S&P Healthcare Economic Hospital Indices Methodology

May 2012
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Introduction

In an environment of increased awareness and regulation of the healthcare industry, it is important to understand and monitor current changes in healthcare costs. Such monitoring could help reduce uncertainty for the general public, insurers, employers and other market participants, in addition to helping private and government organizations better understand the primary components driving increases in healthcare costs.

The S&P Healthcare Economic Hospital Indices (the Indices) are intended to reflect the rate of change in allowed claim costs for the Medicare and Commercial Health Insurance populations over time. More specifically, the Indices are designed to estimate the per capita change in revenues accrued by hospital inpatient and outpatient facilities each month for services provided to patients covered under traditional Medicare and Commercial Health Insurance programs in the United States. In turn, since patient service revenues accrued by hospitals are analogous to the claim costs incurred by patients (through their copayments) and their benefit plans for services rendered by hospitals, the Indices also seek to estimate the per capita change in Total Allowed Claim Costs.

This methodology describes the S&P Healthcare Economic Hospital Index (the Hospital Index), the S&P Healthcare Economic Hospital Medicare Index (the Medicare Index) and the S&P Healthcare Economic Hospital Commercial Index (the Commercial Index), which are designed to estimate per capita changes in hospital claims incurred by these two major segments of the insured population.
Index Family


<table>
<thead>
<tr>
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<th>COMPOSITE</th>
<th>Healthcare Provider:</th>
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<tbody>
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</tr>
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<tr>
<td>MEDICARE</td>
<td>S&amp;P Healthcare Economic Commercial Index</td>
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</tr>
<tr>
<td>COMMERCIAL</td>
<td>S&amp;P Healthcare Economic Professional Services Commercial Index</td>
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</table>

Partnership

The development of the S&P Healthcare Economic Indices is the result of collaboration between S&P Indices and Health Index Advisors (HIA), a joint venture between Aon Hewitt and Milliman Inc. The index methodology for this series was derived in part from Milliman’s proprietary Health Cost Index™ (HCI) model which Milliman has been publishing for its clients since 1987.

Index Rationale

The Indices are designed to provide an independent, timely estimate of the change in the principal cost components of the U.S. healthcare market. In 2009, U.S. national health expenditures (NHE) totaled US$ 2.49 trillion, of which US$ 2.09 trillion (or 84%) was attributable to personal healthcare expenses (PHC). Hospital services, the approximate scope for the Indices in this methodology, represented nearly 40% of PHC. Another 30% were related to various professional service expenditures, the approximate scope for the Professional Services Indices. Together, these two categories represented the largest components of national health expenditures, comprising nearly 70% of PHC and about
55% of NHE. The remaining 30% and 45%, respectively, is fragmented among several categories (prescription drugs, dental services, home healthcare, etc.) none of which represents more than 10% of NHE\(^1\). As such, the S&P Healthcare Economic Indices seek to reflect changes in the two largest components of healthcare expenditures in the United States.

The methodology for this index family was adapted from the HCI, an index that estimates the aggregate change in healthcare cost trends, which Milliman introduced to the healthcare market more than 20 years ago. Then, as now, there were no other sources of public data which provided direct measurement of the monthly claim costs incurred by either the Medicare or Commercial Health Insurance populations in the United States. As such, the HCI indices were developed from an economic model based on publicly available data which have a logical relationship to patient service revenues. For more than 20 years, the original HCI model has been broadly used as one of the primary benchmarks in the healthcare industry.

Prior to the development of the S&P Healthcare Economic Indices, the healthcare and actuarial experts at HIA refined the HCI calculation model and tested the resulting pro-forma history against quarterly Medicare records, historical HCI results, and sample employer and insurer claims data provided to HIA. While the tests produced high correlations, it should be noted that the Indices are market indicators, not actual measures of hospital patient service revenues. In reconciling potential differences between the Indices and a market participant’s individual experience, healthcare insurers, providers and users must recognize the impact of regional, industry, or firm-specific differences in determinants of supply and demand.

The economic model comprises two major phases. The first phase estimates changes in hospital service revenues and the second phase segments these changes into Medicaid/Uninsured, Commercial, and Medicare (more calculation detail is available in the Index Construction section, which follows).

The logic underlying the first phase rests on the assumption that patient service revenues are highly correlated to changes in hospital employment, wages and benefits. This assumption is based on the following insights into the hospital industry:

- The average prices hospitals receive for patient services vary yearly, but are often fixed through Medicare fee schedules or multi-year contracts between hospitals and commercial plans. This means that apart from negotiated contractual price increases, patient service revenues are largely influenced by fluctuations in the quantity or type of services provided.
- Due to the labor-intensive nature of healthcare services, changes in the quantity or type of services provided are closely correlated with changes in employment, wages and benefits.

---

\(^1\) Source: Centers for Medicare & Medicaid Services; National Health Expenditure Data. "Table 2. National Health Expenditures Aggregate Amounts and Average Annual Percent Change, by Type of Expenditures: Selected Calendar Years 1960-2008." Web. 07 June 2010.
• Overall employee compensation is the largest cost component in the hospital industry, representing approximately 60% of non-capital expenditures\textsuperscript{2}. In the short-term, compensation is the primary lever hospital managers use to control for anticipated fluctuations in patient service revenues.

Changes in hospital compensation costs (employment, wages and benefits) are, therefore, used as a predictor of change in hospital patient service revenues. Intuitively, other cost components, such as the fixed costs associated with infrastructure, are not included since (1) their inflexible nature makes it unlikely to track with short-term changes in patient service revenues; and (2) the addition or contraction of real estate or equipment can result in related changes to employment, wages and benefits.

There are many factors that affect the general supply and demand for patient services and the resulting revenue in the hospital industry. Such factors include changes in utilization (the rate at which services are used by the population), new services and technology, changes in benefit coverage, and contractual reimbursement provisions. The S&P Healthcare Economic Hospital Indices do not try to account directly for all of these factors. Rather, they are designed to capture material changes to supply and demand in the hospital industry by incorporating economic variables and other adjustments described herein and as applied to the aggregate hospital industry.

\textit{Please refer to the Glossary for a list of defined terms used throughout this document.}

Index Construction

Index Levels and Monthly Percentage Changes

The use of indices to measure changes of different variables over time is well established in economics and finance. Common examples include the S&P 500® for the U.S. stock market and the Consumer Price Index (CPI), published by the U.S. government. Formally, one speaks of an index number or index level and calculates changes over a period of time from this level. For example, the value of the S&P 500 at the end of March 2010 was 1169.43 and at the end of April 2010 was 1186.69. These figures are calculated from stock prices and related information about companies included in the index. From this, the percentage change from the end of March to the end of April is calculated as:

\[
\left( \frac{1186.69}{1169.43} - 1 \right) = 0.015
\]

or, in symbols:

\[
\frac{X_t}{X_{t-1}} - 1 = \text{Change}
\]

where:
- \( X_t \) is the index level at time \( t \)
- \( X_{t-1} \) is the index level at time \( t-1 \)

The value (0.015) can also be stated as 1.5%. The 0.015 is sometimes termed a decimal percent to distinguish it from 1.5%.

In a similar manner, one can calculate the percentage change over any time period given the value for the index level at the start and end of the period. The above equation can be rearranged to calculate the final level from the previous level and the change:

\[
X_t = (1 + \text{change}) \cdot X_{t-1}
\]

These Indices are calculated by first calculating the Change, as described later in this document and, then, building the index levels by repeated use of the equation given...
above. The end result is a series of index levels that can be used to calculate changes between any month and any other month in the given index.

**Medicare and Commercial Hospital Indices**

The objectives of the S&P Healthcare Economic Hospital Medicare Index (the Hospital Medicare Index) and the S&P Healthcare Economic Hospital Commercial Index (the Hospital Commercial Index) are to use publicly available data to estimate the per capita change in revenues accrued by hospital and out-patient facilities for services provided to patients covered under the traditional Medicare and commercial insurance programs. As revenues accrued by hospitals are analogous to the claim costs incurred by patients and their benefit plans, the Indices also estimate the per capita change in Total Allowed Claim Costs for the Medicare and commercial insurance populations (including the self-insured).

*As described previously, throughout this methodology the indices refer to month-over-month percent changes in total allowed claim costs per capita (Total Allowed Claim Costs). When published, the indices are presented as levels or annual rates of change.*

The monthly change in Total Allowed Claim Costs (hereafter referred to as X) is comprised of (1) a Commercial Health Insurance component, the Hospital Commercial Index (hereafter referred to as SPMDEHC), (2) a Medicare component, the Hospital Medicare Index (hereafter referred to as SPMDEHM), and (3) a Medicaid and uninsured component (hereafter referred to as Y). Publicly available data make it possible to estimate monthly percent changes in both the Total Allowed Claim Cost trends and the Medicare component of the cost trends. From there we derive the commercial component.

Please note, more specific detail on input variables in this methodology can be found in the section titled Monthly Input Data.

The index which estimates the monthly change in the S&P Healthcare Economic Hospital Medicare Index (SPMDEHM) is developed from the following formula:

\[
\text{Monthly change to SPMDEHM} = \left(1 + HE\right) \times \left(1 + MHFU\right) \times \left(1 + \left(PSM \times 0.1\right)\right) \times \left(1 + P & I\right) \times \left(1 + IWD\right)
\]

where:

- \(HE\) = Hospital Employment monthly growth rate
- \(MHFU\) = Medicare Hospital Fee Update monthly growth rate
- \(PSM\) = Professional Services Malpractice monthly growth rate
  [note: only included when PSM is greater than 0]
- \(P & I\) = Pneumonia and Influenza incidence monthly growth rate
- \(IWD\) = Incurred Working Days monthly growth rate
The Hospital Employment growth rate is measured as the rate of growth in the ratio of total hospital employees compared to the total U.S. population.

The Medicare Hospital Fee Update is the percentage change in the reimbursement rates received by hospitals from Medicare for inpatient and outpatient services.

Professional Services Malpractice growth rate measures the month-over-month change in premiums paid by physicians for liability insurance. In this model, for every dollar the malpractice rates increase, total Medicare costs are increased by 10 cents, or a multiplicative factor of 0.13. However, the model only takes this into account when malpractice rates are rising. In other words, it is assumed that if malpractice rates go down, doctors will not reduce their services; but if rates go up, doctors may increase their services resulting in an increase in consumer healthcare utilization. The multiplicative factor used in the equation is, therefore, a measure of the impact of a change in malpractice premiums on Medicare hospital claims utilization which are not reflected in Medicare rates defined in Medicare Hospital Fee Update.

The Pneumonia and Influenza (P&I) Incidence growth rate measures the monthly variation in flu seasons, since more severe flu seasons cause increased hospital use. This variable is the ratio of flu deaths to the total number of deaths from all diseases in the sample data. The mortality ratio is used because increased death rates from P&I are correlated with increases in more severe flu cases, which require treatment from a hospital facility.

The Incurred Working Days growth rate reflects the variability in working day by month, which causes changes in relative claim costs due to the mix of weekends, holidays, etc., over the course of a given month.

The monthly change in Total Allowed Claim Costs (X) is developed from the following formula:

\[
\text{Monthly Change to Total Allowed Claim Costs} = X = (1 + HWEB)*(1 + HE)*(1 + EG)*(1 + P & I)*(1 + IWD)
\]

where:

\[
\begin{align*}
HWEB &= \text{Hospital Wages and Employee Benefits monthly growth rate} \\
HE &= \text{Hospital Employment monthly growth rate} \\
EG &= \text{Excess Growth of Hospital Net Revenue over Labor Costs} \\
P&I &= \text{Pneumonia and Influenza monthly growth rate} \\
IWD &= \text{Incurred Working Days monthly growth rate}
\end{align*}
\]

3 This assumption is drawn from the study *Malpractice Liability Costs And The Practice Of Medicine In The Medicare Program*, by Katherine Baicker, Elliott S. Fisher, and Amitabh Chandra.
Growth rates in Hospital Wages and Employee Benefits together make up the compensation component of the index.

The Hospital Employment growth rate is measured as the rate of growth in the ratio of total hospital employees compared to the total U.S. population.

The Excess Growth of Hospital Net Revenue over Labor Costs variable is the difference between hospital revenue and hospital labor costs, further defined in item (3) in Monthly Input Data below.

The Pneumonia and Influenza (P&I) Incidence growth rate measures the monthly variation in flu seasons, since more severe flu seasons cause increased hospital use. This variable is the ratio of flu deaths to the total number of deaths from all diseases in the sample data. The mortality ratio is used because increased death rates from P&I are correlated with an increase in more severe flu cases, which require treatment from a hospital facility.

The Incurred Working Days growth rate reflects the variability in working day by month, which causes changes in relative claim costs due to the mix of weekends, holidays, etc., over the course of a given month.

Once the Medicare (SPMDEHM) and Total Allowed Claim Cost \((X)\) indices are derived, the effects of Medicaid and Uninsured \((Y)\) are removed from \(X\) in order to calculate the Commercial and Medicare composite index (hereafter referred to as SPMDEH). The effects of SPMDEHM are, then, removed from SPMDEH to derive a preliminary Commercial Index. This Commercial Index is then adjusted based on information derived from the Patient Protection and Affordable Care Act (PPACA) and the American Recovery and Reinvestment Act (ARRA), both of which instituted changes to the healthcare system in 2009 and 2010. These changes resulted in an increase in the commercially insured population. Once incorporated, these index adjustments result in the final Commercial Index (SPMDEHC).

Please note, more specific detail on the adjustment can be found in the section titled Monthly Input Data.

As stated above, the Hospital Commercial Index (SPMDEHC) is developed in three stages; first removing the Medicaid and Uninsured \((Y)\) from the Total \((X)\), leaving Medicare and Commercial (SPMDEH); second, removing the Medicare component (SPMDEHM) from the variable to arrive at the preliminary Hospital Commercial Index; and finally adjusting the Hospital Commercial Index based on the PPACA and ARRA.

The first step of removing Medicaid and Uninsured proceeds as follows:

\[
\text{Monthly Change to Hospital Medicare and Commercial Index (SPMDEH) =} \frac{X - (Y \times W_{MCD})}{I - W_{MCD}}
\]
where $W_{MCD}$ is the weight of Medicaid and Uninsured components of the index relative to the Total (Medicaid, Uninsured, Medicare, and Commercial) and is calculated as:

$$W_{MCD} = \frac{\text{Medicaid + Uninsured}}{\text{Medicaid + Uninsured + Medicare + Commercial}}$$

Please note: These weights are based on dollars spent in each component and are reviewed and updated annually by HIA. They are further described in the section Index Maintenance.

The next stage removes Medicare from the combined Medicare and Commercial index:

$$\text{Monthly Change to Hospital Commercial Index (preliminary)} = \frac{\text{SPMDEH} - (\text{SPMDEHM} \times W_M)}{1 - W_M}$$

where $W_M$ is the weight of the Medicare component of the index relative to the sum of Medicare and Commercial and is calculated as:

$$W_M = \frac{\text{Medicare}}{\text{Medicare + Commercial}}$$

The final stage makes an adjustment to the Commercial Hospital Index. These commercial trends are adjusted further to reflect two provisions in the Patient Protection and Affordable Care Act (PPACA) and the American Recovery and Reinvestment Act (ARRA). Under the PPACA, children can extend coverage under their parent’s healthcare plan to age 26\(^4\). These enrollees might have otherwise been uninsured, but are now covered under commercial insurance. The department of Health and Human Services estimated a 2.37 million person enrollment increase resulting from this provision of the reform act\(^5\). Coverage became available in September 2010, but many insurers instituted the change earlier, in June 2010. This provision has a dampening impact on commercial growth trends, since the newly insured segment has a significantly lower claim costs than the originally insured, likely due to the fact that younger people are relatively healthier than older adults. Both hospital and professional services commercial trends are affected by this change.

The second provision affecting commercial healthcare costs stems from the American Recovery and Reinvestment Act (ARRA), which provided a COBRA subsidy for individuals whose employment terminated between March 2009 and May 2010\(^6\). Under


this provision, qualifying individuals were eligible for a federal subsidy paying 65% of the COBRA premium. The reduced premium was available to those eligible prior to May 2010 for a 15-month period. COBRA administrator, Ceridian Services, reported an increase in COBRA enrollment from 12.4% to 17.7% of eligible participants after the 65% COBRA subsidy was included in the stimulus plan. Individuals who opted for COBRA coverage were typically up to two times the average per capita cost, because only the sickest took this coverage due to the high cost. The subsidy encouraged a significant increase in those selecting this option in 2009 relative to normal rates, but this still represented only a small percentage of those who were eligible. This increase in enrollment is being phased out as the subsidy ends.

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Monthly Input Data

The input variables used in estimating the S&P Healthcare Economic Hospital Medicare and Commercial Indices are detailed below. Not all variables are used in both indices.

1. Hospital Wages and Employee Benefits

Hospital wages and employee benefits together measure the total compensation of hospital employees, and are used to estimate hospital patient services revenue.

*The Wage Component* is derived as the weighted average of the average weekly earnings of production workers, weighted by the number of employees for each type of hospital facility. Both the weekly earnings and the number of employees are published monthly by the Bureau of Labor Statistics (BLS). For the purposes of these calculations, four different categories of facilities, defined by the BLS, are used.

Hospital wages are estimated using the average weekly earnings of production and nonsupervisory employees and total employment in:

- General medical and surgical hospitals
- Other specialty hospitals
- Outpatient mental health centers
- Psychiatric and substance abuse hospitals

Average hospital earnings per employee are calculated as the weighted average of the average weekly earnings of production workers for each hospital type and their corresponding employees:

\[
\text{Average Hospital Earnings} = \frac{\text{Total Hospital Weekly Earnings}}{\text{Total Hospital Employees}}
\]

where

Total Hospital Weekly Earnings = \( \sum_{n=1}^{4} (\text{Weekly earnings}_n \times \text{employees}_n) \)

Total Hospital Employees = \( \sum_{n=1}^{4} \text{employees}_n \)

\( n = \) hospital facility type,

1. General medical and surgical hospitals
2. Other specialty hospitals
3. Outpatient mental health centers
4. Psychiatric and substance abuse hospitals

*The Benefit Component* is the total benefit cost per hour worked for hospitals reported by the BLS on a quarterly basis. The monthly values are obtained by interpolation of the quarterly values. Furthermore, a three-month lag is used because of the lag in reporting.
These two series – wages and benefits – are stated as indices and combined using a weight of 79.2% for wages and 20.8% for benefits. The weights are based on research by HIA, as further defined in the following section.

2. Hospital Employment, Adjusted for the Medicare and Commercial Population

The total number of hospital employees is calculated as described in the Hospital Wages and Employee Benefit section above. The growth rate in hospital employment is discounted by the growth rate in the total U.S. population, which is based on postcensal monthly estimates, and can be found on the Census Bureau’s Web site.

3. Excess Growth of Hospital Net Revenue over Labor Costs

This represents an adjustment of the estimate of total hospital patient service revenue using hospital labor costs. The adjustment is achieved by looking at the historic annual difference between aggregate hospital revenues and hospital labor costs, and applying such differences to the model. This variable is calculated as the ratio of a moving average hospital net revenue growth rate to a moving average hospital labor expense growth rate. Hospital data are available and applied to the model with a two-year lag. These data are updated each year in January.

4. Medicare Hospital Fee Update

Medicare reimburses inpatient hospital claims using the Prospective Payment System (PPS), where patients are classified into Diagnosis Related Groups (DRG) and, more recently, Medicare Severity Adjusted DRGs (MSDRG). Each DRG and MSDRG is paid to the hospital under a pre-determined formula with some other adjustments.

Similarly, Medicare outpatient hospital services are reimbursed through the Medicare Ambulatory Payment Classification (APC) system. These reimbursements are increased or decreased every year by Medicare’s fee updates.

Medicare Hospital Fee Updates are published by the Office of the Federal Register (Federal Register) with a preliminary estimate and, then, a final regulation published, according to law, well before the start of the update period. These updates can be overridden by Congress, or are subject to technical corrections. Changes made and effective are incorporated into the model as soon as practical. Revisions are generally included in the index, but the nature of the change may first require further analysis before a final decision is made by the Index Committee. Any additional legislative changes that affect Medicare costs, reimbursement or utilization are taken from the notice in the Federal Register or from legislative cost estimates, if Federal Register notice is not available. Such changes are included in the index as soon as possible after they become effective. The Hospital Fee update includes a weighting of the update factors for Inpatient and Outpatient services.

The weights used in the various fee updates are calculated from historical reimbursement data from the Centers for Medicare and Medicaid Services (CMS) plus the estimated patient liabilities for those services. The CMS publishes data sets, referred to as the 5%
Sample (Medicare 5% Sample), for inpatient and outpatient services that are based on using a 5% sample of the claims. The Medicare 5% Sample data are used to calculate estimated patient liabilities. The allowed expenditures for Inpatient and Outpatient services are used to derive the relative weights of the two components. The table below uses the 2007 Medicare 5% Sample to calculate 2010 weights, with the same lag in the calculation of the prior years. In future years, the most recent Medicare 5% Sample data available will be used.

<table>
<thead>
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<th>5% Sample Year</th>
<th>Update Year</th>
<th>Inpatient Hospital</th>
<th>Outpatient Hospital</th>
</tr>
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<tbody>
<tr>
<td>2005</td>
<td>2003</td>
<td>72.2%</td>
<td>27.8%</td>
</tr>
<tr>
<td>2005</td>
<td>2004</td>
<td>72.2%</td>
<td>27.8%</td>
</tr>
<tr>
<td>2005</td>
<td>2005</td>
<td>72.2%</td>
<td>27.8%</td>
</tr>
<tr>
<td>2005</td>
<td>2006</td>
<td>72.2%</td>
<td>27.8%</td>
</tr>
<tr>
<td>2005</td>
<td>2007</td>
<td>72.2%</td>
<td>27.8%</td>
</tr>
<tr>
<td>2005</td>
<td>2008</td>
<td>72.2%</td>
<td>27.8%</td>
</tr>
<tr>
<td>2006</td>
<td>2009</td>
<td>71.6%</td>
<td>28.4%</td>
</tr>
<tr>
<td>2007</td>
<td>2010</td>
<td>71.3%</td>
<td>28.7%</td>
</tr>
<tr>
<td>2008</td>
<td>2011</td>
<td>70.9%</td>
<td>29.1%</td>
</tr>
<tr>
<td>2009</td>
<td>2012</td>
<td>69.9%</td>
<td>30.1%</td>
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These weights are calculated and updated by HIA on an annual basis.

Please note, the 2005 Medicare 5% Sample weights are applied to 2003 through 2008 since earlier data were not available.

Hospital Inpatient Fee updates are effective for the hospital fiscal year beginning October 1st, whereas the effective dates of Hospital Outpatient Fee updates coincide with the calendar year. For the monthly indices, any fee increases will impact the indices every October and January, provided there is no delay in implementing the updates.

For example, if the percentages spent on Hospital Inpatient and Hospital Outpatient services were 75.5% and 24.5%, and the payment updates were reported as 3.0% and 4.0%, respectively, the payment update applied beginning in October would equal:

\[
0.03 \times 0.755 + 0 \times 0.245 = 2.265\%
\]

and the payment update beginning in January would equal:

\[
0 \times 0.755 + 0.04 \times 0.245 = 0.98\%
\]
5. Professional Services Malpractice

Malpractice insurance provides liability coverage for doctors and hospitals in the event of a malpractice suit. This variable reflects professional liability premium cost data for professional services, published by the CMS. It can be found on the CMS Web site.

These data are published quarterly. Monthly values are derived by the interpolation of the quarterly values. The malpractice series used in the model is calculated with month-to-month comparisons of the interpolated index values. It is applied to the model with a 10% weight, but is not applied when premium growth rates are less than zero. This variable is intended to represent the impact of defensive medicine on hospital costs. These data are lagged nine (9) months in the model, due to the timing of the CMS publication.

6. Medicaid and Uninsured vs. Total Hospital PPI

The Producer Price Index (PPI) is a measure of wholesale prices received by domestic producers and is published monthly by the BLS. To estimate the Medicaid and Uninsured effect, a ratio of the monthly growth rates of Medicaid Patient PPI to Total Hospital PPI is calculated. This ratio seeks to approximate Medicaid and Uninsured cost changes relative to total hospital cost changes. In addition to using this measure for Medicaid itself, the Medicaid Patient PPI is also used as a proxy for hospital costs of the uninsured population.

The costs attributed to the Medicaid and Uninsured population are, then, removed from the Total Allowed Claim Costs as shown in the Medicare and Commercial Hospital Indices section above.

7. Pneumonia and Influenza

This variable is the ratio of deaths caused by pneumonia and influenza (P&I) in 122 U.S. cities relative to the number of deaths from all diseases in the same cities. These deaths are tracked weekly in the Morbidity and Mortality Weekly Report (MMWR) published by the Centers for Disease Control and Prevention (CDC). Current and recent historical volumes of the MMWR are available on the CDC Web site.

The model requires converting the weekly data into a monthly statistic. For example, the month of December, 2008 includes six days from the week ending December 6th, the full weeks ending December 13th, 20th, and 27th, and four days from the week ending January 3rd 2009. These weeks had 840, 832, 791, 533, and 693 deaths due to P&I, respectively. The total number of deaths caused by P&I for the month of December, 2008 is calculated as:

\[
\left[ 840 \times \left( \frac{6}{7} \right) \right] + 832 + 791 + 533 + \left[ 693 \times \left( \frac{4}{7} \right) \right] = 3,272
\]

This determination is drawn from the study *Malpractice Liability Costs And The Practice Of Medicine In The Medicare Program*, by Katherine Baicker, Elliott S. Fisher, and Amitabh Chandra.
Total deaths are prorated in a similar manner.

The changes in P&I costs use a three-year base period for comparison (October 2005 to September 2008). First a monthly variation in the influenza costs relative to this baseline is determined. During each month of the base period, the number of deaths due to pneumonia and influenza was compared to the total number of deaths from all diseases reported by the CDC. An average ratio was, then, calculated for each one of the 12-months based on the monthly values from each relevant year of this three-year period. For example, the December ratio is the average of December 2005, 2006 and 2007 and the January ratio is the average of January 2006, 2007, and 2008. Following this, the percentage of P&I deaths for each month is compared to the average rate in the entire October 2005 through September 2008 period. For example, in January 2009, the percentage of P&I deaths was 7.15% and the January three-year average rate was 7.37%, resulting in a ratio of 0.9701. Therefore, the January 2009 rate was 2.99% below average.

\[
\left( \frac{0.0715}{0.0737} \right) - 1 = 0.9701 - 1 = -0.0299 = -2.99\%
\]

Quarterly influenza cost weights are, then, applied to the monthly death rate relative to the baseline (October 2005 to September 2008). Because influenza costs vary seasonally, with the first quarter of each calendar year usually being highest and the third quarter the lowest, the excess or deficiency for each month is multiplied by an estimated quarterly percentage of pneumonia and influenza costs. Using January 2009 again as an example, the deficiency of 2.99% is offset a bit, as it is multiplied by the first quarter influenza cost weight of 7.7% (see the table below), resulting in an adjusted influenza ratio of 0.9976. The month-over-month change in this index provides the variable used in the model.

\[
\left[ \left( \frac{0.0715}{0.0737} \right) - 1 \right] * 0.077 = [0.9701 - 1]* 0.077 = -0.0023 = -0.23\%
\]

These influenza costs are developed by Milliman using three years of quarterly Medicare allowed charge data for Hospital Inpatient (October 2005 - September 2008) and Outpatient care (January 2006 - December 2008). Similar data were analyzed for the aggregate hospital universe and a quarterly percentage of P&I cost is developed for the commercial index (SPMDEHC). The weights below were used for all years of the index to date, since this research was recently completed and earlier data weren’t readily available. These P&I weights will be updated by Milliman every three years beginning with the January Index in 2013.
<table>
<thead>
<tr>
<th>Quarter</th>
<th>Medicare Weight</th>
<th>Total Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>7.7%</td>
<td>5.0%</td>
</tr>
<tr>
<td>2</td>
<td>6.5%</td>
<td>4.1%</td>
</tr>
<tr>
<td>3</td>
<td>5.6%</td>
<td>3.6%</td>
</tr>
<tr>
<td>4</td>
<td>6.4%</td>
<td>3.9%</td>
</tr>
</tbody>
</table>

These factors are calculated and updated by Milliman once every three years.

8. Incurred Working Days

The mix of working days in a month can have a significant impact on relative accrued patient service revenues, especially on a monthly and quarterly basis. The annual impact is much less. For example, hospital revenues derived from claims incurred on Mondays are about 25-30% above the average, with claims declining during the rest of the week to less than half of the average on some weekends and holidays. Also, holidays vary with Thanksgiving and Christmas being the lowest claim cost days of the year; some holidays are more like weekends (e.g., Independence Day and Memorial Day), while others have minimal impact.

The holidays included in the analysis are:

1. New Year’s Day
2. Martin Luther King Day
3. Presidents’ Day
4. Memorial Day
5. Independence Day
6. Labor Day
7. Thanksgiving Eve
8. Thanksgiving
9. Day after Thanksgiving
10. Christmas Eve
11. Christmas
12. Day after Christmas
13. New Year’s Eve

Milliman has calculated a weight, or relative value factor, for each day and holiday in each month. Each of the holidays above has a relative value factor lower than its normal day of the week equivalent. Excluding holidays, all other days of the week have their own average factor.

The incurred days adjustment is applied to the change in total hospital costs. For example, a change in days of 2.4% in a given month along with a change in total hospital costs of 7.1% results in a day-adjusted cost change of \((1.024 \times 1.071) - 1 = 9.67\%\) for that month.
9. Medicare Adjusted for the Commercial Index (SPMDEHC)

In order to derive the Hospital Commercial Index (SPMDEHC), the impact of Medicare on the combined Medicare and Commercial Index is removed. This is accomplished by measuring the percentage that Medicare represents of the combined index as the ratio of Medicare expenditures to combined expenditures (including estimated copayments and deductibles). This ratio is derived annually by HIA from the National Health Expenditure (NHE) data.

Subsequent to 2008, the weights derived each year were applicable to each month in the calendar year. However, the severity of the economic recession that took hold in 2008 had an adverse impact on the population covered by commercial insurance. The increase in Medicaid and Uninsured rolls were much greater compared to past recessions. This movement of the insured segment into other groups (Medicaid, Uninsured, etc.) meant that the weights derived annually needed to change monthly to reflect the change in mix amongst the different groups, especially since they are covered at different per member costs. Data published by the Employee Benefits Research Institute (EBRI) provides a population cross section by type of insurance, which makes it possible to calculate the allocation of healthcare dollars amongst each category for each month. The monthly weights are calculated from these new monthly dollar amounts.

To account for the fact that the Indices seek to measure total allowed claims which include the claim amount patients will pay in the form of copayments and deductibles, the NHE Hospital Medicare payments are converted to Medicare allowed dollars by grossing up the Medicare NHE by the ratio of allowed dollars to paid dollars from the Medicare 5% Sample for Inpatient and Outpatient Hospital claims. This product is divided by the total NHE Hospital Expenditures excluding Other Private Funds and Medicaid.

The January 2011 Medicare weight is calculated as follows, using Medicare as a percentage of Medicare plus Commercial costs:

\[
\left( \frac{248,486}{248,486 + 309,135} \right) = 0.4456
\]

The Hospital Medicare impact is, then, removed from the combined Medicare and Commercial index using a method identical to the one for removing Medicaid and Uninsured effects from the Total, as shown in the prior section.

**Restatements**

The indices are published monthly on the third Thursday of each month with an approximate 7-week lag. Each monthly publication will include restated historical index levels in addition to the most recent calculation month.

As described earlier, the calculation model incorporates data from several government sources. This data is often restated by the government as new information is received. The restatement of historical government data used in the index calculation model will therefore result in the restatement of the historical index levels.
Base Dates

The Indices levels are based to 100 in January 2003, the inception of the pro-forma history.
Index Maintenance

**Annual Rebalancing**

Index weights are reviewed annually by the Index Committee and are updated, when needed, once a year in January, when HIA updates proprietary weights and growth rates used in the model as follows below. Other statistics may be updated by their original sources or by HIA at times noted below.

1. **Hospital Wages and Employee Benefits Weights**

The Hospital Wages series and Hospital Employee Benefits series are combined linearly using the weights displayed in the following table:

<table>
<thead>
<tr>
<th>Update Year</th>
<th>Wages</th>
<th>Employee Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY 2003</td>
<td>82.2%</td>
<td>17.8%</td>
</tr>
<tr>
<td>FY 2004</td>
<td>82.2%</td>
<td>17.8%</td>
</tr>
<tr>
<td>FY 2005</td>
<td>82.2%</td>
<td>17.8%</td>
</tr>
<tr>
<td>FY 2006</td>
<td>82.2%</td>
<td>17.8%</td>
</tr>
<tr>
<td>FY 2007</td>
<td>79.2%</td>
<td>20.8%</td>
</tr>
<tr>
<td>FY 2008</td>
<td>79.2%</td>
<td>20.8%</td>
</tr>
<tr>
<td>FY 2009</td>
<td>79.2%</td>
<td>20.8%</td>
</tr>
<tr>
<td>FY 2010</td>
<td>79.2%</td>
<td>20.8%</td>
</tr>
<tr>
<td>FY 2011</td>
<td>79.2%</td>
<td>20.8%</td>
</tr>
<tr>
<td>FY 2012</td>
<td>79.2%</td>
<td>20.8%</td>
</tr>
</tbody>
</table>

These weights are monitored by HIA on an annual basis and updated as needed.

Hospital wages and benefits as a percent of total compensation are drawn from the Centers for Medicare and Medicaid Services (CMS) Market Basket, reflecting price inflation facing providers. Approximately every five years, CMS rebases the market basket to reflect the most recent weights. The market basket data are available on the CMS Web site.
For example, if the changes in Hospital Wages and Hospital Employee Benefits are 3.0% and 4.0%, respectively, the FY 2009 weighted change in Hospital Wages and Employee Benefits would equal: 0.03 * 0.792 + 0.04 * 0.208 = 3.21%

2. Hospital Employment, Adjusted for the Medicare and Commercial Population

Periodically, the population and employment statistics are revised or rebased by the Bureau of Labor Statistics. The most recent data were used in the development of this model.

3. Excess Growth of Hospital Net Revenue over Labor Costs

Hospital revenue and labor cost data are available and applied to the model with a lag. These data are updated each year in January, which is when any changes from the prior year’s estimates will be seen in the model.

<table>
<thead>
<tr>
<th>Index Year</th>
<th>Labor Cost Growth</th>
<th>Revenue Growth</th>
<th>Excess Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>3.36%</td>
<td>3.54%</td>
<td>0.17%</td>
</tr>
<tr>
<td>2004</td>
<td>4.65%</td>
<td>4.76%</td>
<td>0.11%</td>
</tr>
<tr>
<td>2005</td>
<td>5.52%</td>
<td>5.68%</td>
<td>0.15%</td>
</tr>
<tr>
<td>2006</td>
<td>5.94%</td>
<td>6.28%</td>
<td>0.31%</td>
</tr>
<tr>
<td>2007</td>
<td>5.90%</td>
<td>6.31%</td>
<td>0.39%</td>
</tr>
<tr>
<td>2008</td>
<td>5.77%</td>
<td>6.02%</td>
<td>0.24%</td>
</tr>
<tr>
<td>2009</td>
<td>4.74%</td>
<td>5.12%</td>
<td>0.36%</td>
</tr>
<tr>
<td>2010</td>
<td>4.50%</td>
<td>4.74%</td>
<td>0.22%</td>
</tr>
<tr>
<td>2011</td>
<td>4.20%</td>
<td>4.47%</td>
<td>0.25%</td>
</tr>
<tr>
<td>2012</td>
<td>3.95%</td>
<td>4.36%</td>
<td>0.39%</td>
</tr>
</tbody>
</table>

These weights are calculated and updated by HIA on an annual basis.

4. Medicare Hospital Fee Update

The weights used in the various fee updates are calculated by looking at historical reimbursement data from the Medicare Hospital 5% Sample, plus the estimated patient liabilities for those services. The allowed expenditures for Inpatient and Outpatient services are used to derive the relative weights of the two components. The 2007 Medicare 5% sample is used to calculate 2010 weights, with the same lag in the calculation of the prior years. In future years, the most recent Medicare 5% Sample data available will be used. These weights are updated with the October payment update, which is the normal Medicare payment update cycle.
5. Medicaid and Uninsured vs. Total Hospital PPI

The weights for the Medicaid and Uninsured costs are updated annually in January by HIA. The Medicaid and Uninsured weight is developed from the National Health Expenditures (NHE), published by the CMS. The weight for Medicaid and Uninsured is developed by combining the total dollar amount for Medicaid, Medicaid State Children’s Health Insurance Program (SCHIP) Expansion Federal Funds, all State and Local Funds (with the exception of Workers’ Compensation), and Other Private Funds (which represents endowments and other charitable revenues) and dividing this sum by total dollars spent on Hospital Care. Due to reporting frequency and revisions, these data use a three year lag.

Subsequent to 2008, the weights derived each year were applicable to each month in the calendar year. However, the severity of the economic recession that took hold in 2008 had an adverse impact on the population covered by commercial insurance. The increase in Medicaid and Uninsured rolls were much greater compared to past recessions. This movement of the insured segment into other groups (Medicaid, Uninsured, etc.) meant that the weights derived annually needed to change monthly to reflect the change in mix amongst the different groups, especially since they are covered at different per member costs. Data published by the Employee Benefits Research Institute (EBRI) provides a population cross section by type of insurance, which makes it possible to calculate the allocation of healthcare dollars amongst each category for each month. The monthly weights are calculated from these new monthly dollar amounts.

The Medicaid and Uninsured weight for January 2011 is calculated as follows, using Medicaid plus Uninsured as a percentage of Total (Commercial + Medicaid + Uninsured + Medicare):

\[
\frac{(171,201 + 35,400)}{(309,135 + 171,201 + 35,400 + 248,486)} = 0.2703
\]
<table>
<thead>
<tr>
<th>Month Year</th>
<th>Medicaid and Uninsured Weight</th>
<th>Medicare and Commercial Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>January 2011</td>
<td>27.0%</td>
<td>73.0%</td>
</tr>
<tr>
<td>February 2011</td>
<td>26.9%</td>
<td>73.1%</td>
</tr>
<tr>
<td>March 2011</td>
<td>26.8%</td>
<td>73.2%</td>
</tr>
<tr>
<td>April 2011</td>
<td>26.7%</td>
<td>73.3%</td>
</tr>
<tr>
<td>May 2011</td>
<td>26.6%</td>
<td>73.4%</td>
</tr>
<tr>
<td>June 2011</td>
<td>26.5%</td>
<td>73.5%</td>
</tr>
<tr>
<td>July 2011</td>
<td>26.3%</td>
<td>73.7%</td>
</tr>
<tr>
<td>August 2011</td>
<td>26.2%</td>
<td>73.8%</td>
</tr>
<tr>
<td>September 2011</td>
<td>26.0%</td>
<td>74.0%</td>
</tr>
<tr>
<td>October 2011</td>
<td>25.8%</td>
<td>74.2%</td>
</tr>
<tr>
<td>November 2011</td>
<td>25.6%</td>
<td>74.4%</td>
</tr>
<tr>
<td>December 2011</td>
<td>25.4%</td>
<td>74.6%</td>
</tr>
</tbody>
</table>

These weights are calculated and updated by HIA on a monthly basis.

6. Professional Services Malpractice

The weight for this variable is drawn from the study *Malpractice Liability Costs And The Practice Of Medicine In The Medicare Program*, by Katherine Baicker, Elliott S. Fisher, and Amitabh Chandra. It will only be updated if a credible published study becomes available that indicates a need to change the current weight of 10%.

7. Pneumonia and Influenza

The influenza costs are developed by Milliman using three years of quarterly Medicare allowed charge data for Hospital Inpatient (October 2005 - September 2008) and Hospital Outpatient care (January 2006 - December 2008). Hospital Outpatient costs are very small compared to Hospital Inpatient costs. The weights detailed in the prior section were used for all years of the index to date, since this research was recently completed and earlier data were not readily available. These P&I weights will be updated by Milliman every three years beginning with the January Index in 2013.
8. Incurred Working Days

The mix of working days in a month can have a significant impact on relative levels of patient services revenue accrued by healthcare providers, especially on a monthly and quarterly basis. As such, the model incorporates working day factors, to adjust for the relative number of holidays and weekends in each month. The weights of these factors will be updated by Milliman every three years starting with the publication of the January 2013 index.

9. Medicare Adjusted for the Commercial Index (SPMDEHC)

The weights for the Hospital Medicare and Commercial Indices are updated annually in January. This is accomplished by measuring the percentage that Medicare represents in the combined index as the ratio of Medicare expenditures to combined Medicare and commercial expenditures (including estimated copayments and deductibles). This ratio is derived annually by HIA from National Health Expenditure (NHE) data.

The details of the calculations were presented in the prior section. All weights are shown in the table below.

<table>
<thead>
<tr>
<th>Month Year</th>
<th>Medicare Weight</th>
<th>Commercial Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>January 2011</td>
<td>44.6%</td>
<td>55.4%</td>
</tr>
<tr>
<td>February 2011</td>
<td>44.5%</td>
<td>55.5%</td>
</tr>
<tr>
<td>March 2011</td>
<td>44.5%</td>
<td>55.5%</td>
</tr>
<tr>
<td>April 2011</td>
<td>44.5%</td>
<td>55.5%</td>
</tr>
<tr>
<td>May 2011</td>
<td>44.5%</td>
<td>55.5%</td>
</tr>
<tr>
<td>June 2011</td>
<td>44.5%</td>
<td>55.5%</td>
</tr>
<tr>
<td>July 2011</td>
<td>44.4%</td>
<td>55.6%</td>
</tr>
<tr>
<td>August 2011</td>
<td>44.3%</td>
<td>55.7%</td>
</tr>
<tr>
<td>September 2011</td>
<td>44.3%</td>
<td>55.7%</td>
</tr>
<tr>
<td>October 2011</td>
<td>44.2%</td>
<td>55.8%</td>
</tr>
<tr>
<td>November 2011</td>
<td>44.2%</td>
<td>55.8%</td>
</tr>
<tr>
<td>December 2011</td>
<td>44.1%</td>
<td>55.9%</td>
</tr>
</tbody>
</table>

These weights are calculated and updated by HIA on a monthly basis.
Glossary

**Accrued Revenue.** The expected revenues based on published (Medicare) or pre-negotiated (commercial insurance) rates with benefit programs. They represent the total amount due to the provider from both the patient (through copayments) and the benefit program.

**Adjusted Hospital Employment.** The measure of hospital employment relative to the total US population. Calculated as follows:

\[
\frac{\text{Total hospital employees}}{\text{Total US population}}
\]

where total hospital employees are in:
- General medical and surgical hospitals
- Other specialty hospitals
- Outpatient mental health centers
- Psychiatric and substance abuse hospitals

**Commercial Health Insurance.** Commercial health insurance plans include major insurance providers and health benefit programs sponsored by large self-funded employer groups. Commercial health insurance plans for Medicare or for Medicaid and Medicare supplements are not included in the Indices.

**Diagnosis Related Groups (DRG).** A classification system used to categorize hospital admissions into common groups.

**Fee-For-Service.** Traditional insurance where healthcare providers are paid for each service on an individual fee basis.

**Health Cost Index™.** This is the proprietary Milliman healthcare cost index that was first published in 1987. It seeks to represent healthcare costs for the non-Medicare population (including Medicaid and Uninsured). The Health Cost Index estimates revenues that providers receive from healthcare payers. Similar to other indices, its numerical value at each point in time is relative to a base period.

**Hospital Claims.** This refers to either (1) patient service revenues accrued by hospital inpatient and outpatient facilities or (2) the total allowed claim costs incurred by patients and their benefit plans for services rendered by hospital inpatient and outpatient facilities.
**Hospital Employment and Wages.** These measure the number of hospital workers used for the model and their related wages. The data used in these models are published by the Bureau of Labor Statistics.

**Hospital Inpatient.** Hospital Inpatient care provides medical treatment to patients that are admitted to the hospital and stay overnight.

**Hospital Outpatient.** Hospital Outpatient care provides medical treatment in a hospital or outpatient facility, but does not require that the patient be admitted to the hospital.

**Hospital Producer Price Index (Hospital PPI).** The hospital PPI is a measure of wholesale prices for hospitals. The specific hospital category monitored in the model is *General Medical and Surgical Hospitals*. Within this category, a breakdown by payer is available for *Medicare Patients, Medicaid Patients, and All Other Patients*.

**Medicare Severity Diagnosis Related Groups (MSDRG).** A classification system used to categorize hospital admissions into common groups. Medicare uses MSDRGs to determine the amount it pays providers for different categories of service.

**Medicare.** A US government sponsored health insurance program administered by the Centers for Medicare and Medicaid Services (CMS). It provides health insurance for persons 65 and older, as well as those meeting certain eligibility criteria.

**Medicare Hospital Fee Updates.** These are the annual updates to Medicare reimbursement schedules for various hospital services.

**Medicaid.** A US state run health insurance program providing healthcare coverage for low income families. It is funded by both the State and Federal Governments. Eligibility for Medicaid coverage is means based, but qualification may also be available for people with certain disabilities.

**Medicaid SCHIP.** Medicaid State Children’s Health Insurance Program is similar to Medicaid, but provides matching funds to states for health insurance to families with children. The program was designed with the intent to cover uninsured children in families with incomes that are modest but too high to qualify for Medicaid.

**Producer Price Index (PPI).** A monthly economic statistic published by the US Bureau of Labor Statistics (BLS). The Producer Price Index measures the prices received by domestic producers for their output, also known as wholesale prices.

**Professional Services Malpractice Insurance.** Malpractice insurance protects health care providers against lawsuits alleging negligence. Medicare tracks the increase in malpractice premiums/costs as part of their process for updating physician fees.

**Prospective Payment System (PPS).** A payment system used by Medicare to reimburse providers of healthcare for services provided to Medicare beneficiaries. Providers are reimbursed a fixed amount for each type of service.
S&P Healthcare Economic Commercial Index (SPMDEC). The Index is designed to reflect the per capita change in monthly hospital and physician claims (reflecting both estimated payer and patient liabilities) for the commercial health insurance population. The Index is published monthly.

S&P Healthcare Economic Composite Index (SPMDE). The Index is designed to reflect the per capita change in monthly hospital and physician claims (reflecting both estimated payer and patient liabilities) for services provided to patients covered under the traditional Medicare and commercial health insurance programs. The Index is published monthly.

S&P Healthcare Economic Hospital Index (SPMDEH). The Index is designed to reflect the per capita change in monthly hospital inpatient and outpatient claims (reflecting both estimated payer and patient liabilities) for services provided to patients covered under the traditional Medicare and commercial health insurance programs. The Index is published monthly.

S&P Healthcare Economic Medicare Index (SPMDEM). The Index is designed to reflect the per capita change in monthly hospital and physician claims (reflecting both estimated payer and patient liabilities) for the traditional Medicare population. The Index is published monthly.

S&P Healthcare Economic Professional Services Index (SPMDEP). The Index is designed to reflect the per capita change in monthly physician and other healthcare professionals’ claims (reflecting both estimated payer and patient liabilities) for services provided to patients covered under the traditional Medicare and commercial health insurance programs. The Index is published monthly.

Self Insured Employers. Employers who bear the direct risk of their employees’ health insurance costs. The employer will usually have sufficient employees, experience and the financial resources to withstand fluctuations in the costs from year to year.

Total Allowed Claim Costs. This is the approved maximum reimbursement from benefit programs to healthcare providers after negotiated discounts. The value of copayments and deductibles paid by patients is included in the total allowed amount.

Total U.S. Population. The total U.S. population is based on postcensal monthly estimates, and can be found on the Census Bureau’s Web site.

Traditional Medicare. Coverage is split between Part A (hospital inpatient services), Part B (hospital outpatient and professional services) and Part D (prescription drug services) Medicare. It does not include coverage under the Medicare Advantage program, which allows private health insurance plans to offer an alternative to the traditional Medicare program.

Utilization. A measure of the extent to which medical services are used by patients. Examples of utilization are hospital admissions, hospital days, office visits, etc.
**Working Days.** Medical care utilization varies by the day of the week due to the work schedules of the various providers. Historically Monday has been the highest used day of the week. Weekends and holidays tend to have the lowest utilization levels. The mix of these days within a month creates an effect on the observed changes in claim costs.
Index Data

Publicly Available Data Used in the Model


   a. General medical and surgical hospitals
   b. Other hospitals
   c. Outpatient mental health centers
   d. Psychiatric and substance abuse hospitals

2. Current Employment Statistics: All Employees
   a. General medical and surgical hospitals
   b. Other hospitals
   c. Outpatient mental health centers
   d. Psychiatric and substance abuse hospitals
   e. Total nonfarm

3. Employer Cost for Employee Compensation: Total Benefits
   a. Hospital

4. Producer Price Index
   a. General medical and surgical hospitals by payer type: Medicaid patients
   b. General medical and surgical hospitals


1. Professional Liability Physician Premium Survey
2. 5% Sample

Centers for Disease Control, http://www.cdc.gov/mmwr

1. Morbidity and Mortality Weekly Report
   a. Notifiable Diseases and Mortality Tables, Table III
Federal Register (Government Printing Office),
http://www.gpoaccess.gov/fr/advanced.html

1. Hospital Inpatient Payment Update
2. Hospital Outpatient Payment Update


1. Total U.S. Population
   a. Postcensal Monthly Estimates
Index Governance

Index Committee

The S&P Healthcare Economic Indices are maintained and governed by the S&P Healthcare Indices Committee. The Index Committee members are drawn from S&P Indices and Health Index Advisors; the majority of the members and the Index Committee Chairman are employees of S&P Indices.

The Index Committee has complete discretion to determine how the indices are calculated. In addition, the Index Committee may revise index policy covering rules for selecting economic or other indicators to be used in the model.

S&P Indices considers information about changes to the S&P Healthcare Economic Indices and related matters to be potentially market moving and material. Therefore, all Index Committee discussions are confidential.
Announcements

Announcements of index data are made at 09:00 AM Eastern Time, on the third Thursday of each month. Press releases are posted at www.indices.standardandpoors.com, and are released to major news services.

There is no specific announcement time for the S&P Healthcare Economic Indices except for the monthly release of index data, as indicated above.

Holiday Schedule

The monthly indices are published on the third Thursday of each month. In the event this falls on a holiday, the data will be published at the same time on the next business day.

Recalculation Policy

Each month the data are recalculated and published in their entirety, incorporating any revisions to historic input variables that might have occurred over the month.
Index Dissemination

The 12-month moving average of the S&P Healthcare Economic Indices index levels are available through S&P Indices’ Web site at www.standardandpoors.com/indices, major quote vendors (see codes below), numerous investment-oriented Web sites, and various print and electronic media.

Within the Healthcare industry, the most used measure of changes in claims costs is the comparison of a full 12 months of costs versus the same 12 months of the prior year. As such, S&P Indices published each monthly index’s 12-month moving average to compare it with the same 12-month time period of the prior year, which provides an indication of the annual growth rate of claims costs.

Tickers

<table>
<thead>
<tr>
<th>Index</th>
<th>Bloomberg</th>
<th>Reuters</th>
</tr>
</thead>
<tbody>
<tr>
<td>S&amp;P Healthcare Economic Composite Index (12-month moving average)</td>
<td>SPMDEA</td>
<td>.SPMDEA</td>
</tr>
<tr>
<td>S&amp;P Healthcare Economic Commercial Index (12-month moving average)</td>
<td>SPMDECA</td>
<td>.SPMDECA</td>
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<td>S&amp;P Healthcare Economic Medicare Index (12-month moving average)</td>
<td>SPMDEMA</td>
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<tr>
<td>S&amp;P Healthcare Economic Hospital Index (12-month moving average)</td>
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<tr>
<td>S&amp;P Healthcare Economic Hospital Commercial Index (12-month moving average)</td>
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<td>S&amp;P Healthcare Economic Professional Services Index (12-month moving average)</td>
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<td>S&amp;P Healthcare Economic Professional Services Medicare Index (12-month moving average)</td>
<td>SPMDEPMA</td>
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</tr>
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FTP

The index levels for the S&P Healthcare Economic Hospital Indices, described in this document, the S&P Healthcare Economic Professional Services Indices and the S&P Healthcare Economic Composite Indices are available for subscription via FTP on a fee basis.
Web site

Appendix

HIA Data

The following is a list of data calculated by HIA and used within the model: General details on the calculations can be found in the Index Construction and Index Maintenance sections.

- Employee Wage and Benefits Weights
- Excess Growth of Hospital Net Revenue over Labor Costs
- Incurred Working Day Factors*
- Medicaid and Uninsured PPI Weights
- Medicare Expenditure Ratio
- Medicare Hospital Fee Update – Inpatient and Outpatient Hospital Weights
- Pneumonia & Influenza Cost Weights*

* Data which are proprietary to and calculated by Milliman Inc.
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