

# **Rural-Urban Issues in the Wage Index Adjustment for Prospective Payment in Skilled Nursing Facilities**

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## Executive Summary

In July of 1998 the method for determining payments for Medicare services in skilled nursing facilities (SNFs) began a three-year transition from retrospective cost-based reimbursement to a SNF prospective payment system (SNF PPS) based on national rates with an adjustment for differences in local wages. At the time that SNF PPS was introduced, the Centers for Medicare and Medicaid Services (CMS) had no reliable data on regional differences in nursing home wages, so the wage adjustment was based upon the Medicare inpatient hospital wage index. Although by 2001 preliminary SNF wage indexes were available based on 1998 and 1999 data, for FY 2004 payments CMS still uses the hospital index. Many problems of concern to rural providers have been identified in the hospital wage index, such as the use of state boundaries to define rural economic markets, lack of timeliness in collecting the data, and failure to control for differences in occupation mix. All of these problems also apply when the hospital index is used to adjust SNF PPS rates, but additional problems may arise if relative wage patterns for hospitals and nursing homes are not the same. In the hospital inpatient PPS, many rural hospitals are able to correct arbitrary labor market assignments by applying for geographic reclassification. Skilled nursing facilities do not have access to this remedy because there are no provisions for SNF reclassification as long as the hospital index continues to be used.

In this working paper, the hourly wage data collected from Medicare-participating nursing homes are used to examine urban and rural patterns in average hourly nursing home wages and patterns of wage variation within the statewide rural labor markets defined by CMS. The data are also used to examine the adequacy of the hospital wage index as an adjuster for SNF rates. Data from 1998 and 1999 SNF wage surveys are merged with

operating statistics from Medicare SNF cost reports for approximately 11,600 facilities. We find that rural-urban wage differences among SNFs are similar to but not quite as severe as those found in hospitals. Hourly wages paid in non-metropolitan areas averaged 83.5% of those in metropolitan areas, compared to 81.8% for the same period among hospitals. Wages in hospital-based SNFs are substantially higher than those in freestanding facilities in all but the most rural counties. Hospital-based SNF wages decline steadily as areas become more rural (a pattern that is similar to what we see in hospitals). Among freestanding facilities the decline is much less steep, possibly indicating that there are fewer occupation mix differences in freestanding facilities across urban and rural labor markets.

When we examine wage variation within the single statewide rural markets in both hospital-based and freestanding SNF hourly wages, we find evidence of rural sub-markets in both settings. A substantial number of SNF providers in the more urbanized non-metropolitan counties have a wage structure that is more similar to what is found in the smaller metropolitan areas, indicating possible labor market misclassifications. As with hospitals, SNFs in the very rural counties tend to benefit by being grouped in statewide rural markets while those in the less rural areas tend to be penalized. Unlike PPS hospitals, however, SNFs that are penalized by being inappropriately grouped with facilities in lower-wage sub-markets have no recourse to geographic reclassification.

Regarding the continued use of the hospital wage index rather than a SNF index, we find that for urban markets in particular, the hospital index does not correlate well with the SNF index, and hospital relative wages are not a very accurate predictor of geographic variation in skilled nursing wages. The problems are less severe for rural markets. Switching from the hospital index to a SNF index would result in substantial payment changes for some individual markets, but we did not find strong evidence that use of the hospital index creates

systematic bias in SNF payments—that is, that it affects one type or group of nursing homes more than another. We estimate that a slight re-distribution of payments would occur under a SNF index, from the large metropolitan areas to all other areas.

On balance, our findings suggest that although payment equity would be improved by adopting the SNF index, the chief problems with the wage adjustment under SNF PPS stem not from the use of the hospital index, but from two other issues. The first is the inclusion of hospital-based and freestanding facilities in a single market adjuster; except in the very smallest rural counties, this problem appears to affect urban and rural facilities alike. The second is the failure of SNF PPS to allow for geographic reclassification; this problem disproportionately affects a subgroup of facilities located in the larger non-metropolitan counties.

It is not possible to consider separating wage index adjusters for hospital-based and freestanding facilities without simultaneously adjusting the underlying PPS rate structure, a subject that is outside the scope of this working paper. We do find that for the 84% of Medicare-participating SNFs that are freestanding, PPS rates would more closely approximate their markets' expected case-mix adjusted per-diem costs under a wage adjuster that is derived from SNF data. The evidence in favor of allowing some administrative remedy for market misclassification, however, is present regardless of which data are used to construct the index. The question of geographic reclassification for SNFs deserves some rural policy attention whether or not the SNF wage index is put in place.

# **Rural-Urban Issues in the Wage Index Adjustment for Prospective Payment in Skilled Nursing Facilities**

## ***Study Objectives***

In July of 1998 the method for determining payments for Medicare services in skilled nursing facilities (SNFs) began a three-year transition from retrospective cost-based reimbursement to a prospective rate per day of care, that is adjusted for case type, severity, urban or rural location and geographic differences in prevailing wage levels. At the time that the SNF prospective payment system (SNF PPS) was introduced, the Centers for Medicare and Medicaid Services (CMS) had no reliable national data on regional differences in nursing home wages. Consequently, the wage adjustment was initially implemented using the hospital wage index that CMS had already developed for a similar purpose as part of Medicare's inpatient hospital PPS.

Recent hourly wage data collected from cost report surveys of Medicare-participating nursing homes provide an excellent opportunity to study urban-rural differences in average labor costs in the skilled nursing home industry in general, and to address specific questions about regional price adjustments for Medicare's SNF PPS rates. In this working paper we analyze the nursing home wage surveys merged with operating statistics from related Medicare cost reports, to accomplish three objectives:

- I. Identify urban and rural patterns in average hourly nursing home wages, across facilities grouped by location, hospital affiliation, ownership and size.
- II. Identify patterns of wage variation within the statewide rural labor markets defined by CMS, to consider the need for geographic reclassification provisions in the SNF PPS rules.
- III. Examine the adequacy of the hospital wage index as a predictor of market-level variation in SNF wages, and estimate the payment distribution impact of

implementing a SNF wage index, with particular attention to any differential effect on rural providers.

Our primary focus is on rural and urban differences in SNF wages and their relevance to PPS payment issues. However, the distinction between freestanding and hospital-based facilities is a dominating characteristic of the skilled nursing home industry. Because the financial, operating and clinical differences between these two settings can be substantial, most of our findings are also dichotomized along this dimension.

### ***Background***

The inpatient hospital wage index is a cross-sectional measure of relative wages that is computed each year from data filed on hospital cost reports from the period four years earlier. CMS groups all participating Medicare facilities into local labor markets based on Metropolitan Statistical Area (MSA) assignment or, in the case of non-metropolitan counties, by state. For each year and each labor market, the sum of all wage-related costs is divided by the sum of all paid hours to arrive at an aggregate hourly wage (AHW) that is, in effect, a market-specific weighted average. The index value is computed by dividing the AHW for each labor market by the AHW for the nation. Wage index values typically range from 0.65 to 1.50.

Hospitals have been completing wage surveys as part of their annual Medicare costs report since 1990. With the advent of SNF PPS, Medicare-participating nursing facilities are now also required to complete wage surveys. Cost report wage surveys include detailed data on each institution's salaries, benefits, paid hours and contract labor. Since 1998 CMS has stated its intention to develop a wage index constructed from SNF data as soon as reliable data become available (1). In the proposed rules updating SNF PPS rates for FY 2003, CMS published "prototype" SNF wage indexes that were constructed from the 1998 and 1999 wage

surveys from nursing homes. Citing concern with the year-to-year differences in the wage data, CMS chose to continue using hospital index values to adjust SNF PPS rates (2).

In the proposed rules for FY 2004 CMS recommended continuing this policy, citing insufficient resources to audit the SNF survey data:

While we continue to believe that the development of a SNF-specific wage index potentially could improve the accuracy of SNF payments, we do not regard an undertaking of this magnitude as being feasible within the current level of programmatic resources. However, we remain willing to consider the adoption of a SNF-specific wage index should sufficient staffing and budgetary resources to support it become available in the future.

68 FR 26758

(3)

While justifying the use of the hospital index on the grounds that the data are more reliable, CMS has also frequently commented in these regulatory updates that because nursing facilities compete for labor in the same market as hospitals, hospital index values should provide a fair basis for adjustment.

The generalizability of the hospital wage index to other institutional settings is compromised, however, by the fact that data are not adjusted for occupation mix differences. The wage surveys from the cost reports can identify the average hourly wage paid by each facility, but they do not separately identify the rates paid by skill level or type of employee. Consequently, the resulting index reflects market-level differences in both the *price* of labor and in the *mix* of skill levels employed within each market. The wage index thus functions as a cost index—that is, a measure of relative cost rather than relative price<sup>1</sup> (4). Failure to adjust for skill mix introduces bias into the wage index to the extent that the mix is

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<sup>1</sup> The Benefits Improvement and Protection Act of 2000 (22) mandated that CMS begin to collect some occupation-specific data in hospitals in order to begin adjusting the wage index for differences in occupation mix index levels by FY 2005. The data collection effort will not begin until FY 2004, however, which is well behind schedule.

systematically different across markets. This happens in the hospital sector because labor prices and occupation mix are positively correlated. Because rural hospitals are located in low-wage markets and tend to employ a less highly skilled mix of labor, the gap between urban and rural wage index values is greater than it would be under a price index. The same structural differences are not as pronounced between rural and urban nursing facilities, and occupation mix differences may not have the same influence in an index constructed from SNF data as they have on an index constructed from hospital data.

Many problems of concern to rural providers have been identified in the hospital wage index with respect to its role as an input price adjuster for Medicare's inpatient hospital PPS rates. In addition to the occupation mix issues, the problems most frequently cited are those associated with using political boundaries to define economic markets, and lack of timeliness in collecting the data (5-9). All of these problems also apply when the hospital index is used to adjust SNF PPS rates, but additional problems may arise to the extent that relative wage patterns for hospitals and nursing homes are not the same. Theoretically we would expect to see similar regional variation in a pure price index if hospitals and nursing homes compete for the same types of labor, but if occupation mix influences hospital market averages more than nursing home market averages, then using the hospital wage index has the potential to distort the SNF PPS rates.

Perhaps most problematic for rural SNFs under PPS is that the SNF PPS regulations include no administrative remedies to correct arbitrary labor market assignments. In the inpatient PPS, hospitals that are both located close to the border of another labor market and can demonstrate that they compete for labor in the neighboring market, can be reclassified into that market for purposes of assigning their index value (10). Such reclassifications have substantially improved inpatient PPS payments for many rural hospitals (9), but skilled nursing facilities do not have access to this remedy. There are no regulatory provisions to

address reclassification for SNF PPS rates as long as the hospital index is being used, even for skilled nursing units that are located in hospitals that have been granted reclassification for their acute inpatient rates (11).

### ***Data and Approach***

The 1998 and 1999 SNF wage surveys were obtained from CMS public use files. These were merged with operating statistics from Medicare SNF cost reports, matched to the survey records based on the facilities' period-end dates. For all of our analyses the samples are defined by the year of the wage survey file, and include all facilities with both wage survey and cost report data. Approximately 13,000 facilities had matching cost report data for the 1998 survey and 11,900 for the 1999 survey. All of our analyses were conducted on both years, but because differences in aggregate findings between the two years are not great, most of the results reported here are from the 1999 survey data. The survey data as received from CMS have already been adjusted for inflation effects, to make each dollar value reflect what would be reported if every facility had the same accounting period-end date. To reduce the impact of extreme values on our summary data, we excluded facilities with average hourly wages below the 1<sup>st</sup> percentile (about \$7.00) or above 99<sup>th</sup> percentile (\$26.00) of the inflation-adjusted hourly wage from our study sample.

CMS maintains separate wage survey files for freestanding and for hospital-based facilities. The data elements are defined identically in both files but the information is derived in slightly different ways. Surveys from freestanding facilities start out with wage and hour data on all personnel, then exclude the information from areas that are not covered by the SNF PPS, along with a pro-rated portion of wage data from general service areas, before computing the final hourly wage for skilled care. In contrast, the hospital-based SNF surveys start with salary and wage data that hospitals report for their Medicare-certified SNF units

only, then add a pro-rated portion of wage and hour data from each hospital’s general service areas.

Additional information relating to the counties where each nursing home is located was obtained from the Bureau of Health Professions’ Area Resource File as updated in January 2002, and merged on the county FIPS codes that appear on the CMS On-Line Survey and Certification (OSCAR) file as updated by February 2002. Summary statistics on the final 1999 survey sample are presented in Table 1, grouped by metropolitan and non-metropolitan location.

**Table 1: Summary Statistics from 1999 Skilled Nursing Facility Wage Survey Sample**

	In Non-metropolitan Counties	In Metropolitan Counties	Total
Number of Medicare- participating facilities	3,624	8,239	11,863
% hospital-based	18.3%	14.8%	15.8%
% freestanding	81.7%	85.2%	84.2%
Number of SNF beds	141,657	429,150	570,807
% hospital-based	18.1%	10.9%	12.7%
% freestanding	81.9%	89.1%	87.3%

Source: SNF cost report files for FY 1999, CMS. Metropolitan status defined by OMB, 1999.

Throughout this paper the terms “rural” or “urban” are used synonymously with “metropolitan” and “non-metropolitan”, and refer to county-level designations from the Office of Management and Budget (OMB) as of 1999. To be able to examine patterns of rural wages in more detail we make use of the Rural-Urban Continuum Code (RUCC) classification of counties (12). This is a classification scheme that was originally constructed in 1993 with four metropolitan and six non-metropolitan categories. The non-metropolitan categories were based both on the proportion of county population living in urbanized settings

and on county adjacency to areas that OMB had identified as metropolitan at the time.<sup>2</sup>

RUCCs are not used by CMS for labor market definitions or for any other payment differentials; they are used in this paper to identify trends by level of “rurality”, and in particular, to investigate systematic differences in hourly wage patterns within the statewide rural labor markets. The distribution of sample nursing facilities by RUCC is shown in Table 2; the right-most column also shows the percent of facilities within each group that are operated as units within a hospital.

**Table 2: Distribution of 1999 Skilled Nursing Facility Wage Survey Sample by Rural-Urban Continuum Code and Hospital Affiliation**

Rural-Urban Continuum Code	Number of Facilities	Percent of 1999 sample	Percent facilities hospital-based
Metropolitan central counties, population >1 million	4,136	35%	15%
Metropolitan fringe counties, population >1 million	478	4%	13%
Metropolitan, population 250,000-1,000,000	2,510	21%	14%
Metropolitan, population < 250,000	1,037	9%	18%
Adjacent county, urbanized population ≥ 20,000	572	5%	16%
Non-adjacent county, urbanized population ≥ 20,000	384	3%	24%
Adjacent county, urbanized population 2,500-20,000	1,195	10%	16%
Nonadjacent county, urbanized population 2,500-20,000	1,023	9%	20%
Adjacent county, urbanized population < 2,500	197	2%	15%
Nonadjacent county, urbanized population < 2,500	331	3%	21%
All facilities	11,863	100%	16%

Source: 1999 SNF Wage Surveys, CMS.

In Section I we begin with descriptive analyses of average hourly wages by location, hospital affiliation and other facility characteristics. We compare the overall variability

<sup>2</sup> Some counties that were designated as non-metropolitan 1995 have since been redesignated as part of a metropolitan area and are therefore identified as “Metropolitan” for Medicare payment even though they appear in the non-metropolitan RUCC groups. A new version of RUCC groups has recently been published based on the 2000 census figures and the OMB’s most recently revised metropolitan county definitions (23). Because

across nursing homes to the variability across hospitals, and we consider the contribution of occupation mix differences to the overall wage variation. Section II follows with an analysis of wage variation within rural markets. This is captured by a within-market deviation measure computed as the percent difference between each facility's hourly wage and the AHW of the labor market to which it belongs. By summarizing this deviation measure across SNFs grouped by RUCC, we are able to consider the extent to which rural facilities may be disadvantaged by being grouped in one statewide market with no opportunity for geographic reclassification. The third and final section focuses on the differences between the hospital index and an index computed from the new SNF wage data. We consider CMS' concerns about the validity of the SNF survey data, and we compare the percent of SNF wage variation that can be explained by each index, for all facilities as a group and for rural and urban facilities, separately. We examine the potential redistribution of payments that would occur from converting to a SNF-based index, with the objective of identifying potential systematic differences in the redistribution by rural-urban location.

## ***Findings***

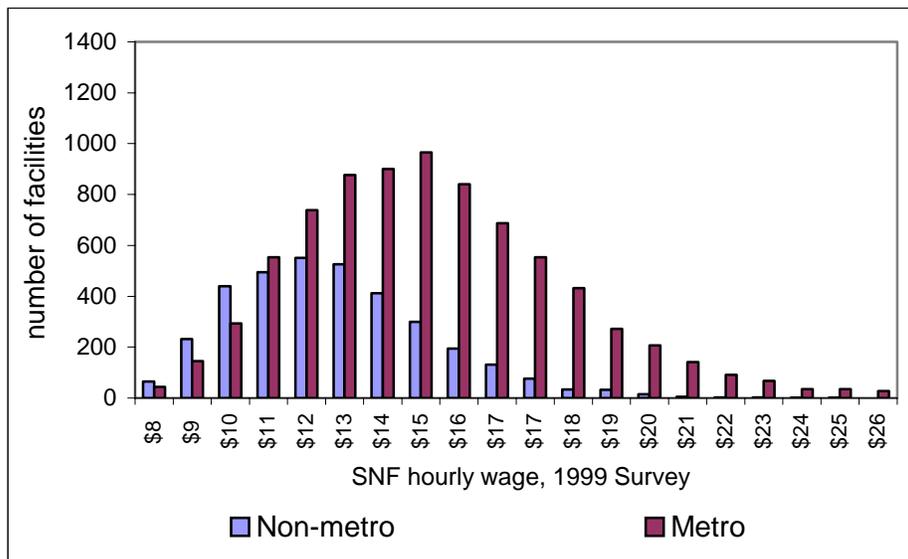
### **Section I: Distribution of Hourly Wages by Location and Facility Type**

In the 1999 SNF wage surveys the average hourly wage across non-metropolitan SNFs was \$11.99 per hour, which is 83.5% of the average wage across metropolitan SNFs (\$14.36). This is a slightly smaller differential than we see in hospital data for the same period, where the wages in non-metropolitan facilities averaged 81.8% of those in metropolitan hospitals (Figure 1).

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CMS has not yet indicated how it plans to use the latest OMB classifications for payment purposes, we have not incorporated the new RUCC groupings into this analysis.

**Figure 1: Distribution of FY 1999 Skilled Nursing Facility Average Hourly Wages by Metropolitan and Non-Metropolitan Location**



Source: Authors' computations from 1999 SNF Wage Survey. Metropolitan status as defined by OMB, 1999.

The underlying variability in SNF hourly wages is actually greater than the variation found in PPS hospitals (Table 3). This finding is surprising, since the majority of services provided in nursing homes are related to nursing care and rehabilitation therapy, and with less variation in the type of services delivered, we expected to see more homogeneity in the wage structure. It is possible that some of the variation in SNF hourly wages could be due to reporting error. CMS has expressed some skepticism about the reliability of the SNF wages reported during these first two years of data collection, given the complexity of the instructions regarding how to report benefits and contract labor. However, when we looked at raw hourly pay for freestanding facilities (the figure taken from wage and hour data that flow directly from the payroll systems onto the first line of the wage survey, that should not be subject to error introduced by subsequent calculations), we saw nearly as much cross-sectional variation as in the final wage data. This suggests that wage variation is a characteristic of the industry.

**Table 3: Variation in Hourly Wages for Metropolitan and Non-metropolitan Skilled Nursing Facilities**

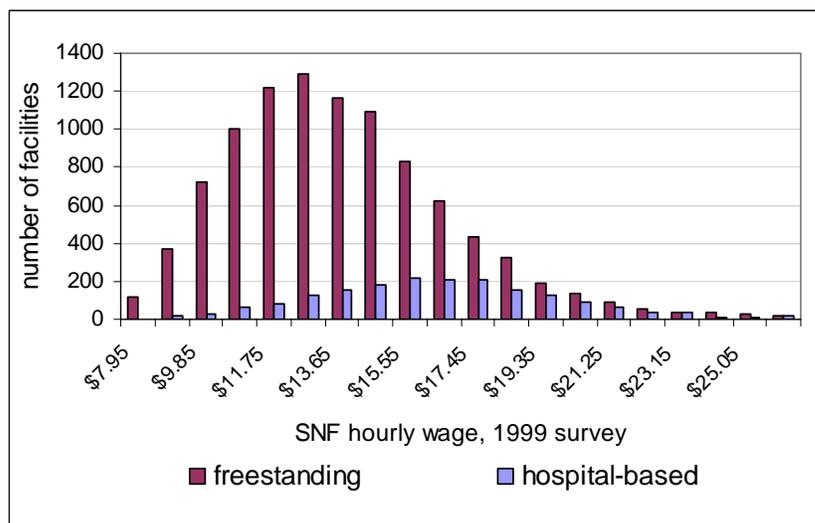
	Mean hourly wage <sup>1</sup>			Coefficient of Variation (std dev as percent of mean)		
	Non-Metro	Metro	All	Non-Metro	Metro	All
SNFs, FY 1998 Survey	\$11.15	\$13.44	\$12.75	22%	25%	26%
SNFs, FY 1999 Survey	\$11.99	\$14.36	\$13.63	21%	23%	24%
FY 1999, freestanding	\$11.62	\$13.90	\$13.22	20%	23%	23%
FY 1999, hospital-based	\$13.62	\$17.07	\$15.83	20%	20%	21%
Compared to: PPS Hospitals, FY1999	\$18.71	\$22.87	\$20.97	16%	18%	20%

<sup>1</sup> Un-weighted average computed across facilities within group.

Source: Authors' computations from 1998 & 1999 SNF Wage Surveys and 1999 PPS Hospital Wage Survey; Metropolitan status defined by OMB, 1999.

There is also a substantial difference between the average hourly wages of freestanding and hospital-based facilities. The difference is large in relative terms—the un-weighted average was 18.6% higher for hospital-based settings in 1999—but hospital-based facilities make up only 16% of all SNFs, and there is still considerable overlap in the distribution of wages across the two groups (Figure 2).

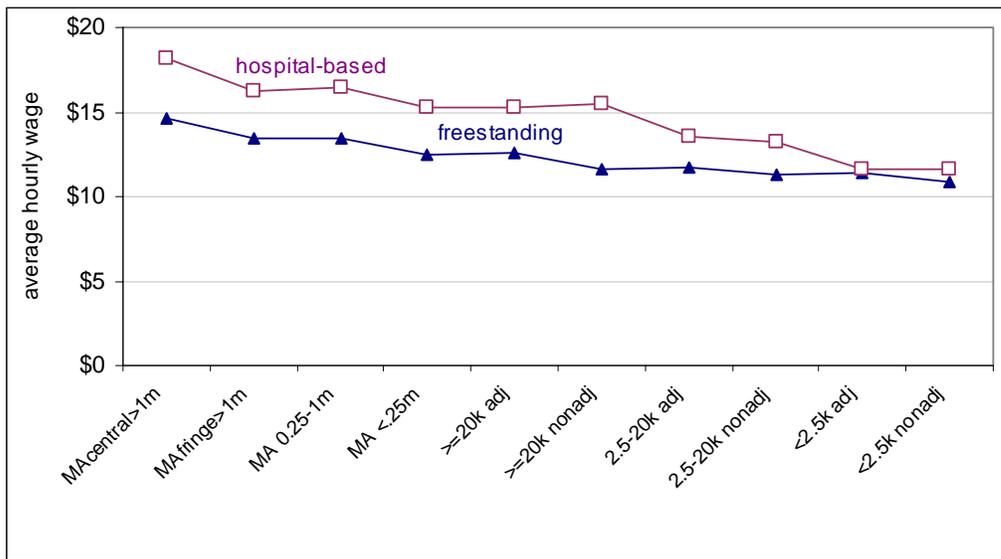
**Figure 2: Distribution of Skilled Nursing Facility Hourly Wages by Hospital Affiliation, 1999**



Source: Authors' computations from 1999 SNF Wage Survey.

Higher wage levels for hospital-based settings are found in both urban and rural settings, but the gap is greatest for facilities in large metropolitan areas and declines both for smaller urban areas and as counties become more rural (Figure 3). In the most rural counties, where hospital-based units make up about one fifth of the facilities and more than one fifth of the skilled beds, there is little difference between the wages in the two settings.

**Figure 3: Skilled Nursing Facilities Hourly Wages Averaged by Rural-Urban Continuum Code and Hospital Affiliation, 1999**



Source: Authors' computations from 1999 SNF Wage Survey.

Some of the difference between hospital-based and freestanding settings could be reporting effect, because the way in which the hospital-based hourly wages are extracted from the larger hospital survey effectively excludes the contribution of ancillary health personnel from the SNF-related average wage. Ancillary health technicians and therapists are relatively skilled employees, however, so there seems little reason to assume that their exclusion could artificially raise the hourly wages computed for hospital-based settings. In addition, such reporting differences would not explain the pattern seen in Figure 3, of declining differences between the two settings as counties become more rural.

A more plausible explanation of the hospital-based wage differential is that it reflects differences in staffing mix that are associated with caring for higher acuity patients. There is substantial evidence from claims data documenting lower lengths of stay and more intense service use per day in hospital-based units (13), and most analysts agree that there are substantial case-mix differences between the two settings (14–16). A point-in-time measure of nurse staffing by job category is recorded as part of state nursing home licensure surveys and included in CMS’ On-Line Survey and Certification database (OSCAR). For measures captured during 1999 and 2000, the ratio of nursing FTEs per bed is more than 50% higher in hospital-based settings than in freestanding ones and the proportion of nurses that are RNs is more than twice as high. Previous work has also found that hospital-based facilities in the most rural counties look more like freestanding facilities in their mix of skilled and non-skilled care, possibly because they are filling in the gaps in areas where there are no community-based nursing facilities (17). This same study noted that in the hospital-based settings, two key staffing measures—nursing FTEs per hospital-based bed and RNs as a percent of total nurse staff—were highest for urban units and declined as the location became more rural—findings that are consistent with the narrowing hourly wage differential between freestanding and hospital-based settings that we see in Figure 3.

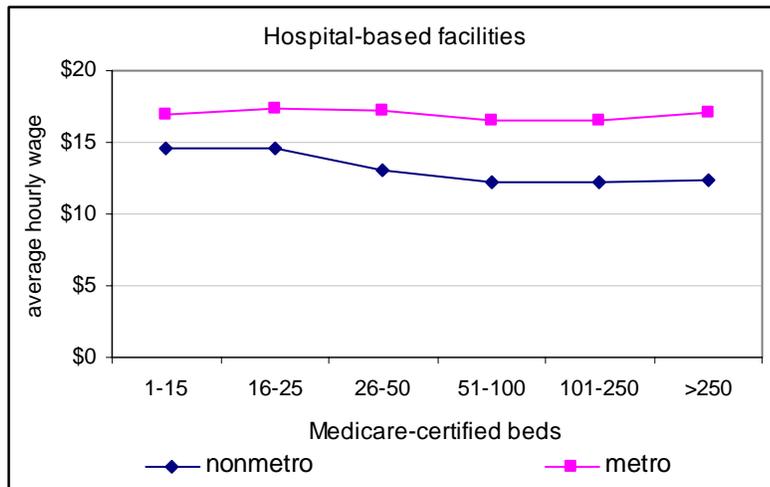
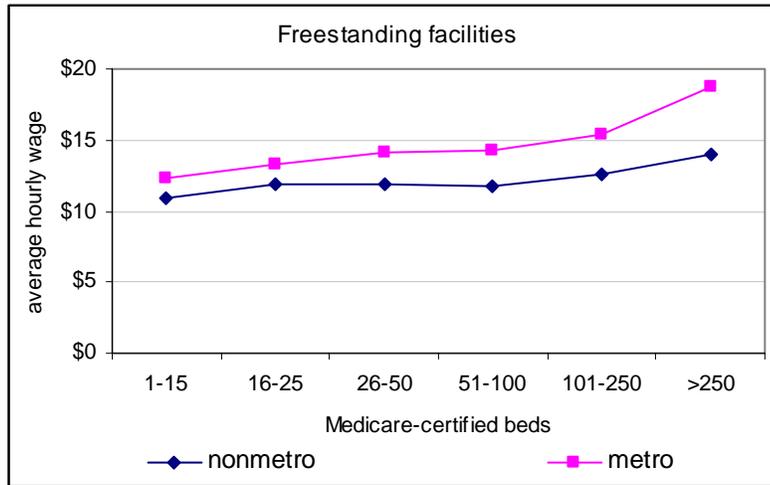
Occupation mix differences between hospital-based and freestanding settings contribute to the high *total* variation in SNF hourly wages, but they are less likely to contribute to the rural-urban wage differential because the proportion of hospital-based facilities is similar across rural and urban markets. In hospitals, we know that occupation mix contributes substantially to the rural-urban wage differential because of the positive

association between case mix, facility size, and market size and market wages<sup>3</sup>. In long-term care the same associations are not present, because while higher case-mix does tend to be found in hospital-based units, the proportion of hospital-based to freestanding facilities is similar across urban and rural areas. Further, we find no clear association between hourly wages and facility size (Figure 4) or Medicare utilization (Figure 5). Among freestanding facilities hourly wages are highest in homes with 250 or more certified beds, but these constitute only one and one-half percent of facilities and they are heavily concentrated in New York State. The OSCAR staffing ratios, which allow a more direct estimate of occupation mix differences across nursing homes, show that among freestanding facilities there is almost no difference in the mix of nursing FTEs across rural-urban levels. Thus, the rural-urban differences that we see in average hourly wages paid in freestanding settings—identified in the lower line of Figure 3—are more likely to reflect true price differences, without the added distortion from occupation mix.

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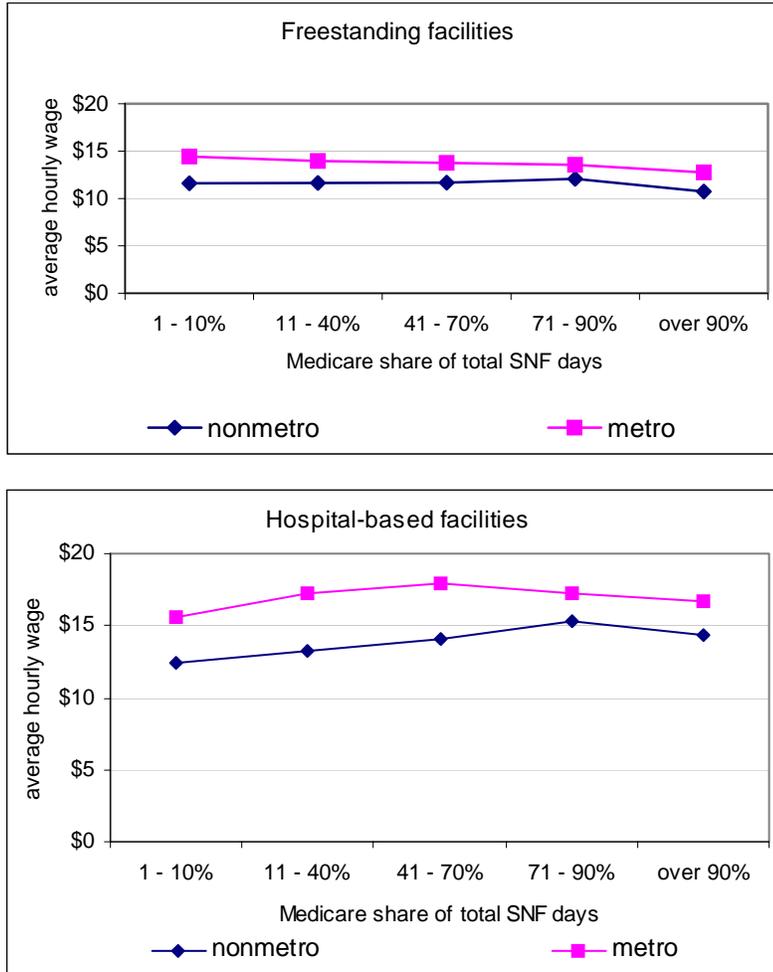
<sup>3</sup> For example, although the hourly wages of rural hospitals as a group averaged about 18% lower than those of urban hospitals in the 1999 hospital wage survey, the difference was 16% for medium-size facilities and only 10% for those with 300 or more beds (Source: Authors' computations from FY 1999 Hospital cost reports).

**Figure 4: Skilled Nursing Facilities Hourly Wages Averaged by Medicare-certified Bed Capacity & Hospital Affiliation**



Source: Authors' computations from 1999 SNF Wage Survey and 1999 Cost Reports. Metropolitan status defined by OMB, 1999.

**Figure 5: Skilled Nursing Facilities Hourly Wages Averaged by level of Medicare Utilization & Hospital Affiliation**

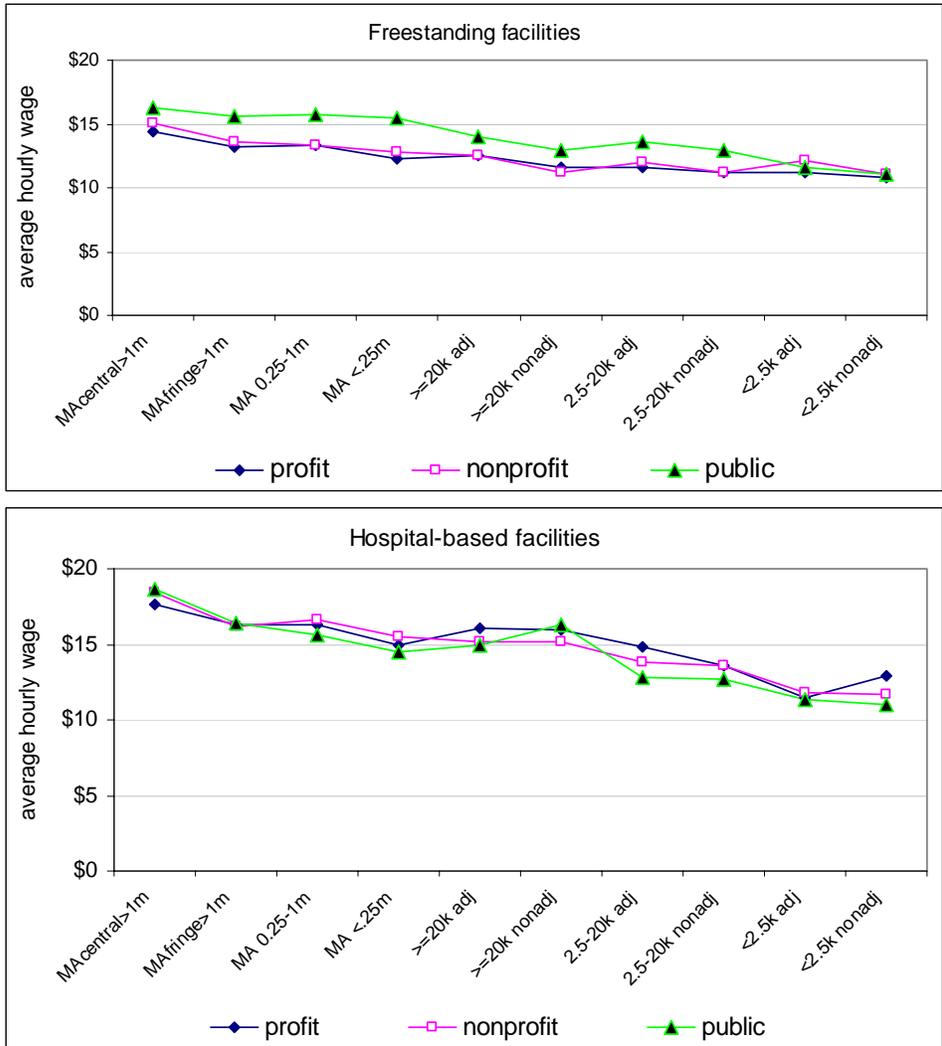


Source: Authors' computations from 1999 SNF Wage Survey and 1999 Cost Reports. Metropolitan status defined by OMB, 1999.

On average, the hourly wages across for-profit facilities are about 9% lower than they are in either private non-profit or public settings, but this is because for-profit facilities are predominantly freestanding. Two-thirds of Medicare SNFs are organized as private for-profit organizations, but in the 1999 survey file only 4% of the proprietary facilities were hospital-based, compared with 36% of those that were private non-profit and 50% of those that were public. Within the subset of freestanding facilities, for-profit and private non-profit facilities appear to have similar average wages within each RUCC category while public facilities have

substantially higher wages than others in all but the most rural counties (Figure 6). Among hospital-based units the association between ownership and hourly wages is mixed, but public facilities tend, if anything, to have slightly lower wages.

**Figure 6: Skilled Nursing Facilities Hourly Wages Averaged by Type of Ownership and Affiliation**



Source: Authors' computations from 1999 SNF Wage Survey.

## Section II: Within-Market Variation

Several previous studies of the hospital inpatient PPS wage index have found that hourly wages in non-metropolitan hospitals decline as location becomes more rural, and the conclusion drawn by many researchers is that the state-wide rural labor markets may be too broadly defined (5; 6; 9). We have constructed a measure of within-market wage deviation for SNFs that is computed as the difference between each facility's hourly wage and its market's aggregate hourly wage (AHW), expressed as a percent of that AHW<sup>4</sup>:

$$\frac{\text{hourlywage}_{\text{facility}} - \text{AHW}_{\text{market}}}{\text{AHW}_{\text{market}}} \times 100$$

The deviation measure is thus negative for facilities with below-market wages and positive for those with above-market wages. All other things being equal, negative deviation measures would be desirable because they would indicate a favorable reimbursement position under PPS rates, and the lower the deviation measure, the more favorable. By comparing the average deviation measures for facilities grouped by RUCC (concentrating on the six non-metropolitan categories), we can identify geographic sub-groups that may be systematically advantaged or disadvantaged by the labor market definitions.

The chart in Figure 7 presents average deviation statistics from the 1999 SNF wage survey. The bars show simple averages across facilities in each RUCC category, where each SNF provider within each RUCC group has equal weight in the average.<sup>5</sup> The picture that is presented is similar in many ways to our earlier findings on within-market variation for

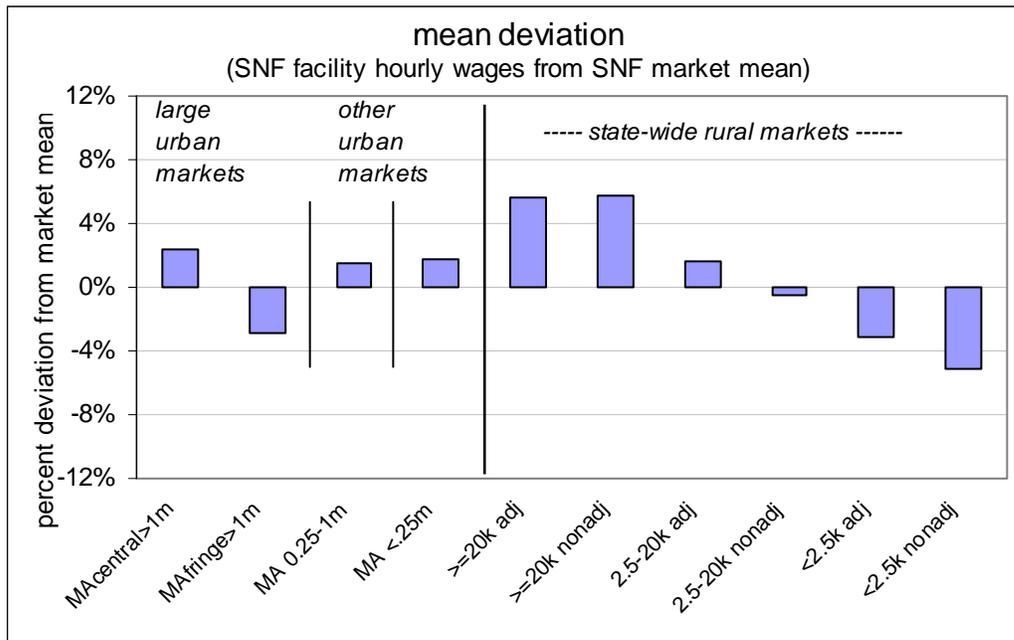
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<sup>4</sup> Deviation can be computed either as a) relative to the AHW of the labor market as computed from the SNF data (as would happen in a SNF index) or b) relative to an AHW that is imputed from the value of the assigned hospital wage index. For any individual labor market, the imputed AHW would be derived by dividing the market's assigned hospital wage index value by the actual national AHW from the SNF data. In this section we focus primarily on deviation from the AHW that is computed directly from the SNF wage data.

<sup>5</sup> We chose to present equal facility-weighted results because we are interested in the impact of wage index policy decisions on individual SNF providers. Alternatively the analysis could be weighted by (for example) the

hospitals (9). The first two bars show the average deviation for large metropolitan central and large metropolitan fringe counties, both of which are combined within “large urban” labor markets under CMS’ definitions. Substantial differences in wage patterns between these two types of counties indicate the likelihood of urban sub-markets that are not recognized by the payment system; about 10% of all SNF facilities located within large urban MSAs are in fringe counties and these appear to enjoy a substantial payment advantage by being grouped in the same labor market with the central counties. The bars in the third and fourth RUCC groups show average deviation for counties that are assigned to smaller MSAs, but since these MSAs each make up their own markets, there is no similar within-market interpretation for either of the groups.

**Figure 7: Average Within-market Wage Variation by Rural-Urban Continuum Code, 1999 Skilled Nursing Facility Wage Survey**



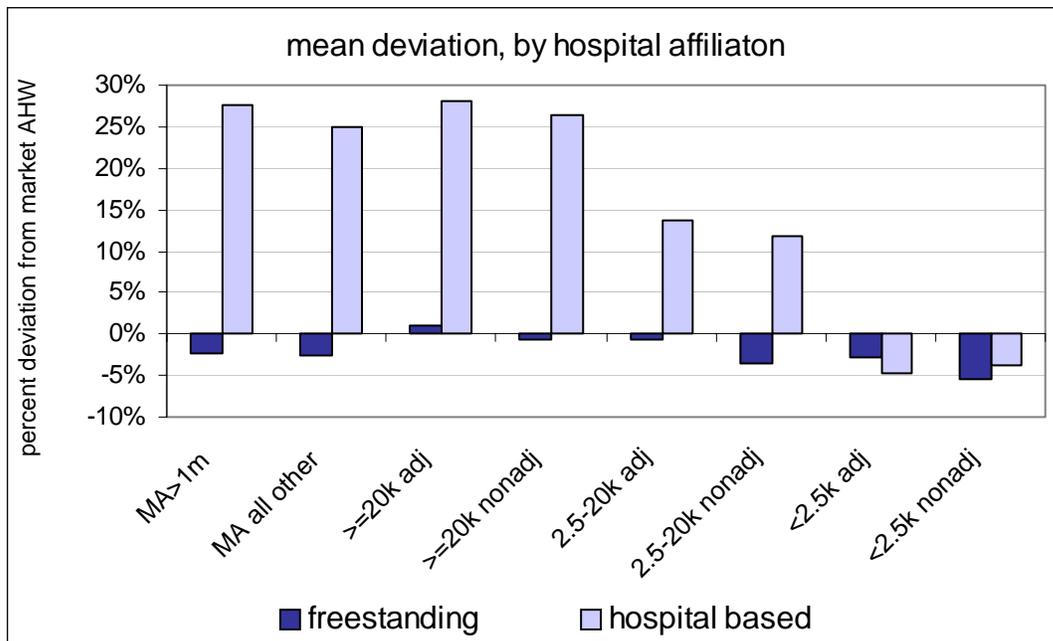
Notes: Horizontal axis identifies county groups according to 1995 Rural Urban Continuum Code assignment, adjusted for facilities located in counties that were reclassified as metropolitan since 1995. These have been re-grouped to the appropriate Metropolitan Area category.

Source: Authors’ computations from 1999 SNF Wage Survey.

number of Medicare covered days, if the study question was focused on beneficiaries, or by total Medicare payments, if the study question was focused on Medicare budget impact.

The average deviation statistics in Figure 7 are computed according to the labor markets as defined by inpatient hospital and SNF PPS regulations, and the chart clearly identifies the locations that tend to be advantaged or disadvantaged under the current labor market definitions. As a tool for understanding SNF wage variation, however, these averages are somewhat misleading, because the within-market variation caused by combining hospital based and freestanding facilities into one index is larger than any sub-market variation that we find, and almost as large as the cross-market variation that a wage index is designed to address. Hourly wages for freestanding facilities average about 2% below the aggregate average for their respective labor markets, but those from hospital-based units average 22% higher, and these differences are present in all but the most rural counties (Figure 8).

**Figure 8: Average Within-market Wage Deviation for Freestanding Compared to Hospital-Based Facilities, 1999 Skilled Nursing Facility Wage Survey**



Source: Authors' computations from 1999 SNF Wage Survey.

Under any PPS setting, the wage index is intended to capture external market-driven variation in input prices, but not variation that relates to organizational characteristics. If there are significant differences in average labor costs that are associated with the type of product offered by certain types of organizations within a market then, in theory, it is the job of case-mix adjusters rather than the wage index to capture such differences. But the magnitude of the within-market wage differences shown in Figure 8 places a very large burden on the SNF case-mix adjusters to be able to compensate hospital-based facilities fairly for such large cost differences, and there is a sizeable body of literature demonstrating that the Resource Utilization Groups (RUG-III) used for case-mix adjustment in this setting are particularly poor cost predictors (18-20). The gap between hospital-based and freestanding labor costs underscores the question of underlying product differences between the two settings, and the appropriateness of a single case-mix adjusted rate for both settings.

Regardless of the type of institutional setting, grouping all rural counties together in one rural market at the state level has the effect of penalizing some facilities in the larger or more urbanized non-metropolitan counties where the wage levels may more closely approximate those in nearby urban areas. Policy analysts have recognized this potential distortion in the hospital PPS payment structure for some time. Yet the state-wide rural markets also create an important reimbursement advantage under PPS for hospitals in the most rural counties, and rather than eliminate that advantage by defining rural markets more precisely, policymakers have opted for an administrative remedy that allows specific hospitals to request reclassification to neighboring metropolitan markets. Geographic reclassification is available to any hospital meeting the statutory criteria, but more than three-fourths of all reclassifications are for hospitals in non-metropolitan counties and it is predominantly a tool for rural PPS payment relief. The skilled nursing facilities with the most interest in extending reclassification to SNFs are those located in the larger and more urbanized non-metropolitan

counties. Although CMS has stated repeatedly in its proposed and final rules updating the SNF PPS rates that it will consider extending reclassification options to SNFs only when it adopts a wage index derived from SNF hourly wage data, identifying appropriate reclassification criteria for SNFs would be problematic no matter which index is used, as long as hospital-based and freestanding facilities are included under the same index and set of base payment rates. The evidence for market-level misclassification—in particular, potential rural/urban misclassification—may be swamped by the larger problem of the substantially higher wages in hospital-based units. The threshold criteria for hospitals to qualify for reclassification are that their hourly wages be at least 6% greater than the AHW for their geographically assigned market, and no less than 82% of the AHW of the market to which they are requesting reclassification (21). More than one-third of both rural and urban SNFs had hourly wages at or above 106% of their market aggregate wage; if reclassification is going to remain an *exceptions* process, that threshold would clearly have to be set somewhat higher in the context of a SNF index. Yet a higher threshold would also make it more difficult for freestanding facilities to qualify.

To consider this problem further we compared the distribution of within-market deviation measures for SNFs under the hospital index and under CMS' SNF index. We compare these to an alternative SNF index that we constructed only from freestanding facility wage data and applied only to freestanding facilities. In Table 4 we present the 25<sup>th</sup>, 50<sup>th</sup> and 75<sup>th</sup> percentile distributions of each of the deviation measures, for key sub-groups of SNFs.

**Table 4: Comparison of Within-market Wage Deviation across Alternative Wage Indexes**

<i>Index</i>	<i>Percent deviation from market-level aggregate hourly wage (distribution across SNFs)</i>		
	25 <sup>th</sup> percentile	50 <sup>th</sup> percentile	75 <sup>th</sup> percentile
<i>CMS 1999 Hospital index, as applied to Medicare-participating SNFs</i>			
Hospital Based			
All locations:	+ 8%	+21%	+33%
Larger non-metropolitan counties only <sup>1</sup>	+16%	+29%	+40%
All non-metropolitan counties	- 2%	+12%	+31%
Freestanding			
All locations	-16%	- 3%	+ 9%
Larger non-metropolitan counties only <sup>1</sup>	-12%	0%	+12%
All non-metropolitan counties	-15%	- 3%	+ 9%
<i>CMS 1999 SNF index, as applied to Medicare-participating SNFs</i>			
Hospital Based			
All locations:	+ 7%	+23%	+36%
Larger non-metropolitan counties only <sup>1</sup>	+11%	+30%	+43%
All non-metropolitan counties	- 4%	+11%	+31%
Freestanding			
All locations:	-14%	- 3%	+ 7%
Larger non-metropolitan counties only <sup>1</sup>	-12%	- 1%	+10%
All non-metropolitan counties	-13%	- 3%	+8%
<i>Alternative Freestanding SNF index computed from wages of freestanding SNFs only (deviations computed based on freestanding facilities only)</i>			
All locations	-12%	- 2%	+ 9%
Larger non-metropolitan counties only <sup>1</sup>	-11%	0%	+12%
All non-metropolitan counties	-12%	- 2%	+ 9%
<i>For Comparison: CMS 1999 Hospital Index, as applied to hospitals, prior to geographic reclassification:</i>			
All locations	-11%	- 3%	+ 4%
Larger non-metropolitan counties only <sup>1</sup>	- 6%	+ 2%	+ 8%
All non-metropolitan counties	-13%	- 5%	+ 4%

<sup>1</sup> RUCC categories 4 and 5, counties with 20,000+ residents living in urbanized settings.  
Source: Authors' computations from 1999 SNF Wage Survey.

Whether the index is based on hospital data or SNF data, a quarter of hospital-based facilities have hourly wages that are 33% or more above their market's AHW. Yet it is important to recognize that this is not only a market definition problem; reclassification is not likely to offer adequate relief because similar wage differentials are present in neighboring markets. In contrast, among freestanding facilities the distribution of within-market deviation

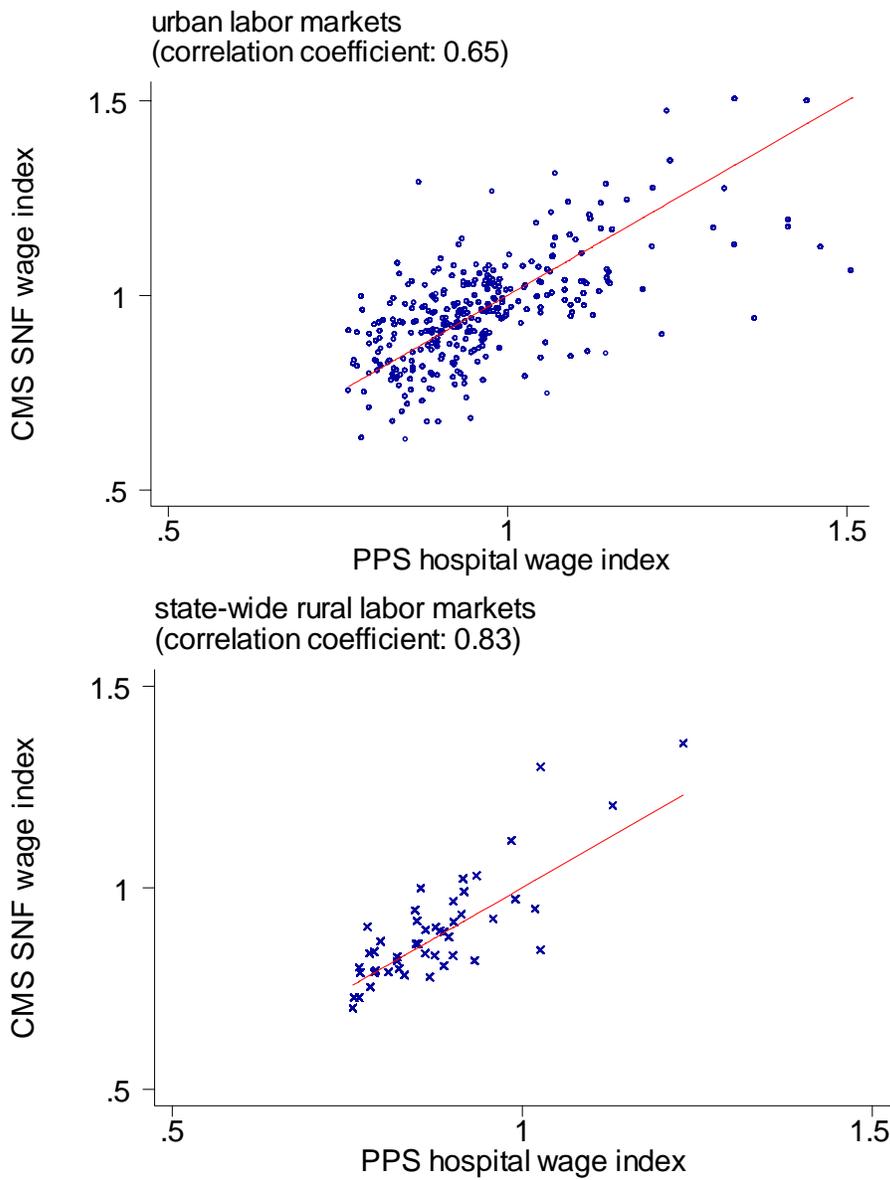
across rural levels provides stronger evidence that geographic reclassification is both needed and will be effective. That evidence is similar whether the wage adjustment is based on the hospital index, on an all-SNF index or on a freestanding SNF index. A quarter of freestanding facilities located in the more urbanized non-metropolitan counties had wages that were at least 12% greater than their market AHW, and many of these will be located near urban labor markets where the wage structure more closely approximates their own.

The bottom panel of Table 4 identifies similar statistics that we have computed for PPS hospitals in FY 1999, for use as a policy reference point. Within-market variability for hospitals is considerably smaller than the variability computed for freestanding facilities. The evidence for rural sub-markets is as strong or stronger for SNFs as it is for hospitals, yet hospitals have recourse to geographic reclassification when skilled nursing facilities do not.

### Section III: Payment Implications of Converting from the Hospital to the SNF Wage Index

Scatter plots between the individual market level hospital index values and the SNF index values reveal substantial differences (Figure 9). The correlation coefficient between the two indexes in the 1999 data is only 0.66, although it is substantially better when computed for the rural markets (0.82) than for the urban markets (0.64). In any transition from the PPS hospital to the SNF index these differences have the potential to translate into real rate differences for specific areas, but for most of the SNF labor markets the differences between the two index values are not great. Three-fourths of all skilled nursing facilities are located in areas where the differences were between -5% and +6%, which would translate into per-diem payment changes of from -4% to +5%.

**Figure 9: Correlation between Hospital and Skilled Nursing Facility Wage Index Values**



Source: Authors' computations from published wage index values for FY 2003, derived from 1999 SNF Wage Survey and 1999 Hospital Wage Survey.

The payment impact of changing to the SNF index depends both on the market-level differences and the distribution of facilities and Medicare covered days across markets. In Table 5 we take these factors into account in summarizing the impact by four levels of the RUCC categories. We estimate that, on balance, the transition from a hospital index to a SNF index based on 1999 data might have resulted in a very slight re-distribution of payments away from facilities in large metropolitan areas.

**Table 5: Estimated Impact of Changing from Hospital to Skilled Nursing Facility Wage Index (1999 Survey)**

RUCC groups	% markets with increase	% SNF facilities in markets with increase	% SNF beds in markets with increase	Estimated mean change in the index, weighted by Medicare days
Large metro RUCC	43%	49%	68%	- 0.005
All other metro RUCC	50%	52%	64%	+0.018
Non-metro counties with:				
$\geq$ 20,000 urbanized	58%	62%	71%	+0.018
$<$ 20,000 urbanized	57%	59%	61%	+0.008

Source: Authors' computations from 1999 SNF Wage Survey and 1999 Medicare Cost Reports.

The poor correlation between the hospital and SNF index confirms that, in the absence of occupation mix adjustment, hospital relative wages do not function as very good proxies for market differences in nursing home wages. We can assess this more systematically by comparing the percent of variation in hourly wages that can be explained by one index or the other (Table 6). The index constructed from 1999 hospital data explains 65% of that year's hospital wage variation (using ordinary least squares regression) but only 28% of SNF wage variation. However, the SNF index only explains 38%--while it is an improvement, it is not a very big improvement.

**Table 6: Percent of FY 1999 Skilled Nursing Facility Hourly Wage Variance Explained:**

	Explained by SNF Wage Index	Explained by Hospital Index	Explained by SNF type-specific Index
All Skilled Nursing Facilities	38%	28%	n/a
Hospital-based facilities' variance explained	27%	43%	56%
Freestanding facilities' variance explained	49%	32%	51%
<b>For Comparison:</b> PPS hospital wages regressed on hospital wage index values	n/a	65%	n/a

Source: Authors' computations from SNF and PPS Hospital wage surveys, FY 1999.

An index will perform well as a predictor of facility-level wages if wages are relatively homogenous within each market, and we have already seen that the within-market variation for SNFs is quite high. The effect of combining both the freestanding and the hospital-based units into a single estimate accounts for some, but not all, of the relatively poor performance of the SNF index. Even after stratifying by hospital affiliation, the SNF index values only explain 49% of the variation in freestanding facilities, and considerably less for the hospital-based. As an alternative, we duplicated the construction of a SNF index, but calculate two separate indices — one using only the data from hospital-based and another only the data from freestanding facilities (third column of Table 6). With separate indexes, the percent variance explained by these stratified index values improves to 56% and 51% for each group, respectively. Thus, if we eliminate the error caused by the use of hospital relative values and then eliminate the additional variance caused by combining two disparate types of facilities within the same index and estimation, the resulting SNF indexes perform almost as well for SNFs as the hospital index performs for hospitals.

Some of the lower explanatory power of SNF index values may reflect poor data quality. SNF wage surveys are reviewed, but they have not yet been audited by CMS or its subcontractors. Poor data quality introduces noise into the market wage estimates, but it does not necessarily contribute to any rural-urban bias. CMS expressed concern over the reliability of SNF wage surveys based primarily on unexpected facility-level changes between the 1998 and 1999 survey results (11). We confirmed that the differences between 1998 and 1999 SNF wages are greater than the year-to-year differences that we calculate for hospital data, although that is probably to be expected in the first years of any data collection effort. The correlation between SNF hourly wages reported for 1998 and 1999, for example, is 0.79 compared to 0.90 for hospital wage data over the same two years, and the year-to-year correlation on hospital hourly wages has ranged only from 0.88 to 0.95 since 1990. The declining coefficients of variation shown in Table 3 indicate that the underlying variation in SNF wages was smaller in 1999 than in 1998 even without CMS audits, and we might expect it to be smaller still in the 2000 surveys as facilities become accustomed to the forms. Perhaps more important from a policy perspective, however, is that we do not find that the SNF index computation is very sensitive to these facility-level year-to-year differences. We edited the 1999 sample to exclude facilities with extreme proportional changes in their hourly wages, but when we reconstructed the SNF index based on this restricted sample the index values were very similar to those constructed on the full sample.

### ***Summary and Policy Implications***

On balance, our findings suggest that although payment equity would be improved by adopting the SNF index, the chief problems with the wage adjustment under SNF PPS stem not from the use of the hospital index, but from two other issues. The first is the inclusion of hospital-based and freestanding facilities under a single market adjuster, and except in the

very smallest rural counties, this problem appears to affect urban and rural facilities alike. The second is the failure of SNF PPS to allow for geographic reclassification, and this problem clearly affects a subgroup of facilities located in the larger non-metropolitan counties.

It is not possible to consider separating wage index adjusters for hospital-based and freestanding facilities without simultaneously adjusting the underlying rate structure, a subject that is outside the scope of this working paper. For the 84% of Medicare-participating SNFs that are freestanding, PPS rates would more closely approximate the market average case-mix adjusted per-diem costs under a wage adjuster that is derived from SNF data. Within each market, a substantial problem exists for the hospital-based facilities, but this problem is related as much to the underlying adequacy of payment rates as to the wage adjustment. Market-level differences across hospital-based facilities are better reflected by the relative values of the hospital index. The absolute level of the wage differences between hospital-based and freestanding settings, however, suggests that the payment system may need to differentiate between the two settings in the underlying rates by RUG-III category. If some sort of dual rate structure were to be developed, one option for wage adjustment might be to construct a SNF index by and for freestanding facilities only, while allowing the hospital-based facilities to use the same wage index value as is applied to the parent hospital.

Once put in place, any system of PPS payment adjustments gains its supporters and its detractors based on relative advantages gained, and any proposal to transition from the hospital to the SNF index is not likely to be an exception to this rule. While the SNF index may represent an improvement in terms of accuracy of the labor cost adjustment, Figure 9 demonstrates that many individual markets would experience major payment shifts. There does not appear to be much systematic rural-urban payment bias in the use of one or the other

index, but as long as some markets experience substantial rate reductions as a result of the transition, support for the policy change is more difficult to implement. The evidence in favor of allowing some sort of administrative remedy for market misclassification, however, is strong, and the question of geographic reclassification for SNFs deserves some rural policy attention whether or not the SNF wage index is put in place.

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