

**An Examination of the Data, Materials,  
and Assumptions Used in the Institute  
of Medicine Report: “Geographic  
Adjustment in Medicare Payment:  
Phase 1: Improving Accuracy”**

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# **An Examination of the Data, Materials, and Assumptions Used in the Institute of Medicine Report: Geographic Adjustment in Medicare Payment: Phase 1: Improving Accuracy**

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# Introduction

## Background

The Department of Health and Human Services (HHS) recently contracted with the Institute of Medicine of The National Academies to conduct a two part, two-year study on “Geographic Adjustment in Medicare Payment” (referred to as the “IOM Report” and “IOM Study”). The purpose of the first year of the IOM Study is to evaluate the accuracy of the geographic adjustment factors in fee-for-service Medicare. The IOM study examined the following issues: 1) the accuracy of adjustment factors; 2) the methodology used to determine the adjustment factors; and 3) the measures used to modify the adjustment factors for timeliness and frequency of revisions. The IOM was also charged with evaluating existing and other potential data sources and the degree to which such data are representative of the operational costs of providers who participate in Medicare. In the second year of the study, IOM will investigate the impact of various adjustment factors on Medicare providers and beneficiaries’ access to efficient, value-based health care.<sup>1</sup> This report focuses only on the first year of the study, as the second year has not yet been initiated.

RTI International, analytic consultants for the first IOM Report, provided the IOM Committee on Geographic Adjustment Factors in Medicare Payment (committee) with a series of foundational databases and analyses. These analyses supported the development of a series of committee recommendations (Appendix A), and the first year IOM Report.

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<sup>1</sup> Institute of Medicine (IOM). 2011, *Geographic Adjustment in Medicare Payment*. Washington, DC: The National Academies Press.

## Scope of Work

Dobson | DaVanzo was commissioned by the IOM to conduct an independent validation of the economic and statistical assumptions and procedures used to develop the IOM Report. Our scope of work was to:

1. Review the draft IOM report methods and approach;
2. Review RTI International's methodology and documentation, and assess internal quality assurance processes for the data analyses, including statistical assumptions; and
3. Prepare a report on our findings, in consultation with IOM and committee staff and RTI International, suitable for publication.

A primary focus of the Dobson | DaVanzo analysis was to determine the overall accuracy of the data used in the IOM Report. Accuracy is defined by the IOM as “the degree of closeness of measurements to the true value of whatever is being measured.”<sup>2</sup> In conducting the study, we determined that it is often impossible to separate the specific economic analysis and its methods from the recommended uses of a particular data set.

The two key data sets being examined – the Centers for Medicare and Medicaid Services (CMS) Medicare Hospital Cost Report (MCR) wage index data and the Bureau of Labor Statistics (BLS) statistical series – each place limitations on how geographic adjustment of Medicare payment can be accomplished. For instance, until the exact formulation and uses of the wage index are specified, one cannot assess the appropriateness of either data set to the task at hand. Similarly, the way the labor market geographic area is defined will influence one's judgment as to the appropriateness of one data set as compared to the other.

Our report thus links labor market (economic) theory to an assessment of the quality of these two data sets, how the data were and can be used, and how each data set influences the IOM Report recommendations. In summary, the choice of particular data sets is intertwined with the labor market theories and concepts put forth by the IOM in determining how best to improve the accuracy of Medicare fee-for-service payments.

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<sup>2</sup> IOM (2011), p. S-5.

## The Dobson | DaVanzo Study Approach

Geographic adjustment of the labor-related share of Medicare payment amounts is required for all Medicare providers (e.g., hospitals, hospital outpatient departments, skilled nursing facilities (SNF), long term care hospitals (LTCHs), other types of hospitals, and physicians). This analysis focuses on acute care hospitals (ACHs), as many of the arguments relevant to acute care hospitals can be generalized to other providers. Similarly, while the IOM Report uses many data sets, its focus is on the current MCR-based self-reported wage and occupational mix statistical series, in comparison to the BLS wage and occupational mix statistical series, as is ours.

After a brief explanation of how the current CMS hospital wage index (HWI) works, including an overview of the history of the initial use of BLS statistics to support the CMS HWI, and an overview of the RTI International programming quality assurance protocols, we structured our analyses around four operational questions. The first question addresses *how* to measure hospital wage indexes, while the second question addresses *what* is measured, that is, the components included in the varying data sets used to measure hospital wage indexes. The third and fourth questions relate to generalizability and other considerations, respectively. Each question consists of several additional targeted questions, which are presented below:

### A. HOW ARE HOSPITAL WAGE INDEXES MEASURED?

1. What is the appropriate statistical tool for measuring the hospital (and other) wage indexes (HWI)? This question focuses on the effect of occupational mix on the development of HWIs, and the degree to which CMS and BLS statistics each reflect occupational mix.
2. How do CMS and BLS wage data compare on a variety of issues related to data quality (e.g., volatility over time, sample composition)?

### B. WHAT DO HOSPITAL WAGE INDEXES MEASURE?

3. Which elements of “wages” should be measured and entered into the HWI? There is a rich history of Medicare policy development that has explored these elements (e.g., the inclusion of benefits, part-time workers, and contract labor). CMS and BLS statistics reflect these elements in different ways.
4. Which industries should be included in the labor market? There are three major possibilities: 1) hospitals only; 2) the health care industry, more broadly defined; and 3) all industries that employ health professional

labor. Each of these definitions will impact the choice of data set. Another relevant decision is the number of labor categories that should be included in the calculation.

5. What geographical definition should be used to characterize a labor market? One possibility is to use the Office of Management and Budget's (OMB) definition of Metropolitan Statistical Areas (MSAs), with the rest of the state described as a "nonmetropolitan" or "non-MSA" area. This particular geographic definition is based on economic interactions (e.g., employee commuting patterns) as opposed to geopolitical boundaries or health care related or hospital specific factors.

We then address questions that relate to the generalizability of the selected approach to other health care professionals or other health care settings.

## **C. CAN THE RESULTS OF WAGE INDEX CALCULATIONS BE GENERALIZED TO OTHER PROFESSIONALS OR PROVIDERS?**

6. How well does the HWI reflect the wages of the various Medicare providers? Key definitional issues will determine the merits of one data set compared to another.
7. How can HWI concepts be applied to physician labor markets? The answer to this question depends upon the extent to which the above issues translate to physician payment.

Finally, our last analytic question addresses important considerations that should be considered before choosing a specific wage index.

## **D. WHAT ARE THE IMPORTANT CONSIDERATIONS?**

8. What are the transparency, administrative, and regulatory issues associated with each data set?

The answers to these questions are, in part, framed by previous work by RTI (see Appendix B). Following the discussion of the four main questions above, we move on to a discussion and summary of key findings, followed by a conclusion.

Before presenting our systematic review of each question, we include a discussion of the definition, importance and CMS' (formerly HCFA) initial use of BLS statistics to provide the reader with a necessary context for the remainder of the report.

## The Medicare Hospital Wage Index: Definition, Importance and CMS' Initial Use of BLS Statistics

The CMS website defines the HWI in two short paragraphs as follows:<sup>3</sup>

Section 1886(d)(3)(E) of the Social Security Act requires that, as part of the methodology for determining prospective payments to hospitals, the Secretary must adjust the standardized amounts "for area differences in hospital wage levels by a factor (established by the Secretary) reflecting the relative hospital wage level in the geographic area of the hospital compared to the national average hospital wage level." This adjustment factor is the wage index. We currently define hospital geographic areas (labor market areas) based on the definitions of Core-Based Statistical Areas (CBSAs) established by the Office of Management and Budget and announced in December 2003. The wage index also reflects the geographic reclassification of hospitals to another labor market area in accordance with sections 1886(d)(8)(B) and 1886(d)(10) of the Act.

The Act further requires that we update the wage index annually, based on a survey of wages and wage-related costs of short-term, acute care hospitals. Data included in the wage index derive from the Medicare Cost Report, the Hospital Wage Index Occupational Mix Survey, hospitals' payroll records, contracts, and other wage-related documentation. In computing the wage index, we derive an average hourly wage for each labor market area (total wage costs divided by total hours for all hospitals in the geographic area) and a national average hourly wage (total wage costs divided by total hours for all hospitals in the nation). A labor market area's wage index value is the ratio of the area's average hourly wage to the national average hourly wage. The wage index adjustment factor is applied only to the labor portion of the standardized amounts.

This deceptively straight-forward definition belies the fact that the hospital wage index is arguably one of the most contentious of all aspects of CMS-administered pricing from the perspective of Congress, CMS, Medicare Payment Advisory Commission (MedPAC) and/or Medicare providers.

When the Inpatient Hospital Prospective Payment System (IPPS) was implemented, many hospitals, especially hospitals in nonmetropolitan areas, immediately noted that they were paid less than hospitals in an adjacent labor market area. As a result of this continued controversy, often referred to as the "boundary problem," the history of IPPS is replete with changes, revisions and exceptions to the wage index measurement and payment process.

The wage index has at least eight different types of exceptions processes which have resulted in 37 percent of hospitals having an exception to their initial wage index

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<sup>3</sup> Centers for Medicare and Medicaid Services (CMS). Available at: [http://www.cms.gov/AcuteInpatientPPS/03\\_wageindex.asp](http://www.cms.gov/AcuteInpatientPPS/03_wageindex.asp).

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assigned in 2007.<sup>4 5</sup> (See Appendix C for a brief description of each exception.) We have attached a compilation of the hospital wage index legislative chronology by year of implementation from a 2007 RTI report in Appendix D. This chronology notes the wage data source, data definitions and adjustments, labor market definitions, labor market exceptions, and other adjustments and exceptions. We use these factors to inform our analyses. Even a cursory glance at Appendix D indicates the enormous attention CMS, MedPAC, the Congress, and affected stakeholders have devoted to the hospital wage index over the years. About 70 percent of acute care hospital payments are adjusted by the hospital wage index.<sup>6</sup> In aggregate, Medicare adjusts over 40 percent of overall Medicare expenditures across all settings (from total Medicare expenditures of \$491 billion in 2009). This shows the importance of the HWI. When reviewing HWI statistics in this report, it is useful for the reader to keep the following in mind: for a hospital with 50 percent Medicare revenues and HWI adjustment for 70 percent of expenses, a 10 percent change in the wage index produces a 3.5 percentage point change in the hospital's total margin. Given that a typical hospital has between a four percent and six percent total margin, sizeable changes in the HWI can have significant financial repercussions to a particular hospital or class of hospitals. As a result, unexpected changes in HWI values for a hospital serve to complicate its budgeting and planning process.

It is also important to note that HWI statistics likely will have an important impact on future implementation of the Patient Protection and Affordable Care Act<sup>7</sup> as regional demonstration payment project price levels are set. In addition, current Medicare Managed Care rates are affected by local wage rates.

Part of the history of the CMS HWI is that in the initial years (FY1984 and FY1985) of Inpatient Prospective Payment System (IPPS), the CMS HWI was based on BLS wage information. This history provides an important context to understanding the committee's recommendations to use BLS wage data to support Medicare's HWI calculations. In its 2007 report, RTI notes that the early BLS data:

- Did not account for differences between full and part-time workers;
- Were tied to wages and workers covered by unemployment insurance;
- Measured aggregate wages without adjustment for occupational mix; and

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<sup>4</sup> Dalton, K., Pope, G., Adamache, W., Dulisse, B., West, N. 2007. "Potential Refinements to Medicare's Wage Indexes for Hospitals and Other Sectors." Prepared for Medicare Payment Advisory Commission (MedPAC), Washington, DC., RTI International (RTI). p. 17.

<sup>5</sup> Miller, Mark. "MedPAC's Approach to the Wage Index and Geographic Practice Cost Indexes," presented to Congress on behalf of MedPAC (MedPAC Presentation), September 16, 2010, Slide #8.

<sup>6</sup> Miller, Mark. MedPAC Presentation, Slide #4.

<sup>7</sup> IOM (2011), p. 1-5, Box 1-3.

- Did not include benefits or other wage related costs as part of total compensation.<sup>8</sup>

For many of these reasons, the Deficit Reduction Act of 1984 mandated that CMS develop a new wage index that controlled for full- and part-time workers. This request was a mandate for the use of the CMS data to construct the HWI, as these data were formulated to provide the requisite information.

The internal inconsistencies of CMS data as they relate to labor market and price index theory have provided the motivation for numerous MedPAC policy recommendations over the years. The committee deliberated on many of these and other issues that arose as CMS moved to the use of its own data to support the construction of the HWI.

## **RTI International Programming Quality Assurance Protocols**

The RTI Quality Assurance (QA) Management Handbook provides the framework for the QA applied to the analyses conducted in support of the IOM Committee. The basic process is as follows:

1. Analysts give written requests to programmers who then provide documentation and an audit trail for their work.
2. Programmers and analysts carefully check the initial output, comparing results to known benchmarks, when available.
3. Every report table identifies the source computer run so that all data reported in each table can be traced back to the program(s) that generated them.
4. Key final runs (i.e., selected runs included in final reports) are sufficiently well-documented that they could be replicated by another research team.
5. At least one Project Director reviews all data tables that will be shared with the IOM committee or included in the IOM Report.

Once a program is written and runs according to the analyst's request, a portion of the input and output files is printed. Using these printouts, the newly created variables are hand calculated to ensure that the results are accurate. For categorical variables, a frequency distribution is run, and for continuous variables, descriptive statistics are generated to make sure the results are reasonable. In addition, all ongoing modifications to study programs are carefully documented.

A series of statistical concerns are also addressed, such as:

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<sup>8</sup> Dalton, et al., p. 7.

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- Methodological approaches are linked to the unit of observation, time frame, and file structures;
- Data documentation is checked with initial outputs in terms of frequency counts and missing data;
- External benchmarks are matched to initial runs if possible;
- Outliers are identified, deleted or transformed;
- All variables are checked for construct validity;
- Sample data are appropriately weighted to produce population estimates;
- Appropriate variance calculation techniques are determined and applied;
- Descriptive analyses are produced and results are checked for reasonableness;
- Multivariate analyses are checked against underlying statistical assumptions;
- Sensitivity analyses are performed;
- Methods and models are documented to ensure objectivity, transparency, and reproducibility of estimates and projections;
- All data are archived; and
- All programs are linked to all outputs.

RTI staff indicated to us that these procedures were followed in completing the analyses for this report. In our review of the methodology and analysis, we benchmarked current data with those of prior RTI work, and, cross-referenced RTI International analyses to work performed by Acumen, the CMS contractor that has performed comparable types of analyses. At this level of observation, no discrepancies were noted. We conclude that the RTI International work product is adequately documented in terms of RTI's internal QA protocols.

The remainder of this report addresses our four operational questions in terms of relevance, discussion and a brief conclusion. The report ends with a broader discussion of our findings.

# Analyses

## A. HOW ARE HOSPITAL WAGE INDEXES CONSTRUCTED?

### 1. What is the appropriate statistical tool for measuring the hospital (and other) wage indexes (HWI)?

#### RELEVANCE

A price index is defined as a normalized average (typically weighted average) of **prices** for a given class of goods or services **in a given region**, during a given interval of time. It is a statistic designed to help compare how these prices, taken as a whole, differ between time periods **or geographical locations**.<sup>9</sup> In the context of this report, the important point to note is that a HWI measures how prices (wages) vary across labor markets for a given mix of labor (occupational mix).

#### DISCUSSION

A varying price (across regions) for a fixed mix of quantities (occupational mix) is called a Laspeyres price index. RTI, in a 2007 report, concluded that “the fixed weight Laspeyres form is simple, and widely used, accepted, and understood, so there would seem to be little reason to divert from it.”<sup>10</sup> MedPAC recommendations, for instance, are based on a Laspeyres index form, as are the IOM committee’s recommendations.

This means that the HWI should not confound changes in labor inputs by occupation (the occupational mix) with changes in prices. If  $\text{Cost} = \text{Price} \times \text{Quantity}$  ( $C = P \times Q$ ), then an expression of the wage index that allows both P and Q to vary (e.g., by reflecting hospital labor costs) will be driven as much by the selection of labor categories (nurses vs. aides) as changes in the respective prices of each labor category. There is widespread agreement

<sup>9</sup> Mansfield E. (1982). Micro-Economics Theory & Applications. New York: W.W. Norton and Company.

<sup>10</sup> Dalton, et al., p.24.

that the HWI should measure price differences not variations in hospital labor costs driven by the hospitals' selection of particular labor category inputs.

The current CMS HWI partially adjusts for variation in labor category (occupational mix) in that the mix of nurse labor (RN, LPN, CNA, and medical assistant staffing categories) is accounted for across hospitals and labor regions in the Medicare Cost Report. This means that the occupational mix of remaining hospital labor categories (non-nursing staff categories) is not controlled for. The IOM Report indicates that nurse labor represents 42.5 percent of hospital workers nationally (the portion of the occupational mix which is adjusted for) while the remaining 57.5 percent of non-nursing staff categories is not adjusted for in the current CMS HWI.<sup>11</sup> Thus, the current CMS HWI is not a pure Laspeyres price index because it does not hold the occupational mix constant across hospitals. Only accounting for 42.5 percent of the occupational inputs is a serious theoretical weakness of the current CMS data. While this could be remedied by extending the CMS data collection of occupational mix information to all labor categories, this requirement would increase the data and administrative reporting burden on both hospitals and on CMS itself.

The BLS data set, on the other hand, contains occupational mix data across a broad spectrum of labor categories, allowing for a more complete occupational mix adjustment. This is clearly an advantage for the BLS statistical series as compared to the limited occupational mix information collected by CMS. The BLS sponsors the Occupational Employment Survey covering 800 occupations across 450 industries. Data are collected through a voluntary mail survey to 200,000 establishments every six months. Data are produced on a three-year rolling average, reflecting 1.2 million establishments. Data are available at the MSA and non-MSA level within a state in both the BLS and CMS data sets.<sup>12</sup>

## CONCLUSION

The committee's recommendation for a fixed national occupational mix (as in a price index) for the HWI is consistent with MedPAC's earlier judgment, which was reached after considerable investigation of the issues.

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<sup>11</sup> IOM (2011), p.3-7.

<sup>12</sup> IOM (2011), pp. 3-14

## 2. How do CMS and BLS wage data compare on a variety of issues related to data quality?

### RELEVANCE

CMS and BLS HWI input data vary on several issues:

- Sample frames
- Reporting errors
- Volatility of the data
- Timeliness of the data

### DISCUSSION

#### Sample Frames

BLS data are derived from a carefully drawn sample of a wide variety of employers representing the broader economy. The CMS data reflect the universe of short term acute care hospitals that complete the wage information segment of their MCR. Therefore, CMS data are not representative if one is interested in a wage index reflecting all employers, not just hospitals. As noted elsewhere, the sample frame is not a clear cut issue if one believes that hospitals have unique labor concerns such as a difficult work environment, state mandates on labor mixes (nurse to patient ratios), or unmeasured differences in the quality of the workforce. If hospitals have particular labor concerns or state requirements, the CMS universe is reflective of a “unique” hospital industry. Given the structure of the wage index and the definition of the labor markets recommended by the committee, the inclusion of industries representing all types of employees who work in hospitals in the BLS data is highly important to the HWI calculation.

#### Reporting Error

In 2007, the Office of the Inspector General (OIG) conducted a 21 hospital study of reporting errors in self-reported MCR wage information.<sup>13</sup> This study found that 17 of 21 hospitals overstated their average hourly wage rates by from 0.23 to 21 percent; while four hospitals understated their average hourly rates by 0.62 to 28 percent. This finding indicates that reporting error could be substantial in CMS MCR HWI-related data.

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<sup>13</sup> Department of Health and Human Services, Office of Inspector General, “Review of Hospital Wage Data Used to Calculate Inpatient Prospective Payment System Wage Indexes” (A-01-05-00504), (2007), p. ii.

With the MCR data, it seems that the more detailed the question, the less accurate the MCR report information. This is likely because different hospitals report the same cost elements in different cost categories. Generally speaking, the more aggregate the cost category, the more the reporting error within that cost category washes out. We suspect much of the OIG findings relate to categorization of data elements into the wrong MCR cost categories. The categories in which OIG found reporting errors were:

- Misstated and misclassified wages;
- Pension and post-retirement benefits;
- Misstated fringe benefits, home office and non-salary costs;
- Contract labor expenses; and
- Non-allowed Part B services.

The OIG findings, while not surprising, are troubling, as they suggest that the MCR data input into HWI calculations are subject to substantive reporter error. That said, the quality of MCR data could be controlled by CMS fiscal intermediaries, through enforcement of consistent category definitions and collection rules for the self-reported CMS HWI data.

CMS has less control over BLS reporting errors. It is unlikely that the BLS statistics reflect error variance attributable to the misclassification of Medicare allowed expenses, because BLS respondents are unaware of issues associated with Medicare allowed cost. We also note that the BLS data are reviewed for accuracy at three levels: state agents who collect the data; BLS staff at the regional level; and BLS staff at the national level.<sup>14</sup> That said, we do not know the extent to which BLS data containing reporting errors would affect the construction of the HWI.

## Data Volatility: Time Series and Cross Sectional

### Time Series

An Acumen analysis attempted to standardize the CMS and BLS wage index measures and then calculate the difference between the two over time. As shown in **Exhibit 1**, the BLS wage index values show less variation over time than the CMS wage index, along with less extreme values.

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<sup>14</sup> IOM (2011), p. 3-18

**Exhibit 1: Percentage of Hospitals with One-Year Changes in Wage Index Values**

	Medicare Wage Index 2005 to 2008		BLS Wage Index 2002 to 2004	
	Number of Providers	Percentage	Number of Providers	Percentage
Decrease of More Than 10%	17	0.16%	2	0.03%
Decrease of Between 10% and 5%	184	1.68%	38	0.53%
Decrease of Between 5% and 1%	2928	26.76%	1786	24.87%
Change of Between -1% and 1%	5487	50.15%	4355	60.64%
Increase of Between 1% and 5%	2097	19.16%	918	12.78%
Increase of Between 5% and 10%	195	1.78%	72	1.00%
Decrease of More Than 10%	34	0.31%	12	0.15%
Total Number of Providers	10942	100.00%	7182	100.00%

Note: These differences in the distribution of wage index volatility for hospitals are statistically meaningful whether we consider only large one-year changes (of 5% or 10%) or whether we consider smaller changes in the range of 1% and 5% as well.

Source: MaCurdy, T., DeLeire, T., Lobe de Nava, K., Kamaneka, P., Tan Y., McClellan. 2009. "Revision of Medicare Wage Index: Final Report, Part 1," Acumen, Table 5.1

The differences in volatility can be explained by the following:

- BLS wage index values represent a three year rolling average, which is more stable than a year-to-year analysis.
- In calculating this rolling average, a constant inflation measure is used across all labor market areas, which reduces year-to-year changes. This is a measurement error, of sorts, as it makes the BLS statistics look less volatile over time than they really are.
- BLS wage index values reflect more observations in each labor market area, leading to less measurement variation over time and less measurement bias.
- The BLS wage index values reflect multiple industries. This reduces the change that industry-specific spikes in wages might exert on wage index values from one year to the next.
- BLS imputation strategies for missing observations could also reduce volatility over time as well as less measurement bias.

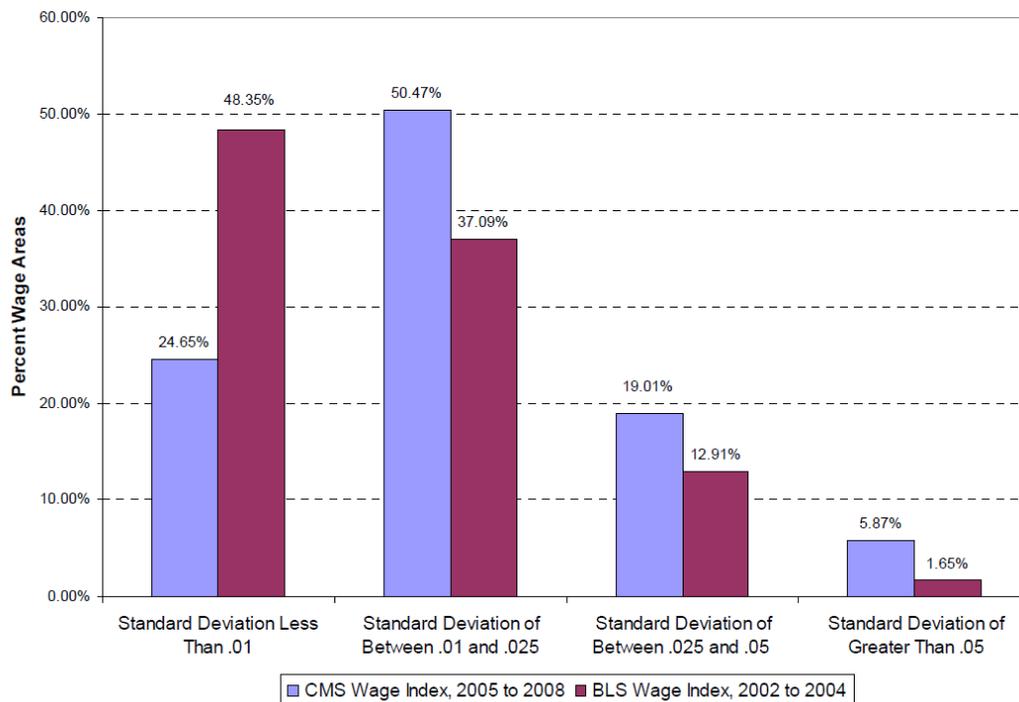
That said, the differences in the above table are not large. RTI found that from 2002-2004, "1.3 percent of MSA/year changes were 10 percent or greater, compared to 0.9

percent for the BLS index.<sup>15</sup> These differences could be further reduced by introducing a two-year rolling average to the CMS index.

## Cross Sectional

Data volatility can also occur within a given wage area. **Exhibit 2** provides a comparison of CMS and BLS wage index standard deviations by wage area as calculated by Acumen. The 315 BLS wage indexes are less volatile, as they show a higher proportion of areas with low standard deviations (less than .01) and a lower proportion with high standard deviations. At any given time, BLS data, thus, are less volatile across both time and wage areas than the CMS data.

**Exhibit 2: Distribution of Standard Deviations of Wage Index Values by Wage Area**



Source: MaCurdy, T., DeLeire, T., Lobez de Nava, K., Kamaneka, P., Tan Y., McClellan. 2009. "Revision of Medicare Wage Index: Final Report, Part 1," Acumen, Figure 5.2

## Timeliness of the Data

The CMS index is based on four-year-old data. The BLS index, based on a three-year rolling average, has a comparable time lag. This is not a critical difference as it relates to the IOM study.

<sup>15</sup> Dalton, et al., p. 51.

## CONCLUSION

Comparing the CMS wage index to various features and measures of the BLS wage index shows relatively small differences. While these differences favor the BLS measures, these small differences suggest that the use of BLS indexes is not based strictly on statistical considerations, but in large part, on the definitional and theoretical construct of the wage index. For instance, the CMS wage data do not reflect the entire labor market for hospital labor and only partially adjust for occupational mix.

### B. WHAT DO HOSPITAL WAGE INDEXES MEASURE?

In this section of our report, we discuss the various components that go into measuring hospital wage indexes, and the extent to which these components are included in the two data sets discussed in the IOM report.

#### 3. Which elements of “wages” should be measured and entered into the HWI?

## RELEVANCE

Over time, CMS has been concerned about three components of “wages” that confound the construction of a wage index. These are: 1) worker benefits; 2) part-time workers and contract labor; and 3) physician employment.

## DISCUSSION

**Worker Benefits:** The IOM Report notes that “excluding benefits from the index would produce inaccurate index values.” This is because “high-wage areas generally pay a higher portion of benefits relative to low-wage areas.”<sup>16</sup> The MCR data contain information on benefits, while the BLS data do not.<sup>17</sup>

If BLS data are used to create the HWI, a benefit information work-around would be needed. For instance, CMS could continue to produce its benefits information and it could be spliced into the BLS data. This would, however, be burdensome and possibly inaccurate. The IOM Report suggests a regression approach,<sup>18</sup> but this methodology might be viewed as lacking transparency.

<sup>16</sup>IOM (2011), p. 3-12

<sup>17</sup> See Appendix E for a copy of the Medicare Hospital Cost Report Form (S-3) that CMS uses to gather wage index information.

<sup>18</sup> IOM (2011), p. 3-17

**Part-time Labor and Contract Workers:** Part-time labor and contract workers are currently included in the CMS HWI. (Proper accounting for part-time workers is important so that part-time labor costs are not over-weighted in the HWI.) Contract labor data are required because they indicate the higher cost of contract labor. The inclusion of contract labor in HWI has been controversial, as the use of contract labor is inefficient. BLS data only reflect the wages paid to the contract worker, not those contract labor costs related to the fees paid to agencies. BLS data can likely be adjusted to reflect part-time labor. These labor categories are likely less important than the benefits labor category in the strength of their effect upon the HWI.

**Part A Physicians:** BLS data do not include Part A physician time that is not related to medical education. This feature could affect the wage estimates of teaching hospitals.

## CONCLUSION

In terms of the elements of wages that are important to capture in a HWI, the CMS MCR data, especially benefit data, are more extensive, but include fewer employers than the BLS data. Additional thought will be required to solve this problem if BLS data are used to calculate the HWI.

## 4. Which industries should be included in the labor market?

### RELEVANCE

The current HWI calculation uses only data from acute care hospitals. This creates three problems. The first problem is that hospital-only data just measure wages paid by the hospital. They cannot reflect wages faced by the provider in the broader market place for workers in hospitals and other industries. The second problem is “circularity.” Individual hospitals can influence their labor markets’ HWI by increasing their wage levels, which in turn, allows them to pay higher wages in the future. This is particularly problematic for labor market areas with a small number of hospitals, especially if one hospital dominates the market. “Nearly half of the hospital markets – as they are currently defined – include four or fewer hospitals.”<sup>19</sup> The third problem is that labor market areas with a small number of acute care hospitals tend to have unstable HWI estimates from one year to the next, and from one labor market to the next.

<sup>19</sup> MaCurdy, T., DeLeire, T., Lopez de Nava, K., Kamenecka, P., Tan y., McClellan. 2009. “Revision of Medicare Wage Index: Final Report, Part I.” p. iii. Acumen.

## DISCUSSION

The use of BLS data opens the possibility of using three types of industry level labor market definitions:

- Acute care hospitals;
- Health care industry firms; and
- All firms that use health care labor.

Labor market theory suggests that the broader the definition of an industry, the less influence acute care hospitals have on their wage index, and the less the wage index influences their ability to pay higher wages. In short, circularity is reduced.

On the other hand, the argument for an acute care hospital index is that unmeasured differences in individual worker characteristics and compensation differences in wage payment may indicate that acute care hospitals' wage structure is different from the wages of workers in other industries employing health care workers. This would be true, for instance, if hospitals have special credentialing or other requirements that are not common for other types of employers of health care workers, or if employees in the relevant occupations tend to have substantial preferences for one setting over another.

In its June 2007 report to MedPAC, RTI concludes, after carefully reporting on the relevant literature:

It is not clear whether the CMS Hospital Wage Survey data or the BLS OES data best reflects the appropriate factors influencing hospital wages, while not reflecting the undesirable factors. Both data should measure the area opportunity wage. The CMS survey will better measure area hospital-specific labor market factors, although, as argued above, the BLS OES data include a significant hospital- and healthcare-industry-specific component. The BLS OES data will be better than the CMS hospital wage survey data at avoiding measuring the effects of hospital size, casemix, occupation mix, unionization, and area competition for healthcare workers.<sup>20</sup>

RTI then goes on to provide a series of arguments for and against the use of hospital-specific (CMS) versus all-industry (BLS) wage data. The set of arguments for a hospital specific wage index (CMS MCR data) essentially centers on the notion that the labor market for hospital workers might be unique and, if so, it should be specifically measured. The argument for a broader inclusion of industries in the labor market definition (BLS data) centers on the notions that labor markets for employees working in hospitals are much broader than the hospital industry, and that hospitals should not be

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<sup>20</sup> Dalton, et al., p. 37.

able to influence their own wage index. Corporate selection of a particular occupational mix, and non competitive factors in hospital wage setting should not be reflected in the wage index. Nor should individual hospital business decisions affect the HWI calculation. In addition, a broader base of all-industry data is less susceptible to reporting errors and non-representative wages paid by individual hospitals as the broader market wages faced by the hospital industry are reflected in the broader industrial labor market. Finally, and on a different line of reasoning, including more industries in the calculation will make the wage index data less volatile over time.<sup>21</sup>

The IOM Report spends considerable time on this issue. The committee found “a strong conceptual rationale for using health sector data rather than industry-wide data to help improve the accuracy in adjustments and to respond to concerns expressed by stakeholders.”<sup>22</sup> This compromise between the extremes of hospital-only and all industry wage indexes is based in part on the fact that there is “a very high correlation between health care specific wages and the two other data sources (all-industry, health care sector, and hospital-specific wages).”<sup>23</sup> **Exhibit 3** shows that these correlations are very high.

**Exhibit 3: Correlation Across Hospital Indexes Computed from Different Industry Sector Wages**

Metropolitan Markets	All Employers	Health Sector	All Hospitals	General Hospitals
All-Employer	1.000			
Health Sector	0.994	1.000		
Hospitals	0.976	0.981	1.000	
General Hospitals	0.974	0.979	0.999	1.000
BLS Rest-of-State Areas	All Employers	Health Sector	All Hospitals	General Hospitals
All-Employer	1.000			
Health Sector	0.990	1.000		
Hospitals	0.951	0.950	1.000	
General Hospitals	0.951	0.950	0.999	1.000

Source: Institute of Medicine (IOM). 2011, *Geographic Adjustment in Medicare Payment*. Washington, DC: The National Academies Press, Table 3-4.

<sup>21</sup> Dalton, et al., pp. 38 - 39

<sup>22</sup> IOM (2011), p. 1-21

<sup>23</sup> IOM (2011), p. 1-21.

## CONCLUSION

A reasonably strong case can be made for a hospital-specific HWI calculation. However, the advantages of a wider industry-based wage index being applied to all Medicare providers is that it is more broadly reflective of the labor employed by hospitals. This methodology can only be supported by the BLS data.

### 5. What geographical definition should be used to characterize a labor market?

## RELEVANCE

The labor market should reflect economic interactions, such as commuting patterns. CMS has used 441 wage index areas, 392 MSAs and 49 rest-of-state areas.<sup>24</sup> So-called Micropolitan Statistical Areas (MicroSA) are included in statewide residential areas. The federal government has used these areas for statistical reporting for over 60 years, and they reassess their definitions every ten years. OMB announces delineations of areas based on new standards several years later. Areas were last revised in 2010, with the next delineations, based on 2010 Census data, scheduled to be announced in 2013.<sup>25</sup>

## DISCUSSION

The nucleus of an MSA has at least 50,000 people. MSAs and MicroSAs reflect economic integration as: 1) at least 25 percent of the outlying county's working residents commute to the central entity (nucleus), and 2) at least 25 percent of the outlying county's workforce commutes to the central county.<sup>26</sup>

It is very important to note, however, that the use of MSAs or any other geographic area designation to represent labor markets is never perfect. The more areas that are used, the more likely it is that each area will reflect a prevailing labor market.

However, a larger number of areas creates a larger number of boundaries between labor markets. This situation creates a "boundary problem" wherein hospitals geographically located near each other receive different wage index adjustments. The "boundary problem" has proven problematic over time and has led to almost 40 percent of hospitals receiving an exception status under the current CMS HWI adjustment system. The exception status, in and of itself, is not a reason to reject a labor market definition that

<sup>24</sup> IOM (2011), p. 2-8

<sup>25</sup> OMB.2010. Standards for delineating metropolitan and micropolitan statistical areas. *Federal Register* 75(123).

<sup>26</sup> OMB.2010.

creates over 400 labor market areas, but it turns out to be a critical concern in the overall wage adjustment process.

## CONCLUSION

The labor market should reflect economic interactions, such as commuting patterns. MSA/State non-MSA is a reasonable choice of a geographic labor market definition in terms of the percent variation in hospital wages explained by alternative wage areas.

### C. CAN THE RESULTS OF WAGE INDEX CALCULATIONS BE GENERALIZED TO OTHER PROFESSIONALS OR PROVIDERS?

#### 6. How well does the HWI reflect the wages of the various Medicare providers?

## RELEVANCE

The application of a wage index based on hospital-only data has important implications for how CMS uses the HWI to adjust Medicare payments to other types of providers. CMS and BLS wage indexes, based on MSA and rest-of-state areas (non-MSA), would both require either an extended exemption process or further adjustment through a “smoothing” algorithm to account for other types of health care providers. As noted above, nearly 40 percent of Medicare payments are affected by the wage adjustment process. **Exhibit 5** shows which Medicare providers (in addition to acute care hospitals) receive wage index adjusted payments as an aspect of prospective payment. In most instances, pre-floor, pre-classification wage indexes are used. Occupational mix adjustments are applied only to inpatient services and hospital outpatient services.

## Exhibit 5: Use of the Hospital Area Wage Index in Other Medicare Prospective Payment Systems

Type of Provider	Wage Index Description
<i>Inpatient Services</i>	
Inpatient rehabilitation facilities (IRF)	Pre-floor, pre-reclassification, occupation-mix adjusted index without outmigration adjustment.
Inpatient psychiatric facilities (IPF)	Pre-floor, pre-reclassification, occupation-mix adjusted index without outmigration adjustment.
Long term care hospitals (LTCH)	Pre-floor, pre-reclassification, occupation-mix adjusted index without outmigration adjustment. Index was phased in over a 5-year period due to lack of evidence on relationship between the index and case-mix-adjusted average cost per discharge.
<i>Inpatient nursing care</i>	
Skilled nursing facilities (SNF)	Pre-floor, pre-reclassification, occupation-mix adjusted index without outmigration adjustment.
<i>Outpatient and home-based settings</i>	
Hospital outpatient department services (HOPD)	Use the same index that is applied to the hospital's inpatient services.
Ambulatory surgery centers (ASC)	Pre-floor, pre-reclassification index without occupation-mix or outmigration adjustments.
Home health agencies (HHA)	Pre-floor, pre-reclassification index without occupation-mix or outmigration adjustments.
Hospice	Pre-floor, pre-reclassification index without occupation-mix or outmigration adjustments.

Source: Dalton, K., Pope, G., Adamache, W., Dulisse, B., West, N. 2007. "Potential Refinements to Medicare's Wage Indexes for Hospitals and Other Sectors." Prepared for Medicare Payment Advisory Commission (MedPAC), Washington, DC., RTI International (RTI), Table 8

## DISCUSSION

The problems inherent in using the CMS HWI for non-acute care hospital providers with other prospective payment systems (PPS) are readily apparent. First, the CMS HWI is likely less accurate when applied to other providers, yet no exceptions are allowed for these providers. Because there are no exceptions, boundary problems are not addressed in any fashion in other sector PPSs.

Second, even limited occupational-mix adjustments are not incorporated for other providers by CMS as these providers do not provide occupational mix information specific to their settings. The occupational mix of other providers is likely different from that of acute care hospitals, which further complicates the application of the HWI beyond the acute care hospital. The result is that the CMS HWIs for other types of providers measure variations in hospital labor costs across labor market areas, rather than the variation in prices alone that a wage index is designed to measure.

Thus, it is difficult to apply an HWI based on CMS data to non-acute care hospital providers without bias in terms of boundaries (i.e., no exceptions process) and occupational mix. This is an area where a BLS-based wage index would be highly advantageous. BLS data would support occupational-mix adjustments, as well as provide detailed wage information targeted to the localities in question for other types of providers. The extensive nature of the BLS data could support an HWI system with noticeable improvements to the current CMS HWI system in this regard.

## CONCLUSION

A HWI based on CMS data does not accurately adjust for geographic boundaries or occupational mix when applied to other types of providers. Use of BLS data could improve wage index adjustment for non-acute care hospital providers.

## 7. How can HWI concepts be applied to physician labor markets?

### RELEVANCE

While the use of BLS data may have advantages over CMS data in the case of non-hospital providers, the application of BLS data to the development of geographic adjustment for physicians and other non-physician clinical practitioners is more complex. This is in part because the current payment areas for physicians were not designed to reflect labor markets. Additionally, physician payment has three components that each require a unique geographic adjustment: 1) physician work; 2) practice expense; and 3) malpractice insurance.

Medicare physician payments are currently adjusted by Geographic Practice Cost Indexes (GPCIs); one each for physician work (on average, 52 percent of physician payments as of 2011); practice expense (on average, 43.7 percent of physician payments as of 2011); and malpractice insurance (on average, 4.3 percent of physician payments as of 2011). Any changes to GPCIs would be made on a budget neutral basis. GPCI payments are now made for 89 distinct payment areas, 34 of which are statewide areas.

### DISCUSSION

The IOM Report makes three recommendations concerning physician payment adjustments. The first recommendation would use the full range of occupations employed in physician practices to adjust physician payments for wage differences. The second recommendation provides for the initiation of a new survey of commercial establishments to obtain data on the cost of office rent per square foot. The third recommendation would use the same labor markets for physician payment as used for the HWI.

## Physician Work and Practice Expense

GPCI payments are currently driven by “proxy” data, which are collected by CMS, BLS, and other sources. These data include:

- BLS wage information on six major non-physician potential occupations (applied to one quarter of the physician work input);
- BLS wage data for clinical and administrative staff;
- Recent American Medical Association (AMA) survey data;
- Office rent from Housing and Urban Development (HUD) (proxied by rent for two bedroom apartments); and
- Malpractice data provided by insurance companies.

Data sets that are not currently available from BLS include:

1. Detailed physician income data;
2. Commercial rent data (to represent land – the HWI is not similarly adjusted); and
3. Detailed staff wages for all occupations employed by physicians.

Existing malpractice data are considered accurate and might not require any additional data.

The committee reviewed several alternative data sources, such as the AMA Physician Practice Information Survey (PPIS) (a one-time survey); the Medical Group Management Association (MGMA) Physician Composition and Production Survey; and the MGMA Survey for single specialty practices. These data, unfortunately, are limited in sample size, representativeness (members may not be representative of all physicians), and frequency of collection (in the case of the AMA survey). At this time, the Committee has not decided if there should be a national standard for occupational mix for physicians.

The committee has indicated that the American Community Survey (ACS) administered by the Census Bureau, as of 2010, will make available salaried and self-employed physician income data (with an income cap of \$250,000) at the disaggregated zip code level. CMS is aware of these survey data as well.

Appropriate local office rent data are unavailable. Rent data sources reviewed include HUD, REIS Inc., and UPS. These data sets were found to be limited in many regards. For this reason, the committee recommends a new survey for the office rental component of the physician work GPCI.

## CONCLUSION

The current system of Geographic Practice Cost Indexes (GPCIs) used by CMS to adjust for differences in input prices across geographic localities is flawed in three ways: 1) the geographic areas used to reflect practitioner labor markets; 2) the use of proxy data for physician compensation and commercial office rents; and 3) the use of limited occupational mix information. The committee reviewed numerous alternative data sources that could be used to bolster existing BLS data in terms of physician compensation, commercial office rent and staff benefits. The committee's three recommendations in this area acknowledge existing data availability issues, while at the same time transitioning from the existing GPCI system to a more accurate payment adjustment system for physician payments.

## D. WHAT ARE THE IMPORTANT CONSIDERATIONS?

### 8. What are the transparency, administrative, and regulatory considerations?

## RELEVANCE

When CMS implemented IPPS, the agency decided to make information from the Medicare statistical system available to stakeholders. The result of this decision is that the claims data used to create individual Notice for Proposed Rule Making (NPRM) policy proposals are provided to stakeholders for their use during the comment period, allowing them to reproduce the analyses underlying the agency's rulemaking process. The policy has included the HWI calculations, as well as the individual hospital exceptions.

## DISCUSSION

CMS' use of BLS statistics in its wage index calculations will markedly improve the current system of geographic adjustments to Medicare payments. These improvements, however, will make it somewhat more difficult for stakeholders to replicate resulting HWI analogy. BLS publishes data for occupational categories by labor market area, depending upon the magnitude of the relative standard error and if more than three employers respond.<sup>27</sup> Under its current policies, BLS does not publish wage and employment data for the health care sector,<sup>28</sup> and BLS data themselves are not provided at the level of the individual institution. Those data can only be accessed through an

<sup>27</sup> IOM (2011), p. 3-18

<sup>28</sup> IOM (2011), p. 3-18

application process. In contrast to MCR information, which is publicly available at the hospital level, access to the BLS data is somewhat more restricted. Additionally, while BLS does not disclose its sample construction or the identity of reporting firms, the methods BLS uses to develop its data files are public information. CMS will need to carefully consider the implications concerning the restricted availability of BLS data in its rulemaking process if it accepts the IOM recommendations.

A statutory change would be required to allow the Secretary of the Department of Health and Human Services to use BLS data to compute the wage index. For instance, Section 1886 (d)(3)(E) of the Social Security Act, which specifies that the wage codes be based on data from “subsection (d)” hospitals would need to be recrafted by the Congress. The committee recommends that this be pursued.

These considerations must be viewed in the context of the benefits of overhauling a “broken system.” The extent to which the current wage index system needs revision indicates that more accurate payment adjustments will outweigh transition costs.

## CONCLUSION

The use of BLS data and other committee recommendations will greatly enhance the accuracy of geographic adjustments to Medicare payments. While transforming the current system will require statutory change, interagency cooperation, and somewhat less transparency in the rulemaking process, these aspects should be considered in light of the overall objective of fixing a system that is widely regarded as being broken due to its many exceptions and theoretical and practical limitations.

# Discussion

There is no easy way to improve the accuracy of geographic adjustment in calculating an area wage index. This is not particularly surprising, given the history of the wage index policy development process, MedPAC's twenty year history of seeking sensible solutions to the problem, and the numerous exceptions that have been made to the process over the years.

Ultimately, both major alternatives – the existing system, which is narrowly focused on hospitals, and a BLS statistical series, which could be much more inclusive in its scope – have both advantages and disadvantages.

On the one hand, the existing HWI system has been tested, refined, and with its numerous flaws and exceptions, has proven serviceable (at least for acute care hospitals). It also is highly transparent, because all of its calculations can be recreated by stakeholders.

That said, the current system is badly flawed and in need of revision; hence, the mandate for the IOM study. It does not adequately adjust for occupational mix; has provided about 40 percent of IPPS hospitals with an exception; does not translate well, if at all, to post-acute care and physician providers; and does not reflect the entire market place for health labor. To the extent that hospital labor categories are somewhat different than other industries, (e.g., special skills needed, specific training requirements, stress of working in a hospital environment), this feature might be acceptable. But, the weight of the evidence appears to support a broader-based labor market approach.

In contrast to the current CMS HWI, a BLS-based wage index system would allow for extensive occupational mix adjustment and the broader inclusion of industries into the calculation of the wage index. Thus, it would be superior in its easy application to outpatient, post-acute care, and physician providers.

The biggest limitation of the BLS data (in addition to the lack of information on employee fringe benefits) is the potential lack of transparency. The identity of

participants in any given sample are not disclosed and their data cannot be independently verified by CMS, MedPAC, or any other affected party. This lack of transparency could be further aggravated by reporting errors such as those found by the OIG for MCR data.

### Implications of a BLS-Based Approach

#### IMPROVEMENTS

The BLS approach directly addresses circularity, as hospitals in areas with only a few hospitals could not influence their wage index calculation by either changing their occupational mix (Q) or more directly by changing their wage levels (P).

The BLS index would allow for broader representation of the wage index calculation by including all Medicare paid providers (e.g., post acute care providers). This is a significant improvement and would help improve physician payment adjustment.

The BLS approach also reduces data volatility over time and across labor markets (and data range and standard deviations) by increasing the number of firms in the Acute Care Hospital labor market.

#### LIMITATIONS

The downsides of the BLS approach are the difficulties with including fringe benefits in the calculations, and, to a lesser extent, the omission of contractual labor and requirements for a part-time labor adjustment. Stakeholders would also potentially encounter difficulties as they attempted to recreate the BLS wage index calculations, unless restrictions on access to these data were revised or lifted.

# *Appendix A: IOM Study Recommendations*

2-1: The same labor market definition should be used for both the hospital wage index and the physician geographic adjustment factor. Metropolitan statistical areas and statewide non-metropolitan statistical areas should serve as the basis for defining these labor markets.

2-2: The data used to construct the hospital wage index and the physician geographic adjustment factor should come from all health care employers.

3-1: Congress should revise the hospital wage index statute (Section 1886(d)(3)(E) of the Social Security Act) to allow the Secretary of the Department of Health and Human Services (HHS) to use data from the Bureau of Labor Statistics (BLS) to compute the wage index.

3-2: The Centers for Medicare and Medicaid Services should establish an ongoing agreement with the Bureau of Labor Statistics to use all necessary wage data from the Occupational Employment Survey to compute the wage index.

3-3: The committee recommends using all occupations as inputs in the hospital wage index, each with a fixed national weight based on the hours of each occupation employed in hospitals nationwide.

3-4: The Centers for Medicare and Medicaid Services should apply the proposed hospital wage index to non-IPPS facilities, using nationwide occupation-specific weights derived from data for each type of facility.

4-1: The committee recommends constructing the geographic practice cost indexes (GPCIs) with the full range of occupations employed in physicians' offices.

4-2: The committee recommends that a survey of commercial establishments be undertaken to obtain data on office rent per square foot.

## Appendix A

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5-1: The committee recommends that wage indexes be adjusted by using formulas based on commuting patterns for health care workers who reside in a county located in one labor market but commute to work in a county located in another labor market.

5-2: The committee's recommendations are intended to replace the system of geographic reclassification and exceptions that is currently in place for health care workers.

Source: Institute of Medicine (IOM). 2011, *Geographic Adjustment in Medicare Payment*. Washington, DC: The National Academies Press.

# *Appendix B: Summary Differences Between BLS and CMS Source Data*

Source: Dalton, K., Pope, G., Adamache, W., Dulisse, B., West, N. 2007. "Potential Refinements to Medicare's Wage Indexes for Hospitals and Other Sectors." Prepared for Medicare Payment Advisory Commission (MedPAC), Washington, DC., RTI International (RTI).

**Table 4  
Summary Differences between BLS and CMS Source Data**

Original BLS wage data (used for payments in FY 1984 and 1985)	CMS wage data (used for payments in FY 1986 and later)	Proposed new BLS wage data
<p><b>Data:</b> Employment Series 202 for SIC 206 (hospitals). (Calendar 1981 data series)</p> <p><b>Source:</b> Quarterly tax filings with State Employment Security Agencies, from all non-federal hospitals</p> <p><b>Measures:</b> County aggregates of total covered wages  County aggregates of total covered workers</p> <p><b>Index construction:</b> MSA or rural market-level aggregate average wage per worker  National area-weighted average wage per worker (= unweighted mean of market average wages, computed across all labor markets)</p> <p><b>Comments:</b></p> <ul style="list-style-type: none"> <li>○ No adjustment for part-time workers</li> <li>○ Influenced by seasonal variation, work stoppages and bonus or back pay</li> <li>○ No data on benefits or contract labor</li> <li>○ Data suppressed for counties with &lt;3 reporting entities</li> <li>○ 3-year lag from data year to payment year</li> <li>○ No opportunity for occupation mix adjustment</li> <li>○ Average wages reflect all hospital pay, including non-PPS</li> </ul>	<p><b>Data:</b> HCFA Wage Index Surveys (periodic, earliest 1982 latest 1988), used for payments from FY 1986 through FY 1993</p> <p>Medicare cost report Worksheet S-3 (starting FY 1990 data), used for payments from FY 1994 on.</p> <p><b>Source:</b> HCFA (CMS) surveys from all PPS hospitals (to payment year 1993)</p> <p>Annual cost report wage data (Wks S-3) beginning FY 1994</p> <p><b>Measures:</b> PPS Hospital average hourly wage (until 1988 survey)  PPS Hospital average hourly total compensation (after 1988)</p> <p><b>Index construction:</b> MSA or rural market-level aggregate average hourly wage  National aggregate average hourly (note: use of aggregate average in denominator was adopted in 1988)</p> <p><b>Comments:</b></p> <ul style="list-style-type: none"> <li>○ Adjusts for part-time workers</li> <li>○ Not influenced by variations in total employment</li> <li>○ Surveys gradually added data on benefits and contract labor between 1986 and 1990. Cost report worksheets gradually added adjustments to limit reporting to IPPS portions of hospital operations.</li> <li>○ Data suppressed only for hospitals reporting below minimum wage or &gt; 2.5 times national hourly</li> <li>○ 4-year lag from data year to payment year</li> <li>○ No occupation mix adjustment from S-3; additional survey data mandated for collection 2003 and again in 2006, selected occupations only</li> <li>○ Hourly wages reflect PPS hospital pay only</li> </ul>	<p><b>Data:</b> Occupation Employment Statistics (OES); all-industry average hourly wages by state and/or metropolitan area, for key hospital occupations as reported in Industry-Specific Occupational Employment &amp; Wage Estimates for NAICS 622100 (General Medical and Surgical Hospitals)</p> <p><b>Source:</b> BLS employer surveys conducted over rolling 3-year periods (data contributed by approximately 70% of all employers).</p> <p><b>Measures:</b> Average hourly wages by occupation, computed across all industry settings for that occupation</p> <p><b>Index construction:</b> MSA or rural market-level weighted sum of occupation-specific relative wages, where:   <math display="block">\text{occupation-specific relative wage} = \frac{\text{occupation hourly wage}}{\text{national hourly wage}}</math>                     and  <math display="block">\text{weights for weighted sum} = \frac{\text{occupation-specific hospital wages}}{\text{total hospital wages}}</math> </p> <p><b>Comments:</b></p> <ul style="list-style-type: none"> <li>○ Hourly wage corrects for part-time workers</li> <li>○ Not influenced by variations in total employment</li> <li>○ No data on benefits</li> <li>○ Contract labor wages are reported by contractor</li> <li>○ Data suppressed for MSA/occupation combinations with large sampling error</li> <li>○ 3- to 5-year lag from data year to payment year (i.e. 1/3 3-yr + 1/3 4-yr + 1/3 5-yr)</li> <li>○ Fixed national occupation weights for all occupations in the index computation, updated annually</li> <li>○ Hourly wages reflect all-industry averages, to extent that specific occupations are found in hospital and non-hospital settings</li> </ul>

SOURCE: RTI analysis of BLS and CMS wage data documentation.

# *Appendix C: Article on Wage Index Reclassifications*

## **Healthcare Economist; Wage Index Reclassifications**

August 16, 2010

(no author indicated)

<http://healthcare-economist.com/2010/08/16/wage-index-reclassifications/>

Should Medicare pay hospitals located in New York City more for the same care as hospitals in Montana? Prima facie, one might believe that New York hospitals should receive higher wages since the costs of operating a hospital are much higher in New York. Labor (i.e., nurses, doctors, etc.) may prefer to live in an urban environment and thus it is possible that the cost to attract labor in Montana would be higher.

To adjust inpatient prospective payments to hospitals, Medicare created a wage index system. Each hospital's wage index value determines whether their payments will be adjusted upwards or downwards depending on the cost of labor in their area. The cost of labor is currently defined as the average hospital worker wage (adjusted for occupation) in a given metropolitan statistical area (MSA).

This simple methodology, however, is complicated by exceptions. Today, I review some of those exceptions where hospitals can reclassify to MSAs where they'd receive a higher wage index value.

According to a 2007 MedPAC report, these exceptions include:

- **Lugar counties:** Entire counties may be reclassified to an adjacent metropolitan statistical area (MSA) if they are adjacent to more than one MSA and, taken together, the commuting pattern to those MSAs would classify them to a single MSA under Office of Management and Budget (OMB) rules. For example, if 13 percent of the workers in a county commute to MSA 1 and another 13 percent commute to MSA 2, the sum of those commuting would be 26 percent. Under OMB rules, 25 percent of workers must commute to a single MSA for a county to be part of that MSA; thus, the county would qualify as a Lugar county.

- **Medicare geographic classification review board decisions:** Hospitals may request reclassification to an adjacent labor market area if they meet conditions of geographic proximity and comparable wage costs. *Close geographic proximity* is defined as being located within 15 miles (if urban or 35 miles (if rural) from the border of the area to which they seek to be reassigned. Proximity may also be demonstrated if at least 50 percent of the hospital's employees reside in the reassigned area. *Comparable wage costs* are defined as having an average hourly wage rate at least 108 percent (if urban) or 106 percent (if rural) of the average hourly wage in their actual labor market location, and having an average hourly wage at least 84 percent (if urban) or 82 percent (if rural) of the average wage rate in the area to which they seek to be reassigned. Comparable wage costs are based on weighted three-year average hourly wages. Sole community hospitals and rural referral centers are not required to meet the proximity criteria. In addition, hospitals that are currently classified or have ever been classified as rural referral centers are not required to meet the 106 percent criterion (they can reclassify even if their wages are not higher than their regional average).

Hospitals that do not meet the geographic reclassification regulations have also been reclassified:

- **Section 508** reclassifications were created in the Medicare Prescription Drug, Improvement, and Modernization Act of 2003; they were to expire at the end of fiscal year 2007.
- **Section 401:** Section 401 allows hospitals to be classified for wage index purposes as rural although they are in an urban area.
- **Special exceptions:** Special exceptions are reclassifications allowed at the discretion of the Secretary for certain providers that previously qualified under rules for group (countywide) reclassifications, where statutory changes related to other prospective payment system provisions would otherwise have disqualified these providers from reclassification. These exceptions were implemented in fiscal year 2005 (CMS 2004).
- **Outcommuting adjustment:** The outcommuting adjustment allows wage indexes for counties in lower wage index areas to be blended with higher wage index areas in proportion to the number of county residents who are hospital workers and who commute to those higher wage index areas.
- **Rural floor:** The rural floor exception requires that any MSA wage index in a state be equal to or greater than the statewide rural wage index in that state. The rural floor exception was extended to states without rural areas and an imputed rural floor was created for those states.
- **Hold harmless:** Under the hold-harmless provision, hospitals now in rural but formerly in metropolitan markets are allowed to retain former metropolitan designation for three years, fiscal years 2005–2007.

Why is there such a complicated system? The crudeness of the current wage index measure and political pressure from hospitals likely explains the need for these exceptions.

# *Appendix D: Hospital Area Wage Index Chronology*

Source: Dalton, K., Pope, G., Adamache, W., Dulisse, B., West, N. 2007. "Potential Refinements to Medicare's Wage Indexes for Hospitals and Other Sectors." Prepared for Medicare Payment Advisory Commission (MedPAC), Washington, DC., RTI International (RTI).

**Table 3**  
**Hospital Area Wage Index Chronology, by Year of Implementation**

Payment Fiscal Year	Wage Data Source	Data Definitions and Adjustments	Labor Market Definitions	Labor Market Exceptions	Other Adjustments and Exceptions
1984	BLS	Market aggregate average hospital wage/worker; national = unweighted average across areas	MSAs or state non-metro	None	None
1985	BLS	Same	Same	None	None
1986	1982 HCFA Wage Index Survey (HWIS)	Market aggregate average hospital hourly wage; national = unweighted average across areas	Same	None	None
1987	50/50 blend of 1982 and 1984 HWIS <sup>1</sup>	Market aggregate average hospital hourly wage; national = aggregate average hourly wage	Same	None	None
1988	Blend of 1982 and 1984 HWIS	Same	Same		
1989	Same	Same	Same	“Lugar” Counties (hospitals deemed urban based on commuting patterns to adjacent MSA)	Index re-computed for affected MSAs and rural areas as though deemed hospitals were located in adjacent MSA
1990	1984 HWIS	Same	Same	“Lugar” Counties	Index assignments for “deemed urban” counties set at higher of county-specific or rural rate; rural areas held harmless from any reduction
1991	1988 HWIS	Excluded data from non-acute hospital areas; included fringe benefits and better editing. 100% 1988 data implemented as of 1/1/91 (proposed phase-in of 1988 survey data for areas with large shifts was dropped following mandated delay of implementation date).	Same	“Lugar” Counties	Limited negative impact of reclassification (on facilities originally located in urban markets) to 1 percent reduction.
1992	1988 HWIS	Same	Same	“Lugar” Counties First year of MGCRB reclassifications implemented for rural-to-rural, rural-to-urban and urban-to-urban changes (930 hospitals)	Same

(continued)

**Table 3 (continued)**  
**Hospital Area Wage Index Chronology, by Year of Implementation**

Payment Fiscal Year	Wage Data Source	Data Definitions and Adjustments	Labor Market Definitions	Labor Market Exceptions	Other Adjustments and Exceptions
1993	1988 HWIS	Same	Reclassification criteria tightened	Lugar Counties 2 <sup>nd</sup> year of MGCRB reclassifications	Same
1994	1990 Medicare Cost Reports (MCR)	Allowed wages and hours for professional contract services if directly related to patient care.	Same	Lugar Counties 3 <sup>rd</sup> year of MGCRB reclassifications; number approved reduced by 60 percent under revised eligibility criteria	Same
1995	1991 MCR	Allowed wages and hours for contracted managers	Same	Same	Same
1996	1992 MCR	Same	Same	Same	Same
1997	1993 MCR	Same	Same	Same	Same
1998	1994 MCR	Same	Same	Same	BBA adds "Rural floors" where urban WI values cannot be lower than state rural values
1999	1995 MCR	Allowed wages and hours for contract physician Part A costs	Same	BBRA Section 401 allows urban-to-rural reclassifications	Same
2000	1996 MCR	Began a five-year phase-out of wages and hours for teaching physicians, medical residents and nurse anesthetists	Same	441 total hospitals were re-declassified hospitals	Same
2001	1997 MCR	Same	Same	Same	Same
2002	1998 MCR	Same	Same	Same	Same
2003	1999 MCR	2003 Occupational Mix data collected	Same	MGCRB decisions become effective for three years	Same
2004	2000 MCR		Same	MMA adds "Section 508" reclassification decision appeals permitted	MMA adds "Section 505" out-migration adjustments to wage index for qualifying counties  MMA places upper limit of 62% on labor-related share of standardized rate topped at 62% for markets with WI below 1.00.

(continued)

**Table 3 (continued)**  
**Hospital Area Wage Index Chronology, by Year of Implementation**

Payment Fiscal Year	Wage Data Source	Data Definitions and Adjustments	Labor Market Definitions	Labor Market Exceptions	Other Adjustments and Exceptions
2005	2001 MCR, adjusted by 10% 2003 Occupation Mix data	Occupation Mix Adjustment (OMA) implemented using 10% of computed adjustment factors	CBSA-based definitions of metropolitan areas; counties newly classified as non-metropolitan retain prior metropolitan assignment for 3 years ("hold harmless").		2-year phase-in for any markets with reduced wage index due to CBSA – related reassignment. "Imputed rural floors" added for all-urban states Occupation Mix Adjustment (OMA) implemented using 10% of computed adjustment factors
2006	2002 MCR, adjusted by 10% 2003 Occupation Mix data	Continued 10% OMA implementation	Same		
2007	2003 MCR, adjusted by 100% 2006 Occupation Mix data	Court order overrules 10% phase-in; CMS implements 100% OMA from 2006 one year ahead of schedule	Same	CMS re-assigns hospital wage index exceptions and reclassifications based on highest payments after occupation-mix revision	

SOURCE: RTI analysis of Federal Registers and other sources.

# *Appendix E:*

# *Worksheet S-3*

# Appendix E

04-05

FORM CMS-2552-96

HOSPITAL AND HOSPITAL HEALTH CARE COMPLEX STATISTICAL DATA PROVIDER NO.: PERIOD FROM \_\_\_\_\_ TO \_\_\_\_\_ WORK PART

Component	No. of Beds	Bed Days Available	IP Days / O/P Visits / Trips						Interns & Residents FTEs			Full Time Equivalent		Discharges				
			Title V	Title XVIII	Title XIX		Total All Patients	Obs. Beds Admitted	Obs. Beds Not Adm.	Total	Less I&R Replacing Non-Phys. Anesthetists	Net	Employees On Payroll	Nonpaid Workers	Title V	Title XVIII	Title XIX	
					Total Title XIX	Obs. Beds												Obs. Beds
1	2	3	4	5	5.01	5.02	6	6.01	6.02	7	8	9	10	11	12	13	14	
1 Hospital Adults & Peds. (columns 3, 4, 5 and 6, exclude Swing Bed, Observation Bed and Hospice days)																		
2 HMO																		
3 Hospital Adults & Peds. Swing Bed SNF																		
4 Hospital Adults & Peds. Swing Bed NF																		
5 Total Adults and Peds. (exclude observation beds) (see instructions)																		
6 Intensive Care Unit																		
7 Coronary Care Unit																		
8 Burn Intensive Care Unit																		
9 Surgical Intensive Care Unit																		
10 Other Special Care																		
11 Nursery																		
12 Total (see instructions)																		
13 R PCH/CAH visits																		
14 Subprovider																		
15 Skilled Nursing Facility																		
16 Nursing Facility																		
17 Other Long Term Care																		
18 Home Health Agency																		
20 ASC (Distinct Part)																		
21 Hospice (Distinct Part)																		
23 Outpatient Rehab. Provider (specify)																		
24 RHC/FQHC (specify)																		
25 Total (sum of lines 12-24)																		
26 Observation Bed Days																		
27 Ambulance Trips																		
28 Employee discount days (see instr.)																		

FORM CMS-2552-96 (4-2005) (INSTRUCTIONS FOR THIS WORKSHEET ARE PUBLISHED IN CMS PUB. 15-11 SECTION 3605.1)

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# Appendix E

3690 (Cont.)

FORM CMS-2552-96

04-05

HOSPITAL WAGE INDEX INFORMATION		PROVIDER NO.:		PERIOD:		WORKSHEET S-3,	
				FROM _____		PART II	
				TO _____			
PART II - WAGE DATA							
		Amount Reported	Reclass. of Salaries (from Wkst. A-6)	Adjusted Salaries (col. 1± col. 2)	Paid Hours Related to Salaries in col. 3	Average Hourly Wage (col. 3 ÷ col. 4)	Data Source
		1	2	3	4	5	6
<b>SALARIES</b>							
1	Total salaries (see instructions)						1
2	Non-physician anesthesiologist Part A						2
3	Non-physician anesthesiologist Part B						3
4	Physician-Part A						4
4.01	Teaching physician salaries (see instructions)						4.01
5	Physician-Part B						5
5.01	Non-physician-Part B						5.01
6	Interns & residents (in an approved program)						6
6.01	Contract services, I&R (see instructions)						6.01
7	Home office personnel						7
8	SNF						8
8.01	Excluded area salaries (see instructions)						8.01
<b>OTHER WAGES &amp; RELATED COSTS</b>							
9	Contract labor (see instructions)						9
9.01	Pharmacy services under contract						9.01
9.02	Laboratory services under contract						9.02
9.03	Management and administrative services						9.03
10	Contract labor: physician-Part A						10
10.01	Teaching physician under contract (see instru.)						10.01
11	Home office salaries & wage-related costs						11
12	Home office: physician Part A						12
12.01	Teaching physician salaries (see instructions)						12.01
<b>WAGE-RELATED COSTS</b>							
13	Wage-related costs (core)						CMS 339 13
14	Wage-related costs (other)						CMS 339 14
15	Excluded areas						CMS 339 15
16	Non-physician anesthesiologist Part A						CMS 339 16
17	Non-physician anesthesiologist Part B						CMS 339 17
18	Physician Part A						CMS 339 18
18.01	Part A teaching physicians (see instructions)						CMS 339 18.01
19	Physician Part B						CMS 339 19
19.01	Wage-related costs (RHC/FQHC)						CMS 339 19.01
20	Interns & residents (in an approved program)						CMS 339 20

# Appendix E

FORM CMS-2552-96 (5/2004) (INSTRUCTIONS FOR THIS WORKSHEET ARE PUBLISHED IN CMS PUB. 15-II, SECTION 3605.2)

36-506.2  
06-03

FORM CMS-2552-96

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3690 (Cont.)

HOSPITAL WAGE INDEX INFORMATION	PROVIDER NO.:	PERIOD: FROM _____ TO _____	WORKSHEET S-3, PART III
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PART II - WAGE DATA							
	Amount Reported	Reclass. of Salaries (from Wkst. A-6)	Adjusted Salaries (col. 1 ± col. 2)	Paid Hours Related to Salaries in col. 3	Average Hourly Wage (col. 3 ÷ col. 4)	Data Source	
	1	2	3	4	5	6	
<b>OVERHEAD COSTS - DIRECT SALARIES</b>							
21	Employee Benefits						21
22	Administrative & General						22
22.01	Administrative & General under contract (see inst.)						22.01
23	Maintenance & Repairs						23
24	Operation of Plant						24
25	Laundry & Linen Service						25
26	Housekeeping						26
26.01	Housekeeping under contract (see instructions)						26.01
27	Dietary						27
27.01	Dietary under contract (see instructions)						27.01
28	Cafeteria						28
29	Maintenance of Personnel						29
30	Nursing Administration						30
31	Central Services and Supply						31
32	Pharmacy						32
33	Medical Records & Medical Records Library						33
34	Social Service						34
35	Other General Service						35

PART III - HOSPITAL WAGE INDEX SUMMARY							
1	Net salaries (see instructions)						1
2	Excluded area salaries (see instructions)						2
3	Subtotal salaries (line 1 minus line 2)						3
4	Subtotal other wages & related costs (see inst.)						4
5	Subtotal wage-related costs (see inst.)						5
6	Total (sum of lines 3 thru 5)						6
7	Net salaries (see instructions)						7
8	Excluded area salaries						8
9	Subtotal salaries (line 7 minus line 8)						9
10	Subtotal other wages & related costs (see inst.)						10
11	Subtotal wage-related costs (see inst.)						11
12	Total (sum of lines 9 thru 11)						12
13	Total overhead costs (see inst.)						13