REGIONAL DISPARITIES IN MEDICARE EXPENDITURES: AN OPPORTUNITY FOR REFORM

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INTRODUCTION

There is general agreement that Medicare needs to be fixed. The Medicare Part A trust fund is expected to be bankrupt within the next five years, and the projected trust fund balance is projected to sink to –$375 billion by 2005 (U.S. Congress, 1996a, b). Avoiding bankruptcy requires increases in taxes allocated to Medicare, cuts in projected Medicare spending, or some combination of the two.[1]

There is widespread disagreement on how Medicare should be fixed. One approach is to make incremental changes in Medicare policy and hope for moderation in future Medicare expenditures, either because of cost-containment mechanisms within the Medicare system or favorable spillover effects from private-sector cost-cutting initiatives.[2] The recent balanced-budget agreements reached by President Clinton and the Congressional leadership followed this approach: across-the-board reductions in hospital and managed care reimbursements along with unspecified future cost saving.

The second approach is to encourage the migration of Medicare enrollees to managed care, and thereby reduce the role of Medicare to one of simply negotiating risk-adjusted annual capitation payments, with perhaps a residual role in the fee-for-service market. A third approach proposes turning Medicare into a financial assistance or "voucher" program (Aaron and Reischauer, 1995). In this approach, competition for Medicare dollars among private insurance companies would hold back cost increases and offer a menu of health plans to enrollees.

We argue that none of these three proposals deals directly with a funda-

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mental problem in the Medicare program—the enormous geographic disparity in Medicare spending across the United States. Average 1994–5 Medicare reimbursements per enrollee were $8,537 in Miami but only $3,300 in Minneapolis.[3] There are a number of perfectly good reasons why such disparities exist, including differences in general costs of living, the age structure of the population, and health status. We show, however, that even after adjusting for age, sex, race, price, and illness related factors, major variations in Medicare spending persist.[4] Thus, we focus on the "supply side" of how physicians and hospitals in different regions provide very different levels of resources to people with what appear to be similar health problems.

While such variations have long been recognized in the health services research literature, a different question is, how important are such variations for Medicare reform? Results from this paper suggest that such variations are very important. Even after adjusting Medicare reimbursements for differences in demographic composition, regional price levels, and illness levels, scaling back Medicare reimbursements in high-cost cities to those observed in areas such as Richmond, VA, Minneapolis, MN, or Hartford, CT would yield savings to the Medicare system on the order of one-fifth, or about $30 billion in 1994–5. Scaling back expenditures per enrollee to those in Richmond yields very large benefits; even with a gradual transition during the period 1998–2003, the predicted 2005 combined Medicare trust funds (Parts A and B) under such a scenario are more than half a trillion dollars above the current intermediate projections.

Identifying these potential gains is one thing, getting there is another. We consider the effectiveness of the three conventional approaches to reforming Medicare mentioned above in attenuating these geographic variations. All three of these approaches seek to trim health care costs by scaling back reimbursements (as in incremental reform) or by creating more cost-effective organizations of physicians and hospitals in a given area (as in a managed care or voucher system). A different approach is to consider more direct constraints on Medicare payments to high-cost areas. A number of specific policies could be considered. For example, reimbursement rates for hospital staffs with high per-admission billings could be scaled back, as in Welch and Miller (1994). We raise the possibility of another option: restricting physician supply in "overserved" areas by placing limits on both the quantity of billing numbers (required by each physician to bill the Medicare system) and the annual dollar billing per physician.

GEOGRAPHIC VARIATION IN MEDICARE SPENDING

It is well established that there are sharp differences by region in the way medicine is practiced, even if there is sharp disagreement among researchers as to why such differences should exist.[5] We draw on the extensive data analysis in the *Dartmouth Atlas of Health Care* (Wennberg et al., 1996, 1997) as our primary source of data to characterize regional variations in Medicare reimbursement levels.

The first problem in determining regional variations in Medicare spending is identifying the region. Many high-cost procedures paid for by Medicare are performed in large hospitals that may be 50 miles distant (and across state lines) from the patient's residence. We

use as our primary geographical area "hospital referral regions," or HRRs, from the *Dartmouth Atlas*, of which there are 306 in the United States. Each HRR includes one major hospital that performs both cardiovascular and neurological surgery. In Wennberg et al. (1996), the HRR regions were determined by inspection of the hospital migration patterns for a 100 percent sample of all Medicare enrollees. Based on their zip code of residence, and the location of their hospital discharges, the *Atlas* was able to characterize hospital "catchment areas" for the entire country. Many times these catchment areas crossed state lines, or followed interstate highways, in determining the geographical markets for hospitals.

There are some sources of "small area variation" that should not elicit much surprise. For example, one might expect higher health care spending in regions with a larger population of older people. To correct for this, all reported Medicare expenditure values from the *Atlas* are adjusted for differences in the age composition of the elderly population, as well as differences in the sex and racial composition.[6]

Second, regional averages may be thrown off by large academic centers that attract patients from long distances. Suppose an elderly patient living in Hartford, CT is referred to Beth Israel Hospital in Boston, and while there accounts for $2,000 in Medicare reimbursements. To correct for this potential bias, the *Dartmouth Atlas* allocates the $2,000 to the Hartford HRR, and not the Boston HRR.

Third, Medicare spending may differ simply because of differences in regional prices. Nearly everything is more expensive in New York City, and health care is no exception. We control for such differences using a variant of the GPCI price index, which was developed to correct for differences in costs of physician practice in different regions (Zuckerman, Welch, and Pope, 1990). The GPCI index depends primarily on the cost of office space and the wages of nonmedical professionals in the region; it varies from 1.28 in New York City to 0.81 in Enid, OK.

Fourth, there may be genuine differences in regional health status. For example, while Medicare spending is high in Tennessee, Alabama, and Mississippi, so also are general levels of poor self-reported health (Ashby et al., 1996). We seek to control for differences in health status across regions by calculating, for each hospital referral region, the age-sex-race adjusted mortality rate, as well as the (adjusted) rates in each region of heart attacks (AMI), strokes (CVA), gastrointestinal bleeding, surgery for lung cancer, and hip fractures. We use regression analysis to explain as much of the overall variance in Medicare spending as is possible with these seven indicators of community-level health status. (Under the null hypothesis that health care costs are distributed according to health "needs," the coefficients on these indicators should reflect the direct costs of each illness, as well as the costs of other (unmeasured) diseases that are correlated with the incidence of the observed disease.)[7]

To provide a flavor for how these factors vary across regions, consider Table 1, which shows the adjustment to health care spending for selected cities. Consider, for example, Grand Junction, CO, in the first row. According to the regression analysis, this area (including both the city of Grand Junction and the outlying zip codes) is the healthiest in the United States; the rate of strokes per

TABLE 1
MEDICARE REIMBURSMENTS AND ILLNESS RATES IN SELECTED HOSPITAL REFERRAL REGIONS, 1994–95

	Illness Adjustment (Percent of Total)	Actual per Enrollee	Illness-Adjusted per Enrollee	Heart Attacks (AMI) per 1,000	Strokes (CVA) per 1,000	Mortality per 1,000
Grand Junction, CO	16.92	3756	4527	8.49	7.62	46.42
Salt Lake City, UT	12.54	4165	4774	7.25	8.17	45.72
Lincoln, NE	12.07	3550	4074	7.82	8.66	47.29
Hartford, CT	11.90	4282	4883	8.77	9.10	48.89
New York, NY	7.57	5649	6118	8.23	9.24	48.30
Minneapolis, MN	5.06	3528	3722	9.13	10.54	48.58
Miami, FL	–1.17	7955	7874	9.45	11.50	47.91
Los Angeles, CA	–3.99	5900	5671	6.88	11.98	51.29
Richmond, VA	–6.70	4072	3842	7.82	12.28	53.81
New Orleans, LA	–9.07	7205	6638	9.50	12.19	57.03
Charleston, WV	–12.06	5085	4553	14.31	13.47	57.99
Slidell, LA	–13.87	7019	6126	10.62	15.32	61.63
Birmingham, AL	–15.84	5650	4900	9.59	14.18	55.21
Oxford, MA	–19.18	5121	4310	9.21	18.76	50.93

Note: All reimbursements are adjusted for regional differences in prices.
Source: *Dartmouth Atlas of Health Care* (Wennberg et al., 1997).

1,000 individuals is only 7.6, while the mortality rate is 46.4.[8] Predicted Medicare spending is 16.9 percent less than average given the relative health of the population. Hence, the illness adjustment *adds* 16.9 percent to actual Medicare spending to make the adjusted measure more comparable to other areas with greater reservoirs of illness.

By contrast, the populations of Birmingham, AL and Oxford, MS are relatively sick. Stroke rates are 14.2 and 18.8, respectively, while mortality rates are 55.2 and 50.9. Given these and other health indicators, the illness adjustments are –15.8 and –19.1, meaning that actual Medicare spending should be shifted downward to reflect the poorer health of the population. Note that Minneapolis and Miami are roughly equivalent with respect to their health index, suggesting that the observed difference in Medicare spending between the two cities cannot be explained solely by differences in health status. And the index of health suggests that the elderly in Richmond actually have *worse* health than those in Miami.

Table 1 also provides illustrative levels of Medicare reimbursements per enrollee over age 65 in 1994–5. Column 2 shows combined Parts A and B reimbursements adjusted for differences in price levels across regions, as well as being standardized for regional differences in age, race, and sex. There are wide variations in Medicare spending, with a modest correlation between the level of Medicare spending and our index of illness. In Table 1, Medicare spending in the healthiest region, Grand Junction, CO, is only $3,756 per enrollee, compared to $5,121 in the least healthy region, Oxford, MS.

The third column of Table 1 reports illness-adjusted Medicare spending. Medicare spending is adjusted upward (by 16.9 percent) in Grand Junction because of the relative health of that population, while spending is adjusted downward in Oxford and Birmingham because of the higher incidence of disease in those communities. Considerable variation in Medicare spending remains, with (illness-adjusted) reimbursements of $7,874 in Miami, compared to $3,722 in Minneapolis and $3,842 in Richmond.

What is causing such wide variation in these expenditures? It is not necessarily a larger number of expensive hospital procedures. For example, the age- and sex-adjusted rates of coronary artery bypass grafts and angioplasty are actually higher in Richmond than in Miami. However, the overall costs of professional and laboratory services, which include office consultations, blood tests, biopsy evaluations, and payments to surgeons, are substantially higher in Miami, $1,416 versus $957 per enrollee in Richmond. Home health care costs are also higher in Miami ($882 versus $282 per enrollee in Richmond) as are hospice services.[9] In short, it appears that the intensity of spending per health "event" is higher in Miami than in Richmond, although there is no simple story as to why Miami costs so much more.

Figure 1 provides a map of illness- and price-adjusted Medicare reimbursements in the United States. Each shade (or color) represents an (unweighted) quintile, or 20 percent interval, of reimbursement levels, ranging from the lowest (light or blue) to the highest (dark or red). There are some broad regional patterns, with high levels of spending in Florida, most of Texas, and the Los Angeles area and low areas of spending in the Pacific Northwest, Iowa, Minneapolis, and central Virginia and

North Carolina. But not all of the variation is simply the consequence of differences by broad regions; there is a "patchwork" characteristic of regions so that some HRRs in the top quintile (Columbia, MO) are adjacent to an HRR in the bottom quintile (Des Moines, IA).

The importance of these variations in health care spending for the practice of medicine has long been recognized in the health services research literature. As Phelps (1992) pointed out, some regions must be doing *something* wrong; either Minneapolis and Richmond are providing too little medical care, or Miami is providing too much (or there is enormous unmeasured variation in underlying health needs). But are these variations sufficiently large to matter for the fiscal balance of the Medicare program? Is this a problem that should be left to clinicians trying to determine which rate is right, or is this a problem that might catch the attention of policymakers trying to balance the Medicare trust fund? We address this question in the next section.

THE AGGREGATE COST OF GEOGRAPHIC VARIATION IN MEDICARE SPENDING

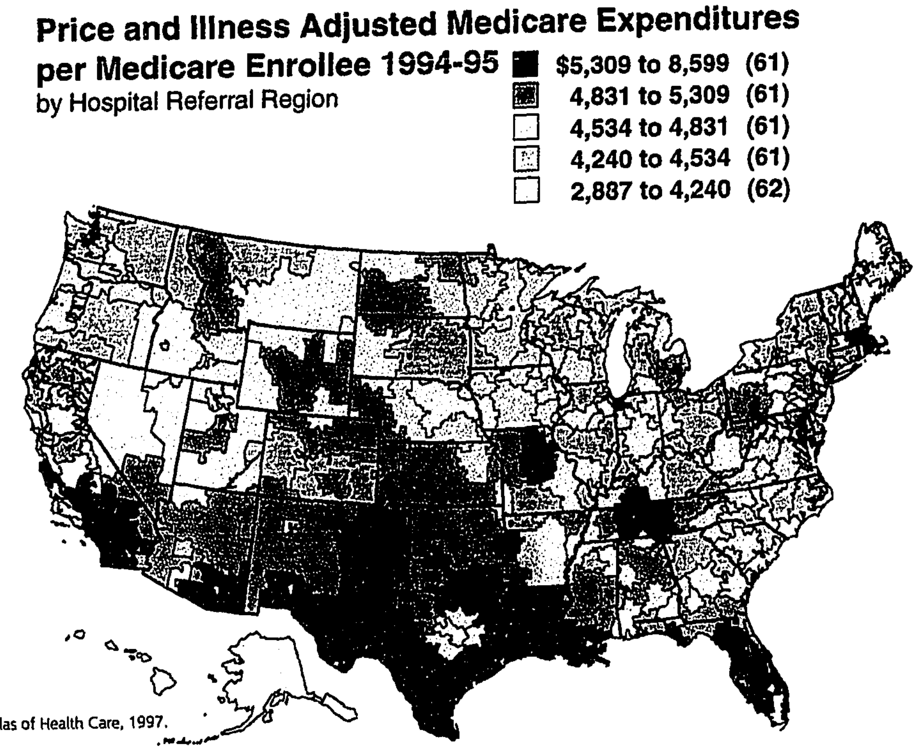
There are a number of studies that suggest that citizens of Minneapolis or Richmond are not being cheated in the quality of care they receive from Medicare providers. Indeed, it appears that residents of Miami may be *less* satisfied with the quality of their health system than those in Minneapolis.[10] Thus, it is useful to ask what is the aggregate saving realized by reducing adjusted Medicare spending to the level observed in, say, Richmond, VA. We choose the Richmond catchment area because it is centered on a city that may be more comparable to population centers in the East and the South, which seem to account for high Medicare expenditures. The results would be strengthened were we to use Minneapolis as our benchmark.

Specifically, the conceptual experiment is to reduce Medicare reimbursements (adjusted for illness, price levels, age, sex, and race) to the $3,842 observed in the Richmond region. Areas with spending less than $3,842 are not affected. Our calculations suggest that such a policy could have saved $30 billion in 1994–5, or 20 percent of direct Medicare reimbursements at that time. How would a permanent 20 percent saving in Medicare expenditures affect the fiscal balance of the Medicare trust fund?

Figure 2 shows trust fund balances for the combined Part A (Federal Hospital Insurance Trust Fund) and Part B (Supplemental Medical Insurance Trust Fund). The solid line provides both the actual and projected balances using the 1996 intermediate projections to forecast out to the year 2005 (U.S. Congress, 1996a, b). The Part A trust fund is predicted to become bankrupt just after the turn of the century, although the Part B trust fund is projected to maintain a modest balance through 2005. The combined funds, however, are predicted to turn negative by the year 2002, and reach –$328 billion by the year 2005. (As the Report notes, however, the Medicare Part A trust fund is not authorized to borrow money, so the negative balances are conjectural.)

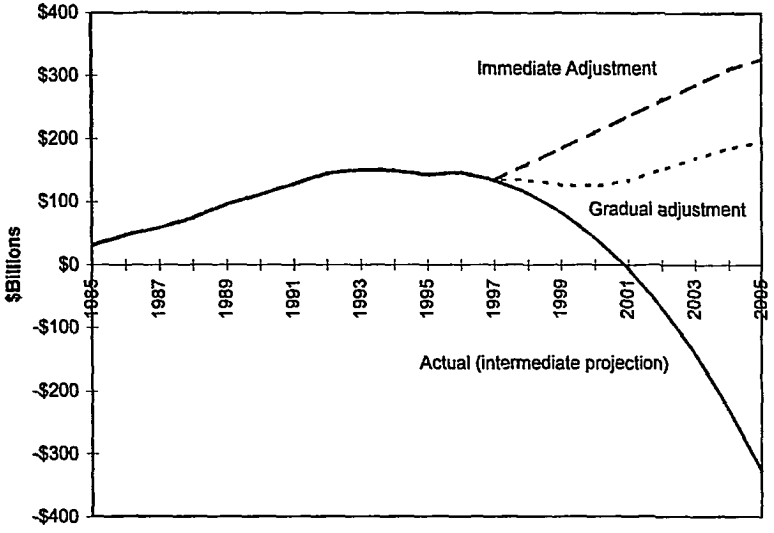
The impact on the trust funds' balances of reducing Medicare spending in all regions to that in Richmond as of January 1, 1998 is shown as the dashed line in Figure 2 (labeled "quick adjustment").[11] The declines in the trust funds are reversed, and projected balances circa 2005 are now $327 billion, an almost exact reversal of the status quo projection. The dotted line (labeled

FIGURE 1. Price and Illness Adjusted Medicare Expenditures per Medicare Enrollee 1994–95 (by Hospital Referral Region)



Data Source: Dartmouth Atlas of Health Care, 1997.

FIGURE 2. Actual and Projected Medicare Trust Balances, 1985–2005



"gradual adjustment") shows the impact on the trust fund of a more modest policy change: a transition or phase-in period from 1998 to 2003. Even with this gradual shift, the Medicare trust fund ends up with a balance of $195 billion.

The purpose of this section was to argue that focusing on geographic variation in Medicare reform could yield substantial reductions in Medicare spending. Identifying the gains is one thing; realizing them is another. In the next section, we consider how specific proposals for Medicare reform might affect the cost and quality of health care for the elderly.

REFORMING MEDICARE

The first approach to reforming Medicare is the incremental one: lowering hospital reimbursements here, cutting back on home health care there. This is the nature of the most recent Medicare reforms contained in the May 1997 President's balanced budget bill. While such changes are politically acceptable because they spread the pain relatively evenly, they leave for a later day Medicare reform to realize the unspecified cost saving in the future. Also, this incremental approach does not address the problem of geographical variation in Medicare spending. Managed care plans that enroll Medicare enrollees receive a capitated payment that is (currently) 95 percent of average fee-for-service spending in their county.[12] Medicare reform has proposed cutting the 95 percent payment to 85 percent (or less) because of the generally better health levels of people in managed care. Under such a proposal, the regional disparities in HMO payments would be preserved,

with HMOs in Miami still getting roughly double the capitated payment for a given (risk-adjusted) elderly person in Minneapolis.

The second approach focuses on encouraging the growth of managed care in the Medicare program. Currently, it is estimated that 11 percent of Medicare enrollees are in managed care plans; that percentage is projected to increase to 29 percent in 2005 (Lamphere et al., 1997). It is hoped that the shift to managed care will result in significant cost saving for Medicare. While overall resources devoted to Medicare patients may have fallen because of managed care, cost saving from managed care *for the Medicare budget* have been elusive. As noted above, Medicare pays 95 percent of the average fee-for-service costs in the area, but there is increasing evidence that the elderly people who actually enroll in managed care programs also account for less than 95 percent of average costs, leaving little or no saving for Medicare (for example, see Riley et al., 1996).

A third option is to change the role of Medicare from a third-party insurance company to one that assists the elderly in buying private insurance policies. Medicare would provide each individual with a voucher good for an insurance plan provided by private insurance companies. For example, in the Aaron and Reischauer (1995) proposal, Medicare would specify required standards of coverage, and then insurance companies would offer a variety of plans to compete for enrollments. Some plans with additional coverage might require out-of-pocket premiums as well as the voucher. Other proposals provide for cash rebates in the event that the insurance plan is offered for less than the amount of the voucher.

These proposals are an excellent way for the Medicare system to promote competition among insurance companies to keep costs low, as well as allowing Medicare to maintain global budget limits. And if the vouchers are adjusted only for regional differences in price (and perhaps community-level illness levels), they have the potential to capture savings from a reduction in regional disparities in Medicare spending.

But there is still considerable debate about how such a voucher program would affect the equity and distribution of health care. Provider groups would still enjoy "market power" in negotiating with insurance companies for plans that entail additional premiums in excess of the voucher amount. Physicians and hospitals providing higher levels of health care per enrollee could conceivably pass along the costs through higher premiums, especially if they enjoy market power in negotiating for particular locations. Finally, there is some concern about the existence of a two-tier health insurance program for the elderly, with many options for high-income elderly but for low-income elderly a ". . . limited choice of physicians, limited care options, and a limited drug formulary" (Hanauer, 1997).

If one fundamental problem with the Medicare system is the geographical disparities in spending, a different approach to reform would be to focus on the supply side directly. For example, Welch and Miller (1994) have suggested volume-performance standards for hospital medical staffs. Reimbursements from Medicare would be adjusted downward for medical staffs with expenditures per admission above a certain limit, after adjusting for differences in the mix of cases. The idea behind targeting medical staffs is that

they are sufficiently small that peer group pressure would be an effective inducement to restrict overall costs.

Another approach borrows from Canada's attempts to limit costs in overserved areas. For a physician to bill Medicare for services, she must have a UPIN (Unique Physician Identification Number). Currently, these numbers are provided upon request. Suppose instead that the supply of UPIN numbers by the Health Care Financing Administration (HCFA) were restricted, using guidelines on community levels of health in a particular region. All physicians currently in practice would be grandfathered with their existing UPIN numbers. But in areas with an oversupply of physicians (as determined by a benchmarking approach, as in Goodman et al., 1996), the HCFA could purchase UPIN numbers, perhaps by encouraging early retirement or migration to underserved areas. In these regions where the demand for UPINs is above the quantity supplied, a market could be established for selling and buying such permits. Among new physicians choosing where to practice, the market value of UPIN numbers would provide a signal to practice in, say, rural North Carolina, where UPIN numbers would be inexpensive (or free), instead of Miami. And like the Welch and Miller (1994) plan, volume-performance standards could be instituted to restrict overall billing for a given UPIN number.

While this suggested approach may appear radical, there are precedents in recent provincial reforms in Canada (Barer, Lomas, and Sanmartin, 1996). In Ontario, there are restrictions on new billing numbers for the national health insurance program, while New Brunswick places restrictions on new billing numbers in areas deemed to be oversupplied. Newfoundland and other provinces pay new physicians in oversupplied areas only 50 percent of the normal billing (Barer, Lomas, and Sanmartin).

We also recognize some potentially serious problems with quantity restrictions on physicians. Those who bill Medicare the least would be those most likely to sell their permits, thus potentially limiting the projected cost reductions. Billing patterns would have to be followed carefully so that physicians are prevented from purchasing UPINs from underserved areas and then consulting with patients in overserved areas. The monopoly power of large managed care corporations could be strengthened if they finance the purchase of most UPINs in small areas. And finally, there is considerable variation in practice patterns by physicians; simply restricting the number of physicians may have limited impact on total expenditures. Nevertheless, control over both the quantity and location of UPIN numbers, as well as their billing limits, could provide a valuable policy "lever" for the Medicare program in reducing geographical disparities in Medicare spending.

Discussion and Conclusions

It seems clear that the Medicare system will require major reform in the next decade. In this paper, we have identified one source of major saving in Medicare spending—the existence of wide regional variation in Medicare reimbursements that don't appear to be driven by conventional demand factors. The amount of saving is substantial; in the best-case scenario, reducing illness- and price-adjusted Medicare spending to levels observed in areas such as Minneapolis, MN or Richmond, VA can effect a permanent 20 percent reduction in Medicare expenditures. Were Medicare spending in all regions of the

United States limited to the level in Richmond, the projected Medicare trust fund would be $327 billion in 2005 instead of its current projected value of –$328 billion.

The calculations thus far have presumed that there would be no reduction in the quality of health care by reducing Medicare spending in high cost areas. There is an increasing amount of evidence suggesting that the more intensive health care received in the high-utilization areas yield little or no improvement in health outcomes (e.g., McClellan, McNeil, and Newhouse, 1994). A randomized early-intervention program in a Veterans Administration hospital actually resulted in worse outcomes for the treatment group (Weinberger, Oddone, and Henderson, 1996). At the macro level, there is no relationship between age-sex-race-adjusted mortality rates and the level of hospital resources in an area, even after controlling for a wide battery of factors measuring the health and socioeconomic status of a community (Fisher et al., 1997).

But how to reduce such spending? Cutting back on rates may or may not reduce overall expenditures; some evidence suggests that physicians increase volume in response to lower reimbursement rates, thus stymieing what would otherwise be cost-cutting strategies. Systems of vouchers provided to Medicare enrollees to purchase private insurance policies hold promise, but they may not address directly the issue of geographic misallocation of health care resources. In this paper, we have reviewed alternative approaches that could more directly address the problem of geographic variation in Medicare spending. These include restrictions on Medicare reimbursements per admission (e.g., Welch and Miller, 1994), as well as the possibility of restricting Medicare billing numbers (and the annual amount physicians can bill to Medicare) in oversupplied areas. Although the specific policies best suited to reducing regional variation in Medicare spending are still unclear, the benefits from a focus on such disparities are too large to ignore.

ENDNOTES

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[1] We focus here just on the short-term viability of Social Security. There is also the problem of the long-term balance of the Medicare system after the baby boomers retire.

[2] For an example of the former, see Moon and Davis (1995).

[3] These numbers are for the Miami and Minneapolis hospital referral regions, as defined in Wennberg et al. (1997); we discuss the construction of these regions below.

[4] Of course, it could be that the low-cost areas are providing inadequate health care for their populations. However, there is little evidence that health care outcomes in low-resource areas are worse than outcomes in high-resource areas. For a disscussion of this point, see Goodman (1990).

[5] For example, see Wennberg and Gittelsohn (1982), Escarce (1992), and Leape et al. (1990).

[6] This is done by calculating Medicare reimbursements in each HRR separately for different age-sex-race cells, for example, for 75 to 79-year-old African American women. An age-sex-race-adjusted average Medicare spending measure is then calculated by weighting each cell by the U.S. distribution of these demographic groups in the elderly population.

[7] Regression results are available upon request. They are actually run at a more disaggregated level, the hospital service area (which includes nonreferral hospitals; there are more than 3,000 of these areas), and then aggregated up to the HRR level.

[8] Recall that these and later numbers are adjusted for differences in age, race, and sex across regions.

[9] These numbers have not been adjusted for illness differences between the two areas, although doing so would probably widen the disparities.

[10] Goodman et al. (1996), quoting a written communication from James Knickman of the Robert Wood Johnson Foundation.

[11] We perform these calculations by subtracting "other income" from the trust fund income sources (which includes interest income) and adding back interest income (at a 6.3 percentage point rate, that assumed by U.S. Congress (1996a, b) accumulated on our counterfactual trust fund balance.

[12] The actual capitated payment is determined by taking an average of Medicare spending in past years (the AAPCC) and is adjusted by age, sex, whether disabled, and Medicaid status.

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