

# Relationship Between Regional Per Capita Medicare Expenditures and Patient Perceptions of Quality of Care

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IT HAS BEEN WELL DOCUMENTED that per capita expenditures for Medicare beneficiaries vary widely from area to area across the United States. In 2003, total Medicare Part A and B per capita expenditures for beneficiaries living in Miami, Florida, were nearly \$12 000, while the comparable value for those living in Minneapolis was \$5700.<sup>1</sup> These large differences persist even after controlling for demographic and health differences across regions.<sup>2-7</sup>

Fisher et al<sup>8</sup> have demonstrated that differences in health status cannot account for why areas vary in expenditure per capita. Wennberg et al<sup>3</sup> have shown that when one looks only at the expenditures during the last 6 months of life, the differences in expenditures persist and are highly correlated with the overall mean expenditure.

While inadequate access to care continues to be a problem in the United States,<sup>9</sup> inappropriate and ineffective care also persists.<sup>8,10</sup> Some indices of quality of care are not better in regions with higher utilization, and they are sometimes significantly worse than those in low-expenditure areas.<sup>11</sup> Of

**Context** Wide variations in Medicare expenditures exist across regions, but little is known about whether beneficiaries residing in low-expenditure regions perceive receiving lower-quality care than those in high-expenditure regions.

**Objective** To evaluate how Medicare beneficiaries' perceptions of their health care are related to per capita expenditure in the areas where they live.

**Design, Setting, and Respondents** A probability sample of Medicare beneficiaries living in households in the United States was surveyed by a combination of mail and telephone in 2005. Each respondent was allocated to 1 of 5 quintiles, depending on mean age-, sex-, and race-adjusted per capita Medicare expenditures based on Centers for Medicare & Medicaid Services claims data.

**Main Outcome Measures** The survey included 3 questions about perceived unmet need for care, 4 questions about the perceived quality of ambulatory care, and 3 questions rating the perceived quality of overall care.

**Results** Of 4000 Medicare beneficiaries sampled, 160 (4%) were ascertained to have died or to be living in a long-term care facility. Of the remaining 3840 potentially eligible beneficiaries, 2515 (65%) responded. Per capita expenditures were highly related to receiving more medical care, such as mean number of ambulatory visits to physicians in the past year (range from lowest to highest expenditure quintile, 3.4-3.9;  $P < .001$  for linear trend) and more cardiac tests (respondents reporting receiving tests in past year, 158/387 [40.1%] to 468/739 [63.5%];  $P < .001$  for linear trend). However, 7 of the 10 measures of perceived quality, including perceived unmet needs for tests and treatment (respondents reporting unmet needs, 15/387 [3.9%] to 37/739 [5.0%];  $P = .25$  for linear trend) and spending enough time with physicians (respondents reporting adequate time, 311/387 [88.7%] to 603/739 [87.0%];  $P = .94$  for linear trend), were unrelated to expenditures, while the overall rating of perceived quality of care was higher in the lower-expenditure areas (respondents reporting overall care rating of 9 or 10, 242/387 [63.3%] to 404/739 [55.4%];  $P = .008$  for linear trend).

**Conclusion** In this representative sample of Medicare beneficiaries, no consistent association was observed between the mean per capita expenditure in a geographic area and the perceptions of the quality of medical care of the people who live in those areas.

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even more importance, Fisher et al<sup>10</sup> have shown that there are no apparent survival benefits from living in high-expenditure areas.

None of these studies addresses the very reasonable hypothesis that persons in regions like Miami are getting

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more of the care wanted by most persons. Thus, those in high-expenditure areas might perceive a higher quality of care from their perspectives and might be happier with their health care treatments, even if it is difficult to actually measure differences in survival or if their values do not square with quality of care from a purely clinical perspective. For example, one study examined the association between Medicare expenditures and "process" measures of quality and found no statistically significant associations at the state level.<sup>11</sup> However, these measures were mainly specific to management of a specific acute care problem (eg, use of  $\beta$ -blockers following acute myocardial infarction) and may not reflect the overall quality of primary care or the priorities of patients.

To address these issues, in this article we report results for a detailed survey of Medicare patients, which included a number of questions about the perceptions of quality of health care from the patients' own perspectives. The Dartmouth Atlas project<sup>1</sup> has divided the country into 306 service areas, termed hospital referral regions (HRRs). For each HRR, we compared the answers to the quality questions with the overall level of per capita expenditure within the HRR, to test whether more spending leads to a more positive patient experience with the health care system.

## METHODS

The purpose of the survey was to gather information about the health care Medicare beneficiaries received and the extent to which they were getting the care they wanted. The protocols were reviewed and approved by the institutional review boards of Dartmouth Medical School and the University of Massachusetts Boston.

A probability sample of 4000 persons who had been Medicare beneficiaries in 2003 was drawn. The selected sample identification numbers were matched to the Centers for Medicare & Medicaid Services (CMS) current beneficiary file to obtain current

contact information. Beneficiaries found to be living in long-term care facilities or deceased were designated as not eligible and deleted from the sample.

The formal data collection protocol was specified by the CMS. The selected individuals were sent 2 prenotification letters, 1 from the CMS and 1 on Dartmouth Medical School letterhead. The initial contact with a Medicare beneficiary was the CMS letter. This letter outlined the purposes of the study, assured selected individuals that their participation was voluntary and that their benefits would not be affected by their participation, and provided them with a toll-free telephone number that they could call to decline participation if they so desired. The follow-up letter from the researchers provided similar information.

Telephone numbers were matched to addresses to the extent possible; interviewers called those numbers and attempted to arrange to interview the selected individual. At least 6 attempts were made to contact hard-to-reach persons. Sampled persons for whom a valid telephone number could not be found or who were not reached by telephone were sent a dual-language (English-Spanish) mail version of the same set of questions used by the interviewers. The initial mailing of the questionnaire packet contained a \$5 bill as an incentive to participate. To be equitable, all those who had responded by telephone were also sent \$5. Nonrespondents to the mail survey were sent a reminder card and a second questionnaire.

For those interviewed by telephone, the interviewer went over the issues covered in the advance mailing, including sponsorship, purposes, confidentiality, and the voluntary nature of the survey and answered any respondent questions before beginning the interview. Mail respondents were considered to be consenting to the terms of the survey by the act of returning the mail questionnaire.

The telephone interview took approximately 20 minutes on average to administer. It took a similar amount of time to complete the self-administered

questionnaire. This dual-language, mixed-mode survey was fielded between March and October 2005.

The survey instrument included 3 kinds of questions relevant to the topic of this article: measures of perceived unmet need for medical care; measures of the perceived quality of ambulatory care; and self-ratings of overall medical care. The survey also included some questions about use of medical care in the preceding year. Item wording is presented in the BOX. In addition, we were able to match claims data to get measures of claims for care in 2004-2005 for all respondents not enrolled in a Medicare health maintenance organization plan (n=2034).

Most of the questions were drawn from commonly used survey instruments. All questions were cognitively tested to ascertain that they were consistently understood and that answers conveyed what respondents meant to say.<sup>12,13</sup> A telephone pretest was conducted, and the question-and-answer process was behavior coded to identify questions that were difficult either to ask or to answer.<sup>14</sup> Revisions were made as needed based on the test results.

Using the 306 HRRs in the Dartmouth Atlas project,<sup>1</sup> we measured regional utilization level as the age-, sex-, and race-adjusted per capita Part A and B Medicare spending in an HRR in 2003, the most recent publicly available data. Per capita expenditures were calculated for each HRR; then the areas were ordered by mean per capita Medicare Part A and B expenditures and grouped into quintiles to facilitate visually examining trends. The mean per capita expenditure varied from approximately \$5200 in the lowest quintile to \$8500 in the highest quintile.

The basic analytic approach is to look at how respondent answers were related to the mean per capita Medicare expenditure in areas where respondents lived. Respondents were coded into HRRs, based on their addresses, and their answers were tabulated by quintiles of HRR spending. The tables were created in 2 parallel analytic steps. First, to tabulate the dependent vari-

**Box. Items Used in Survey of Medicare Patients****Utilization of Medical Care**

In the last 12 months, how many times did you go to a doctor's office or clinic to get care for yourself?

In the last 12 months, how many different doctors did you see?

Your personal doctor is the one you would see if you need a check-up, want advice about a health problem, or get sick or hurt. Do you have a personal doctor? (Yes/No)

In the last 12 months, did you see a cardiologist or other heart specialist? (Yes/No)

An EKG is a test where electrodes and wires are hooked up to a person's chest. In the last 12 months, have you had an EKG? (Yes/No)

A stress test is a test to check a person's heart, while they are on a treadmill. In the last 12 months, have you had a stress test? (Yes/No)

An angiogram is a test where a small tube is inserted through a person's leg artery to look directly at the heart. In the last 12 months, have you had an angiogram? (Yes/No)

Prescription medicine includes anything a doctor writes a prescription for. How many different prescription medicines are you currently using?

**Measures Indicative of Perceived Unmet Need for Care in the Past Year**

In the last 12 months, was there any medical care, tests, or treatment you wanted, but didn't get? (Yes/No)

In the last 12 months, was there ever a time when you wanted to see a specialist and didn't? (Yes/No)

In the last 12 months, do you think you had too few, too many, or about the right number of tests for heart disease? (Too few/Too many/Right number)

**Measures Related to the Perceived Quality of Ambulatory Care in the Past Year**

In the last 12 months, how often did doctors spend enough time with you? (Never/Sometimes/Usually/Always)

(If prescribed new medications in past 12 months) In the last 12 months, how often did doctors explain the purposes of these new medicines in a way that was easy to understand? (Never/Sometimes/Usually/Always)

(If experienced side effects from medications) Do any of your doctors know about these side effects? (Yes/No)

(If experiencing pain) Do any of your doctors know about this? (Yes/No)

**Ratings of Perceived Overall Care**

Do you think the quality of the health care you received in the last 12 months was better, worse, or about the same quality as most people your age get? (Better/Worse/About the same)

Compared to the rest of the United States, do you think people in your community get better quality medical care, worse quality medical care or about the same quality? (Better/Worse/About the same)

Using any number from 0 to 10 where 0 is the worst health care possible and 10 is the best health care possible, what number would you use to rate all your health care?

**Reporting Financial Strain**

How important are financial issues for you when you decide whether or not to get any medical care? (Very important/Important/Somewhat important/Not important)

**Health Status**

In general, how would you rate your overall health? (Poor/Fair/Good/Very good/Excellent)

ables by quintile, we adjusted for differences between the populations of the quintiles. We categorized each respondent's age into 1 of 3 groups: 65 through 74 years, 75 through 84 years, and 85 years or older. We categorized self-reported race/ethnicity into mutually exclusive groups of non-Hispanic white, black, hispanic, or other race. If the hispanic answer was missing, we assumed respondents were non-Hispanic. We also included whether financial issues were said to be "very important" or "important" (vs "somewhat important" or "not important") in deciding whether to obtain medical care. Self-reported health status was categorized as "poor" or "fair" (vs "good," "very good," or "excellent"). The re-

ported percentages of each variable by quintile of spending are adjusted for patient characteristics by substituting the sample mean for every variable when solving the regression equation, which was used to estimate the value in each table cell.

Second, to take advantage of all the data available, we used the per capita spending in each of the 306 HRRs in a multiple logistic regression analysis including all of the variables noted above to estimate the probability that there was a linear relationship between the per capita expenditure in an HRR and the value of the various measures of perceived quality of health care that we were using. These analyses were performed with Stata version 9 (Stata-

Corp, College Station, Texas), and robust calculations of standard errors were calculated, taking into account the clustering within HRRs.  $P < .05$  was considered statistically significant.

The sample was designed to support a number of different analyses, including the analysis in this article. Given the sample size, the power of the data to detect meaningful differences by quintile was quite adequate. When comparing 2 quintiles with approximately 500 respondents each, for percentages around 50%, differences of 8 percentage points could be detected with 70% power and differences of 9 percentage points with 80% power. For percentages around 20%, differences of 6 percentage points could be detected

with 70% power and differences of 7 percentage points with 80% power.

Focusing more specifically on the linear trend analysis, for 8 of the 10 key dependent variables, the logistic regressions had 70% power to detect a mean increase of from 0.08 to 0.18 in the rates at which respondents gave a particular response for each \$1000 of increased expenditure per capita. For the 2 variables that applied to only a subset of respondents who had experienced pain or adverse effects of new medications, a mean slope of close to 0.4 per \$1000 increase in expenditure was needed to have that much power.

## RESULTS

Of the 4000 persons initially sampled, 47 were found to be deceased and another 113 were living in long-term care facilities (4% noneligible). A total of 2515 Medicare beneficiaries responded to the survey, 1384 by telephone and 1131 by mail. There were 222 refusals, and 62 persons could not respond for other reasons (mainly illness or language). Of the original sample, 1041 could not be reached by telephone and did not respond by mail, so we have no information about whether or not they were still alive and in private housing. Using the American Association for Public Opinion Re-

search RR1 formula,<sup>15</sup> which includes in the denominator all those about whom we have no information, the response was 65% (2515/3840). Since some of those not contacted undoubtedly were either deceased or living in long-term care facilities, that underestimates the true response rate, but there is no easy way to estimate how many were not eligible.

TABLE 1 presents the age, sex, and race/ethnicity of those responding. Those same characteristics are also available from the sample frame for the total population. Comparisons show that persons 85 years or older were slightly underrepresented, while the Hispanic population appears to have been better represented in the survey than in the CMS sample frame data. This is most likely because of underreporting in the CMS data, rather than overrepresentation in the survey sample.<sup>16</sup> Otherwise, the sample closely mirrors the total Medicare population.

TABLE 2 describes some of the health utilization patterns of respondents, using both claims data and survey reports. It has been previously shown that the distinctive profile of the higher-expenditure areas is more visits to physicians, more hospital care, more specialty care, and more tests.<sup>8,10</sup> It can be seen that the experience of the survey respondents generally mirrored those

patterns: there were significant linear trends for those in the higher-expenditure areas to have more visits to physicians, to see more different physicians, to see more cardiologists, and to have more cardiac tests. The relationship between the rate of inpatient hospitalization and the HRR per capita expenditure did not reach statistical significance ( $P = .17$  for trend).

TABLE 3 addresses the question of whether barriers to access exist that might explain differences between areas. Respondents in higher-expenditure regions tended to be somewhat more likely to have seen a physician in the past year ( $P = .10$  for trend) and to say that they have a personal

**Table 1.** Characteristics of Respondents and Those in Sample Source

	%	
	Respondents (n = 2515)	Source <sup>a</sup> (n = 6 384 199)
Sex		
Men	42	42
Women	58	58
Age, y		
65-74	48	46
75-84	42	40
≥85	10	14
Race/ethnicity		
Black	6	8
Hispanic	5	2
Non-Hispanic white	85	87
Other	4	3

<sup>a</sup>Source: 2003 and 2004 Centers for Medicare & Medicaid Services denominator files.

**Table 2.** Utilization of Medical Services by Quintiles of Per Capita Spending

	Quintiles From Low to High Mean Expenditures, No. (%) <sup>a</sup>					P Value for Linear Trend <sup>b</sup>
	1 \$5209 (n = 334)	2 \$5887 (n = 359)	3 \$6405 (n = 384)	4 \$7034 (n = 410)	5 \$8522 (n = 547)	
From CMS claims <sup>c</sup>						
Mean No. of outpatient visits 2004-2005	5.9	7.1	7.3	8.2	8.2	<.001
Had ≥1 inpatient stay during 2004-2005	69 (20.7)	93 (25.8)	109 (28.4)	118 (28.8)	145 (26.5)	.17
From survey <sup>d</sup>						
Mean No. of physician visits in the past year	3.4	3.8	3.6	3.8	3.9	<.001
Mean No. of physicians seen in past year	2.4	2.7	2.5	2.7	2.8	.006
Cardiologist seen in past year	87 (22.5)	134 (31.0)	141 (31.5)	146 (30.9)	276 (37.4)	.006
Cardiac tests in past year <sup>e</sup>	158 (40.1)	221 (51.4)	235 (52.8)	256 (54.7)	468 (63.5)	<.001

Abbreviation: CMS, Centers for Medicare & Medicaid Services.

<sup>a</sup>Ranges for the mean expenditures shown were \$4273 to < \$5595, \$5595 to < \$6120, \$6120 to < \$6664, \$6664 to < \$7706, and \$7706 to < \$11 351 for quintiles 1-5, respectively.

<sup>b</sup>Probability of a linear relationship to per capita spending in hospital referral region, adjusted for age (65-74 years is suppressed category), female sex, race/ethnicity (white is suppressed category), self-reported health status (good/very good/excellent is suppressed category), and financial concerns when paying medical bills (somewhat/not important is suppressed category).

<sup>c</sup>Claims data are for respondents who are not members of health maintenance organizations.

<sup>d</sup>Total number of survey respondents for each item varies slightly owing to item nonresponse and skip patterns.

<sup>e</sup>Had ≥1 electrocardiogram, stress test, or angiogram.



physician ( $P=.04$  for trend). All respondents had insurance through Medicare, and this survey was conducted before Part D went into effect. The mean number of current prescription drugs reported was similar across quintiles, suggesting a lack of differences in ability to pay across these regions. More directly, when we asked respondents how important financial issues were in deciding to get medical care, again there was no evidence that financial concerns could account for the variation

across quintiles. Finally, the self-ratings of health were similar across quintiles, suggesting that observed differences in spending were not explained by enrollee health.

TABLE 4 presents the measures of perceived unmet need for care in the preceding 12 months by quintiles based on mean per capita Medicare expenditures. As noted in the "Methods" section, in these and subsequent analyses, we adjusted for any differences across quintiles in age, sex, race/ethnicity, self-

reported health status, and financial strain.

There was no evidence that respondents in low-expenditure areas perceived more unmet needs for tests or treatments of any kind or for having cardiac tests. In fact, the perceived unmet need for seeing specialists was higher in the high-expenditure areas, despite the greater likelihood of seeing specialists in these regions ( $P=.001$  for trend).

Table 4 also presents 4 measures of perceived quality of ambulatory care by

**Table 3.** Factors Related to Need and Access to Care By Quintiles of Per Capita Spending

Factor	Quintiles From Low to High Mean Expenditures, No. (%) <sup>a</sup>					P Value for Linear Trend
	1 \$5209 (n = 387)	2 \$5887 (n = 431)	3 \$6405 (n = 448)	4 \$7034 (n = 471)	5 \$8522 (n = 739)	
Seen a physician in the past year	369 (93.5)	423 (96.8)	422 (92.7)	453 (94.7)	721 (96.1)	.10 <sup>b</sup>
Have a personal physician	365 (93.4)	414 (95.8)	425 (94.3)	445 (94.2)	722 (97.2)	.04 <sup>b</sup>
Mean No. of current prescription medications	3.8	4.1	3.9	4.1	3.9	.84 <sup>b</sup>
Rated health as poor or fair	92 (23.8)	134 (31.1)	139 (31.2)	133 (28.6)	184 (24.9)	.63 <sup>c</sup>
Financial issues important or very important for medical care	211 (53.3)	225 (51.5)	248 (54.5)	250 (52.3)	383 (51.0)	.41 <sup>d</sup>

<sup>a</sup>Total number of survey respondents for each item varies slightly owing to item nonresponse and skip patterns. See Table 1 footnote for ranges of mean expenditures.

<sup>b</sup>Probability of a linear relationship to per capita spending in hospital referral region, adjusted for age (65-74 years is suppressed category), female sex, race/ethnicity (white is suppressed category), self-reported health status (good/very good/excellent is suppressed category), and financial concerns when paying medical bills (somewhat/not important is suppressed category).

<sup>c</sup>Probability of a linear relationship to per capita spending in hospital referral region, adjusted for age (65-74 years is suppressed category), female sex, race/ethnicity (white is suppressed category), and financial concerns when paying medical bills (somewhat/not important is suppressed category).

<sup>d</sup>Probability of a linear relationship to per capita spending in hospital referral region, adjusted for age (65-74 years is suppressed category), female sex, race/ethnicity (white is suppressed category), and self-reported health status (good/very good/excellent is suppressed category).

**Table 4.** Perceived Unmet Needs, Ambulatory Caring and Attention, and Overall Care by Quintiles of Per Capita Spending

	Quintiles From Low to High Mean Expenditures, No. (%) <sup>a</sup>					P Value for Linear Trend <sup>b</sup>
	1 \$5209 (n = 387)	2 \$5887 (n = 431)	3 \$6405 (n = 448)	4 \$7034 (n = 471)	5 \$8522 (n = 739)	
Unmet Needs (Respondent Perception)						
Tests or treatment	15 (3.9)	23 (5.2)	16 (3.5)	21 (4.5)	37 (5.0)	.25
Specialists	13 (3.3)	30 (6.9)	26 (5.7)	32 (6.7)	59 (8.0)	<.001
Cardiac tests (had “too few” tests for heart disease)	42 (12.5)	56 (14.1)	39 (9.7)	48 (11.8)	94 (14.2)	.14
Ambulatory Caring and Attention (Respondent Perception)						
Physicians always/usually spent enough time	311 (88.7)	352 (86.7)	342 (86.0)	374 (87.7)	603 (87.0)	.94
Physicians always/usually explained new medications	129 (90.3)	172 (86.3)	171 (86.4)	164 (86.9)	262 (86.1)	.75
Physicians knew medication adverse effects (if any)	58 (97.3)	80 (90.6)	75 (91.8)	77 (89.8)	130 (89.8)	.27
Physicians knew about pain (if any)	184 (93.2)	251 (97.6)	252 (97.6)	255 (95.2)	391 (97.8)	.01
Overall Care (Respondent Rating)						
My health care better than average	124 (33.3)	132 (31.0)	126 (29.2)	159 (35.1)	225 (32.1)	.67
Community’s care better than average	118 (29.8)	116 (26.6)	105 (23.1)	115 (24.1)	223 (29.7)	.33
Overall rating of care is 9 or 10	242 (63.3)	245 (57.0)	247 (56.6)	260 (56.5)	404 (55.4)	.008

<sup>a</sup>Total number of survey respondents for each item varies slightly owing to item nonresponse and skip patterns. See Table 1 footnote for ranges of mean expenditures.

<sup>b</sup>Probability of a linear relationship to per capita spending in hospital referral region, adjusted for age (65-74 years is suppressed category), female sex, race/ethnicity (white is suppressed category), self-reported health status (good/very good/excellent is suppressed category), and financial concerns when paying medical bills (somewhat/not important is suppressed category).

quintiles based on mean per capita expenditures. For 3 of these measures (physicians spent enough time, physicians explained new medications, and physicians knew about any adverse effects of medications), there was no statistically significant association between per capita spending and patient reports. Among respondents who reported experiencing pain, those in the high-expenditure areas were more likely to say that their physicians were aware of the conditions that caused them pain ( $P=.01$ ).

Table 4 also presents 3 respondent ratings of the medical care they and those in their communities receive. When respondents were asked to compare their own care and that in their community with the average, there was no significant linear trend associated with per capita spending by region. When asked to rate their own health care on a scale from 0 to 10, there was a statistically significant trend for the percentage of respondents ranking their care more favorably (9 or 10) to be in the lower-expenditure regions ( $P=.008$ ).

Finally, we evaluated how the various measures of perceptions of quality of care were interrelated. Our goal in choosing the measures was to sample different aspects of care of which patients would likely be aware, ie, whether they thought they needed various kinds of care that they did not receive, their perceptions of their communications and interactions with their physicians, and their own ratings of the medical care they and others received. We did not anticipate that these measures would be highly interrelated, because in fact we were trying to have a diverse set of measures. The size of the sample meant that some of the measures were related to a statistically significant degree. For example, respondents' overall health care ratings were significantly associated with perceptions of spending enough time with their physicians ( $r=0.45$ ,  $P<.001$ ), how well their physicians explained new medications ( $r=0.45$ ,  $P<.001$ ), the perception of unmet need for care ( $r=0.21$ ,  $P<.001$ ), how their care compared with the US average ( $r=0.22$ ,  $P<.001$ ), and

whether their physicians knew about conditions causing their pain ( $r=0.10$ ,  $P<.001$ ). The majority of the correlation coefficients were lower than 0.20. The generally low levels of correlations among the various outcome measures is consistent with the fact that these measures were not reflective of a single underlying construct but rather constituted a sampling of various aspects of care experiences in which problems might be apparent to respondents.

## COMMENT

Fisher et al<sup>8,10</sup> have described in detail the key differences in patterns of care that account for the widely varying differences in how much is spent on medical care. Persons in high-expenditure areas get more specialty care, go to more different physicians, have more physician visits, and are more likely to spend time in the hospital and in intensive care units during the last days of their lives. However, Fisher et al<sup>8,10</sup> also have shown that those extra expenditures are not associated with improvements in survival or access to care; Baicker and Chandra<sup>11</sup> have demonstrated a similar lack of association using process measures of care based on a study by Jencks et al.<sup>17</sup>

The literature on appropriateness of care tells a somewhat different story: that high-intensity regions provide both more appropriate and more inappropriate care.<sup>18</sup> For example, Landrum et al<sup>19</sup> have reported that high-utilization areas provide more care for colorectal cancer deemed appropriate using clinical criteria but also proportionately more care that does not meet clinical appropriateness standards. On the other hand, Baicker et al<sup>20</sup> have reported that regions with higher rates of cesarean deliveries perform the procedure among mothers who are healthier or who are less appropriate candidates for the procedure for other reasons.<sup>20</sup>

All of these studies used measures of quality that were not necessarily those valued directly by patients. A closer match is a recent study, using the same data set, demonstrating that Medicare beneficiaries generally prefer end-of-life treatment focused on palliation

rather than life extension and that differences in patient preferences are unlikely to explain regional variation in end-of-life health care expenditures.<sup>21</sup> These results are also consistent with international comparisons of patients' experiences with health care in high- and low-expenditure countries. The United States spends more on health care per capita than any other country in the world, but US residents do not show consistent evidence of being more satisfied with the quality of their health care.<sup>22,23</sup>

Our survey respondents differed in their rates of use of health care in ways that parallel the aggregate analyses previously reported by Fisher et al.<sup>8,10</sup> There is little basis for attributing those differences to access to care, concerns about costs, or the health status of the populations. Most important, the results taken together document that spending more on medical care does not improve patients' perceptions of the medical care they receive. On average, those in the lower-expenditure areas reported no more perceived unmet needs for care and a perceived quality of ambulatory care similar to that in high-expenditure areas; furthermore, they rated the overall quality of their health care at least as highly as those in high-expenditure areas.

An important limitation of this study is that the design is observational, so we cannot prove that persons in the high-expenditure areas would perceive no important deficits in their medical care if they were put into a low-expenditure environment. For example, persons in high-expenditure regions may have grown to expect aggressive diagnostic testing, use of specialists, and hospitalization, while those in low-expenditure regions expect and receive less aggressive care. For each group, expectations are met and so they report similar measures of satisfaction with their care. But this explanation is more difficult to reconcile with perceived quality measures that are mainly descriptive, such as whether the physician spent enough time with the patient or did a good job of explaining new

medications. Even for those measures, persons in the lowest-expenditure regions reported perceptions of their care that at least equaled the reports of those in the higher-expenditure areas.

In the short term, Medicare enrollees who moved from the highest quintile to the lowest quintile of intensity might well experience an adjustment to a less intensive treatment style. However, we can certainly say that those in the lower-expenditure areas have accommodated very well to that style of medical care. Furthermore, a summary of 17 randomized trials in which patients were exposed to decision aids to help them make decisions about major interventions reported that informed patients consistently wanted fewer major interventions than they received under "usual care."<sup>24,25</sup>

As has been reported elsewhere,<sup>26</sup> an equity problem exists in that persons in the lower-expenditure areas pay the same Medicare premiums as those in the higher-expenditure areas, but less money is spent on their care. However, this is a different problem from that documented by our findings, ie, that from a patient perspective, persons in the low-expenditure areas appear to value the care they are getting as much as those in the high-expenditure areas.

Ultimately, the culture that develops in particular medical communities seems to be an important factor in how much medical care is delivered and how much it costs.<sup>6,7,27</sup> This study suggests that, should fundamental changes in the structure of the US health care system occur so that the lowest-expenditure quintile is viewed as the benchmark, the fraction of patients who view their care as inadequate or constrained will not, in the long term, increase above current levels. Instead, we suspect that the limiting factor in restraining cost growth or in fundamental reform will be the extent to which

the medical community will be able to adjust to new standards for what constitutes appropriate medical practice.

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**Study concept and design:** Fowler, Gallagher, Skinner. **Acquisition of data:** Fowler, Gallagher, Anthony, Skinner.

**Analysis and interpretation of data:** Fowler, Anthony, Larsen, Skinner.

**Drafting of the manuscript:** Fowler, Gallagher, Anthony.

**Critical revision of the manuscript for important intellectual content:** Gallagher, Anthony, Larsen, Skinner. **Statistical analysis:** Fowler, Anthony, Larsen, Skinner. **Obtained funding:** Gallagher, Skinner.

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