Payment to health maintenance organizations and the geographic factor

by Louis F. Rossiter and Killard W. Adamache

The adjusted average per capita cost (AAPCC) payment system for Medicare risk-based plans uses a county level geographic adjustment factor to account for differences in beneficiary costs across areas. The implications of abandoning the county unit as the basis of the geographic area are examined and the merging of counties to match the geographic definition used in the prospective payment system are considered. Year-to-year variation in a county AAPCC is inversely associated with county population size and, based on year-to-year AAPCC variation, 86 percent of all counties are too small to be used for the geographic adjustment.

Introduction

Medicare's adjusted average per capita cost (AAPCC) system for paying risk-based health maintenance organizations (HMOs) and competitive medical plans (CMPs) is perhaps one of the most complex and detailed capitation payment systems in the country. One could argue that the system has more than one-third million payment cells, because an individual beneficiary's payment-rate cell is determined by a cross classification of demographic factors, eligibility status, and county geographic location. Each item consists of numerous categories. Because there are more than 3,000 counties in the country, the county geographic factor contributes a great deal to the enormous number of payment rate cells.

Policymakers and the industry are currently debating the relative merits of increasing the complexity of the AAPCC system. An increase in complexity would better adjust payments, it is argued, for the inherent risks of an enrolled population (Lubitz, 1987; Rossiter et al., 1987; Ginsburg, 1987). However, the geographic adjustment factor in the AAPCC may require simplification before it is made more complex for three reasons:

- Year-to-year variation in AAPCC at the county-level is a source of doubt and confusion among managers of risked-based plans (Langwell et al., 1986 and 1987). Some of this variation is the result of using the relatively small numbers of beneficiaries in some counties to calculate the AAPCC (a point discussed later in this article). Combining counties to increase the number of beneficiaries used in the calculation would reduce yearly variations.
- Border crossing is a form of "gaming" the AAPCC system in which beneficiaries are enrolled in high-payment counties and treated in low-payment counties (Langwell et at., 1986). Using relatively small areas (counties) to distinguish the geographic adjustment facilitates border crossing.
- Comparability with the prospective payment system (PPS) is not a critical issue today, but may become more important as the risk-based system (RBS) grows. If the geographic factors for Part A payments under RBS and PPS are markedly different, as they are today, the tendency will arise to compare local area disparities in changes in the payment level for HMOs and hospitals, and the clamor will increase for changes to treat both the same.

One way to simplify the AAPCC is to abandon the county as the basis of the geographic adjustment factor and combine groups of counties in logical and meaningful ways. Reconfiguring the geographic adjustment would address all three reasons for AAPCC simplification and reduce the total number of cells. The annual process of attempting to explain, when the new rates are published, unexplainable variation in a particular county AAPCC or the reasons for one county having a markedly different AAPCC payment rate from another neighboring county would be greatly simplified, if for no other reason than the number of geographic areas for which comparisons are possible would be reduced.

The purpose of this article is to develop and propose a new definition of the AAPCC geographic adjustment factor. Two new definitions are examined—one for urban counties and one for rural counties. For urban counties, counties within a metropolitan statistical area (MSA) are combined, and a MSA-wide AAPCC is calculated. For rural counties, non-MSA counties within a State are combined to form a statewide rural AAPCC. Using this method to reconfigure counties matches the way in which the geographic areas for the PPS wage adjustment factor is currently defined. New AAPCCs for reconfigured areas are calculated and compared with the current county AAPCC system. In addition, we present descriptive statistics comparing counties within MSAs to their MSA-wide payment rates and analyzes "winner" and "loser" counties.

First we examine in more detail the complexity and the extent of geographic variation in the current AAPCC system. Then, we compare the current with the reconfigured geographic adjustment factor. Finally, we provide a brief policy analysis of the impact of reconfiguring the current county system.

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Reprint requests: Williamson Institute for Health Studies, P.O. Box 203, MCV Station, Richmond, Virginia 23298.

Geographic adjustment factor

Payment and its components

The AAPCC is mandated by section 1976 of the Social Security Act as amended by the Tax Equity and Fiscal Responsibility Act (TEFRA) of 1982. The legislation defines the AAPCC as average Medicare program expenditures in a geographic area, making allowances for "... appropriate classes of members, based on age, disability status, and such other factors as the Secretary determines to be appropriate." By law, the AAPCC is suppose to be the best estimate of fee-for-service equivalent costs the Secretary of Health and Human Services can determine for defined geographic areas with adjustments for actuarial equivalent categories of individuals (Langwell and Hadley, 1986). The legislation does not require that counties be used in the definition of geographic area.

The geographic adjustment factor of the AAPCC is calculated by two steps:

- The average expected Medicare program cost per beneficiary for the entire country is estimated for the U.S. per capita cost (USPCC).
- The county geographic adjustment factor is calculated. This factor is the ratio of all actual Medicare program costs for any county, including HMO and non-HMO costs, divided by the actual program cost for the Nation.

The geographic adjustment is based on a census of claims data for the previous 5 calendar years. Each year, a new year of claims experience is added and the earliest year dropped for the 5-year calculation, thereby smoothing the variation in the ratio.

The Health Care Financing Administration's Office of the Actuary has selected counties in the United States to be the geographic areas referenced in the law. Each year, 3,074 geographic adjustment factors are calculated—one for each county—to develop the AAPCC payment system. The USPCC and the geographic adjustment factor in the AAPCC calculation are based on the trustees' assumptions about total program costs and adjusts for relative program cost differences across geographic areas.

Using counties as the geographic area creates a complex system. If each county defines a different actuarial payment cell, the rate book (a table defining payment rates, given actuarial characteristics) quickly becomes large (Table 1). First, multiply 3,074 counties by 30 cells for demographic factors defined by age (5 categories), sex (2 categories), and welfare and institutional status (3 categories). Then multiply this figure by 2 categories of eligibility status and 2 categories of coverage status, plus 54 end stage renal disease (ESRD) cells (one for each State or possession). In this extreme case, the system has 368,934 rate cells.

The calculations in Table 1 overstate the number of cells widely used in practice because of the small number of individuals who fall in the disability (non-ESRD) and ESRD eligibility categories, and the small number of beneficiaries with Part A coverage only. Eliminating these categories and crossing the number of counties by the 30 demographic factors leaves 92,220 payment rate cells. Even from this perspective, the AAPCC system contains an inherently enormous level of detail. It is not a gross or simple system of risk estimation at all, but an extremely complex system created principally by the geographic adjustment factor. It is clear that this enormous level of detail can be alleviated by reducing the number of geographic areas, especially if it leads to difficulties in a large number of areas.

Table 1

Long-term ratesetting strategies: AAPCC rate classes and the number of payment rate cells

AAPCC rate classes[1]	Number of payment rate cells
U.S. counties	3,074
Demographic factors Age(5) Sex(2) Welfare and institutional status(3)	30
Eligibility status Aged (non-ESRD[2]) Disability (non-ESRD)	2
Coverage status Part A only Part A and Part B	2
Total number of cells	368,880
Plus statewide ESRD cells	54
Total	368,934

[1] Figures in parenthesis are number of categories.
[2] End stage renal disease (ESRD).

NOTE: AAPCC is adjusted average per capita cost.

SOURCE: (*Federal Register*, 1985.)

Reasons for reconfiguring counties

That the use of counties yields a large number of geographic areas is not a problem—unless it leads to unintended results. As it is currently configured, the geographic adjustment factor poses three difficulties: year-to-year variation, border crossing, and comparability with PPS.

Year-to-year variation

A frequently heard complaint about the AAPCC is that the variation in the payment for any county seems to be subject to a large degree of random fluctuation (Greenlick 1983; Langwell et al., 1986). One county in a MSA may experience a 10-percent increase while another experiences a 2-percent decline. The considerable variation in medical care costs and utilization between major regions of the country has been long known (Fuchs and Kramer, 1972). More recently, researchers have also found evidence of considerable variation within even smaller geographic areas (Wennberg, 1984).

We examined the variation of the AAPCCs for the aged in counties within a MSA and year-to-year variation in the AAPCC rates from 1985 through 1987. The 10 most populous consolidated metropolitan statistical areas

(CMSAs) were studied. Also included in the study were 17 MSAs and other areas if at least one county had a TEFRA risk-based enrollment that was 5 percent or more of all Medicare beneficiaries. The Seattle CMSA was included because of the high level of HMO presence in that market. To have at least three counties for each area, counties that were contiguous to the area of interest were included. Thus, the total number of areas studied was 28. All areas showed variation in the year-to-year change in the AAPCC across counties within an MSA. Some of the more extreme cases are illustrated in the following figures. All numbers are changes in the published AAPCC payment rates, which are expressed per person per month.

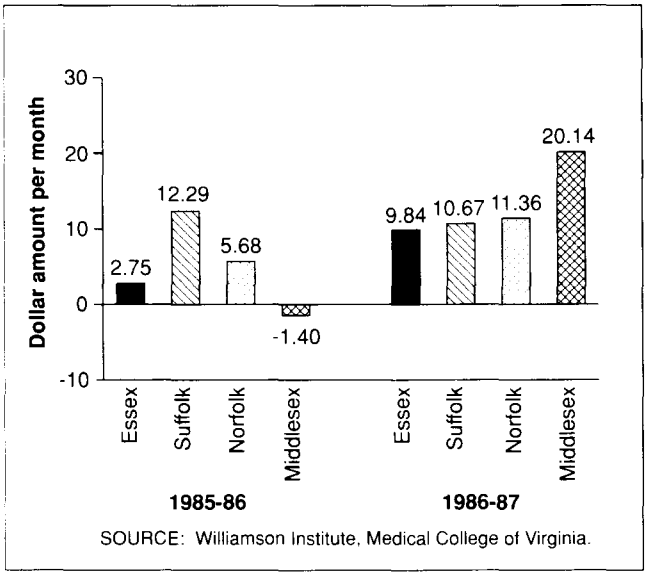
In the 1985-86 period in Boston, for example, the AAPCC increased in three counties and decreased in one (Figure 1). In the next period, 1986-87, all four counties increased except that Suffolk, the county that fell the previous period, nearly doubled the increase of the other counties. It is not clear why contiguous counties would have such markedly different experiences. Perhaps the experience of Suffolk County in the later period was to catch up for the decrease in the prior period. The geographic adjustment is based on claims as paid, rather than claims as incurred. Thus, payment delays in Suffolk County in 1986 which were caught up in 1987, could have accounted for the pattern observed.

Similar results are seen in other areas. In Chicago, Cook County fell in 1986-87 while DuPage and McHenry Counties increased (Figure 2). In Detroit, all counties increased at different rates in the earlier period, but Wayne County was singled out in the later period for a nearly $7 monthly decrease per person enrolled (Figure 3). Likewise, in Des Moines, Polk County experienced a $6.41 decrease, while neighboring Warren County experienced a $5.14 increase (Figure 4).

Indianapolis provides a unique pattern of modest increases in the early period, ranging from $0.34 to $6.99, with one county as an exception (Figure 5). These

Figure 1

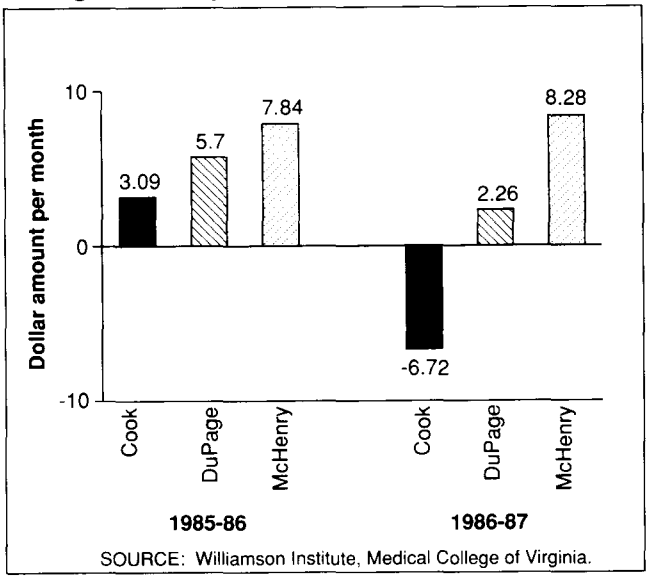
Year-to-year adjusted average per capita cost changes: Boston counties, 1985-86 and 1986-87



SOURCE: Williamson Institute, Medical College of Virginia.

Figure 2

Year-to-year adjusted average per capita cost changes: Chicago counties, 1985-86 and 1986-87



SOURCE: Williamson Institute, Medical College of Virginia.

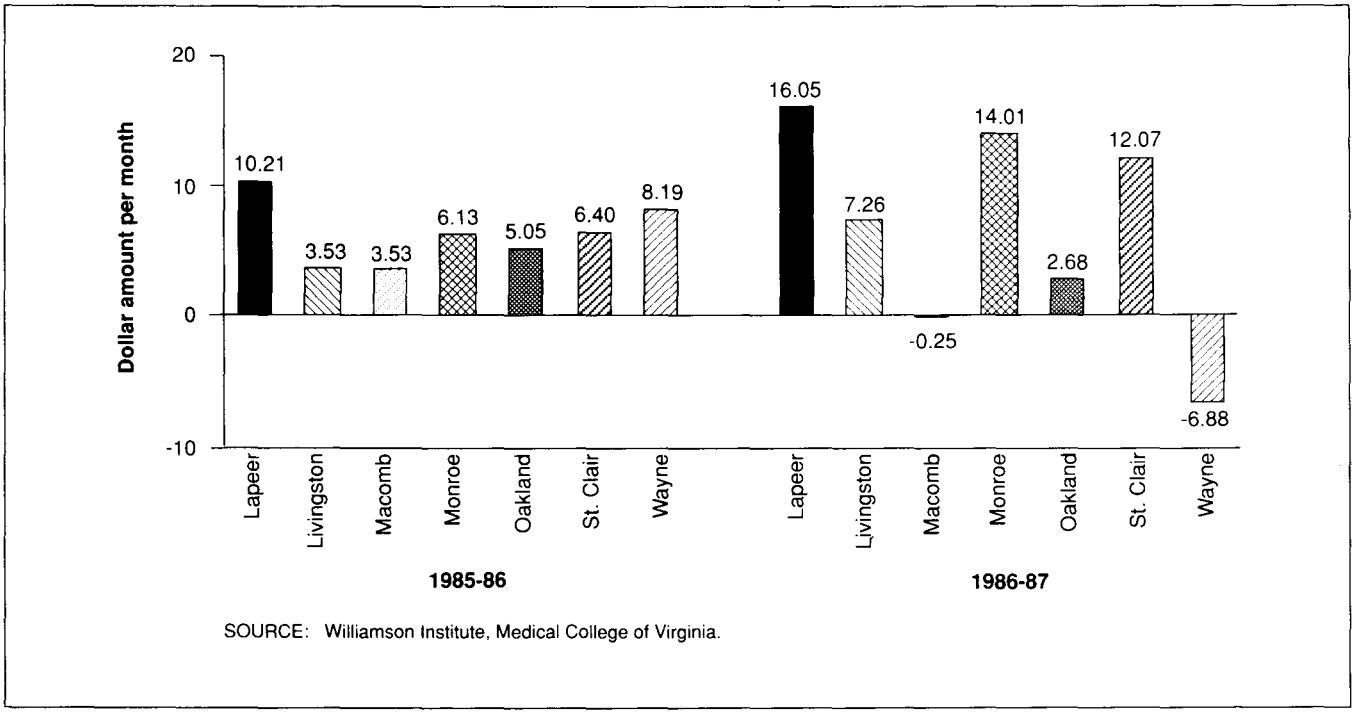
are followed by relatively large increases, as high as $25.08, in the later period. It would seem certain that the risk-based plans serving the Indianapolis area puzzled over the AAPCC increasing $25 in Morgan County and only $0.28 in Marion County, an increase of 12.9 percent in Morgan compared with about 0.1 percent in Marion. Similarly, in San Francisco, the increases in the earlier period were relatively similar across counties, although in the later period the increase for Marion County was more than three times the increase for San Francisco (Figure 6).

In Minneapolis, a mixture of increases and decreases is observed in the earlier period, which might be the impact of prolonged and fairly intensive competition in the area, followed by marked increases in the later period as high as $46.41 or 28 percent in one county (Figure 7). When comparing the heavily populated Virginia counties in the District of Columbia area with the Maryland counties, the rather modest AAPCC changes may be accounted for by differences in State regulations (Figure 8). Nevertheless, the District of Columbia, Arlington, and Fairfax Counties experienced about one-half the AAPCC increase that nearby Montgomery and Prince Georges Counties experienced in 1986-87.

One source of unexplained variation may simply be the problem of small numbers. The computation of the geographic adjustment factor is based on cell sizes (number of beneficiaries) as small as 16 beneficiaries in one county in Texas and as large as 743,000 beneficiaries in Los Angeles County. The distribution of counties by Medicare population is shown in Table 2. About 14.2 percent of counties (437 counties) have very small population sizes of less than 1,000. Medicare beneficiaries with a few high-cost cases in one year that did not occur the previous year could cause marked year-to-year variation. Nearly all of the smallest population counties are non-standard metropolitan statistical area (SMSA) counties, but nine are MSA counties. Counties with 1,000 to 3,000 beneficiaries

Figure 3

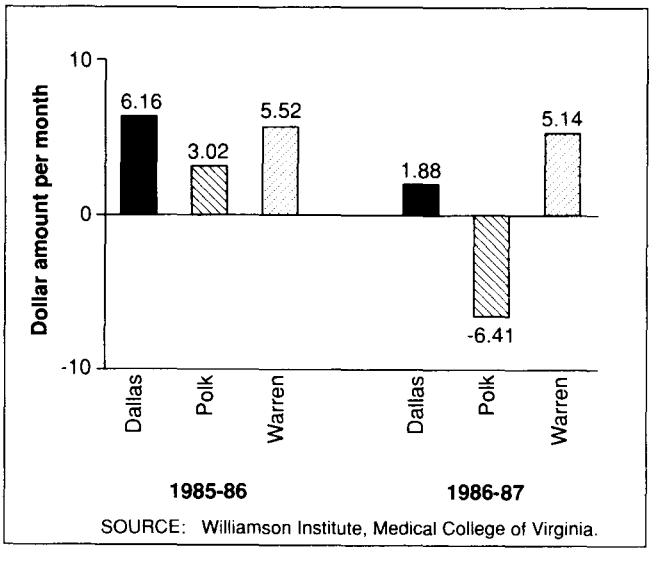
Year-to-year adjusted average per capita cost changes: Detroit counties, 1985-86 and 1986-87



SOURCE: Williamson Institute, Medical College of Virginia.

Figure 4

Year-to-year adjusted average per capita cost changes: Des Moines counties, 1985-86 and 1986-87



SOURCE: Williamson Institute, Medical College of Virginia.

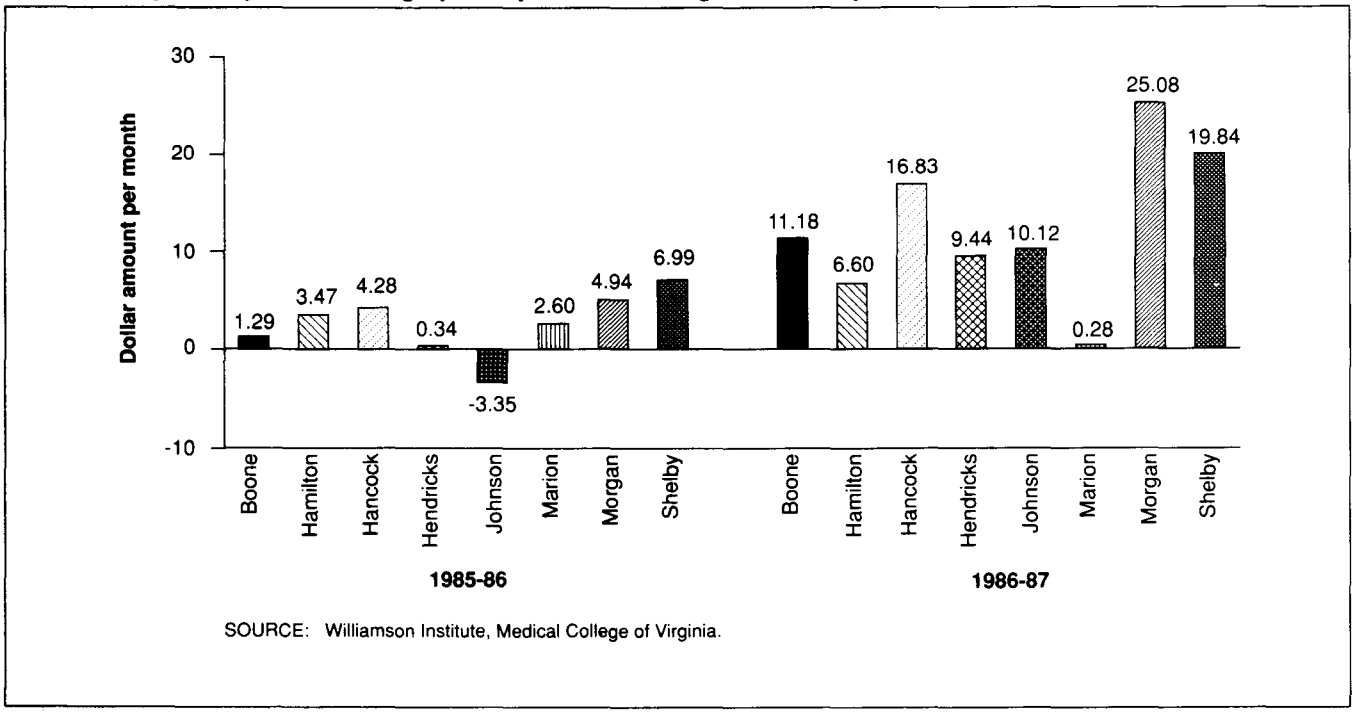
account for 37 percent of all counties, and those with 3,000 to 10,000 are 34.8 percent. Thus, 86 percent of all the differentiated areas in the AAPCC system are in the smallest population counties, those with less than 10,000 elderly population. Most of the small population counties are in rural areas, suggesting the potential for variation is largely a rural county phenomenon. Yet as this discussion indicates, variation could be an issue for urban counties as well.

The variance of a mean for a subgroup is equal to the population variance divided by the size of the group. Statistically, then, we would expect the mean of the year-to-year change in the AAPCC to have a variance in inverse proportion to the population size of the county. The question is the cutoff for acceptable county size, assuming the minimum variance possible is among counties with the largest population.

To determine the cutoff, we regressed the absolute value of the 1986 to 1987 percent change in the AAPCC (DIFF) on total county population 65 years of age or over, converted to dummy variables according to the intervals shown in Table 2. The omitted variable represents the largest population group, where the total population 65 years of age or over is 50,000 or more. Thus, a positive sign indicates larger year-to-year variation (in absolute value) than the variation observed for the largest population counties. The results in Table 3 strongly suggest a relationship between population size and year-to-year variation in the AAPCC across all three AAPCC types. Counties with a population less than 1,000 experienced 2 percentage points more variation in their combined AAPCC than the largest counties; counties with a population between 1,000 and 2,999 showed 1.8 percentage points more; counties with 3,000 to 9,999 population, 1.2 percentage points more; and counties with 10,000 to 24,999 population, 1.9 percentage points more than the largest counties. The statistically significant difference in variation disappears for counties with a population between 25,000 and 49,999. The simple regressions shown imply that the size of the population used to compute the geographic adjustment factor influences AAPCC variation. An accurate AAPCC

Figure 5

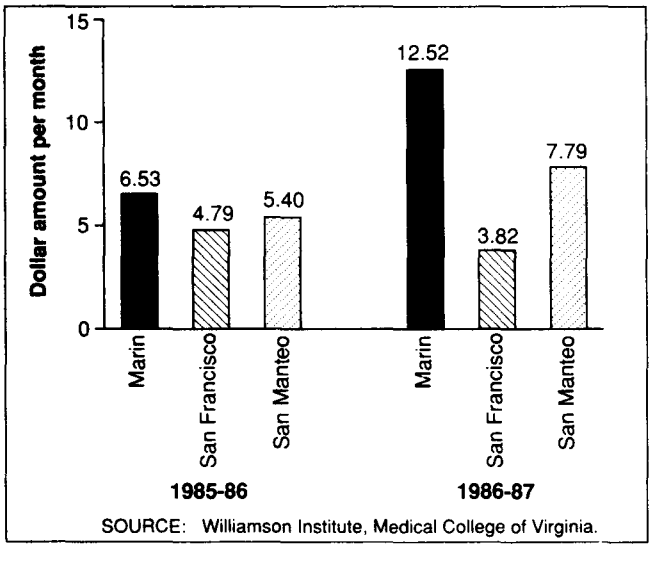
Year-to-year adjusted average per capita cost changes: Indianapolis counties, 1985-86 and 1986-87



SOURCE: Williamson Institute, Medical College of Virginia.

Figure 6

Year-to-year adjusted average per capita cost changes: San Francisco counties, 1985-86 and 1986-87



SOURCE: Williamson Institute, Medical College of Virginia.

predictor should be independent of county population size. Thus, aggregating the current geographic areas should improve the AAPCC, and one target level of aggregation is above 25,000 population. It is important to note that the relationship between year-to-year variation exists even though the equivalent of five times the number of beneficiaries is used in each county because the AAPCC is based on a 5-year average of claims experience in each county.

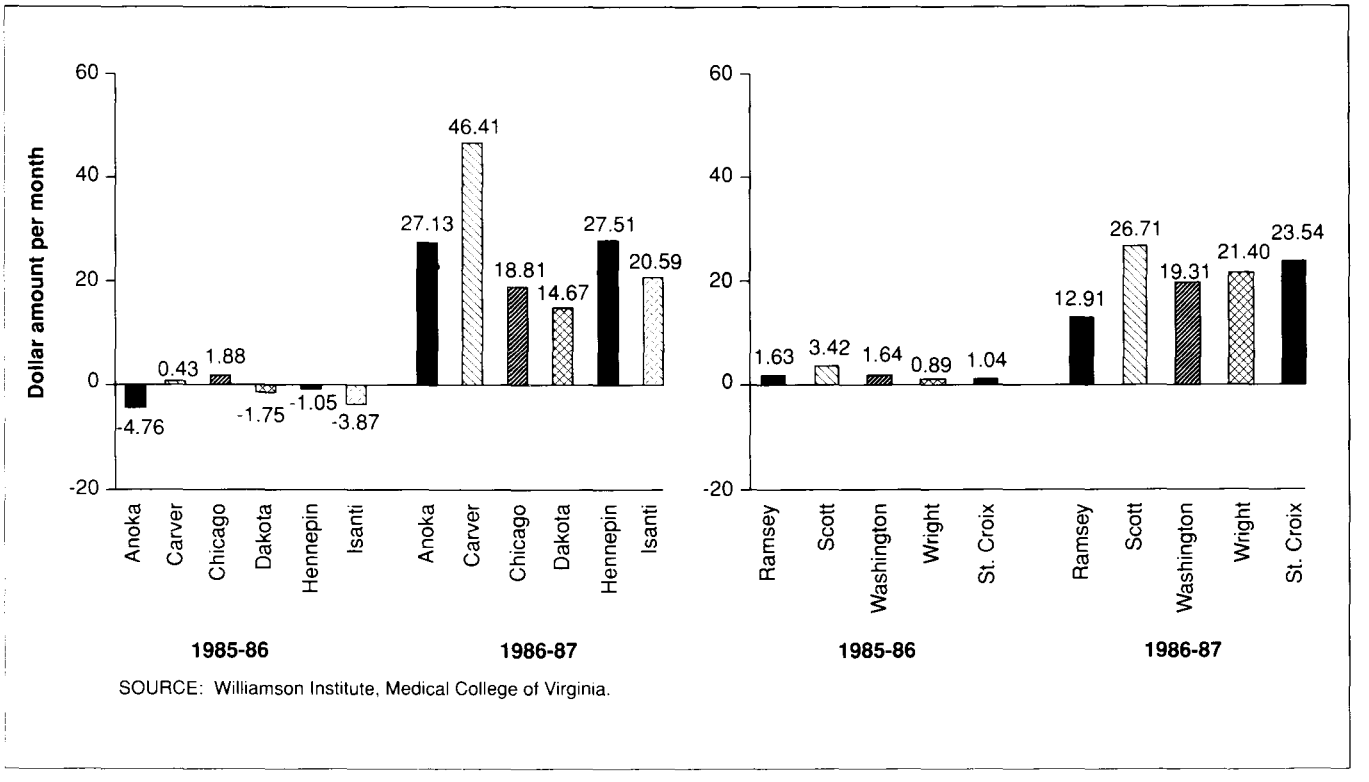
Border crossing

Counties are artificial political boundaries. As such, they do not respect market forces that establish real differences in the costs of providing care to Medicare beneficiaries. Fortunately, Medicare claims processing tracks the Medicare cost of care for beneficiaries in any area no matter where that care was received or whether or not the beneficiary crosses a county border to obtain care. The problem of border crossing arises in the risk-based system when a particular county, with a high AAPCC, is targeted for enrollment, yet beneficiaries are required by the plan to cross borders to obtain care at a lower cost (Rossiter, Friedlob, and Langwell, 1985). Border crossing is not necessarily bad if it reflects cost consciousness on the part of HMOs and CMPs. But when artificial differences in AAPCC payments are created between adjacent counties in urban areas, where differences in real costs are difficult to observe, a form of redlining occurs in the Medicare risk-based market. Redlining, a term from the real estate industry, occurs when some neighborhoods are favored and others excluded for mortgage placements.

An example will illustrate the point. The 1987 per person, monthly AAPCC in Dade County, Florida, was $332.83. The rate in neighboring Broward County was $287.70. The rate in nearby Palm Beach was $221.06. The area covered by these contiguous counties includes most of south Florida. Yet the difference in the AAPCC is remarkable. Dade is nearly 16 percent higher than Broward and 50 percent higher than Palm Beach. From a marketing standpoint, assuming unbiased enrollment, the ideal way to game the system is to draw enrollment from

Figure 7

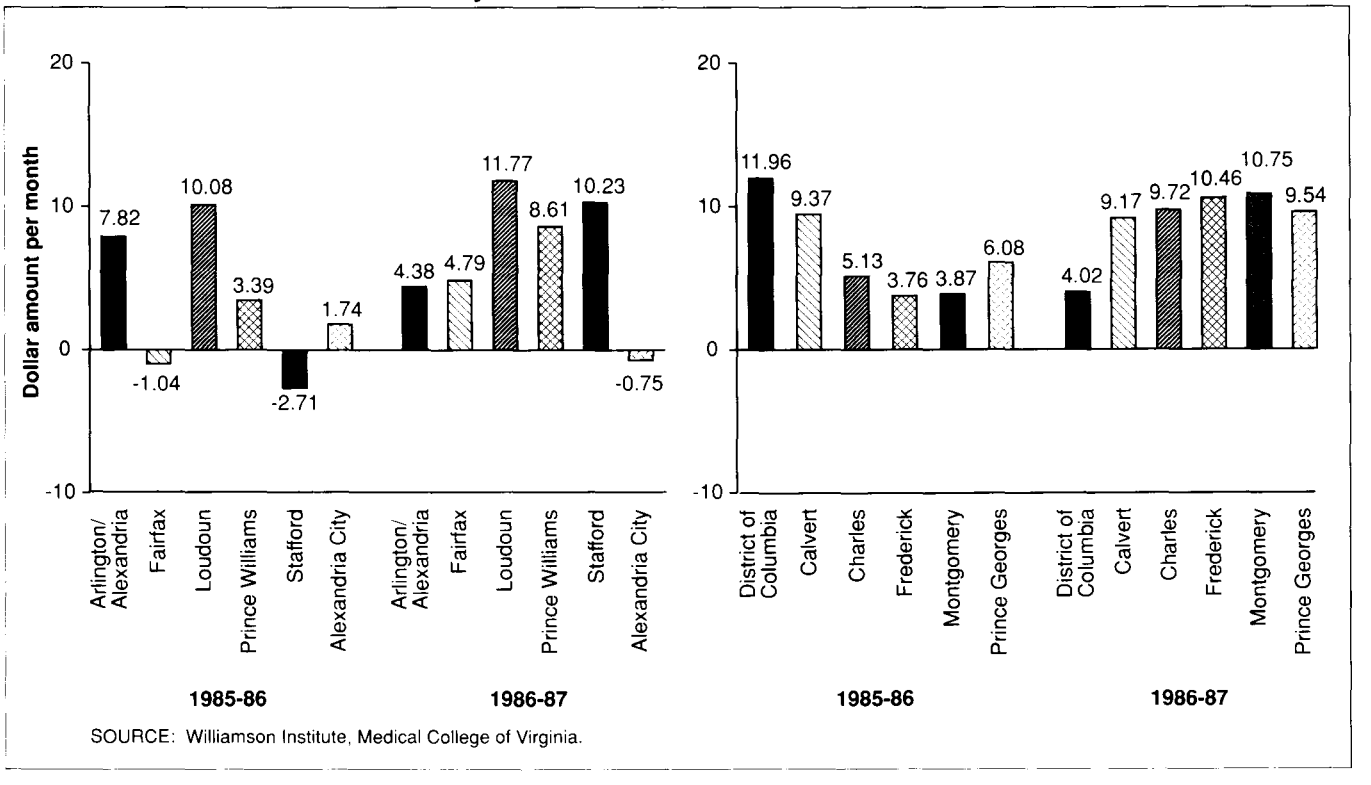
Year-to-year adjusted average per capita cost changes: Minnneapolis - St. Paul counties, 1985-86 and 1986-87



SOURCE: Williamson Institute, Medical College of Virginia.

Figure 8

Year-to-year adjusted average per capita cost changes: Virginia, District of Columbia, and Maryland counties, 1985-86 and 1986-87



SOURCE: Williamson Institute, Medical College of Virginia.

Table 2

Long-term ratesetting strategies: Frequency and percent distribution of counties, by size: 1983

1983 population age 65 or over	Total		MSA		Non-MSA	
	Number of counties	Percent	Number of counties	Percent	Number of counties	Percent
Total	3,047	100.0	725	100.0	2,349	100.0
Less than 1,000	437	14.2	9	1.2	428	18.2
1,000-3,000	1,138	37.0	70	9.7	1,068	45.5
3,000-10,000	1,071	34.8	266	36.7	805	34.3
10,000-25,000	241	7.8	196	27.0	45	1.9
25,000-50,000	94	3.1	91	12.6	3	0.1
50,000 or more	93	3.0	93	12.8	0	0.0

NOTE: MSA is metropolitan statistical area.

SOURCE: Health Resources Services Administration: Data from the Area Resource File.

Table 3

Long-term ratesetting strategies: OLS regression equations for counties for absolute value of the percent change in 1986-87 AAPCC as a function of population 65 years of age or over in the county

Independent dummy variables	Dependent variable					
	Part A		Part B		Part A and B	
	b-value	*t*-value	*b*-value	*t*-value	*b*-value	*t*-value
Population 65 years of age or over[1]						
0-999	*2.522	3.49	*0.984	2.42	*2.07	3.32
1,000-2,999	*1.980	2.90	*1.323	3.45	*1.81	3.07
3,000-9,999	*1.419	2.07	*1.103	2.87	*1.19	3.07
10,000-24,999	*1.710	2.21	*1.026	2.36	*1.87	2.81
25,000-49,999	1.003	1.08	0.569	1.10	1.28	1.60
Constant	5.316	8.09	10.636	28.86	5.26	9.30
R-square	0.006		0.005		0.006	
F-statistic	3.87		3.21		3.96	

*Significant at 95-percent level.

[1]Omitted category is population 65 years of age or over with 50,000 persons or more.

NOTES: OLS is ordinary least squares. AAPCC is adjusted average per capita cost.

SOURCE: Williamson Institute, Medical College of Virginia.

Dade and provide services in Broward County or Palm Beach County, if the AAPCC is a true measure of costs in those areas. In practice, it may be sufficient to use mailings, selective periodical advertising, or individual representatives to market in the high-AAPCC county and avoid enrollment from the low-AAPCC county. There is only anecdotal evidence that this type of enrollment occurs (Langwell et al., 1986). Because of rule changes mandated by 1985 Consolidated Omnibus Budget Reconciliation Act (COBRA) legislation, risk-based plans are able to omit counties for risk-based enrollment although they are federally qualified to do business in those counties. At the end of 1987, seven plans submitted requests to exclude enrollment in 62 counties from which they had previously drawn enrollment. This was expected to affect 31,628 enrollees. Most of the counties were rural counties, but they were traditional areas of enrollment for these plans. This type of selectivity is further evidence of the redlining phenomena, but if the payment is low one can hardly blame the plans.

Therefore, small areas are associated with AAPCC year-to-year variations and are a source of differences in the AAPCC between contiguous areas. If plans shun certain of these areas as a result, the potential for correcting the problem by aggregating areas is clear.

Comparability with prospective payment system

The final problem associated with year-to-year variation in the AAPCC is less quantifiable but no less important than the other two. Nearly 70 percent of Medicare's costs are for hospital services, which are paid under the PPS system. Each year Congress, based on the advice of the Health Care Financing Administration (HCFA) and the Prospective Payment Assessment Commission (ProPAC), establishes the allowable increase in the PPS payment rates for hospitals as part of the Federal budget process. One factor it considers is the change in the area wage index, i.e., the cost of labor inputs for the hospital industry taken from hospital labor market areas (Prospective Payment Assessment Commission, 1985; 1986). For fiscal years 1984 and 1985, the area wage index data was calculated from 1981 Bureau of Labor Statistics data (*Federal Register*, 1983). More recently, HCFA has collected its own data, but the definition of hospital market area still follows a MSA versus non-MSA distinction. ProPAC has studied within-MSA variation of individual hospital wages and has recommended developing a system that would differentiate inner city and suburban wage differences. Nonetheless, the current system for paying hospitals uses

the MSA to define the market sometimes modified by a political process involving the Congress when legislators want geographic areas redefined. Risk-based plans, on the other hand, receive an increase in the AAPCC for Part A which is most comparable with hospital payments, through an administrative process in which the actuary determines the annual increases. Geographic differences in payments are based on counties not MSAs.

The potential for variance in the allowable increase for hospitals and HMOs is inherently large because they are established by different processes, but it is magnified by the current system because the definition of geographic area differs between the two payment systems. The allowable increase for Part A services for fiscal year 1987-88 was less than 3 percent for hospitals but more than 13 percent for risk-based plans. There is also a very real possibility that hospitals would always receive an increase but risk-based plans might receive a decrease in payments in the same year for the same covered services. As a result, the current differences in the configuration of geographic areas for payments to hospitals and risk-based plans confuses providers. In addition, these differences create unintended payment changes that inherently raise questions about the validity of Medicare's assertion that it pays the costs of care under both payment systems.

Reconfiguring of the geographic areas will not eliminate the problem. However, the number of instances of marked differences in payment rate changes for hospitals and risk-based plans in the same area at the same time could be substantially reduced if the definition of geographic area was the same for both hospitals under PPS and HMOs under risk-based contracting. Reconfiguring geographic areas to include areas smaller than counties, such as ZIP Codes or urban rings (Welch, 1989), exacerbate the previous two problems of year-to-year variation and redlining. To keep all participants in Medicare on equal footing, and market the competition fair, it would be best to adopt similar geographic definitions for all.

Impact of reconfiguring counties

To address the difficulties created by using counties to define geographic areas for the AAPCC, this study used two sources of data to recompute the AAPCC: the 1987 payment rates and the distribution of population 65 years of age or over in all counties by AAPCC demographic factors. Recomputation of the AAPCC depended upon whether urban or rural counties were involved. For urban counties, the study defined the geographic area as the MSA, thereby combining counties within each MSA to create a MSA-level AAPCC. As a result, there are both winner and loser counties in each MSA. For rural counties, the study combined all non-MSA counties within a State to form one geographic area for the purposes of calculating a non-MSA AAPCC. Likewise, there are both winner and loser counties in each non-MSA area.

The design follows the PPS calculation of wage adjustments, which is distinguished by MSA and non-MSA areas and treats non-MSA areas within a State as one geographic area. The total number of geographic areas for the AAPCC falls from 3,074 under the current county system to 358 under the proposed reconfigured system; 312 MSAs and 46 non-MSA areas. Rhode Island, New Jersey, and the District of Columbia have no non-MSA counties. Alaska, Hawaii, and Puerto Rico were excluded from the analysis.

The AAPCC was recalculated using the weighted sum of the aged population in each county. The weights are the demographic cost factors assumed by HCFA (*Federal Register*, 1985). multiplied by the published AAPCC payment rates for Part A and Part B. This converted the adjusted average cost to aggregate cost figure for each county, that is, the estimate of aggregate Medicare claims paid in each county, according to the assumptions employed by HCFA to compute the AAPCC. The aggregate costs in each reconfigured area (either a MSA or non-MSA geographic area within a State) were derived by adding the aggregate costs across each county in the reconfigured area. Next, the weighted sum of the aged population in each reconfigured area was derived by adding the weighted sum of the aged population across each county in the reconfigured area. Division by the weighted sum of all counties at the level of the reconfigured area produced a new AAPCC payment, and it is equivalent to reconfiguration of the geographic adjustment factor. The new AAPCC for each reconfigured area was assigned to each county within that area. By assigning new AAPCC values, the study was able to compare the AAPCC for 1987 before and after the change in reconfiguration.

Impact on mean county payments

The results of the reconfiguration and the calculations as previously described are shown in Table 4. Mean unweighted county AAPCCs are shown for the current county level AAPCC system for the reconfigured MSA-level system. Separate AAPCC payment levels are shown for Part A, Part B, and Part A and B.

The difference is not large, with the mean AAPCC for Part A and B across all counties falling from $170.95 to $170.23 per person per month, a difference of $0.72. The decrease is less than one-half of 1 percent.

The mean AAPCC for MSA counties increases and the mean for non-MSA counties decreases. Because higher AAPCC counties are more likely to be in MSAs, without weighting to compute the means, the reconfiguration tends to increase the average AAPCC across all MSA counties. Likewise, because lower AAPCC counties are more likely to be in non-MSAs, without weighting to compute the means, the reconfiguration tends to decrease the average AAPCC across non-MSA counties. Weighting by the aged population would eliminate the changes, and the impact shown in Table 5 is an artifact of our choice of method for calculating the mean. In MSA counties, the AAPCC rises from $195.50 to $201.23, and in non-MSA counties the AAPCC falls from $163.37 to $160.66. In MSA counties, this figure represents an increase of $5.73 or 3 percent, and in non-MSA counties a decrease of $2.71 or about 1.7 percent.

Risk-based enrollment occurred in only about 13 percent of all counties at the end of 1986. Plans that

Table 4

Long-term ratesetting strategies: Mean county actual AAPCCs per person per month, and reconfigured geographic adjustment factor for AAPCCs

AAPCC components	All		MSA		Non-MSA	
	Actual	Reconfigured	Actual	Reconfigured	Actual	Reconfigured
1987 all counties[1]						
Part A	$116.22	$115.20	$131.75	$134.80	$111.42	$109.04
Part B	54.73	55.11	63.74	66.43	51.95	51.62
Part A and B	170.95	170.23	195.50	201.23	163.37	160.66
Counties with 1987 risk-based enrollment[2]						
Part A	132.98	134.98	142.79	146.87	114.57	112.67
Part B	66.64	67.91	71.73	74.51	57.08	55.53
Part A and B	199.61	202.88	214.52	221.37	171.65	168.19

[1] N = 3,074.
[2] N = 394.

NOTES: AAPCC is adjusted average per capita. MSA is metropolitan statistical area.

SOURCE: Williamson Institute, Medical College of Virginia.

Table 5

Long-term ratesetting strategies: MSA counties with large AAPCC changes from reconfiguration of the geographic adjustment factor: 1987

County and State	Monthly AAPCC for Part A and B		
	Actual	Reconfigured	Differences
Increases			
Frederick, Maryland	$153.30	$262.22	$108.92
Stafford, Virginia	165.57	262.22	96.65
Queen Annes, Maryland	177.55	255.57	78.02
St. Clair, Michigan	212.29	290.14	77.85
Washington, D.C.	156.67	233.00	76.33
Decreases			
Prince Georges, Maryland	323.60	262.22	−61.38
St. Bernard, Louisiana	241.73	196.98	−44.75
Philadelphia, Pennsylvania	307.73	266.90	−40.83
Wilson, Tennessee	227.57	190.34	−37.23
Douglas, Georgia	235.82	199.04	−36.78

NOTES: MSA is metropolitan statistical area. AAPCC is adjusted average per capita cost.

SOURCE: Williamson Institute, Medical College of Virginia.

enter the risk-based market do so in counties with high AAPCCs (Adamache and Rossiter, 1986). Thus, a larger change in the AAPCC from reconfiguration is expected for these counties because they are being combined with lower AAPCC neighboring counties. Means before and after the change in the geographic adjustment factor for counties with risk-based enrollment are also compared (Table 4). The mean Part A and B actual AAPCC for all plans with any risk-based enrollment is $199.61 before reconfiguration and $202.88 after reconfiguration, or $3.27 higher. Most of the difference occurs in MSA counties, with about the same relative effect on Part A and Part B.

Impact on individual urban counties

MSA counties with large changes in the AAPCC from reconfiguring the geographic adjustment factor are listed in Table 5. The five counties with the largest increases and the five counties with the largest decreases in the AAPCC are shown. By combining counties in the same MSA and treating them as one geographic area for the purposes of computing the geographic adjustment factor, Frederick, Maryland, and Stafford, Virginia, become part of the Washington, D.C. area. Before reconfiguration, Frederick has an AAPCC of $153.30 and Stafford has an AAPCC of $165.57. After reconfiguration, each increased about $100 to $262.22. This increase is extreme, however, because the magnitude of the change falls off rapidly with the other three counties shown: Queen Annes, Maryland, St. Clair, Michigan, and Washington D.C. The change in the AAPCC of these three counties is in the range of $75.

The counties with decreases in the AAPCC before and after reconfiguration did not change as markedly as the counties that had an increase in the AAPCC (Table 5). The county with the largest decrease is Prince Georges, Maryland, which fell from $323.60 to $262.22 if the county is paid the adjusted average cost for the MSA and not for the county. For the fifth county, Douglas, Georgia, the decrease is as low as $36.78. The decreases in the AAPCC are smaller than the increases.

Among the 725 counties in MSAs, the distribution of changes from a reconfiguration of the AAPCC is as follows:

- 325 counties, or 44.8 percent, increased.
- 192 counties, or 26.6 percent, had no change.
- 208 counties, or 28.6 percent, decreased.

Increases and decreases are defined as a change of $1 or more. Only 121 counties (16.7 percent) had an increase of $20 or more, and 29 counties (4.0 percent) had a decrease of $20 or more. More MSA counties were winners than losers from reconfiguration.

In Figure 1, year-to-year changes in the AAPCC were illustrated for eight selected CMSAs. By definition, reconfiguration eliminates differences across counties in

the change in the AAPCC for those areas. (Additional information on the reconfigured AAPCC, the actual AAPCC and their projected difference for the 10 most populated CMSAs and 18 other MSAs with risk-based enrollment is available from the authors upon request.)

Impact on individual non-rural counties

Non-MSA counties with large AAPCC changes from reconfiguration are shown in Table 6. The five counties with the largest increase and the five counties with the largest decreases are shown. Franklin and Bernstable, the two lowest-paid areas in Massachusetts before reconfiguration, received the largest increase. This increase is the result of combining non-MSA counties in the same State and treating them as one geographic area for the purposes of computing the geographic adjustment factor. Franklin, in western Massachusetts, had an AAPCC of $176.05. Barnstable, in the far eastern part of the State on Cape Cod, had an AAPCC of $182.98. Each increased about $100 to $281.03. As with the MSA counties, differences are sharp with the next three counties: Elko, Nevada, Holmes, Ohio, and Lander, Nevada. Each increased from $69 to $86. In percentage terms, however, Holmes, is the big winner with about a 75-percent increase in its AAPCC.

The non-MSA counties with decreases in the AAPCC after reconfiguration changed more markedly than counties that had an increase in the AAPCC. The county with the largest decrease is Loving, Texas. For unknown reasons, Loving had among the highest AAPCCs, even when compared with MSA counties. As a result, its AAPCC falls the most from reconfiguration. Jackson, South Dakota is similar, with a high AAPCC for either a MSA or non-MSA county. Both Loving and Jackson may be oddities, in part exemplifying the problem associated with small population sizes. They both have a small population of 65 years of age or over. The next three counties fall by just over $100 or by roughly 40 percent.

Table 6

Long-term ratesetting strategies: Non-MSA counties with large AAPCC changes from reconfiguration of the geographic adjustment factor: 1987

County and State	Monthly AAPCC for Part A and B		
	Actual	Reconfigured	Differences
Increases			
Franklin, Maine	$176.05	$281.03	$104.98
Barnstable, Maine	182.98	281.03	98.05
Elko, Nevada	139.52	225.70	86.18
Holmes, Ohio	89.19	159.89	70.70
Lander, Nevada	156.42	225.70	69.28
Decreases			
Loving, Texas	333.66	171.15	−162.50
Jackson, South Dakota	315.46	161.83	−153.60
Chambers, Texas	286.67	171.15	−115.50
Mineral, Colorado	272.88	160.85	−112.00
Jackson, Arkansas	255.59	147.74	−107.90

NOTES: MSA is metropolitan statistical area. AAPCC is adjusted average per capita cost.

SOURCE: Williamson Institute, Medical College of Virginia.

Among the 2,349 non-MSA counties, the distribution of changes from a reconfiguration of the AAPCC was as follows:

- 1,100 counties, or 46.8 percent, increased.
- 80 counties, or 3.5 percent, had no change.
- 1,167 counties, or 49.7 percent, decreased.

Increases and decreases are defined as a change of $1 or more. Only 323 counties (13.8 percent) had an increase of $20 or more, and 462 counties (19.7 percent) had a decrease of $20 or more. There are more loser non-MSA counties than winner counties from reconfiguration.

Impact on Medicare costs

The proposed reconfiguration tends to increase the average AAPCC for MSA counties and lower the average AAPCC for non-MSA counties. This tendency raises questions about the impact of reconfiguration on Medicare program costs. To estimate the impact, we simulated what it would have cost to enroll the risk-based population that was enrolled at the end of 1986, paying 1987 rates before and after reconfiguration. To determine a payment amount, the simulation used data on the number of risk-based enrollees in each county by AAPCC demographic factor. The estimates are based on the demographics of the risk-based population at the beginning of 1987. There were 257 MSA counties and 137 more non-MSA counties with enrollment, for a total of 394 counties. The results are shown in Table 7.

The aggregate impact of the change in AAPCC is relatively small, less than $400,000. But the impact on

Table 7

Long-term ratesetting strategies: Simulated changes in Medicare risk-based payments from reconfiguration of the geographic adjustment factor for counties with any 1987 risk-based enrollment

AAPCC components	Aggregate 1987 Medicare cost changes		
	Total	Maximum county	Minimum county
MSA and Non-MSA reconfiguration[1]			
Part A	$ 87,366	$1,714,240	$−4,068,159
Part B	−480,510	666,363	−2,010,939
Part A and B	−393,143	2,056,239	−6,079,099
MSA only reconfiguration[2]			
Part A	262,033	1,714,240	−4,068,159
Part B	−177,977	666,363	−2,010,939
Part A and B	84,057	2,056,240	−6,079,100
Non-MSA only reconfiguration[3]			
Part A	−174,667	540,292	−223,668
Part B	302,532	215,421	−289,735
Part A and B	−477,200	755,713	−286,511

[1] N = 394.
[2] N = 257.
[3] N = 137.

NOTES: MSA is metropolitan statistical area. AAPCC is adjusted average per capita cost.

SOURCE: Williamson Institute, Medical College of Virginia.

Part A is not the same as the impact on Part B. Part A costs more and Part B costs less in aggregate, for a net decrease in Medicare risk-based payments. One county has about a $2 million increase in aggregate payments. Another has a $6 million reduction in payments. By reconfiguring MSA counties only, the impact on total Medicare costs is almost nonexistent, only about $84,000 out of more than $1 billion paid in these counties. The aggregate payment is reduced across the board in non-MSA counties. However, this reduction most likely reflects the tendency for risk-based plans to enter in rural counties with higher AAPCCs than rural counties with lower AAPCCs within the same State.

Conclusions and implications

We have examined the implications of abandoning the county as the geographic area for the AAPCC, and merging counties for the purposes of calculating the AAPCC. The county is too small to use as the geographic area, leading to several problems: unwarranted year-to-year changes in the AAPCC, the potential for gaming the system either by border crossing or enrollment redlining, and consternation among hospital and HMO representatives alike that Medicare's payment systems are either confused or unfair. Our analysis suggests that year-to-year variation is inversely associated with county population size. Counties with smaller populations of 65 years of age or over experience nearly 2 percentage points more variation each year than the largest counties. This figure is roughly 25 percent of the annual variation for these counties. When compared with the largest counties, year-to-year AAPCC variation statistically tied to county population size disappears for counties with 25,0000 or more people. Thus, if we want geographic areas with sufficient population to ensure stability over time in the AAPCC, at least 86 percent of all counties are not appropriate because they are too small.

One way of reconfiguring the geographic area creates MSA-wide AAPCCs and statewide AAPCCs for non-MSA areas. MSA-wide and statewide AAPCCs match the geographic configuration for adjustments in the PPS and make the AAPCC across counties in a reconfigured area identical. The AAPCC for about 20 percent of MSA counties and 34 percent of non-MSA counties changes substantially from reconfiguration ($20 more either up or down). The impact on Medicare costs is minimal. A simulation of the impact of reconfiguration on the aggregate cost of risk-based enrollment at the beginning of 1987 indicates a cost saving of about $400,000 for the Medicare program.

The simulation described above does not reflect any changes in behavior resulting the reconfiguration. HMOs would be motivated to realign their service areas according to their own self interest. The result could be additional costs to the program.

Reconfiguring the geographic adjustment factor would enhance the attractiveness of the Medicare risk-based system. In a system that seeks wider participation, providers are more likely to find a payment system with fewer differentiated geographic areas more comprehensible than one with more. Reduced year-to-year variation in the AAPCC would greatly enhance provider trust. Growth in the risk-based payment system and shrinkage of the hospital prospective payment system are certain to increase comparisons between the two systems at the market level. If the geographic market is defined one way for payment adjustments under one system and another way for payment adjustments under the other system, the potential for confusion and suspicion among providers is inherent when payment adjustments differ for the two systems in one year.

A uniform definition of the geographic area for both systems will not eliminate differences between the two systems in payment adjustments, but the number of instances of divergence would be sharply reduced. Both HMO and traditional insurance are almost always sold across an entire MSA. HMOs can easily segment a metropolitan market geographically by carefully selecting providers and requiring beneficiaries to obtain care from those HMO-approved providers. Traditional insurers have less control over county border crossing than HMOs. Thus, wider participation of traditional insurers in the Medicare risk program is better suited to a single price for an entire MSA, undifferentiated by county boundaries. An MSA-level AAPCC would be more closely associated with a level playing field for those providers who find it difficult to understand marked differences in AAPCC between contiguous counties.

On the other hand, plans that are already serving enrollees in lower AAPCC counties could reap windfall profits from reconfiguration because their county AAPCC would be increased to the higher MSA level. But, the potential for windfall profits is small because under the current system the incentives are such that lower payment counties are shunned by plans anyway. It would seem to be more important to discourage redlining, which is encouraged by the current system, and is always easier with smaller differentiated areas for payment, than to allow the potential for windfall profits among a few plans.

The problems of rural areas and their low AAPCC payment levels are of special concern. The results in this article show more rural counties would experience a decrease rather than an increase in the AAPCC under reconfiguration; so how can this help? By reducing the number of non-MSA payment areas to 51 from the current 2,349, simplicity may beget understanding. Moreover, a smaller number of areas may make a supplement for rural areas, much like the sole community provider supplement under PPS, more politically understandable and palatable.

The simplest reason for reconfiguring counties is that complexity creates a lack of understanding. Moreover, using larger populations to compute the payment rate enhances accuracy of the AAPCC by reducing year-to-year variation. There may be more willingness among policymakers and the industry to increase complexity in other, more beneficial ways, if complexity can first be reduced with the approach proposed here.

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