case-mix determination associated with age, gender, and race/ethnicity. The following demographic variables were included:
 - Age (age groups 65 to 74, 75 to 84, 85 to 84, and 95 and above; age under 65 is the reference category);
 - Gender (male);
 - Race (White and African American; other, including Asian, Hawaiian/Pacific Islander, and Native American/Alaskan Native, is the reference category).

In addition, the age variables were interacted with the gender and race dummy variables to fully exploit the potential differences in effect on case-mix from the various demographic subgroups. There were a total of 19 demographic variables in the model.

- **Measures of prior utilization:** Prior hospital, inpatient rehabilitation, and SNF stays and days of care are likely to be associated with home health case-mix for a variety of reasons. For example, individuals with a recent rehabilitation facility stay may be recovering from an injury or fall and may require substantial amounts of care and further rehabilitation services as they continue to recover during their home health episodes. The model included measures of utilization of acute care hospital, long-term care hospital, inpatient rehabilitation facility, and Medicare skilled nursing facility in the period preceding the home health episode:
 - Acute Care Hospital Days in Period 14 Days Preceding Home Health Episode
 - Acute Care Hospital Days in Period 15 to 120 Days Preceding Home Health Episode
 - Long Term Care Hospital Days in Period 14 Days Preceding Home Health Episode
 - Long Term Care Hospital Days in Period 15 to 120 Days Preceding Home Health Episode
 - Rehabilitation Facility Days in Period 14 Days Preceding Home Health Episode
 - Rehabilitation Facility Days in Period 15 to 120 Days Preceding Home Health Episode
 - Medicare Skilled Nursing Facility (SNF) Days in Period 14 Days Preceding Home Health Episode
 - Medicare Skilled Nursing Facility (SNF) Days in Period 15 to 120 Days Preceding Home Health Episode
- **Measures of patient living arrangements:** Individuals who live with other people, especially spouses and close family members, may have lower home health care needs from third parties (home health agencies), resulting in lower home health resource use and lower case-mix, all else equal. The model included dummy variables indicating the patient's living status at home:
 - Patient Lives Alone
 - Patient Lives with Other (Not Family, Friends, Paid Help or Spouse)
 - Patient Lives with Other Family
 - Patient Lives with Paid Help
 - Patient Lives with Spouse

These living status variables were the only variables in the model that came from agency-reported OASIS data.

- **Measures of patient's acute care hospital inpatient history:** We examined the patient's acute care hospital inpatient history for the four years preceding the home health episode, considering the All Patient Refined Diagnosis Related Group (APR DRG) for the patient for his or her most recent inpatient stay³. Approximately 90% of beneficiaries with home health care episodes in the sample had a hospital stay during the look-back period. APR DRGs are designed to predict patient acuity and care needs in acute care hospital settings. To the extent that such acute care acuity and needs reflect the patient's need for more-intensive care in other settings (in this case, in home health settings), APR DRGs are reasonable proxy variables for home health resources need (i.e., home health case-mix). The model included dummy variables for the following:

- The All Patient Refined Diagnosis Related Group (APR DRG) for the patient for his or her most recent inpatient stay.
- Whether that APR DRG was procedure-based or medically-based.
- The patient's expected risk of mortality at the time of the hospitalization (four levels – the reference group is patients with no APR DRGs– their relative mortality risk cannot be coded).
- Interactions between the APR DRG and APR DRG severity level. Based on a patient's personal characteristics and comorbidities at the time of the hospital stay, each patient within each APR DRG is assigned to one of four severity levels in the APR DRG algorithm. The severity levels are specified in the model as interactions, because the APR DRG severity levels are developed individually for each APR DRG classification. Interactions for the first three severity levels are included (the fourth and highest severity level is the reference category). This specification is equivalent to having a separate group indicator variable for each combination of APR DRG and severity level.

APR DRG variables and interactions with severity levels were included only if at least 25 episodes had that combination of APR DRG and severity in the baseline (IPS) period file. The model included a total of 291 APR DRG variables and interactions. Stays from APR DRG groups that did not meet the sample size requirements are included in the model and they have values for the basic procedure- or medically- based classification and mortality risk variables.

To adjust for changes in ICD-9-CM code sets and the derivation of the DRGs, the APR DRG software incorporates an ICD-9-CM code “mapper” to map hospital diagnosis codes back to their predecessor codes in case of changes to the code set across the study years. The code mapper, which we used in defining our analysis variables, is intended to permit valid comparisons of acute stay APR DRG assignments across years, even though the ICD-9-CM code set may incorporate a few changes from year to year.

³ The APR-DRG system was developed in 1990 to address both the severity of illness and risk of mortality over all patient populations. The APR- DRG system includes four severity of illness classes (minor, moderate, major or extreme loss of function) and risk of mortality subclass for each base diagnostic group (minor, moderate, major, and extreme).

We consulted with clinical experts to review the findings for APR DRGs that had large changes in prevalence over time, soliciting input on whether there were “external” explanations for such changes ((e.g. changes in coding guidelines) or whether the changes likely reflected actual changes in patient conditions. Changes in APR DRG incidence that were identified for further review were those that had a prevalence of at least 0.2% in the prior year and which had a change in incidence of 11% or more. For the 2007 analyses, this included the following DRGs:

- 130: Respiratory system diagnosis w ventilator support 96+ hours
- 165: Coronary bypass w/o malfunctioning coronary bypass w cardiac cath
- 169: Major abdominal vascular procedures
- 460: Renal failure
- 468: Other kidney & urinary tract diagnoses

Also, CMS requested that we examine APR DRG 227 (Hernia procedures except inguinal & femoral). For each of these DRGs, analyses were performed to identify the most frequent principal diagnoses and other diagnoses, and the most frequent procedures performed (all from the inpatient claim record). These data were circulated to clinical coding experts asking whether coding guidelines for any of these diagnoses or procedures could conceivably account for the observed changes in incidence of the APR-DRGs. There was no feedback received that indicated that any particular adjustment to the data was required to account for changes in coding guidance, and no such changes were made for this year's analysis.

- ***Measures of home health agency ownership type:*** The model included dummy variables based on the agency's ownership type/type of control:
 - Free-standing, voluntary or non-profit
 - Free-standing, proprietary
 - Free-standing, government-owned
 - Facility-Based, voluntary or non-profit
 - Facility-Based, proprietary
 - Facility-Based, government-owned
 - Other, voluntary or non-profit
 - Other, proprietary
 - Other, government-owned

The reference category is unknown facility ownership/control.

- ***Measures of Medicare Part A payments.*** Measures of Medicare Part A payments may serve as measures of the intensity of services in the period preceding the home health episode. The model included measures of Medicare Part A payments in the 120 days preceding the home health episode, by service type:
 - Acute care hospital payments in 120 days preceding home health episode
 - Long-term care Hospital payments in 120 days preceding home health episode
 - Rehabilitation facility payments in 120 days preceding home health episode
 - Medicare SNF payments in 120 days preceding home health episode

Medicare payments between the two periods vary due to the increases in Medicare payment rates made between the IPS period and 2007. To adjust for this, we deflated the 2007 Medicare payment amounts using a deflation factor that was based on the aggregate effect of payment rate updates during this time period.⁴ The factors used were as follows:

○ Acute care hospital:	1.252705187
○ Long-term care hospital:	1.304680232
○ Rehabilitation facility:	1.250057327
○ SNF:	1.224626601

3.2 Calculating Real Case-Mix Change

After estimating the model, the results (coefficient estimates) were applied to data for a later period. That is, a predicted relative payment weight for each episode in the later period was estimated. The resulting predicted values were then averaged, and compared to the actual average case-mix for the later period.⁵ The following calculations were made:

- **Total change in case-mix:** We calculate the total difference in case-mix between the baseline period and subsequent periods. This was based on the change in average relative payment weight between the two periods.
- **Real (expected) change in case-mix and percentage of total change in case-mix that is real (expected):** Changes in patient characteristics over time can lead to expected case-mix changes. We used the regression coefficients from the model and patient characteristics from the later period to calculate the expected case-mix for the later period. The differences between the case-mix in the baseline period and the expected case-mix in the later period indicate how much of the case-mix change across the two periods is accounted for by observable differences (changes in the independent variables) in each model. We divided the predicted change in case-mix by the total change in case-mix to calculate the percentage of the total change in case-mix that was predicted by the model.
- **Nominal (unpredicted) change in case-mix and percentage of total change in case-mix that is nominal (unpredicted):** The unpredicted change in case-mix is calculated as the difference between the total and expected change in case-mix. It is a measure of the change in case-mix that is not due to observable changes in patient characteristics. The estimates of the unpredicted change in case-mix are attributed to changes in agency coding practices.

⁴ The Medicare payment increases in each setting in each year were multiplied together, and then an annual - average increase was calculated. The resulting average annual increases were then raised to the power of - the average difference in years for episodes in the IPS and 2006-07 files.

⁵ In actuality, because all the models are completely linear, calculating each predicted value and then averaging is equivalent to predicting the average case-mix for all episodes by multiplying the mean value of each independent variable in the later period by the model coefficient for that variable, and then summing these products. The latter calculations were performed and will be displayed below.

While there may be observable or unobservable factors related to patient case-mix that were not included in the model, it is important to note that the omission of these variables affects estimates of case-mix change only if there were changes in the prevalence of these variables between the IPS and later periods. Variables that remain constant over time do not contribute to real case-mix changes regardless of how important they are in predicting case-mix level.

4.0 Results

Between 2000 and 2007, average case-mix increased by 15.03%, increasing from 1.0959171 in the baseline period to 1.2606115 in 2007. There was a 1.09% increase in average case-mix between 2006 and 2007, with the average case-mix weight increasing from 1.2469902 to 1.2606115.

4.1 Changes in Patient Characteristics

We analyzed the means of all of the variables included in the regression models for the baseline period, 2006, and 2007 (Table 3). These changes may indicate differences in patient acuity and real case-mix change. Some notable differences in patient characteristics occurred between the two periods.

- After adjustment for payment rate updates, there was a decrease in mean acute care hospital expenditures in the 120 days preceding the home health episode, which declined from \$7,570 in the baseline period to \$6,160 in 2007, a decrease of 18%.
- Average acute care hospital days in the 14 days preceding the home health episode decreased from 2.26 in the baseline period, to 1.69 in 2006 and 1.56 in 2007. The average number of hospital days in the 15-120 days preceding the home health episode decreased from 4.07 in the baseline period to 3.47 in 2006 and 3.29 in 2007.
- The average number of SNF days in the 15-120 days preceding the home health episode increased from 2.77 in the baseline period to 3.70 in 2006 and 3.75 in 2007. Mean SNF days in the 14 days preceding the episode increased, but not as much, with a mean value of 1.17 days in the base period, 1.27 days for 2006 and 1.24 days for 2007.
- There were changes in the distribution of episodes by agency types:
 - The proportion of episodes for other proprietary home health agencies increased from 29.3% in the baseline period to 50% of episodes in 2006 and 54% in 2007. There was also a large increase in the proportion of episodes for free-standing proprietary agencies.
 - The percentage of episodes for facility-based non-profit agencies decreased from 29.9 in the baseline period to 15.5% in 2006 and 13.6% in 2007.

- The proportion of episodes for freestanding government agencies decreased from 3.9% in the baseline period to 2% in 2006 and 1.9% in 2007.
- While the means of most of the APR-DRG variables were low, there were large changes in the mean values of some APR-DRG variables:
 - The prevalence of renal failure was more than twice as high in 2007 (0.016) than it was for the baseline period (0.007).
 - The proportion of patients who had cardiac defibrillator and heart assist implant was more than twice as high in 2007 (0.0033) than in the baseline period (0.0012).
 - Coronary artery bypass without cardiac catheterization or percutaneous cardiac procedure was less prevalent in 2007 (0.006) than in the baseline period (0.011).
 - The prevalence of hip joint replacement with low or medium severity decreased between the baseline period and 2007, while the prevalence of hip joint replacement with high severity increased.
 - For all except the highest severity level, the prevalence of heart failure decreased from the baseline period to 2007. The prevalence decreased from 0.061 in the baseline period to 0.0525 in 2006 and 0.050 in 2007.
 - The prevalence of knee joint replacement increased from 0.0276 in the baseline period to 0.041 in 2006 and 0.039 in 2007.

Table 3						
Mean Values for Model Covariates in the Baseline (IPS), 2006 and 2007 Periods						
Sev	Variable	Mean			% Change in Mean from Baseline	
		Baseline	2006	2007	2006	2007
	Age 65 to 74	0.24525	0.23958	0.23830	-2.31%	-2.83%
	Age 75 to 84	0.40132	0.37959	0.37056	-5.42%	-7.67%
	Age 85 to 94	0.23657	0.23830	0.24223	0.73%	2.40%
	Age 95+	0.02461	0.02421	0.02498	-1.62%	1.49%
	Age 65 to 74 * Male	0.09241	0.09091	0.09021	-1.63%	-2.38%
	Age 75 to 84 * Male	0.13414	0.12862	0.12532	-4.12%	-6.57%
	Age 85 to 84 * male	0.06418	0.06893	0.07016	7.40%	9.33%
	Age 95+ * Male	0.00487	0.00485	0.00518	-0.50%	6.19%
	Male	0.33952	0.34730	0.34745	2.29%	2.33%
	Age 65 to 74 * White	0.19339	0.17994	0.17700	-6.95%	-8.47%
	Age 75 to 84 * White	0.34045	0.30420	0.29419	-10.65%	-13.59%
	Age 85 to 94 * White	0.20412	0.20199	0.20474	-1.05%	0.30%
	Age 95+ * White	0.02005	0.01969	0.02040	-1.80%	1.76%
	White	0.82305	0.78360	0.77601	-4.79%	-5.72%
	Age 65 to 74 * African American	0.03864	0.04435	0.04488	14.76%	16.13%
	Age 75 to 84 * African American	0.04459	0.04814	0.04741	7.94%	6.31%
	Age 85 to 94 * African American	0.02373	0.02422	0.02429	2.05%	2.37%
	Age 95+ * African American	0.00351	0.00321	0.00328	-8.47%	-6.68%
	African American	0.13240	0.15246	0.15512	15.16%	17.17%
	Any Hospital in Prior 14 Days IP Claims	0.38390	0.31461	0.29331	-18.05%	-23.60%
	Any Rehab in 14 Days Prior from IP Claims	0.04423	0.03584	0.03108	-18.98%	-29.74%

Table 3
Mean Values for Model Covariates in the Baseline (IPS), 2006 and 2007 Periods

Sev	Variable	Mean			% Change in Mean from Baseline	
		Baseline	2006	2007	2006	2007
	Any MCR SNF in 14 Days Prior From IP Claims	0.11958	0.12238	0.11815	2.35%	-1.19%
	No Hosp/Rehab/SNF in 14 Days From Prior IP Claims	0.51808	0.57713	0.60118	11.40%	16.04%
	Acute Care Hospital Days in Period 14 Days Preceding Home Health Episode	2.25851	1.69327	1.55584	-25.03%	-31.11%
	Acute Care Hospital Days in 15-120 Days Preceding Home Health Episode	4.07408	3.47288	3.29343	-14.76%	-19.16%
	Long Term Care Hospital Days in Period 14 Days Preceding Home Health Episode	0.05415	0.06974	0.05991	28.80%	10.63%
	Long Term Care Hospital Days in 15-120 Days Preceding Home Health Episode	0.20612	0.28677	0.26206	39.12%	27.14%
	Rehabilitation Facility Days in Period 14 Days Preceding Home Health Episode	0.44197	0.35981	0.31633	-18.59%	-28.43%
	Rehabilitation Facility Days in 15- 120 Days Preceding Home Health Episode	0.67949	0.46306	0.42812	-31.85%	-36.99%
	Medicare Skilled Nursing Facility (SNF) Days in Period 14 Days Preceding Home Health Episode	1.17008	1.27731	1.24250	9.16%	6.19%
	Medicare Skilled Nursing Facility (SNF) Days in 15-120 Days Preceding Home Health Episode	2.77538	3.69992	3.75143	33.31%	35.17%
	Patient Lives Alone	0.30460	0.29083	0.29405	-4.52%	-3.46%
	Patient Lives with Other (Not Family, Friends, Paid Help or Spouse)	0.01460	0.00947	0.00936	-35.13%	-35.93%
	Patient Lives with Other Family	0.28298	0.28382	0.28076	0.30%	-0.78%
	Patient Lives with Paid Help	0.07667	0.09054	0.09139	18.08%	19.20%
	Patient Lives with Spouse	0.34951	0.36468	0.36263	4.34%	3.76%
	Medical APR DRG	0.69830	0.71019	0.71164	1.70%	1.91%
	Procedure APR DRG	0.18862	0.20001	0.19475	6.04%	3.25%
	Mortality Risk Level 1 (Minor)	0.14185	0.14070	0.13554	-0.81%	-4.45%
	Mortality Risk Level 2 (Moderate)	0.26644	0.24754	0.23828	-7.09%	-10.57%
	Mortality Risk Level 3 (Major)	0.08862	0.09915	0.10111	11.88%	14.09%
	Mortality Risk Level 4 (Extreme)	0.01610	0.02615	0.02857	62.40%	77.46%
	Heart and/or Long Transplant	0.00007	0.00007	0.00007	-10.87%	-3.55%
Any	Tracheotomy W Long Term Mechanical Ventilation W Extensive Procedure	0.00054	0.00048	0.00050	-9.91%	-6.04%
High	Tracheotomy W Long Term Mechanical Ventilation W Extensive Procedure	0.00019	0.00014	0.00011	-26.46%	-39.52%
Any	Tracheotomy W Long Term Mechanical Ventilation W/O Extensive Procedure	0.00095	0.00098	0.00089	3.42%	-6.58%
Mod	Tracheotomy W Long Term Mechanical Ventilation W/O Extensive Procedure	0.00011	0.00007	0.00005	-39.71%	-57.45%
High	Tracheotomy W Long Term Mechanical Ventilation W/O Extensive Procedure	0.00035	0.00034	0.00028	-2.78%	-21.09%
Any	Craniotomy except for Trauma	0.00228	0.00232	0.00228	1.73%	0.00%
Minor	Craniotomy except for Trauma	0.00090	0.00080	0.00078	-11.43%	-13.47%
Mod	Craniotomy except for Trauma	0.00081	0.00088	0.00083	8.82%	3.03%

Table 3
Mean Values for Model Covariates in the Baseline (IPS), 2006 and 2007 Periods

Sev	Variable	Mean			% Change in Mean from Baseline	
		Baseline	2006	2007	2006	2007
Major	Craniotomy except for Trauma	0.00040	0.00039	0.00041	-0.53%	2.41%
Any	Ventricular Shunt Procedures	0.00064	0.00085	0.00079	32.57%	23.45%
Minor	Ventricular Shunt Procedures	0.00018	0.00020	0.00019	11.04%	7.36%
Mod	Ventricular Shunt Procedures	0.00036	0.00051	0.00050	40.26%	36.49%
Major	Ventricular Shunt Procedures	0.00007	0.00012	0.00008	67.73%	12.52%
Any	Extra cranial Vascular Procedures	0.00366	0.00389	0.00387	6.34%	5.70%
Minor	Extra cranial Vascular Procedures	0.00121	0.00141	0.00143	16.75%	18.25%
Mod	Extra cranial Vascular Procedures	0.00169	0.00171	0.00163	1.02%	-4.04%
Major	Extra cranial Vascular Procedures	0.00066	0.00068	0.00070	2.66%	5.61%
Any	Other Nervous System and Related Procedures	0.00092	0.00095	0.00101	3.45%	9.96%
Minor	Other Nervous System and Related Procedures	0.00013	0.00016	0.00020	19.17%	53.69%
Mod	Other Nervous System and Related Procedures	0.00044	0.00041	0.00036	-8.56%	-18.82%
Major	Other Nervous System and Related Procedures	0.00033	0.00035	0.00039	4.13%	15.43%
Any	Intracranial Hemorrhage	0.00282	0.00266	0.00253	-5.74%	-10.18%
Minor	Intracranial Hemorrhage	0.00057	0.00042	0.00039	-26.90%	-31.57%
Mod	Intracranial Hemorrhage	0.00129	0.00121	0.00107	-6.11%	-17.37%
Major	Intracranial Hemorrhage	0.00084	0.00086	0.00092	3.15%	10.56%
Any	CVA w infarct/Nonspecific CVA & precerebral occl w/o infarct	0.03496	0.02666	0.02535	-23.74%	-27.48%
Minor	CVA w infarct/Nonspecific CVA & precerebral occl w/o infarct	0.00355	0.00240	0.00223	-32.37%	-37.12%
Mod	CVA w infarct/Nonspecific CVA & precerebral occl w/o infarct	0.02253	0.01632	0.01571	-27.58%	-30.28%
Major	CVA w infarct/Nonspecific CVA & precerebral occl w/o infarct	0.00839	0.00730	0.00679	-13.04%	-19.11%
Any	Transient Ischemia	0.01097	0.00986	0.00973	-10.17%	-11.30%
Minor	Transient Ischemia	0.00194	0.00161	0.00147	-17.05%	-24.07%
Mod	Transient Ischemia	0.00731	0.00631	0.00627	-13.57%	-14.12%
Major	Transient Ischemia	0.00170	0.00188	0.00192	10.11%	12.71%
Any	Peripheral, Cranial and Autonomic Nerve Disorders	0.00394	0.00493	0.00483	25.31%	22.76%
Minor	Peripheral, Cranial and Autonomic Nerve Disorders	0.00167	0.00224	0.00214	34.44%	28.59%
Mod	Peripheral, Cranial and Autonomic Nerve Disorders	0.00164	0.00191	0.00194	16.46%	18.09%
Major	Peripheral, Cranial and Autonomic Nerve Disorders	0.00061	0.00072	0.00069	17.35%	12.61%
Any	Major Respiratory and Chest Procedures	0.00193	0.00231	0.00217	19.44%	12.28%
Minor	Major Respiratory and Chest Procedures	0.00029	0.00031	0.00025	5.88%	-14.50%
Mod	Major Respiratory and Chest Procedures	0.00097	0.00110	0.00102	13.17%	4.80%
Major	Major Respiratory and Chest Procedures	0.00053	0.00067	0.00064	26.79%	20.66%
Any	Other Respiratory and Chest Procedures	0.00179	0.00171	0.00174	-4.62%	-3.04%
Minor	Other Respiratory and Chest Procedures	0.00031	0.00021	0.00021	-33.43%	-33.38%
Mod	Other Respiratory and Chest Procedures	0.00081	0.00075	0.00076	-7.68%	-6.83%
Major	Other Respiratory and Chest Procedures	0.00049	0.00056	0.00055	13.08%	12.00%

Table 3
Mean Values for Model Covariates in the Baseline (IPS), 2006 and 2007 Periods

Sev	Variable	Mean			% Change in Mean from Baseline	
		Baseline	2006	2007	2006	2007
Any	Respiratory System Diagnosis W Ventilator Support 96+ Hours	0.00286	0.00233	0.00206	-18.69%	-28.07%
Mod	Respiratory System Diagnosis W Ventilator Support 96+ Hours	0.00050	0.00025	0.00022	-49.73%	-55.36%
Major	Respiratory System Diagnosis W Ventilator Support 96+ Hours	0.00138	0.00093	0.00084	-32.38%	-39.41%
Any	Pulmonary Edema and Respiratory Failure	0.00620	0.00921	0.00937	48.55%	51.17%
Minor	Pulmonary Edema and Respiratory Failure	0.00012	0.00003	0.00003	-72.84%	-74.45%
Mod	Pulmonary Edema and Respiratory Failure	0.00145	0.00138	0.00135	-5.01%	-7.16%
Major	Pulmonary Edema and Respiratory Failure	0.00264	0.00423	0.00436	60.66%	65.49%
Any	Respiratory Malignancy	0.00313	0.00241	0.00220	-23.03%	-29.80%
Minor	Respiratory Malignancy	0.00012	0.00010	0.00009	-15.90%	-30.76%
Mod	Respiratory Malignancy	0.00138	0.00089	0.00077	-35.63%	-44.28%
Major	Respiratory Malignancy	0.00152	0.00127	0.00122	-16.17%	-19.63%
Any	Major Respiratory Infections and Inflammations	0.01413	0.01029	0.01007	-27.18%	-28.73%
Minor	Major Respiratory Infections and Inflammations	0.00059	0.00034	0.00027	-42.62%	-53.52%
Mod	Major Respiratory Infections and Inflammations	0.00558	0.00369	0.00352	-33.97%	-37.04%
Major	Major Respiratory Infections and Inflammations	0.00665	0.00504	0.00496	-24.24%	-25.37%
Any	Other Pneumonia	0.04435	0.03989	0.03828	-10.06%	-13.68%
Minor	Other Pneumonia	0.00227	0.00187	0.00194	-17.63%	-14.56%
Mod	Other Pneumonia	0.02324	0.01989	0.01893	-14.41%	-18.53%
Major	Other Pneumonia	0.01738	0.01643	0.01580	-5.43%	-9.09%
Any	Chronic Obstructive Pulmonary Disease	0.02930	0.02677	0.02574	-8.64%	-12.16%
Minor	Chronic Obstructive Pulmonary Disease	0.00627	0.00440	0.00407	-29.75%	-35.03%
Mod	Chronic Obstructive Pulmonary Disease	0.01491	0.01341	0.01279	-10.01%	-14.21%
Major	Chronic Obstructive Pulmonary Disease	0.00715	0.00801	0.00784	12.10%	9.69%
Any	Interstitial Lung Disease	0.00127	0.00126	0.00119	-0.67%	-6.61%
Minor	Interstitial Lung Disease	0.00007	0.00005	0.00004	-27.21%	-49.68%
Mod	Interstitial Lung Disease	0.00056	0.00056	0.00051	-0.22%	-8.85%
Major	Interstitial Lung Disease	0.00058	0.00056	0.00056	-2.60%	-2.84%
Any	Other Respiratory Diagnoses Except Signs, Symptoms and Minor Diagnoses	0.00290	0.00240	0.00231	-17.20%	-20.24%
Minor	Other Respiratory Diagnoses Except Signs, Symptoms and Minor Diagnoses	0.00022	0.00013	0.00016	-40.45%	-30.19%
Mod	Other Respiratory Diagnoses Except Signs, Symptoms and Minor Diagnoses	0.00147	0.00117	0.00111	-20.47%	-24.68%
Major	Other Respiratory Diagnoses Except Signs, Symptoms and Minor Diagnoses	0.00101	0.00090	0.00085	-10.65%	-16.43%
Any	Respiratory Signs, Symptoms, and Diagnoses	0.00660	0.00682	0.00643	3.21%	-2.60%
Minor	Respiratory Signs, Symptoms, and Diagnoses	0.00137	0.00152	0.00134	10.69%	-2.43%
Mod	Respiratory Signs, Symptoms, and Diagnoses	0.00369	0.00372	0.00356	0.67%	-3.50%
Major	Respiratory Signs, Symptoms, and Diagnoses	0.00149	0.00148	0.00142	-0.93%	-4.93%

Table 3
Mean Values for Model Covariates in the Baseline (IPS), 2006 and 2007 Periods

Sev	Variable	Mean			% Change in Mean from Baseline	
		Baseline	2006	2007	2006	2007
Any	Cardiac Defibrillator and Heart Assist Implant	0.00126	0.00340	0.00336	170.21%	167.39%
Minor	Cardiac Defibrillator and Heart Assist Implant	0.00008	0.00011	0.00014	46.63%	78.16%
Mod	Cardiac Defibrillator and Heart Assist Implant	0.00041	0.00097	0.00099	134.43%	139.39%
Major	Cardiac Defibrillator and Heart Assist Implant	0.00061	0.00200	0.00190	226.54%	209.61%
Any	Cardiac Valve Procedures W Cardiac Cath	0.00232	0.00211	0.00200	-9.09%	-14.02%
Minor	Cardiac Valve Procedures W Cardiac Cath	0.00012	0.00011	0.00007	-8.29%	-41.62%
Mod	Cardiac Valve Procedures W Cardiac Cath	0.00060	0.00046	0.00039	-23.17%	-35.36%
Major	Cardiac Valve Procedures W Cardiac Cath	0.00135	0.00111	0.00101	-18.13%	-25.24%
Any	Coronary Artery Bypass W Cardiac Cath or Percutaneous Cardiac Procedure	0.01120	0.00775	0.00678	-30.82%	-39.49%
Minor	Coronary Artery Bypass W Cardiac Cath or Percutaneous Cardiac Procedure	0.00066	0.00036	0.00028	-44.94%	-57.24%
Mod	Coronary Artery Bypass W Cardiac Cath or Percutaneous Cardiac Procedure	0.00582	0.00353	0.00288	-39.37%	-50.49%
Major	Coronary Artery Bypass W Cardiac Cath or Percutaneous Cardiac Procedure	0.00389	0.00291	0.00274	-25.28%	-29.51%
Any	Coronary Artery Bypass W/O Cardiac Cath or Percutaneous Cardiac Procedure	0.00690	0.00503	0.00460	-27.05%	-33.26%
Minor	Coronary Artery Bypass W/O Cardiac Cath or Percutaneous Cardiac Procedure	0.00074	0.00035	0.00031	-52.67%	-58.39%
Mod	Coronary Artery Bypass W/O Cardiac Cath or Percutaneous Cardiac Procedure	0.00400	0.00259	0.00229	-35.32%	-42.93%
Major	Coronary Artery Bypass W/O Cardiac Cath or Percutaneous Cardiac Procedure	0.00187	0.00165	0.00154	-11.34%	-17.40%
Any	Other Cardiothoracic Procedures	0.00031	0.00031	0.00032	-0.64%	2.35%
Mod	Other Cardiothoracic Procedures	0.00006	0.00007	0.00006	15.79%	7.16%
Major	Other Cardiothoracic Procedures	0.00016	0.00015	0.00015	-10.23%	-7.96%
Any	Major Thoracic and Abdominal Vascular Procedures	0.00341	0.00232	0.00191	-31.99%	-43.94%
Minor	Major Thoracic and Abdominal Vascular Procedures	0.00024	0.00014	0.00014	-43.81%	-42.89%
Mod	Major Thoracic and Abdominal Vascular Procedures	0.00145	0.00088	0.00072	-39.13%	-50.25%
Major	Major Thoracic and Abdominal Vascular Procedures	0.00122	0.00086	0.00067	-29.35%	-45.52%
Any	Permanent Cardiac Pacemaker Implant with AMI, Heart Failure, or Shock	0.00113	0.00092	0.00088	-19.16%	-22.66%
Minor	Permanent Cardiac Pacemaker Implant with AMI, Heart Failure, or Shock	0.00013	0.00008	0.00005	-38.99%	-60.96%
Mod	Permanent Cardiac Pacemaker Implant with AMI, Heart Failure, or Shock	0.00057	0.00043	0.00044	-24.60%	-22.59%
Major	Permanent Cardiac Pacemaker Implant with AMI, Heart Failure, or Shock	0.00039	0.00035	0.00032	-10.21%	-17.10%
Any	Permanent Cardiac Pacemaker Implant W/O AMI, Heart Failure, or Shock	0.00725	0.00850	0.00826	17.35%	13.96%
Minor	Permanent Cardiac Pacemaker Implant W/O AMI, Heart Failure, or Shock	0.00192	0.00204	0.00201	6.53%	4.95%

Table 3
Mean Values for Model Covariates in the Baseline (IPS), 2006 and 2007 Periods

Sev	Variable	Mean			% Change in Mean from Baseline	
		Baseline	2006	2007	2006	2007
Mod	Permanent Cardiac Pacemaker Implant W/O AMI, Heart Failure, or Shock	0.00392	0.00462	0.00438	17.64%	11.58%
Major	Permanent Cardiac Pacemaker Implant W/O AMI, Heart Failure, or Shock	0.00126	0.00162	0.00166	28.70%	31.45%
Any	Other Vascular Procedures	0.01149	0.01039	0.01046	-9.55%	-8.94%
Minor	Other Vascular Procedures	0.00222	0.00193	0.00200	-12.92%	-10.07%
Mod	Other Vascular Procedures	0.00445	0.00396	0.00399	-11.09%	-10.37%
Major	Other Vascular Procedures	0.00401	0.00352	0.00348	-12.36%	-13.19%
Any	Percutaneous Cardiovascular Procedures	0.00287	0.00428	0.00441	48.91%	53.32%
Minor	Percutaneous Cardiovascular Procedures	0.00027	0.00040	0.00048	48.87%	79.88%
Mod	Percutaneous Cardiovascular Procedures	0.00140	0.00199	0.00203	42.74%	45.03%
Major	Percutaneous Cardiovascular Procedures	0.00071	0.00125	0.00125	74.49%	75.24%
Any	Percutaneous Cardiovascular Procedures W/o AMI	0.00515	0.00836	0.00856	62.22%	66.16%
Minor	Percutaneous Cardiovascular Procedures W/o AMI	0.00116	0.00236	0.00250	104.15%	115.92%
Mod	Percutaneous Cardiovascular Procedures W/o AMI	0.00245	0.00361	0.00366	47.34%	49.40%
Major	Percutaneous Cardiovascular Procedures W/o AMI	0.00121	0.00197	0.00197	62.39%	62.44%
Any	Cardiac Pacemaker and Defibrillator Device Replacement	0.00056	0.00073	0.00081	30.77%	45.04%
Minor	Cardiac Pacemaker and Defibrillator Device Replacement	0.00040	0.00045	0.00049	13.98%	23.20%
Any	Cardiac Pacemaker and Defibrillator Device Revision Except Device Replacement	0.00029	0.00048	0.00062	65.20%	111.97%
Minor	Cardiac Pacemaker and Defibrillator Device Revision Except Device Replacement	0.00012	0.00020	0.00020	56.81%	58.27%
Mod	Cardiac Pacemaker and Defibrillator Device Revision Except Device Replacement	0.00012	0.00015	0.00023	26.77%	92.89%
Major	Cardiac Pacemaker and Defibrillator Device Replacement	0.00012	0.00018	0.00022	56.06%	88.55%
Any	Other Circulatory System Procedures	0.00193	0.00139	0.00132	-28.23%	-31.50%
Minor	Other Circulatory System Procedures	0.00039	0.00014	0.00011	-64.99%	-70.51%
Mod	Other Circulatory System Procedures	0.00056	0.00041	0.00041	-27.59%	-27.12%
Major	Other Circulatory System Procedures	0.00082	0.00060	0.00059	-27.15%	-28.57%
Any	Acute Myocardial Infarction	0.01335	0.00990	0.00964	-25.84%	-27.78%
Minor	Acute Myocardial Infarction	0.00131	0.00088	0.00078	-33.41%	-40.62%
Mod	Acute Myocardial Infarction	0.00579	0.00363	0.00354	-37.41%	-38.89%
Major	Acute Myocardial Infarction	0.00488	0.00403	0.00392	-17.35%	-19.63%
Any	Cardiac Catheterization W Circ Disorders Except Ischemic Heart Disease	0.00339	0.00388	0.00362	14.33%	6.70%
Minor	Cardiac Catheterization W Circ Disorders Except Ischemic Heart Disease	0.00024	0.00031	0.00031	25.88%	26.48%
Mod	Cardiac Catheterization W Circ Disorders Except Ischemic Heart Disease	0.00064	0.00073	0.00077	14.29%	21.04%
Major	Cardiac Catheterization W Circ Disorders Except Ischemic Heart Disease	0.00231	0.00249	0.00214	7.79%	-7.29%
Any	Cardiac Catheterization for Ischemic Heart Disease	0.00377	0.00499	0.00501	32.44%	32.90%

Table 3
Mean Values for Model Covariates in the Baseline (IPS), 2006 and 2007 Periods

Sev	Variable	Mean			% Change in Mean from Baseline	
		Baseline	2006	2007	2006	2007
Minor	Cardiac Catheterization for Ischemic Heart Disease	0.00095	0.00139	0.00140	46.64%	47.26%
Mod	Cardiac Catheterization for Ischemic Heart Disease	0.00196	0.00250	0.00248	27.16%	26.29%
Major	Cardiac Catheterization for Ischemic Heart Disease	0.00078	0.00102	0.00104	29.44%	31.99%
Any	Heart Failure	0.06074	0.05254	0.04956	-13.50%	-18.41%
Minor	Heart Failure	0.00845	0.00547	0.00488	-35.26%	-42.29%
Mod	Heart Failure	0.03768	0.03038	0.02774	-19.37%	-26.38%
Major	Heart Failure	0.01317	0.01490	0.01504	13.15%	14.20%
Any	Major Stomach, Esophageal and Duodenal Procedures	0.00250	0.00216	0.00212	-13.60%	-15.01%
Minor	Major Stomach, Esophageal and Duodenal Procedures	0.00034	0.00036	0.00038	6.65%	12.07%
Mod	Major Stomach, Esophageal and Duodenal Procedures	0.00083	0.00062	0.00059	-24.94%	-28.87%
Major	Major Stomach, Esophageal and Duodenal Procedures	0.00101	0.00076	0.00073	-24.79%	-27.71%
Any	Major Small and Large Bowel Procedures	0.01626	0.01433	0.01398	-11.90%	-14.07%
Minor	Major Small and Large Bowel Procedures	0.00167	0.00167	0.00155	0.28%	-7.17%
Mod	Major Small and Large Bowel Procedures	0.00741	0.00575	0.00539	-22.40%	-27.23%
Major	Major Small and Large Bowel Procedures	0.00570	0.00494	0.00486	-13.43%	-14.72%
Any	Other Stomach, Esophageal and Duodenal Procedures	0.00019	0.00015	0.00017	-23.83%	-11.98%
Mod	Other Stomach, Esophageal and Duodenal Procedures	0.00009	0.00006	0.00007	-32.85%	-27.94%
Major	Other Stomach, Esophageal and Duodenal Procedures	0.00038	0.00040	0.00037	4.22%	-3.82%
Any	Other Small and Large Bowel Procedures	0.00140	0.00130	0.00129	-7.02%	-7.81%
Minor	Other Small and Large Bowel Procedures	0.00042	0.00032	0.00032	-25.50%	-24.58%
Mod	Other Small and Large Bowel Procedures	0.00053	0.00049	0.00048	-8.41%	-9.17%
Major	Other Small and Large Bowel Procedures	0.00031	0.00040	0.00033	30.26%	8.50%
Any	Peritoneal Adhesiolysis	0.00099	0.00105	0.00098	6.13%	-1.38%
Minor	Peritoneal Adhesiolysis	0.00014	0.00009	0.00010	-40.02%	-32.84%
Mod	Peritoneal Adhesiolysis	0.00046	0.00044	0.00040	-4.33%	-13.97%
Major	Peritoneal Adhesiolysis	0.00022	0.00036	0.00035	62.41%	58.42%
Any	Hernia Procedures Except Inguinal, Femoral and Umbilical	0.00167	0.00198	0.00185	18.38%	10.29%
Minor	Hernia Procedures Except Inguinal, Femoral and Umbilical	0.00056	0.00060	0.00055	6.79%	-0.61%
Mod	Hernia Procedures Except Inguinal, Femoral and Umbilical	0.00085	0.00092	0.00087	7.62%	1.75%
Major	Other Digestive System and Abdominal Procedures	0.00027	0.00027	0.00023	0.89%	-15.66%
Any	Other Digestive System and Abdominal Procedures	0.00065	0.00061	0.00056	-7.17%	-13.90%
Mod	Other Digestive System and Abdominal Procedures	0.00025	0.00020	0.00022	-18.80%	-8.98%
Major	Peptic Ulcer and Gastritis	0.00293	0.00299	0.00294	1.94%	0.37%
Any	Peptic Ulcer and Gastritis	0.00900	0.00851	0.00830	-5.40%	-7.74%

Table 3
Mean Values for Model Covariates in the Baseline (IPS), 2006 and 2007 Periods

Sev	Variable	Mean			% Change in Mean from Baseline	
		Baseline	2006	2007	2006	2007
Minor	Peptic Ulcer and Gastritis	0.00107	0.00106	0.00099	-1.58%	-7.58%
Mod	Peptic Ulcer and Gastritis	0.00480	0.00411	0.00401	-14.29%	-16.36%
Major	Major Esophageal Disorders	0.00024	0.00030	0.00033	24.08%	34.94%
Any	Major Esophageal Disorders	0.00056	0.00068	0.00069	21.22%	22.42%
Mod	Major Esophageal Disorders	0.00027	0.00028	0.00028	4.11%	2.12%
Major	Other Esophageal Disorders	0.00070	0.00081	0.00079	16.54%	13.04%
Any	Other Esophageal Disorders	0.00282	0.00308	0.00291	9.23%	3.44%
Minor	Other Esophageal Disorders	0.00042	0.00047	0.00045	12.41%	7.74%
Mod	Other Esophageal Disorders	0.00164	0.00171	0.00161	4.29%	-1.67%
Major	Diverticulitis and Diverticulosis	0.00137	0.00180	0.00191	31.48%	39.38%
Any	Diverticulitis and Diverticulosis	0.00606	0.00698	0.00705	15.04%	16.27%
Minor	Diverticulitis and Diverticulosis	0.00075	0.00111	0.00113	48.49%	51.12%
Mod	Diverticulitis and Diverticulosis	0.00387	0.00392	0.00389	1.20%	0.40%
Major	Other and Unspecified Gastrointestinal Hemorrhage	0.00205	0.00240	0.00250	17.22%	22.10%
Any	Other and Unspecified Gastrointestinal Hemorrhage	0.00634	0.00636	0.00677	0.32%	6.73%
Minor	Other and Unspecified Gastrointestinal Hemorrhage	0.00068	0.00063	0.00067	-7.08%	-1.60%
Mod	Other and Unspecified Gastrointestinal Hemorrhage	0.00347	0.00297	0.00321	-14.44%	-7.51%
Major	Other Digestive System Diagnoses	0.00164	0.00226	0.00225	38.13%	37.75%
Any	Other Digestive System Diagnoses	0.00671	0.00789	0.00778	17.71%	15.95%
Minor	Other Digestive System Diagnoses	0.00206	0.00233	0.00224	12.75%	8.73%
Mod	Other Digestive System Diagnoses	0.00286	0.00307	0.00302	7.54%	5.49%
Major	Major Pancreas, Liver and Shunt Procedures	0.00046	0.00045	0.00045	-0.85%	-1.30%
Any	Major Pancreas, Liver and Shunt Procedures	0.00083	0.00085	0.00087	2.37%	5.07%
Mod	Major Pancreas, Liver and Shunt Procedures	0.00022	0.00021	0.00023	-3.44%	6.70%
Major	Cholecystectomy Except Laparoscopic	0.00068	0.00060	0.00060	-12.19%	-11.51%
Any	Cholecystectomy Except Laparoscopic	0.00211	0.00163	0.00155	-22.82%	-26.30%
Minor	Cholecystectomy Except Laparoscopic	0.00023	0.00022	0.00016	-2.72%	-28.56%
Mod	Cholecystectomy Except Laparoscopic	0.00101	0.00061	0.00058	-39.45%	-42.31%
Major	Laparoscopic Cholecystectomy	0.00134	0.00181	0.00193	34.72%	44.29%
Any	Laparoscopic Cholecystectomy	0.00388	0.00532	0.00553	37.12%	42.43%
Minor	Laparoscopic Cholecystectomy	0.00058	0.00078	0.00087	34.24%	49.50%
Mod	Laparoscopic Cholecystectomy	0.00174	0.00244	0.00241	40.62%	38.39%
Any	Hip Joint Replacement	0.03144	0.03199	0.03094	1.74%	-1.60%
Minor	Hip Joint Replacement	0.00348	0.00245	0.00223	-29.57%	-35.79%
Mod	Hip Joint Replacement	0.01617	0.01431	0.01356	-11.53%	-16.15%
Major	Hip Joint Replacement	0.01158	0.01473	0.01468	27.19%	26.78%
Any	Knee Joint Replacement	0.02765	0.04073	0.03934	47.31%	42.29%
Minor	Knee Joint Replacement	0.01394	0.01798	0.01669	28.98%	19.69%
Mod	Knee Joint Replacement	0.01225	0.02004	0.01983	63.62%	61.89%
Major	Knee Joint Replacement	0.00138	0.00253	0.00262	82.99%	89.78%
Any	Hip and Femur Procedures For Trauma Except Joint Replacement	0.02414	0.02133	0.02053	-11.65%	-14.97%

Table 3
Mean Values for Model Covariates in the Baseline (IPS), 2006 and 2007 Periods

Sev	Variable	Mean			% Change in Mean from Baseline	
		Baseline	2006	2007	2006	2007
Minor	Hip and Femur Procedures For Trauma Except Joint Replacement	0.00560	0.00355	0.00322	-36.55%	-42.53%
Mod	Hip and Femur Procedures For Trauma Except Joint Replacement	0.01356	0.01172	0.01135	-13.55%	-16.33%
Major	Hip and Femur Procedures For Trauma Except Joint Replacement	0.00464	0.00551	0.00539	18.71%	16.13%
Any	Fracture of Femur	0.00048	0.00037	0.00038	-22.33%	-19.63%
Minor	Fracture of Femur	0.00220	0.00171	0.00161	-22.22%	-27.09%
Mod	Fracture of Femur	0.00055	0.00037	0.00029	-33.44%	-47.04%
Major	Fracture of Femur	0.00115	0.00096	0.00091	-16.90%	-21.01%
Any	Diabetes	0.00866	0.00912	0.00900	5.29%	3.88%
Minor	Diabetes	0.00329	0.00305	0.00289	-7.21%	-12.09%
Mod	Diabetes	0.00318	0.00357	0.00354	11.98%	11.04%
Major	Diabetes	0.00202	0.00221	0.00227	9.45%	12.06%
Major	Electrolyte Disorders Except Hypovolemia Related	0.00140	0.00206	0.00237	47.24%	69.09%
Any	Electrolyte Disorders Except Hypovolemia Related	0.00528	0.00682	0.00715	29.15%	35.41%
Minor	Electrolyte Disorders Except Hypovolemia Related	0.00060	0.00082	0.00080	36.85%	34.10%
Mod	Electrolyte Disorders Except Hypovolemia Related	0.00320	0.00374	0.00381	17.06%	19.07%
Major	Other Kidney, Urinary Tract and Related Procedures	0.00039	0.00066	0.00069	70.83%	77.49%
Any	Other Kidney, Urinary Tract and Related Procedures	0.00119	0.00142	0.00147	19.58%	23.50%
Minor	Other Kidney, Urinary Tract and Related Procedures	0.00016	0.00018	0.00016	11.38%	2.88%
Mod	Other Kidney, Urinary Tract and Related Procedures	0.00055	0.00047	0.00046	-14.58%	-15.89%
Major	Renal Failure	0.00505	0.01290	0.01464	155.32%	189.77%
Any	Renal Failure	0.00671	0.01485	0.01633	121.39%	143.36%
Minor	Renal Failure	0.00012	0.00010	0.00004	-19.98%	-64.47%
Mod	Renal Failure	0.00113	0.00105	0.00075	-7.18%	-32.97%
Major	Other Kidney and Urinary Tract Diagnoses, Signs, and Symptoms	0.00099	0.00104	0.00125	5.81%	26.51%
Any	Other Kidney and Urinary Tract Diagnoses, Signs, and Symptoms	0.00345	0.00353	0.00400	2.22%	15.88%
Minor	Other Kidney and Urinary Tract Diagnoses, Signs, and Symptoms	0.00084	0.00087	0.00097	4.19%	16.01%
Mod	Other Kidney and Urinary Tract Diagnoses, Signs, and Symptoms	0.00156	0.00153	0.00165	-2.04%	5.65%
Major	Uterine and Adnexa Procedures for Ovarian and Adnexal Malignancy	0.00017	0.00016	0.00017	-6.04%	-0.46%
Any	Uterine and Adnexa Procedures for Ovarian and Adnexal Malignancy	0.00047	0.00039	0.00036	-17.49%	-23.45%
Mod	Uterine and Adnexa Procedures for Ovarian and Adnexal Malignancy	0.00026	0.00018	0.00013	-29.14%	-48.01%
Major	Uterine and Adnexa Procedure for non-Ovarian and Non-Adnexal Malig	0.00011	0.00016	0.00016	39.59%	43.29%

Table 3
Mean Values for Model Covariates in the Baseline (IPS), 2006 and 2007 Periods

Sev	Variable	Mean			% Change in Mean from Baseline	
		Baseline	2006	2007	2006	2007
Any	Uterine and Adnexa Procedure for non-Ovarian and Non-Adnexal Malig	0.00075	0.00084	0.00086	12.39%	14.23%
Minor	Uterine and Adnexa Procedure for non-Ovarian and Non-Adnexal Malig	0.00023	0.00024	0.00022	3.94%	-1.74%
Mod	Uterine and Adnexa Procedure for non-Ovarian and Non-Adnexal Malig	0.00041	0.00043	0.00044	4.92%	9.61%
Major	Uterine and Adnexa Procedures for Non-Malignancy Except Leiomyoma	0.00013	0.00015	0.00017	15.83%	27.03%
Any	Uterine and Adnexa Procedures for Non-Malignancy Except Leiomyoma	0.00136	0.00134	0.00136	-1.42%	-0.09%
Minor	Uterine and Adnexa Procedures for Non-Malignancy Except Leiomyoma	0.00054	0.00057	0.00056	5.33%	3.87%
Mod	Uterine and Adnexa Procedures for Non-Malignancy Except Leiomyoma	0.00065	0.00061	0.00061	-7.33%	-6.06%
Major	Other Anemia and Disorders of Blood and Blood-Forming Organs	0.00083	0.00145	0.00166	74.77%	100.44%
Any	Uterine and Adnexa Procedures for Leiomyoma	0.00010	0.00009	0.00011	-4.11%	8.89%
Any	Other Anemia and Disorders of Blood and Blood-Forming Organs	0.00463	0.00657	0.00712	41.87%	53.90%
Minor	Other Anemia and Disorders of Blood and Blood-Forming Organs	0.00187	0.00198	0.00215	5.71%	14.77%
Mod	Other Anemia and Disorders of Blood and Blood-Forming Organs	0.00187	0.00294	0.00310	57.31%	66.02%
Major	Infectious and Parasitic Diseases Including HIV W O.R. Procedure	0.00085	0.00107	0.00112	25.53%	31.13%
Any	Infectious and Parasitic Diseases Including HIV W O.R. Procedure	0.00165	0.00240	0.00264	45.67%	60.38%
Mod	Infectious and Parasitic Diseases Including HIV W O.R. Procedure	0.00043	0.00028	0.00029	-36.44%	-32.16%
Major	Septicemia and Disseminated Infections	0.00675	0.00806	0.00854	19.41%	26.50%
Any	Septicemia and Disseminated Infections	0.01451	0.01737	0.01879	19.72%	29.47%
Minor	Septicemia and Disseminated Infections	0.00020	0.00020	0.00025	0.36%	23.57%
Mod	Septicemia and Disseminated Infections	0.00620	0.00507	0.00517	-18.15%	-16.60%
Major	Other Complications of Treatment	0.00048	0.00069	0.00070	41.61%	44.88%
Any	Other Complications of Treatment	0.00193	0.00215	0.00217	11.59%	12.17%
Minor	Other Complications of Treatment	0.00043	0.00037	0.00035	-14.33%	-18.19%
Mod	Other Complications of Treatment	0.00097	0.00100	0.00099	2.50%	2.25%
Major	HIV W Major HIV Related Condition	0.00016	0.00011	0.00015	-33.72%	-6.77%
Any	Other Aftercare and Convalescence	0.00011	0.00023	0.00018	102.07%	60.75%
Any	HIV W Multiple Major HIV Related Conditions	0.00013	0.00013	0.00016	3.35%	23.78%
Any	HIV W Major HIV Related Condition	0.00027	0.00020	0.00023	-27.65%	-13.39%
Mod	Musculoskeletal & Other Procedures for Multiple Significant Trauma	0.00024	0.00019	0.00022	-20.88%	-9.90%
Major	Musculoskeletal & Other Procedures for Multiple Significant Trauma	0.00021	0.00029	0.00032	34.12%	49.23%
Mod	Multiple Significant Trauma W/O O.R.	0.00015	0.00020	0.00021	33.11%	39.31%
Major	Multiple Significant Trauma W/O O.R.	0.00011	0.00021	0.00023	96.96%	114.64%
	Free-Standing Vol/NP	0.15849	0.12683	0.11555	-19.98%	-27.10%

Table 3
Mean Values for Model Covariates in the Baseline (IPS), 2006 and 2007 Periods

Sev	Variable	Mean			% Change in Mean from Baseline	
		Baseline	2006	2007	2006	2007
	Free-Standing Proprietary	0.04057	0.07132	0.07288	75.81%	79.66%
	Free-Standing Government	0.03869	0.01983	0.01857	-48.74%	-52.00%
	Facility-Based Vol/NP	0.29925	0.15517	0.13603	-48.15%	-54.54%
	Facility-Based Proprietary	0.03622	0.01381	0.01295	-61.86%	-64.23%
	Facility-Based Government	0.04120	0.02348	0.02068	-43.00%	-49.79%
	Other Vol/NP	0.08832	0.08474	0.07810	-4.05%	-11.58%
	Other Proprietary	0.29267	0.49962	0.53995	70.71%	84.49%
	Other Government	0.00441	0.00460	0.00469	4.38%	6.44%
	Acute Care Hospital Payments in 120 Days Preceding Home Health Episode	\$7,569.96	\$6,676.14	\$6,159.58	-11.81%	-18.63%
	Long Term Care Hospital Payments in 120 Days Preceding Home Health Episode	\$214.01	\$355.12	\$289.68	65.94%	35.36%
	Rehabilitation Facility Payments in 120 Days Preceding Home Health Episode	\$799.97	\$825.36	\$727.16	3.17%	-9.10%
	Medicare SNF Payments in 120 Days Preceding Home Health Episode	\$1,164.79	\$1,671.50	\$1,700.16	43.50%	45.96%

Notes: "Sev" indicates interactions between severity levels and APR DRGs (e.g., "Minor" indicates an interaction between an APR DRG and the lowest severity level), "Mod" indicates an interaction between an APR DRG and the moderate severity level, "Major" indicates an interaction between an APR DRG and the major severity level). "Any" indicates any severity level and is not an interaction term. The highest severity level (extreme loss of function) is the reference category for the models, and is not shown in the table.

Source: Abt Associates, 2009

4.2 Statistical Performance of Regression Models

We measured the statistical performance of the regression model using the adjusted R-squared statistic, a measure of the percentage of the variation in relative payment weight that is explained or predicted by variation in independent variables in the model, adjusting for the number of independent variables in the model. The adjusted R-squared statistic was 0.1735, indicating that more than 17% of relative payment weight variation was accounted for by the independent variables in the model.

4.3 Regression Coefficients

Table 4 presents the results from the regression model that was estimated using data from the baseline (IPS) period. The table also reports means from the baseline period, 2006, and 2007 and measures of the real (expected) case-mix change associated with each variable in the model. The real case-mix change associated with a variable equals the regression coefficient multiplied times the change in mean values relative to the IPS period. A positive value means that the change in means that has occurred since the baseline period is associated with an expected increase in case-mix; a negative value means that the change in means is associated with an expected decrease in case-mix.

Because of the large number of independent variables used in these models, including the use of many interaction terms, the potential presence of multicollinearity means that the interpretation of

individual regression coefficients should be approached with caution, as we have an imprecise estimate of the impact of independent changes in covariates. In a context where our goal is to predict the dependent variable, multicollinearity is not a problem because the predictions remain accurate. Nonetheless, there are several key model results worth noting:

Utilization in period preceding home health episode: The coefficients on the variables indicating the number of days of care in each setting in the 14 days preceding the home health episode and in the period 15 to 120 days prior were all positive and significant. This implies that having more days of care in these settings is associated with higher relative payment weights during the home health episode. In addition, the coefficients for the variables for days of care in the 14 days immediately preceding the home health episode were higher than those for the variables for days of care in the earlier period. Such a finding indicates that more-recent days of care in acute care hospital, long-term care hospital, rehabilitation facility, and SNF settings have a greater impact on the home health episode's relative payment weight.

Patient's living arrangements: Relative to the reference category (those living with a friend), individuals living alone had a significantly lower relative payment weight, on average, while those living with a spouse, other family members, paid help, or someone else had higher relative payment weights. The coefficients for living alone (-0.0755) and living with paid help (0.1265) were particularly interesting, in part because they identify the living arrangements associated with the lowest average case-mix (living alone) and highest average case-mix (living with paid help), after controlling for the other independent variables in the model. One possible explanation is a self-selection effect. Individuals with the lowest care needs are able and choose to live alone (assuming these individuals do not have a living spouse). Conversely, individuals with greater care needs may have already hired live-in help to provide custodial care and services.

Hospital inpatient history: Most of the individual APR DRG variables were not significant. Note that the analysis was not intended to identify and explain all individual effects of APR DRGs on home health episode relative payment weights. There are far too many variables, and interpreting them is complicated, given the inclusion of APR DRG and severity interactions, as well as the basic classification into either a medical APR DRG or a procedure APR DRG. (That is, any measured impact of an APR DRG is understood to be relative to its basic classification.) The purpose of including these variables was to capture the impact of the type and severity of an individual's most recent acute care hospital stay preceding the home health episode, after accounting for all other effects in the model.

Agency type: Relative to agencies for which the agency type is unknown, relative payment weights were lower at freestanding voluntary/non-profit agencies and also lower for facility-based government facilities.

Medicare payment amount: Adjusting for the other variables in the model, there was a negative relationship between relative payment weight and acute care hospital payments and a positive relationship between relative payment weight and Medicare payments for long-term care hospitals, rehabilitation facilities, and SNF. Each \$1,000 (baseline) increase in payments was associated with the following change in case-mix:

- Acute care hospital: -0.0025
- Long-term hospital: 0.0002
- Rehabilitation facility: 0.0024

- SNF: 0.0096

The negative coefficient on the acute care hospital expenditures measure may be because the model already includes variables that could be related to inpatient payments – e.g., variables for stays and days of care in each care setting, as well as APR DRG data for the most recent acute care hospital stay. Given the large number of independent variables in the models, it is difficult to interpret the coefficients on the payment variables. One possibility is that these variables, when added to the model alongside the related variables, might be a further measure of intensity of service – i.e., the amount of service provided per day. If services are more intensive in other settings, particularly acute care hospital settings, care needs following acute care stays in the home health setting could be lower.

Table 4								
Regression Estimates and Real Case-Mix Change Associated with Variables in Model								
Sev	Variable	Regression Results		Mean Values			Real Case-Mix Change	
		Parameter Estimate	P-value	Baseline Period	2006	2007	2006	2007
	Age 65 to 74	-0.01755	0.193	0.24525	0.23958	0.23830	0.00010	0.00012
	Age 75 to 84	0.00407	0.7562	0.40132	0.37959	0.37056	-0.00009	-0.00013
	Age 85 to 94	0.05425	0.0002	0.23657	0.23830	0.24223	0.00009	0.00031
	Age 95+	0.10901	<.0001	0.02461	0.02421	0.02498	-0.00004	0.00004
	Age 65 to 74 * Male	-0.0071	0.2588	0.09241	0.09091	0.09021	0.00001	0.00002
	Age 75 to 84 * Male	-0.00805	0.1783	0.13414	0.12862	0.12532	0.00004	0.00007
	Age 85 to 84 * male	-0.01633	0.0121	0.06418	0.06893	0.07016	-0.00008	-0.00010
	Age 95+ * Male	-0.03249	0.0197	0.00487	0.00485	0.00518	0.00000	-0.00001
	Male	-0.00758	0.1537	0.33952	0.34730	0.34745	-0.00006	-0.00006
	Age 65 to 74 * White	-0.00925	0.4965	0.19339	0.17994	0.17700	0.00012	0.00015
	Age 75 to 84 * White	-0.01045	0.4289	0.34045	0.30420	0.29419	0.00038	0.00048
	Age 85 to 94 * White	-0.04895	0.0007	0.20412	0.20199	0.20474	0.00010	-0.00003
	Age 95+ * White	-0.09849	0.0004	0.02005	0.01969	0.02040	0.00004	-0.00003
	White	0.01459	0.2053	0.82305	0.78360	0.77601	-0.00058	-0.00069
	Age 65 to 74 * African American	0.0257	0.0818	0.03864	0.04435	0.04488	0.00015	0.00016
	Age 75 to 84 * African American	0.04608	0.0013	0.04459	0.04814	0.04741	0.00016	0.00013
	Age 85 to 94 * African American	0.00543	0.733	0.02373	0.02422	0.02429	0.00000	0.00000
	Age 95+ * African American	-0.03237	0.2942	0.00351	0.00321	0.00328	0.00001	0.00001
	African American	-0.00707	0.5669	0.13240	0.15246	0.15512	-0.00014	-0.00016
	Any Hospital in Prior 14 Days IP Claims	-0.08433	<.0001	0.38390	0.31461	0.29331	0.00584	0.00764
	Any Rehab in 14 Days Prior from IP Claims	0.0821	<.0001	0.04423	0.03584	0.03108	-0.00069	-0.00108
	Any MCR SNF in 14 Days Prior From IP Claims	0.03852	<.0001	0.11958	0.12238	0.11815	0.00011	-0.00005
	No Hosp/Rehab/SNF in 14 Days From Prior IP Claims	-0.04279	<.0001	0.51808	0.57713	0.60118	-0.00253	-0.00356
	Acute Care Hospital Days in Period 14 Days Preceding Home Health Episode	0.00793	<.0001	2.25851	1.69327	1.55584	-0.00448	-0.00557

Table 4								
Regression Estimates and Real Case-Mix Change Associated with Variables in Model								
Sev	Variable	Regression Results		Mean Values			Real Case-Mix Change	
		Parameter Estimate	P-value	Baseline Period	2006	2007	2006	2007
	Acute Care Hospital Days in 15-120 Days Preceding Home Health Episode	0.00415	<.0001	4.07408	3.47288	3.29343	-0.00249	-0.00324
	Long Term Care Hospital Days in Period 14 Days Preceding Home Health Episode	0.02249	<.0001	0.05415	0.06974	0.05991	0.00035	0.00013
	Long Term Care Hospital Days in 15-120 Days Preceding Home Health Episode	0.00405	<.0001	0.20612	0.28677	0.26206	0.00033	0.00023
	Rehabilitation Facility Days in Period 14 Days Preceding Home Health Episode	0.02295	<.0001	0.44197	0.35981	0.31633	-0.00189	-0.00288
	Rehabilitation Facility Days 15-120 Days Preceding Home Health Episode	0.0075	<.0001	0.67949	0.46306	0.42812	-0.00162	-0.00189
	Medicare Skilled Nursing Facility (SNF) Days in Period 14 Days Preceding Home Health Episode	0.01292	<.0001	1.17008	1.27731	1.24250	0.00139	0.00094
	Medicare Skilled Nursing Facility (SNF) Days in 15-120 Days Preceding Home Health Episode	0.00213	<.0001	2.77538	3.69992	3.75143	0.00197	0.00208
	Patient Lives Alone	-0.0756	<.0001	0.30460	0.29083	0.29674	0.00104	0.00059
	Patient Lives with Other (Not Family, Friends, Paid Help or Spouse)	0.05094	<.0001	0.01460	0.00947	0.00968	-0.00026	-0.00025
	Patient Lives with Other Family	0.06419	<.0001	0.28298	0.28382	0.27966	0.00005	-0.00021
	Patient Lives with Paid Help	0.12649	<.0001	0.07667	0.09054	0.08721	0.00175	0.00133
	Patient Lives with Spouse	0.04581	<.0001	0.34951	0.36468	0.36263	0.00070	0.00060
	Medical APR DRG	-0.00623	0.0315	0.69830	0.79999	0.80525	-0.00063	-0.00067
	Procedure APR DRG	0.38871	0.0049	0.18862	0.20001	0.19475	0.00443	0.00238
	Mortality Risk Level 1	-0.18253	0.0771	0.14185	0.14070	0.13554	0.00021	0.00115
	Mortality Risk Level 2	-0.1672	0.1052	0.26644	0.24754	0.23828	0.00316	0.00471
	Mortality Risk Level 3	-0.14338	0.1647	0.08862	0.09915	0.10111	-0.00151	-0.00179
	Mortality Risk Level 4	-0.12504	0.2267	0.01610	0.02615	0.02857	-0.00126	-0.00156
Any	Heart and/or Long Transplant	-0.32729	0.0128	0.00007	0.00007	0.00007	0.00000	0.00000
Any	Tracheotomy W Long Term Mechanical Ventilation W Extensive Procedure	-0.08472	0.4039	0.00054	0.00048	0.00050	0.00000	0.00000

Table 4								
Regression Estimates and Real Case-Mix Change Associated with Variables in Model								
Sev	Variable	Regression Results		Mean Values			Real Case-Mix Change	
		Parameter Estimate	P-value	Baseline Period	2006	2007	2006	2007
Major	Tracheotomy W Long Term Mechanical Ventilation W Extensive Procedure	0.10208	0.1608	0.00019	0.00014	0.00011	-0.00001	-0.00001
Any	Tracheotomy W Long Term Mechanical Ventilation W/O Extensive Procedure	-0.09875	0.3174	0.00095	0.00098	0.00089	0.00000	0.00001
Mod	Tracheotomy W Long Term Mechanical Ventilation W/O Extensive Procedure	-0.18865	0.0273	0.00011	0.00007	0.00005	0.00001	0.00001
Major	Tracheotomy W Long Term Mechanical Ventilation W/O Extensive Procedure	0.04536	0.4211	0.00035	0.00034	0.00028	0.00000	0.00000
Any	Craniotomy except for Trauma	0.10369	0.3447	0.00228	0.00232	0.00228	0.00000	0.00000
Minor	Craniotomy except for Trauma	-0.13112	0.0476	0.00090	0.00080	0.00078	0.00001	0.00002
Mod	Craniotomy except for Trauma	-0.09495	0.1548	0.00081	0.00088	0.00083	-0.00001	0.00000
Major	Craniotomy except for Trauma	-0.04016	0.5806	0.00040	0.00039	0.00041	0.00000	0.00000
Any	Ventricular Shunt Procedures	0.0726	0.6926	0.00064	0.00085	0.00079	0.00002	0.00001
Minor	Ventricular Shunt Procedures	0.10273	0.5458	0.00018	0.00020	0.00019	0.00000	0.00000
Mod	Ventricular Shunt Procedures	-0.00502	0.9757	0.00036	0.00051	0.00050	0.00000	0.00000
Major	Ventricular Shunt Procedures	0.01487	0.9362	0.00007	0.00012	0.00008	0.00000	0.00000
Any	Extra cranial Vascular Procedures	0.04855	0.6935	0.00366	0.00389	0.00387	0.00001	0.00001
Minor	Extra cranial Vascular Procedures	-0.25571	0.0028	0.00121	0.00141	0.00143	-0.00005	-0.00006
Mod	Extra cranial Vascular Procedures	-0.17499	0.0385	0.00169	0.00171	0.00163	0.00000	0.00001
Major	Extra cranial Vascular Procedures	-0.14734	0.0939	0.00066	0.00068	0.00070	0.00000	-0.00001
Any	Other Nervous System and Related Procedures	-0.07681	0.7803	0.00092	0.00095	0.00101	0.00000	-0.00001
Minor	Other Nervous System and Related Procedures	0.00477	0.9858	0.00013	0.00016	0.00020	0.00000	0.00000
Mod	Other Nervous System and Related Procedures	0.07225	0.7831	0.00044	0.00041	0.00036	0.00000	-0.00001
Major	Other Nervous System and Related Procedures	0.1234	0.6394	0.00033	0.00035	0.00039	0.00000	0.00001
Any	Intracranial Hemorrhage	0.36034	0.0045	0.00282	0.00266	0.00253	-0.00006	-0.00010
Minor	Intracranial Hemorrhage	0.03928	0.6295	0.00057	0.00042	0.00039	-0.00001	-0.00001
Mod	Intracranial Hemorrhage	0.06012	0.4376	0.00129	0.00121	0.00107	0.00000	-0.00001
Major	Intracranial Hemorrhage	0.08589	0.2777	0.00084	0.00086	0.00092	0.00000	0.00001
Any	CVA w infarct/Nonspecific CVA & precerebral occl w/o infarct	0.50321	<.0001	0.03496	0.02666	0.02535	-0.00418	-0.00483
Minor	CVA w infarct/Nonspecific CVA & precerebral occl w/o infarct	-0.08082	0.0384	0.00355	0.00240	0.00223	0.00009	0.00011

Table 4								
Regression Estimates and Real Case-Mix Change Associated with Variables in Model								
Sev	Variable	Regression Results		Mean Values			Real Case-Mix Change	
		Parameter Estimate	P-value	Baseline Period	2006	2007	2006	2007
Mod	CVA w infarct/Nonspecific CVA & precerebral occl w/o infarct	-0.07743	0.0363	0.02253	0.01632	0.01571	0.00048	0.00053
Major	CVA w infarct/Nonspecific CVA & precerebral occl w/o infarct	-0.0729	0.0522	0.00839	0.00730	0.00679	0.00008	0.00012
Any	Transient Ischemia	0.06875	0.7295	0.01097	0.00986	0.00973	-0.00008	-0.00009
Minor	Transient Ischemia	0.20036	0.2413	0.00194	0.00161	0.00147	-0.00007	-0.00009
Mod	Transient Ischemia	0.22034	0.1956	0.00731	0.00631	0.00627	-0.00022	-0.00023
Major	Transient Ischemia	0.16355	0.3391	0.00170	0.00188	0.00192	0.00003	0.00004
Any	Peripheral, Cranial and Autonomic Nerve Disorders	0.3796	0.0563	0.00394	0.00493	0.00483	0.00038	0.00034
Minor	Peripheral, Cranial and Autonomic Nerve Disorders	-0.05591	0.744	0.00167	0.00224	0.00214	-0.00003	-0.00003
Mod	Peripheral, Cranial and Autonomic Nerve Disorders	-0.02722	0.8737	0.00164	0.00191	0.00194	-0.00001	-0.00001
Major	Peripheral, Cranial and Autonomic Nerve Disorders	-0.08252	0.6336	0.00061	0.00072	0.00069	-0.00001	-0.00001
Any	Major Respiratory and Chest Procedures	-0.26048	0.0225	0.00193	0.00231	0.00217	-0.00010	-0.00006
Minor	Major Respiratory and Chest Procedures	-0.08532	0.3029	0.00029	0.00031	0.00025	0.00000	0.00000
Mod	Major Respiratory and Chest Procedures	-0.08828	0.2251	0.00097	0.00110	0.00102	-0.00001	0.00000
Major	Major Respiratory and Chest Procedures	-0.0794	0.2989	0.00053	0.00067	0.00064	-0.00001	-0.00001
Any	Other Respiratory and Chest Procedures	-0.23525	0.0325	0.00179	0.00171	0.00174	0.00002	0.00001
Minor	Other Respiratory and Chest Procedures	-0.11959	0.1164	0.00031	0.00021	0.00021	0.00001	0.00001
Mod	Other Respiratory and Chest Procedures	-0.12195	0.0692	0.00081	0.00075	0.00076	0.00001	0.00001
Major	Other Respiratory and Chest Procedures	-0.09186	0.1942	0.00049	0.00056	0.00055	-0.00001	-0.00001
Any	Respiratory System Diagnosis W Ventilator Support 96+ Hours	0.20835	0.0501	0.00286	0.00233	0.00206	-0.00011	-0.00017
Mod	Respiratory System Diagnosis W Ventilator Support 96+ Hours	-0.01663	0.7076	0.00050	0.00025	0.00022	0.00000	0.00000
Major	Respiratory System Diagnosis W Ventilator Support 96+ Hours	-0.07604	0.0242	0.00138	0.00093	0.00084	0.00003	0.00004
Any	Pulmonary Edema and Respiratory Failure	0.07884	0.4516	0.00620	0.00921	0.00937	0.00024	0.00025
Minor	Pulmonary Edema and Respiratory Failure	-0.03788	0.6103	0.00012	0.00003	0.00003	0.00000	0.00000

Table 4								
Regression Estimates and Real Case-Mix Change Associated with Variables in Model								
Sev	Variable	Regression Results		Mean Values			Real Case-Mix Change	
		Parameter Estimate	P-value	Baseline Period	2006	2007	2006	2007
Mod	Pulmonary Edema and Respiratory Failure	-0.06495	0.0199	0.00145	0.00138	0.00135	0.00000	0.00001
Major	Pulmonary Edema and Respiratory Failure	-0.0331	0.1669	0.00264	0.00423	0.00436	-0.00005	-0.00006
Any	Respiratory Malignancy	-0.00403	0.9749	0.00313	0.00241	0.00220	0.00000	0.00000
Minor	Respiratory Malignancy	0.09948	0.3427	0.00012	0.00010	0.00009	0.00000	0.00000
Mod	Respiratory Malignancy	-0.00441	0.9556	0.00138	0.00089	0.00077	0.00000	0.00000
Major	Respiratory Malignancy	-0.01026	0.8964	0.00152	0.00127	0.00122	0.00000	0.00000
Any	Major Respiratory Infections and Inflammations	0.27227	0.0099	0.01413	0.01029	0.01007	-0.00105	-0.00111
Minor	Major Respiratory Infections and Inflammations	-0.18036	<.0001	0.00059	0.00034	0.00027	0.00005	0.00006
Mod	Major Respiratory Infections and Inflammations	-0.05796	0.0204	0.00558	0.00369	0.00352	0.00011	0.00012
Major	Major Respiratory Infections and Inflammations	0.00579	0.813	0.00665	0.00504	0.00496	-0.00001	-0.00001
Any	Other Pneumonia	0.07968	0.4493	0.04435	0.03989	0.03828	-0.00036	-0.00048
Minor	Other Pneumonia	0.02181	0.4248	0.00227	0.00187	0.00194	-0.00001	-0.00001
Mod	Other Pneumonia	0.02673	0.2267	0.02324	0.01989	0.01893	-0.00009	-0.00012
Major	Other Pneumonia	0.03528	0.1121	0.01738	0.01643	0.01580	-0.00003	-0.00006
Any	Chronic Obstructive Pulmonary Disease	0.01972	0.8529	0.02930	0.02677	0.02574	-0.00005	-0.00007
Minor	Chronic Obstructive Pulmonary Disease	0.00141	0.9601	0.00627	0.00440	0.00407	0.00000	0.00000
Mod	Chronic Obstructive Pulmonary Disease	0.02677	0.3222	0.01491	0.01341	0.01279	-0.00004	-0.00006
Major	Chronic Obstructive Pulmonary Disease	0.0097	0.7267	0.00715	0.00801	0.00784	0.00001	0.00001
Any	Interstitial Lung Disease	0.08643	0.5536	0.00127	0.00126	0.00119	0.00000	-0.00001
Minor	Interstitial Lung Disease	-0.12971	0.3523	0.00007	0.00005	0.00004	0.00000	0.00000
Mod	Interstitial Lung Disease	-0.02327	0.8304	0.00056	0.00056	0.00051	0.00000	0.00000
Major	Interstitial Lung Disease	0.03936	0.7167	0.00058	0.00056	0.00056	0.00000	0.00000
Any	Other Respiratory Diagnoses Except Signs, Symptoms and Minor Diagnoses	0.11139	0.3459	0.00290	0.00240	0.00231	-0.00006	-0.00007
Minor	Other Respiratory Diagnoses Except Signs, Symptoms and Minor Diagnoses	0.02073	0.7929	0.00022	0.00013	0.00016	0.00000	0.00000
Mod	Other Respiratory Diagnoses Except Signs, Symptoms and Minor Diagnoses	-0.00829	0.8927	0.00147	0.00117	0.00111	0.00000	0.00000
Major	Other Respiratory Diagnoses Except Signs, Symptoms and Minor Diagnoses	0.04506	0.4745	0.00101	0.00090	0.00085	0.00000	-0.00001
Any	Respiratory Signs, Symptoms, and Diagnoses	0.3552	0.0222	0.00660	0.00682	0.00643	0.00008	-0.00006
Minor	Respiratory Signs, Symptoms, and Diagnoses	-0.23363	0.048	0.00137	0.00152	0.00134	-0.00003	0.00001

Table 4								
Regression Estimates and Real Case-Mix Change Associated with Variables in Model								
Sev	Variable	Regression Results		Mean Values			Real Case-Mix Change	
		Parameter Estimate	P-value	Baseline Period	2006	2007	2006	2007
Mod	Respiratory Signs, Symptoms, and Diagnoses	-0.20492	0.0796	0.00369	0.00372	0.00356	-0.00001	0.00003
Major	Respiratory Signs, Symptoms, and Diagnoses	-0.20106	0.0883	0.00149	0.00148	0.00142	0.00000	0.00001
Any	Cardiac Defibrillator and Heart Assist Implant	-0.24122	0.032	0.00126	0.00340	0.00336	-0.00052	-0.00051
Minor	Cardiac Defibrillator and Heart Assist Implant	-0.12779	0.2569	0.00008	0.00011	0.00014	0.00000	-0.00001
Mod	Cardiac Defibrillator and Heart Assist Implant	-0.04921	0.5193	0.00041	0.00097	0.00099	-0.00003	-0.00003
Major	Cardiac Defibrillator and Heart Assist Implant	-0.13324	0.0673	0.00061	0.00200	0.00190	-0.00018	-0.00017
Any	Cardiac Valve Procedures W Cardiac Cath	-0.30651	0.0036	0.00232	0.00211	0.00200	0.00006	0.00010
Minor	Cardiac Valve Procedures W Cardiac Cath	-0.11158	0.2118	0.00012	0.00011	0.00007	0.00000	0.00001
Mod	Cardiac Valve Procedures W Cardiac Cath	-0.09248	0.1302	0.00060	0.00046	0.00039	0.00001	0.00002
Major	Cardiac Valve Procedures W Cardiac Cath	-0.06242	0.2646	0.00135	0.00111	0.00101	0.00002	0.00002
Any	Coronary Artery Bypass W Cardiac Cath or Percutaneous Cardiac Procedure	-0.23323	0.015	0.01120	0.00775	0.00678	0.00081	0.00103
Minor	Coronary Artery Bypass W Cardiac Cath or Percutaneous Cardiac Procedure	-0.20293	<.0001	0.00066	0.00036	0.00028	0.00006	0.00008
Mod	Coronary Artery Bypass W Cardiac Cath or Percutaneous Cardiac Procedure	-0.16741	<.0001	0.00582	0.00353	0.00288	0.00038	0.00049
Major	Coronary Artery Bypass W Cardiac Cath or Percutaneous Cardiac Procedure	-0.13598	<.0001	0.00389	0.00291	0.00274	0.00013	0.00016
Any	Coronary Artery Bypass W/O Cardiac Cath or Percutaneous Cardiac Procedure	-0.32093	0.0019	0.00690	0.00503	0.00460	0.00060	0.00074
Minor	Coronary Artery Bypass W/O Cardiac Cath or Percutaneous Cardiac Procedure	-0.14209	0.0113	0.00074	0.00035	0.00031	0.00006	0.00006
Mod	Coronary Artery Bypass W/O Cardiac Cath or Percutaneous Cardiac Procedure	-0.09787	0.0468	0.00400	0.00259	0.00229	0.00014	0.00017
Major	Coronary Artery Bypass W/O Cardiac Cath or Percutaneous Cardiac Procedure	-0.03283	0.5194	0.00187	0.00165	0.00154	0.00001	0.00001
Any	Other Cardiothoracic Procedures	-0.47735	0.0001	0.00031	0.00031	0.00032	0.00000	0.00000
Mod	Other Cardiothoracic Procedures	0.10096	0.4545	0.00006	0.00007	0.00006	0.00000	0.00000
Major	Other Cardiothoracic Procedures	0.02467	0.8136	0.00016	0.00015	0.00015	0.00000	0.00000
Any	Major Thoracic and Abdominal Vascular Procedures	-0.26932	0.0063	0.00341	0.00232	0.00191	0.00029	0.00040

Table 4								
Regression Estimates and Real Case-Mix Change Associated with Variables in Model								
Sev	Variable	Regression Results		Mean Values			Real Case-Mix Change	
		Parameter Estimate	P-value	Baseline Period	2006	2007	2006	2007
Minor	Major Thoracic and Abdominal Vascular Procedures	0.00942	0.8815	0.00024	0.00014	0.00014	0.00000	0.00000
Mod	Major Thoracic and Abdominal Vascular Procedures	-0.09011	0.0325	0.00145	0.00088	0.00072	0.00005	0.00007
Major	Major Thoracic and Abdominal Vascular Procedures	-0.02593	0.5454	0.00122	0.00086	0.00067	0.00001	0.00001
Any	Permanent Cardiac Pacemaker Implant with AMI, Heart Failure, or Shock	-0.43385	0.0051	0.00113	0.00092	0.00088	0.00009	0.00011
Minor	Permanent Cardiac Pacemaker Implant with AMI, Heart Failure, or Shock	0.03342	0.8152	0.00013	0.00008	0.00005	0.00000	0.00000
Mod	Permanent Cardiac Pacemaker Implant with AMI, Heart Failure, or Shock	0.09685	0.4543	0.00057	0.00043	0.00044	-0.00001	-0.00001
Major	Permanent Cardiac Pacemaker Implant with AMI, Heart Failure, or Shock	0.13584	0.3014	0.00039	0.00035	0.00032	-0.00001	-0.00001
Any	Permanent Cardiac Pacemaker Implant W/O AMI, Heart Failure, or Shock	-0.11771	0.3005	0.00725	0.00850	0.00826	-0.00015	-0.00012
Minor	Permanent Cardiac Pacemaker Implant W/O AMI, Heart Failure, or Shock	-0.20978	0.0027	0.00192	0.00204	0.00201	-0.00003	-0.00002
Mod	Permanent Cardiac Pacemaker Implant W/O AMI, Heart Failure, or Shock	-0.18147	0.0081	0.00392	0.00462	0.00438	-0.00013	-0.00008
Major	Permanent Cardiac Pacemaker Implant W/O AMI, Heart Failure, or Shock	-0.2098	0.0031	0.00126	0.00162	0.00166	-0.00008	-0.00008
Any	Other Vascular Procedures	-0.13623	0.1566	0.01149	0.01039	0.01046	0.00015	0.00014
Minor	Other Vascular Procedures	-0.13367	<.0001	0.00222	0.00193	0.00200	0.00004	0.00003
Mod	Other Vascular Procedures	-0.09415	0.0024	0.00445	0.00396	0.00399	0.00005	0.00004
Major	Other Vascular Procedures	-0.08875	0.0044	0.00401	0.00352	0.00348	0.00004	0.00005
Any	Percutaneous Cardiovascular Procedures	-0.35402	0.0003	0.00287	0.00428	0.00441	-0.00050	-0.00054
Minor	Percutaneous Cardiovascular Procedures	-0.00526	0.9318	0.00027	0.00040	0.00048	0.00000	0.00000
Mod	Percutaneous Cardiovascular Procedures	-0.00553	0.8971	0.00140	0.00199	0.00203	0.00000	0.00000
Major	Percutaneous Cardiovascular Procedures	-0.00104	0.9825	0.00071	0.00125	0.00125	0.00000	0.00000
Any	Percutaneous Cardiovascular Procedures W/o AMI	-0.24613	0.0157	0.00515	0.00836	0.00856	-0.00079	-0.00084

Table 4								
Regression Estimates and Real Case-Mix Change Associated with Variables in Model								
Sev	Variable	Regression Results		Mean Values			Real Case-Mix Change	
		Parameter Estimate	P-value	Baseline Period	2006	2007	2006	2007
Minor	Percutaneous Cardiovascular Procedures W/o AMI	-0.0776	0.1246	0.00116	0.00236	0.00250	-0.00009	-0.00010
Mod	Percutaneous Cardiovascular Procedures W/o AMI	-0.08184	0.0848	0.00245	0.00361	0.00366	-0.00009	-0.00010
Major	Percutaneous Cardiovascular Procedures W/o AMI	-0.13757	0.0061	0.00121	0.00197	0.00197	-0.00010	-0.00010
Any	Cardiac Pacemaker and Defibrillator Device Replacement	-0.26023	0.1018	0.00056	0.00073	0.00081	-0.00004	-0.00007
Minor	Cardiac Pacemaker and Defibrillator Device Replacement	-0.03355	0.805	0.00040	0.00045	0.00049	0.00000	0.00000
Any	Cardiac Pacemaker and Defibrillator Device Revision Except Device Replacement	-0.4096	0.0068	0.00029	0.00048	0.00062	-0.00008	-0.00013
Minor	Cardiac Pacemaker and Defibrillator Device Revision Except Device Replacement	0.00947	0.9461	0.00012	0.00020	0.00020	0.00000	0.00000
Mod	Cardiac Pacemaker and Defibrillator Device Revision Except Device Replacement	-0.1059	0.4514	0.00012	0.00015	0.00023	0.00000	-0.00001
Major	Cardiac Pacemaker and Defibrillator Device Replacement	-0.06259	0.6752	0.00012	0.00018	0.00022	0.00000	-0.00001
Any	Other Circulatory System Procedures	-0.27171	0.0147	0.00193	0.00139	0.00132	0.00015	0.00017
Minor	Other Circulatory System Procedures	-0.04648	0.5369	0.00039	0.00014	0.00011	0.00001	0.00001
Mod	Other Circulatory System Procedures	-0.01837	0.7977	0.00056	0.00041	0.00041	0.00000	0.00000
Major	Other Circulatory System Procedures	-0.02481	0.7194	0.00082	0.00060	0.00059	0.00001	0.00001
Any	Acute Myocardial Infarction	0.07243	0.4926	0.01335	0.00990	0.00964	-0.00025	-0.00027
Minor	Acute Myocardial Infarction	-0.02935	0.3536	0.00131	0.00088	0.00078	0.00001	0.00002
Mod	Acute Myocardial Infarction	-0.02949	0.2366	0.00579	0.00363	0.00354	0.00006	0.00007
Major	Acute Myocardial Infarction	-0.01656	0.5117	0.00488	0.00403	0.00392	0.00001	0.00002
Any	Cardiac Catheterization W Circ Disorders Except Ischemic Heart Disease	-0.02186	0.8526	0.00339	0.00388	0.00362	-0.00001	0.00000
Minor	Cardiac Catheterization W Circ Disorders Except Ischemic Heart Disease	0.08122	0.2894	0.00024	0.00031	0.00031	0.00001	0.00001
Mod	Cardiac Catheterization W Circ Disorders Except Ischemic Heart Disease	0.06214	0.3389	0.00064	0.00073	0.00077	0.00001	0.00001

Table 4								
Regression Estimates and Real Case-Mix Change Associated with Variables in Model								
Sev	Variable	Regression Results		Mean Values			Real Case-Mix Change	
		Parameter Estimate	P-value	Baseline Period	2006	2007	2006	2007
Major	Cardiac Catheterization W Circ Disorders Except Ischemic Heart Disease	0.01213	0.8372	0.00231	0.00249	0.00214	0.00000	0.00000
Any	Cardiac Catheterization for Ischemic Heart Disease	0.06281	0.6559	0.00377	0.00499	0.00501	0.00008	0.00008
Minor	Cardiac Catheterization for Ischemic Heart Disease	0.0033	0.9736	0.00095	0.00139	0.00140	0.00000	0.00000
Mod	Cardiac Catheterization for Ischemic Heart Disease	0.02256	0.8176	0.00196	0.00250	0.00248	0.00001	0.00001
Major	Cardiac Catheterization for Ischemic Heart Disease	-0.01663	0.8683	0.00078	0.00102	0.00104	0.00000	0.00000
Any	Heart Failure	0.06792	0.5197	0.06074	0.05254	0.04956	-0.00056	-0.00076
Minor	Heart Failure	-0.03874	0.1104	0.00845	0.00547	0.00488	0.00012	0.00014
Mod	Heart Failure	-0.01915	0.404	0.03768	0.03038	0.02774	0.00014	0.00019
Major	Heart Failure	0.00208	0.9288	0.01317	0.01490	0.01504	0.00000	0.00000
Any	Major Stomach, Esophageal and Duodenal Procedures	-0.26522	0.0095	0.00250	0.00216	0.00212	0.00009	0.00010
Minor	Major Stomach, Esophageal and Duodenal Procedures	-0.05993	0.3417	0.00034	0.00036	0.00038	0.00000	0.00000
Mod	Major Stomach, Esophageal and Duodenal Procedures	-0.0346	0.5175	0.00083	0.00062	0.00059	0.00001	0.00001
Major	Major Stomach, Esophageal and Duodenal Procedures	-0.06279	0.2276	0.00101	0.00076	0.00073	0.00002	0.00002
Any	Major Small and Large Bowel Procedures	-0.30279	0.0013	0.01626	0.01433	0.01398	0.00059	0.00069
Minor	Major Small and Large Bowel Procedures	-0.06554	0.0258	0.00167	0.00167	0.00155	0.00000	0.00001
Mod	Major Small and Large Bowel Procedures	-0.0513	0.03	0.00741	0.00575	0.00539	0.00009	0.00010
Major	Major Small and Large Bowel Procedures	-0.03145	0.1897	0.00570	0.00494	0.00486	0.00002	0.00003
Any	Other Stomach, Esophageal and Duodenal Procedures	-0.24973	0.0399	0.00019	0.00015	0.00017	0.00001	0.00001
Mod	Other Stomach, Esophageal and Duodenal Procedures	-0.03846	0.7387	0.00009	0.00006	0.00007	0.00000	0.00000
Major	Other Stomach, Esophageal and Duodenal Procedures	-0.36206	0.0009	0.00038	0.00040	0.00037	-0.00001	0.00001

Table 4								
Regression Estimates and Real Case-Mix Change Associated with Variables in Model								
Sev	Variable	Regression Results		Mean Values			Real Case-Mix Change	
		Parameter Estimate	P-value	Baseline Period	2006	2007	2006	2007
Any	Other Small and Large Bowel Procedures	-0.00164	0.9904	0.00140	0.00130	0.00129	0.00000	0.00000
Minor	Other Small and Large Bowel Procedures	-0.31431	0.0036	0.00042	0.00032	0.00032	0.00003	0.00003
Mod	Other Small and Large Bowel Procedures	-0.30046	0.0048	0.00053	0.00049	0.00048	0.00001	0.00001
Major	Other Small and Large Bowel Procedures	-0.10335	0.3064	0.00031	0.00040	0.00033	-0.00001	0.00000
Any	PeritLowal Adhesiolysis	-0.16973	0.1867	0.00099	0.00105	0.00098	-0.00001	0.00000
Minor	PeritLowal Adhesiolysis	-0.24901	0.0266	0.00014	0.00009	0.00010	0.00001	0.00001
Mod	PeritLowal Adhesiolysis	-0.12249	0.2091	0.00046	0.00044	0.00040	0.00000	0.00001
Major	PeritLowal Adhesiolysis	-0.12762	0.3332	0.00022	0.00036	0.00035	-0.00002	-0.00002
Any	Hernia Procedures Except Inguinal, Femoral and Umbilical	-0.21619	0.1529	0.00167	0.00198	0.00185	-0.00007	-0.00004
Minor	Hernia Procedures Except Inguinal, Femoral and Umbilical	-0.12001	0.3371	0.00056	0.00060	0.00055	0.00000	0.00000
Mod	Hernia Procedures Except Inguinal, Femoral and Umbilical	-0.14926	0.2264	0.00085	0.00092	0.00087	-0.00001	0.00000
Major	Other Digestive System and Abdominal Procedures	0.06104	0.4686	0.00027	0.00027	0.00023	0.00000	0.00000
Any	Other Digestive System and Abdominal Procedures	-0.36678	0.0014	0.00065	0.00061	0.00056	0.00002	0.00003
Mod	Other Digestive System and Abdominal Procedures	0.04973	0.5616	0.00025	0.00020	0.00022	0.00000	0.00000
Major	Other Digestive System and Abdominal Procedures	0.06402	0.2797	0.00293	0.00299	0.00294	0.00000	0.00000
Any	Peptic Ulcer and Gastritis	0.11026	0.35	0.00900	0.00851	0.00830	-0.00005	-0.00008
Minor	Peptic Ulcer and Gastritis	0.04469	0.4741	0.00107	0.00106	0.00099	0.00000	0.00000
Mod	Peptic Ulcer and Gastritis	0.02092	0.7208	0.00480	0.00411	0.00401	-0.00001	-0.00002
Major	Peptic Ulcer and Gastritis	-0.07763	0.5302	0.00024	0.00030	0.00033	0.00000	-0.00001
Any	Major Esophageal Disorders	0.25073	0.1003	0.00056	0.00068	0.00069	0.00003	0.00003
Mod	Major Esophageal Disorders	-0.02712	0.8248	0.00027	0.00028	0.00028	0.00000	0.00000
Any	Other Esophageal Disorders	0.14093	0.3342	0.00282	0.00308	0.00291	0.00004	0.00001
Minor	Other Esophageal Disorders	-0.0261	0.8134	0.00042	0.00047	0.00045	0.00000	0.00000
Mod	Other Esophageal Disorders	-0.00722	0.9453	0.00164	0.00171	0.00161	0.00000	0.00000
Major	Major Esophageal Disorders	0.04514	0.675	0.00070	0.00081	0.00079	0.00001	0.00000

Table 4								
Regression Estimates and Real Case-Mix Change Associated with Variables in Model								
Sev	Variable	Regression Results		Mean Values			Real Case-Mix Change	
		Parameter Estimate	P-value	Baseline Period	2006	2007	2006	2007
Any	Diverticulitis and Diverticulosis	0.13484	0.3247	0.00606	0.00698	0.00705	0.00012	0.00013
Minor	Diverticulitis and Diverticulosis	0.00766	0.9356	0.00075	0.00111	0.00113	0.00000	0.00000
Mod	Diverticulitis and Diverticulosis	-0.01627	0.8581	0.00387	0.00392	0.00389	0.00000	0.00000
Major	Diverticulitis and Diverticulosis	-0.00591	0.9492	0.00137	0.00180	0.00191	0.00000	0.00000
Any	Other and Unspecified Gastrointestinal Hemorrhage	0.04169	0.7375	0.00634	0.00636	0.00677	0.00000	0.00002
Minor	Other and Unspecified Gastrointestinal Hemorrhage	0.06322	0.4062	0.00068	0.00063	0.00067	0.00000	0.00000
Mod	Other and Unspecified Gastrointestinal Hemorrhage	0.11481	0.1055	0.00347	0.00297	0.00321	-0.00006	-0.00003
Major	Other and Unspecified Gastrointestinal Hemorrhage	0.11441	0.1109	0.00205	0.00240	0.00250	0.00004	0.00005
Any	Other Digestive System Diagnoses	0.15388	0.2097	0.00671	0.00789	0.00778	0.00018	0.00016
Minor	Other Digestive System Diagnoses	0.02513	0.7149	0.00206	0.00233	0.00224	0.00001	0.00000
Mod	Other Digestive System Diagnoses	0.00115	0.9865	0.00286	0.00307	0.00302	0.00000	0.00000
Major	Other Digestive System Diagnoses	0.0054	0.938	0.00164	0.00226	0.00225	0.00000	0.00000
Any	Major Pancreas, Liver and Shunt Procedures	-0.3827	0.0006	0.00083	0.00085	0.00087	-0.00001	-0.00002
Mod	Major Pancreas, Liver and Shunt Procedures	-0.07651	0.363	0.00022	0.00021	0.00023	0.00000	0.00000
Major	Major Pancreas, Liver and Shunt Procedures	0.00309	0.967	0.00046	0.00045	0.00045	0.00000	0.00000
Any	Cholecystectomy Except Laparoscopic	-0.34915	0.0014	0.00211	0.00163	0.00155	0.00017	0.00019
Minor	Cholecystectomy Except Laparoscopic	0.05427	0.4948	0.00023	0.00022	0.00016	0.00000	0.00000
Mod	Cholecystectomy Except Laparoscopic	0.03838	0.5512	0.00101	0.00061	0.00058	-0.00002	-0.00002
Major	Cholecystectomy Except Laparoscopic	0.05122	0.4421	0.00068	0.00060	0.00060	0.00000	0.00000
Any	Laparoscopic Cholecystectomy	-0.22628	0.0342	0.00388	0.00532	0.00553	-0.00033	-0.00037
Minor	Laparoscopic Cholecystectomy	-0.02832	0.6585	0.00058	0.00078	0.00087	-0.00001	-0.00001
Mod	Laparoscopic Cholecystectomy	0.01102	0.8494	0.00174	0.00244	0.00241	0.00001	0.00001
Major	Laparoscopic Cholecystectomy	-0.08419	0.1529	0.00134	0.00181	0.00193	-0.00004	-0.00005
Any	Hip Joint Replacement	-0.16073	0.1339	0.03144	0.03199	0.03094	-0.00009	0.00008
Minor	Hip Joint Replacement	0.10398	0.0694	0.00348	0.00245	0.00223	-0.00011	-0.00013
Mod	Hip Joint Replacement	0.04596	0.4114	0.01617	0.01431	0.01356	-0.00009	-0.00012
Major	Hip Joint Replacement	0.04067	0.4682	0.01158	0.01473	0.01468	0.00013	0.00013
Any	Knee Joint Replacement	-0.09455	0.4664	0.02765	0.04073	0.03934	-0.00124	-0.00111

Table 4								
Regression Estimates and Real Case-Mix Change Associated with Variables in Model								
Sev	Variable	Regression Results		Mean Values			Real Case-Mix Change	
		Parameter Estimate	P-value	Baseline Period	2006	2007	2006	2007
Minor	Knee Joint Replacement	0.01716	0.8526	0.01394	0.01798	0.01669	0.00007	0.00005
Mod	Knee Joint Replacement	0.00631	0.9456	0.01225	0.02004	0.01983	0.00005	0.00005
Major	Knee Joint Replacement	-0.00844	0.9288	0.00138	0.00253	0.00262	-0.00001	-0.00001
Any	Hip and Femur Procedures For Trauma Except Joint Replacement	-0.08552	0.4	0.02414	0.02133	0.02053	0.00024	0.00031
Minor	Hip and Femur Procedures For Trauma Except Joint Replacement	0.07082	0.1161	0.00560	0.00355	0.00322	-0.00014	-0.00017
Mod	Hip and Femur Procedures For Trauma Except Joint Replacement	0.05828	0.1878	0.01356	0.01172	0.01135	-0.00011	-0.00013
Major	Hip and Femur Procedures For Trauma Except Joint Replacement	0.05182	0.2517	0.00464	0.00551	0.00539	0.00004	0.00004
Any	Fracture of Femur	0.31612	0.1121	0.00220	0.00171	0.00161	-0.00015	-0.00019
Minor	Fracture of Femur	0.11752	0.4985	0.00055	0.00037	0.00029	-0.00002	-0.00003
Mod	Fracture of Femur	0.05499	0.749	0.00115	0.00096	0.00091	-0.00001	-0.00001
Major	Fracture of Femur	-0.03366	0.8467	0.00048	0.00037	0.00038	0.00000	0.00000
Any	Diabetes	0.04593	0.7033	0.00866	0.00912	0.00900	0.00002	0.00002
Minor	Diabetes	0.0599	0.3501	0.00329	0.00305	0.00289	-0.00001	-0.00002
Mod	Diabetes	0.08919	0.1644	0.00318	0.00357	0.00354	0.00003	0.00003
Major	Diabetes	0.08266	0.2035	0.00202	0.00221	0.00227	0.00002	0.00002
Any	Electrolyte Disorders Except Hypovolemia Related	0.16948	0.205	0.00528	0.00682	0.00715	0.00026	0.00032
Minor	Electrolyte Disorders Except Hypovolemia Related	-0.05522	0.5455	0.00060	0.00082	0.00080	-0.00001	-0.00001
Mod	Electrolyte Disorders Except Hypovolemia Related	-0.02146	0.8037	0.00320	0.00374	0.00381	-0.00001	-0.00001
Major	Electrolyte Disorders Except Hypovolemia Related	0.03033	0.7297	0.00140	0.00206	0.00237	0.00002	0.00003
Any	Other Kidney, Urinary Tract and Related Procedures	-0.2129	0.0863	0.00119	0.00142	0.00147	-0.00005	-0.00006
Minor	Other Kidney, Urinary Tract and Related Procedures	-0.06688	0.5247	0.00016	0.00018	0.00016	0.00000	0.00000

Table 4								
Regression Estimates and Real Case-Mix Change Associated with Variables in Model								
Sev	Variable	Regression Results		Mean Values			Real Case-Mix Change	
		Parameter Estimate	P-value	Baseline Period	2006	2007	2006	2007
Mod	Other Kidney, Urinary Tract and Related Procedures	-0.08966	0.3215	0.00055	0.00047	0.00046	0.00001	0.00001
Major	Other Kidney, Urinary Tract and Related Procedures	-0.07162	0.4417	0.00039	0.00066	0.00069	-0.00002	-0.00002
Any	Renal Failure	0.13608	0.2184	0.00671	0.01485	0.01633	0.00111	0.00131
Minor	Renal Failure	0.02859	0.7311	0.00012	0.00010	0.00004	0.00000	0.00000
Mod	Renal Failure	-0.03084	0.5078	0.00113	0.00105	0.00075	0.00000	0.00001
Major	Renal Failure	-0.02294	0.5798	0.00505	0.01290	0.01464	-0.00018	-0.00022
Any	Other Kidney and Urinary Tract Diagnoses, Signs, and Symptoms	-0.03263	0.8188	0.00345	0.00353	0.00400	0.00000	-0.00002
Minor	Other Kidney and Urinary Tract Diagnoses, Signs, and Symptoms	0.156	0.1267	0.00084	0.00087	0.00097	0.00001	0.00002
Mod	Other Kidney and Urinary Tract Diagnoses, Signs, and Symptoms	0.15537	0.1217	0.00156	0.00153	0.00165	0.00000	0.00001
Major	Other Kidney and Urinary Tract Diagnoses, Signs, and Symptoms	0.14841	0.1438	0.00099	0.00104	0.00125	0.00001	0.00004
Any	Uterine and Adnexa Procedures for Ovarian and Adnexal Malignancy	-0.17604	0.2447	0.00047	0.00039	0.00036	0.00001	0.00002
Mod	Uterine and Adnexa Procedures for Ovarian and Adnexal Malignancy	-0.28086	0.031	0.00026	0.00018	0.00013	0.00002	0.00003
Major	Uterine and Adnexa Procedures for Ovarian and Adnexal Malignancy	-0.24588	0.0694	0.00017	0.00016	0.00017	0.00000	0.00000
Any	Uterine and Adnexa Procedure for non-Ovarian and Non-Adnexal Malig	-0.62887	0.0574	0.00075	0.00084	0.00086	-0.00006	-0.00007
Minor	Uterine and Adnexa Procedure for non-Ovarian and Non-Adnexal Malig	0.25545	0.4283	0.00023	0.00024	0.00022	0.00000	0.00000
Mod	Uterine and Adnexa Procedure for non-Ovarian and Non-Adnexal Malig	0.31612	0.3241	0.00041	0.00043	0.00044	0.00001	0.00001
Major	Uterine and Adnexa Procedure for non-Ovarian and Non-Adnexal Malig	0.35302	0.2803	0.00011	0.00016	0.00016	0.00002	0.00002
Any	Uterine and Adnexa Procedures for Non-Malignancy Except Leiomyoma	-0.51138	0.0013	0.00136	0.00134	0.00136	0.00001	0.00000

Table 4								
Regression Estimates and Real Case-Mix Change Associated with Variables in Model								
Sev	Variable	Regression Results		Mean Values			Real Case-Mix Change	
		Parameter Estimate	P-value	Baseline Period	2006	2007	2006	2007
Minor	Uterine and Adnexa Procedures for Non-Malignancy Except Leiomyoma	0.13121	0.3297	0.00054	0.00057	0.00056	0.00000	0.00000
Mod	Uterine and Adnexa Procedures for Non-Malignancy Except Leiomyoma	0.20838	0.1194	0.00065	0.00061	0.00061	-0.00001	-0.00001
Major	Uterine and Adnexa Procedures for Non-Malignancy Except Leiomyoma	0.08535	0.5636	0.00013	0.00015	0.00017	0.00000	0.00000
Any	Uterine and Adnexa Procedures for Leiomyoma	-0.3329	0.0066	0.00010	0.00009	0.00011	0.00000	0.00000
Any	Other Anemia and Disorders of Blood and Blood-Forming Organs	0.01549	0.9155	0.00463	0.00657	0.00712	0.00003	0.00004
Minor	Other Anemia and Disorders of Blood and Blood-Forming Organs	0.07424	0.4795	0.00187	0.00198	0.00215	0.00001	0.00002
Mod	Other Anemia and Disorders of Blood and Blood-Forming Organs	0.08582	0.4136	0.00187	0.00294	0.00310	0.00009	0.00011
Major	Other Anemia and Disorders of Blood and Blood-Forming Organs	0.06846	0.5223	0.00083	0.00145	0.00166	0.00004	0.00006
Any	Infectious and Parasitic Diseases Including HIV W O.R. Procedure	-0.26276	0.0094	0.00165	0.00240	0.00264	-0.00020	-0.00026
Mod	Infectious and Parasitic Diseases Including HIV W O.R. Procedure	0.0592	0.3025	0.00043	0.00028	0.00029	-0.00001	-0.00001
Major	Infectious and Parasitic Diseases Including HIV W O.R. Procedure	0.07764	0.1248	0.00085	0.00107	0.00112	0.00002	0.00002
Any	Septicemia and Disseminated Infections	0.17934	0.0893	0.01451	0.01737	0.01879	0.00051	0.00077
Minor	Septicemia and Disseminated Infections	-0.07934	0.1905	0.00020	0.00020	0.00025	0.00000	0.00000
Mod	Septicemia and Disseminated Infections	0.02241	0.3663	0.00620	0.00507	0.00517	-0.00003	-0.00002
Major	Septicemia and Disseminated Infections	0.02515	0.3037	0.00675	0.00806	0.00854	0.00003	0.00004
Any	Other Complications of Treatment	0.52843	0.0008	0.00193	0.00215	0.00217	0.00012	0.00012
Minor	Other Complications of Treatment	-0.42088	0.0009	0.00043	0.00037	0.00035	0.00003	0.00003
Mod	Other Complications of Treatment	-0.41573	0.0007	0.00097	0.00100	0.00099	-0.00001	-0.00001
Major	Other Complications of Treatment	-0.35921	0.0042	0.00048	0.00069	0.00070	-0.00007	-0.00008
Any	Other Aftercare and Convalescence	0.08995	0.4828	0.00011	0.00023	0.00018	0.00001	0.00001
Any	HIV W Multiple Major HIV Related Conditions	-0.05905	0.6376	0.00013	0.00013	0.00016	0.00000	0.00000
Any	HIV W Major HIV Related Condition	-0.02186	0.8646	0.00027	0.00020	0.00023	0.00000	0.00000

Table 4								
Regression Estimates and Real Case-Mix Change Associated with Variables in Model								
Sev	Variable	Regression Results		Mean Values			Real Case-Mix Change	
		Parameter Estimate	P-value	Baseline Period	2006	2007	2006	2007
Major	HIV W Major HIV Related Condition	0.00066484	0.9946	0.00016	0.00011	0.00015	0.00000	0.00000
Mod	Musculoskeletal & Other Procedures for Multiple Significant Trauma	-0.01239	0.9065	0.00024	0.00019	0.00022	0.00000	0.00000
Major	Musculoskeletal & Other Procedures for Multiple Significant Trauma	0.03668	0.7321	0.00021	0.00029	0.00032	0.00000	0.00000
Mod	Multiple Significant Trauma W/O O.R. Procedure	0.34401	0.0048	0.00015	0.00020	0.00021	0.00002	0.00002
Major	Multiple Significant Trauma W/O O.R. Procedure	0.1732	0.1788	0.00011	0.00021	0.00023	0.00002	0.00002
	Free-Standing Vol/NP	-0.12837	0.0298	0.15849	0.12683	0.11555	0.00406	0.00551
	Free-Standing Proprietary	-0.06536	0.2696	0.04057	0.07132	0.07288	-0.00201	-0.00211
	Free-Standing Government	-0.11695	0.0482	0.03869	0.01983	0.01857	0.00221	0.00235
	Facility-Based Vol/NP	-0.12931	0.0286	0.29925	0.15517	0.13603	0.01863	0.02111
	Facility-Based Proprietary	-0.09858	0.096	0.03622	0.01381	0.01295	0.00221	0.00229
	Facility-Based Government	-0.13758	0.0201	0.04120	0.02348	0.02068	0.00244	0.00282
	Other Vol/NP	-0.09483	0.1088	0.08832	0.08474	0.07810	0.00034	0.00097
	Other Proprietary	-0.0855	0.1479	0.29267	0.49962	0.53995	-0.01769	-0.02114
	Other Government	-0.09935	0.0994	0.00441	0.00460	0.00469	-0.00002	-0.00003
	Acute Care Hospital Payments in 120 Days Preceding Home Health Episode	-0.00000248	<.0001	\$7,569.96	\$6,676.14	\$6,159.58	0.00222	0.00350
	Long Term Care Hospital Payments in 120 Days Preceding Home Health Episode	2.15327E-07	0.8426	\$214.01	\$355.12	\$289.68	0.00003	0.00002
	Rehabilitation Facility Payments in 120 Days Preceding Home Health Episode	0.00000237	0.0028	\$799.97	\$825.36	\$727.16	0.00006	-0.00017
	Medicare SNF Payments in 120 Days Preceding Home Health Episode	0.0000096	<.0001	\$1,164.79	\$1,671.50	\$1,700.16	0.00486	0.00514

Notes: Real case-mix change associated with variable equals the regression coefficient multiplied times the change in mean values relative to the baseline period. A positive value means that the change in means that has occurred since the baseline period is associated with an expected increase in case-mix; a negative value means that the change in means is associated with an expected decrease in case-mix.

Table 4								
Regression Estimates and Real Case-Mix Change Associated with Variables in Model								
Sev	Variable	Regression Results		Mean Values			Real Case-Mix Change	
		Parameter Estimate	P-value	Baseline Period	2006	2007	2006	2007
<p>“Sev” indicates interactions between severity levels and APR DRGs (e.g., “Minor” indicates an interaction between an APR DRG and the lowest severity level), “Mod” indicates an interaction between an APR DRG and the moderate severity level, “Major” indicates an interaction between an APR DRG and the major severity level). “Any” indicates any severity level and is not an interaction term.</p> <p>Source: Abt Associates, 2009</p>								

4.4 Analysis of Case-Mix Change

We calculated predicted case-mix values for 2006 and 2007, using the regression coefficients and means reported in Table 4. We also calculated the differences between actual case-mix for the baseline period and the predicted case-mix values for 2006 and 2007 and compared these to the actual total change in case-mix that occurred during this period. Most of the case-mix change that occurred between the baseline period and either 2006 or 2007 was not associated with changes in the prevalence of the independent variables included in the regression model and presumably reflects changes in nominal factors such as agency coding practices.

- The total change in case-mix between the baseline period and 2006 was 0.1542; the change between the baseline period and 2007 was 0.1647 (Table 5).
- The estimate of real case-mix change was 0.0177 for 2006 and 0.0161 for 2007. This leads to an expected relative payment weight of 1.1136 for 2006 and 1.1120 for 2007.
- Most of the observed case-mix change is nominal change that was not predicted by the model. Our estimate is that 88.551% of the case-mix change that occurred between the baseline period and 2006 is unpredicted, as is 90.226% of the case-mix change that occurred between the baseline period and 2007.
- Our best estimate is that 11.449% of the case-mix change that occurred between the baseline period and 2006, and 9.774% of the change that occurred between the baseline period and 2007, is real case-mix change that is due to changes in patient characteristics.

Table 5: Estimates of 2006 and 2007 Case-Mix Change	
Measure	Value
Actual relative payment weight	
Baseline period (2000)	1.095917
2006	1.250078
2007	1.260612
Change in case-mix (Relative to baseline period)	
Baseline-2006	0.1542
Baseline-2007	0.1647
Real (predicted) change in case-mix	
2006	0.0177
2007	0.0161
Predicted relative payment weight	
2006	1.1136
2007	1.1120
Nominal (unpredicted) change in case-mix	
2006	0.1365
2007	0.1486
Nominal (Unpredicted) change as % of Actual increase in case-mix	
2006	88.551%
2007	90.226%
Real (predicted) change as % of actual increase in case-mix	
2006	11.449%
2007	9.774%
Notes: Estimates of real (predicted) case-mix are based on the sum of real case-mix change associated with the variables (from Table 2). Nominal case-mix is defined as the total change in case-mix – real-case-mix change.	
Source: Abt Associates, 2009	

4.5 Drivers of Case-Mix Change

Either because their regression coefficient is close to zero, or because there was only a small change in mean values relative to the baseline period, most of the variables in the model add or subtract a trivial amount to the base year level of average case-mix. Only 37 of the 331 variables in the model predict a case-mix increase of more than 0.01% relative to the baseline year and 32 of the variables in the model predict a case-mix decrease of more than 0.01%.

In this section, we focus on the subset of variables in the model that were associated with real changes (either increases or decreases) in predicted (real) case-mix for 2007. In addition to the regression coefficients and mean values that were reported in Table 4, Table 6 also includes information on the percentage change in real case-mix and the percentage of observed case-mix change that is predicted by these drivers. Note that the denominator for the estimate of percent change in predicted case-mix is the average case-mix level in the baseline period (1.0959171), while the denominator for the percentage of the observed case-mix change is the 0.1647 case-mix change that occurred between the baseline period and 2007.

The table is organized by variable category.

- **Demographics:** None of the demographic variables in the model led to a substantial change in expected case-mix. While the interaction terms used in the model complicate interpretation of individual parameter estimates, combined, the demographic variables included in Table 6 led to a -0.02% decrease in expected case-mix.
- **Living arrangements:** Changes in the distribution of patients by living arrangement lead to a real case-mix change of 0.00207, a 0.19% increase relative to the baseline period. Combined, these variables account for 1.25% of the case-mix change that was observed between the baseline period and 2007. The increase in the proportion of patients that live with paid help, which had a rather high regression coefficient (0.12649), was the major case-mix driver among the living arrangement variables.
- **Agency type of control:** The two largest drivers of case-mix change were the other proprietary and facility-based Vol/NP variables. The proportion of episodes to other proprietary agencies increased by 84.5% between the baseline period and 2007. This variable had a negative regression coefficient, leading to lower expected case-mix in 2007. This was offset by the decrease in the proportion of episodes to facility-based Vol/NP agencies, which also had a negative regression coefficient. Combined, the agency type of control variables in the model led to a real case-mix change of 1.07%, accounting for 7.15% of the case-mix change that was observed between the baseline period and 2007.
- **Medicare cost and utilization variables:** The Medicare cost and utilization variables were split almost evenly between those that were associated with a prediction of higher case-mix (e.g., Medicare SNF payments in the 120 days preceding the home health episode, Medicare SNF days in the 15-120 days preceding the episode) and those that were associated with a prediction of lower case-mix (e.g., acute care hospital payments in the 120 days preceding the episode, Medicare skilled nursing days in the 15 days preceding the home health episode). Combined, the Medicare cost and utilization variables lead to a predicted real case-mix change of 0.11% relative to the baseline period, accounting for only 0.7% of the actual case-mix change that was observed during this period.
- **Mortality risk:** The decrease in patients in the moderate mortality risk category was associated with an increase in expected case-mix, given the negative regression coefficient. However, the increase in prevalence of the major and extreme mortality risk

categories was associated with a prediction of lower case-mix, as these variables also had a negative coefficient. Overall, the mortality risk variables are associated with a 0.23% increase in real case-mix.

- ***Hospital diagnosis variables:*** There was a 27.5% decrease in the proportion of patients with APR DRG 045 or 046 (CVA and precerebral occlusion with or without infarction). As noted above, this variable had a large positive coefficient (0.5032), meaning that the change in means was associated with a decrease of 0.0048 in real case-mix. The increase in the proportion of patients with a procedure-based APR DRG led to an increase in real case-mix and accounted for 1.45% of the total observed case-mix change. The mean values of most of the hospital diagnosis variables were low, meaning that they do not lead to much of a change in the predicted case-mix level. Combined, the hospital diagnosis variables included in Table 3 led to a small (0.10%) decrease in expected case-mix.

Table 6 Analysis of Drivers of Real Case-Mix Change									
Sev	Variable	Regression coefficient (Baseline)	Baseline Mean	2007 Mean	Change in Mean	% Change in Mean	Real case-mix change	% Change in Real Case-Mix	% of Total Change Predicted by Variable
	Demographic Variables								
	White	0.01459	0.82305	0.77601	-0.04705	-5.72%	-0.00069	-0.06%	-0.42%
	Age 75 to 84 * White	-0.01045	0.34045	0.29419	-0.04626	-13.59%	0.00048	0.04%	0.29%
	African American	-0.00707	0.13240	0.15512	0.02273	17.17%	-0.00016	-0.01%	-0.10%
	Age 65 to 74 * African American	0.02570	0.03864	0.04488	0.00623	16.13%	0.00016	0.01%	0.10%
	Age 65 to 74 * White	-0.00925	0.19339	0.17700	-0.01639	-8.47%	0.00015	0.01%	0.09%
	Age 75 to 84 * African American	-0.02294	0.00505	0.01464	0.00959	189.77%	-0.00022	-0.02%	-0.13%
	Age 75 to 84	0.00407	0.40132	0.37056	-0.03076	-7.67%	-0.00013	-0.01%	-0.08%
		0.52843	0.00193	0.00217	0.00024	12.17%	0.00012	0.01%	0.08%
	Age 65 to 74	-0.01755	0.24525	0.23830	-0.00695	-2.83%	0.00012	0.01%	0.07%
	Age 85 to 94 * Male	-0.01633	0.06418	0.07016	0.00599	9.33%	-0.00010	-0.01%	-0.06%
	Total: Demographic drivers						-0.00025	-0.02%	-0.15%
	Living Arrangement Variables								
	Patient Lives with Paid Help	0.12649	0.07667	0.08721	0.01054	13.75%	0.00133	0.12%	0.81%
	Patient Lives with Spouse	0.04581	0.34951	0.36263	0.01313	3.76%	0.00060	0.05%	0.37%
	Patient Lives Alone	-0.0756	0.30460	0.29674	-0.00786	-2.58%	0.00059	0.05%	0.36%
	Patient Lives with Other (Not Family, Friends, Paid Help or Spouse)	0.05094	0.01460	0.00968	-0.00492	-33.69%	-0.00025	-0.02%	-0.15%
	Patient Lives with Other Family	0.06419	0.28298	0.27966	-0.00331	-1.17%	-0.00021	-0.02%	-0.13%
	Total: Living Arrangements						0.00207	0.19%	1.25%
	Type of Control Variables								
	Other Proprietary	-0.08550	0.29267	0.53995	0.24728	84.49%	-0.02114	-1.93%	-12.84%
	Facility-Based Vol/NP	-0.12931	0.29925	0.13603	-0.16322	-54.54%	0.02111	1.93%	12.82%
	Free-Standing Vol/NP	-0.12837	0.15849	0.11555	-0.04295	-27.10%	0.00551	0.50%	3.35%
	Facility-Based Government	-0.13758	0.04120	0.02068	-0.02052	-49.79%	0.00282	0.26%	1.71%
	Free-Standing Government	-0.11695	0.03869	0.01857	-0.02012	-52.00%	0.00235	0.21%	1.43%

Table 6 Analysis of Drivers of Real Case-Mix Change									
Sev	Variable	Regression coefficient (Baseline)	Baseline Mean	2007 Mean	Change in Mean	% Change in Mean	Real case-mix change	% Change in Real Case-Mix	% of Total Change Predicted by Variable
	Facility-Based Proprietary	-0.09858	0.03622	0.01295	-0.02326	-64.23%	0.00229	0.21%	1.39%
	Free-Standing Proprietary	-0.06536	0.04057	0.07288	0.03231	79.66%	-0.00211	-0.19%	-1.28%
	Other Vol/NP	-0.09483	0.08832	0.07810	-0.01022	-11.58%	0.00097	0.09%	0.59%
	Other Government	-0.09935	0.00441	0.00469	0.00028	6.44%	-0.00003	0.00%	-0.02%
	Total: Type of Control						0.01177	1.07%	7.15%
	Medicare Cost and Utilization Variables								
	Medicare SNF Payments in 120 Days Preceding Home Health Episode	0.00001	1164.79	1700.16	535.37	45.96%	0.00514	0.70%	4.64%
	Acute Care Hospital Payments in 120 Days Preceding Home Health Episode	0.00000	7569.96	6159.58	-1410.38	-18.63%	0.00350	-0.51%	-3.38%
	Medicare Skilled Nursing Facility (SNF) Days in 15-120 Days Preceding Home Health Episode	0.00213	2.77538	3.75143	0.97605	35.17%	0.00208	0.47%	3.12%
	Medicare Skilled Nursing Facility (SNF) Days in Period 14 Days Preceding Home Health Episode	0.01292	1.17008	1.24250	0.07242	6.19%	0.00094	-0.32%	-2.16%
	Long Term Care Hospital Days in 15-120 Days Preceding Home Health Episode	0.00405	0.20612	0.26206	0.05594	27.14%	0.00023	0.32%	2.12%
	Long Term Care Hospital Days in Period 14 Days Preceding Home Health Episode	0.02249	0.05415	0.05991	0.00576	10.63%	0.00013	-0.30%	-1.97%
	Long Term Care Hospital Payments in 120 Days Preceding Home Health Episode	0.00000	214.00	289.68	75.67	35.36%	0.00002	-0.26%	-1.75%
	Any MCR SNF in 14 Days Prior From IP Claims	0.03852	0.11958	0.11815	-0.00142	-1.19%	-0.00005	0.19%	1.26%
	Rehabilitation Facility Payments in 120 Days Preceding Home Health Episode	0.00000	799.97	727.16	-72.81	-9.10%	-0.00017	-0.17%	-1.14%
	Any Rehab in 14 Days Prior from IP Claims	0.08210	0.04423	0.03108	-0.01316	-29.74%	-0.00108	-0.10%	-0.66%

Table 6 Analysis of Drivers of Real Case-Mix Change									
Sev	Variable	Regression coefficient (Baseline)	Baseline Mean	2007 Mean	Change in Mean	% Change in Mean	Real case-mix change	% Change in Real Case-Mix	% of Total Change Predicted by Variable
	Rehabilitation Facility Days in 15-120 Days Preceding Home Health Episode	0.00750	0.67949	0.42812	-0.25137	-36.99%	-0.00189	0.09%	0.57%
	Rehabilitation Facility Days in Period 14 Days Preceding Home Health Episode	0.02295	0.44197	0.31633	-0.12564	-28.43%	-0.00288	0.02%	0.14%
	Acute Care Hospital Days in 15-120 Preceding Home Health Episode	0.00415	4.07408	3.29343	-0.78065	-19.16%	-0.00324	-0.02%	-0.10%
	No Hosp/Rehab/SNF in 14 Days From Prior IP Claims	-0.04279	0.51808	0.60118	0.08310	16.04%	-0.00356	0.01%	0.08%
	Acute Care Hospital Days in Period 14 Days Preceding Home Health Episode	0.00793	2.25851	1.55584	-0.70266	-31.11%	-0.00557	-0.01%	-0.03%
	Any Hospital in Prior 14 Days IP Claims	-0.08433	0.38390	0.29331	-0.09058	-23.60%	0.00764	0.00%	0.01%
	Total: Medicare cost and utilization						0.00122	0.11%	0.74%
	Mortality Risk								
	Mortality Risk Level 1 (Minor)	-0.18253	0.14185	0.13554	-0.00631	-4.45%	0.00115	0.11%	0.70%
	Mortality Risk Level 2 (Moderate)	-0.16720	0.26644	0.23828	-0.02816	-10.57%	0.00471	0.43%	2.86%
	Mortality Risk Level 3 (Major)	-0.14338	0.08862	0.10111	0.01249	14.09%	-0.00179	-0.16%	-1.09%
	Mortality Risk Level 4 (Extreme)	-0.12504	0.01610	0.02857	0.01247	77.46%	-0.00156	-0.14%	-0.95%
	Total: Mortality risk						0.00251	0.23%	1.52%
	Hospital Diagnosis Variables	Regression coefficient (Baseline)	Baseline Mean	2007 Mean	Change in Mean	% Change in Mean	Real case-mix change	% Change in Real Case-Mix	% of Total Change Predicted by Variable
Any	CVA w infarct/Nonspecific CVA & precerebral occl w/o infarct	0.50321	0.03496	0.02535	-0.00961	-27.48%	-0.00483	-0.44%	-2.94%
Any	Procedure APR DRG	0.38871	0.18862	0.19475	0.00613	3.25%	0.00238	0.22%	1.45%
Any	Renal Failure	0.13608	0.00671	0.01633	0.00962	143.36%	0.00131	0.12%	0.79%
Any	Knee Joint Replacement	-0.09455	0.02765	0.03934	0.01169	42.29%	-0.00111	-0.10%	-0.67%

Table 6 Analysis of Drivers of Real Case-Mix Change									
Sev	Variable	Regression coefficient (Baseline)	Baseline Mean	2007 Mean	Change in Mean	% Change in Mean	Real case-mix change	% Change in Real Case-Mix	% of Total Change Predicted by Variable
Any	Major Respiratory Infections and Inflammations	0.27227	0.01413	0.01007	-0.00406	-28.73%	-0.00111	-0.10%	-0.67%
Any	Major Respiratory Infections and Inflammations	-0.23323	0.01120	0.00678	-0.00442	-39.49%	0.00103	0.09%	0.63%
Any	Percutaneous Cardiovascular Procedures W/o AMI	-0.24613	0.00515	0.00856	0.00341	66.16%	-0.00084	-0.08%	-0.51%
Any	Septicemia and Disseminated Infections	0.17934	0.01451	0.01879	0.00428	29.47%	0.00077	0.07%	0.47%
Any	Heart Failure	0.06792	0.06074	0.04956	-0.01118	-18.41%	-0.00076	-0.07%	-0.46%
Any	Coronary Artery Bypass W/O Cardiac Cath or Percutaneous Cardiac Procedure	-0.32093	0.00690	0.00460	-0.00229	-33.26%	0.00074	0.07%	0.45%
Any	Major Small and Large Bowel Procedures	-0.30279	0.01626	0.01398	-0.00229	-14.07%	0.00069	0.06%	0.42%
Any	Medical APR DRG	-0.00623	0.69830	0.80525	0.10695	15.32%	-0.00067	-0.06%	-0.40%
Any	Percutaneous Cardiovascular Procedures W AMI	-0.35402	0.00287	0.00441	0.00153	53.32%	-0.00054	-0.05%	-0.33%
Mod	CVA w infarct/Nonspecific CVA & precerebral occl w/o infarct	-0.07743	0.02253	0.01571	-0.00682	-30.28%	0.00053	0.05%	0.32%
Any	Cardiac Defibrillator and Heart Assist Implant	-0.24122	0.00126	0.00336	0.00210	167.39%	-0.00051	-0.05%	-0.31%
Mod	Coronary Artery Bypass W Cardiac Cath or Percutaneous Cardiac Procedure	-0.16741	0.00582	0.00288	-0.00294	-50.49%	0.00049	0.04%	0.30%
Any	Other Pneumonia	0.07968	0.04435	0.03828	-0.00606	-13.68%	-0.00048	-0.04%	-0.29%
Any	Major Thoracic and Abdominal Vascular Procedures	-0.26932	0.00341	0.00191	-0.00150	-43.94%	0.00040	0.04%	0.25%
Any	Laparoscopic Cholecystectomy	-0.22628	0.00388	0.00553	0.00165	42.43%	-0.00037	-0.03%	-0.23%
Any	Peripheral, Cranial and Autonomic Nerve Disorders	0.37960	0.00394	0.00483	0.00090	22.76%	0.00034	0.03%	0.21%
Any	Electrolyte Disorders Except Hypovolemia Related	0.16948	0.00528	0.00715	0.00187	35.41%	0.00032	0.03%	0.19%
Any	Hip and Femur Procedures For Trauma Except Joint Replacement	-0.08552	0.02414	0.02053	-0.00361	-14.97%	0.00031	0.03%	0.19%

Table 6
Analysis of Drivers of Real Case-Mix Change

Sev	Variable	Regression coefficient (Baseline)	Baseline Mean	2007 Mean	Change in Mean	% Change in Mean	Real case-mix change	% Change in Real Case-Mix	% of Total Change Predicted by Variable
Any	Acute Myocardial Infarction	0.07243	0.01335	0.00964	-0.00371	-27.78%	-0.00027	-0.02%	-0.16%
Any	Infectious and Parasitic Diseases Including HIV W O.R. Procedure	-0.26276	0.00165	0.00264	0.00099	60.38%	-0.00026	-0.02%	-0.16%
Any	Pulmonary Edema and Respiratory Failure	0.07884	0.00620	0.00937	0.00317	51.17%	0.00025	0.02%	0.15%
Mod	Transient Ischemia	0.22034	0.00731	0.00627	-0.00103	-14.12%	-0.00023	-0.02%	-0.14%
Major	Renal Failure	-0.02294	0.00505	0.01464	0.00959	189.77%	-0.00022	-0.02%	-0.13%
Any	Cholecystectomy Except Laparoscopic	-0.34915	0.00211	0.00155	-0.00055	-26.30%	0.00019	0.02%	0.12%
Mod	Heart Failure	-0.01915	0.03768	0.02774	-0.00994	-26.38%	0.00019	0.02%	0.12%
Any	Fracture of Femur	0.31612	0.00220	0.00161	-0.00060	-27.09%	-0.00019	-0.02%	-0.11%
Major	Cardiac Defibrillator and Heart Assist Implant	-0.13324	0.00061	0.00190	0.00128	209.61%	-0.00017	-0.02%	-0.10%
Minor	Hip and Femur Procedures For Trauma Except Joint Replacement	0.07082	0.00560	0.00322	-0.00238	-42.53%	-0.00017	-0.02%	-0.10%
Mod	Coronary Artery Bypass W Cardiac Cath or Percutaneous Cardiac Procedure	-0.09787	0.00400	0.00229	-0.00172	-42.93%	0.00017	0.02%	0.10%
Any	Respiratory System Diagnosis W Ventilatory Support 96+ Hours	0.20835	0.00286	0.00206	-0.00080	-28.07%	-0.00017	-0.02%	-0.10%
Any	Other Circulatory System Procedures	-0.27171	0.00193	0.00132	-0.00061	-31.50%	0.00017	0.02%	0.10%
Any	Other Digestive System Diagnoses	0.15388	0.00671	0.00778	0.00107	15.95%	0.00016	0.02%	0.10%
	Total: Hospital diagnosis drivers					15.95%	-0.00109	-0.10%	-0.66%

Notes:

1. Regression coefficient is from the baseline regression model
2. Change in mean equals the 2007 mean minus the baseline mean
3. The % change in mean equals the change in mean divided by the baseline mean.
4. Real case-mix change equals the change in mean times the regression coefficient.
5. The % change in real case-mix equals the predicted case-mix change divided by the baseline case-mix level (1.0959171).
6. The % of observed case-mix change predicted by the variable equals real case-mix change divided by the 0.1647 case-mix change that occurred between the baseline period and 2007.

Table 6 Analysis of Drivers of Real Case-Mix Change									
Sev	Variable	Regression coefficient (Baseline)	Baseline Mean	2007 Mean	Change in Mean	% Change in Mean	Real case-mix change	% Change in Real Case-Mix	% of Total Change Predicted by Variable
7. The totals reported in the table only include the variables included in this table. Other covariates, which were not major drivers of case-mix change, are not included in the total reported in this table, although they are used for the estimates of case-mix change reported in Table 4.									
Source: Abt Associates, 2009									

5.0 Discussion

Since implementation of the prospective payment system, there has been a steady increase in the average case-mix of home health patients. The overall observed case-mix increased by 15.03% between 2000 and 2007, with the average relative payment weight increasing from 1.091 to 1.261. The purpose of the analyses described in this report was to understand the extent to which this increase is associated with changes in patient characteristics that reflect real case-mix change vs. changes in agency coding practices or other nominal factors.

Most of the case-mix change that occurred between the baseline period and either 2006 or 2007 was not associated with changes in the prevalence of the independent variables included in the regression model and presumably reflects changes in agency coding practices or other nominal factors (i.e., case-mix creep). Our estimate is that 88.851% of the case-mix change that occurred between the baseline period and 2006 is unpredicted, as is 90.226% of the case-mix change that occurred between the baseline period and 2007.

As we continue to update these models, we find very little change in real (or predicted) case-mix. This is because the mean values for most of the variables in the model do not change much over time. Predicted case-mix was actually slightly lower in 2007 than it was in 2006, falling from 1.1136 to 1.1120. Given the increase in actual case-mix that occurred during this period, the gap between actual and expected case-mix continues to increase, with a higher proportion of the increase attributable to nominal factors.