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## Association of Patient Preferences for Participation in Decision Making With Length of Stay and Costs Among Hospitalized Patients

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### Abstract

**Importance**—Patient participation in medical decision making has been associated with improved patient satisfaction and health outcomes. However, there is little evidence concerning its effects on resource utilization. Patient participation in medical decision making has been hypothesized to decrease excess utilization but might be expected to increase utilization when other decision makers have incentives to reduce utilization, as under prospective payment systems for hospital care.

**Objective**—To examine the relationship between patient preferences for participation in medical decision making and health care utilization among hospitalized patients.

**Design and Setting**—Survey study in an academic research setting.

**Participants**—A survey that included questions about preferences to receive medical information and to participate in medical decision making was administered to all patients admitted to the University of Chicago Medical Center general internal medicine service between July 1, 2003, and August 31, 2011, and completed by 21 754 (69.6%) of admitted patients.

**Main Outcomes and Measures**—The survey data were linked with administrative data, including length of stay and total hospitalization costs. We used generalized linear models to measure the association of patient preference for participation in decision making with length of stay and costs.

**Results**—The mean length of stay was 5.34 days, and the mean hospitalization costs were \$14 576. While 96.3% of patients expressed a desire to receive information about their illnesses and treatment options, 71.1% of patients preferred to leave medical decision making to their physician. Preference to participate in decision making increased with educational level and with private

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health insurance. Compared with patients who had a strong desire to delegate decisions to their physician, patients who preferred to participate in decision making concerning their care had a 0.26-day (95% CI, 0.06-0.47 day) longer length of stay ( $P = .01$ ) and \$865 (95% CI, \$155-\$1575) higher total hospitalization costs ( $P = .02$ ).

**Conclusions and Relevance**—Patient preference to participate in decision making concerning their care may be associated with increased resource utilization among hospitalized patients. Variation in patient preference to participate in medical decision making and its effects on costs and outcomes in the presence of varying physician incentives deserve further examination.

Making Good Medical decisions is complex. The body of medical knowledge is vast and may be difficult to tailor to the needs and preferences of individual patients. Physicians have professional knowledge regarding treatment options and their effectiveness that patients often do not have, but patients better understand their personal preferences about the benefits and risks of treatment options.

Under these circumstances, shared decision making has been widely endorsed as a model for making complex medical decisions<sup>1-4</sup> and may have many advantages,<sup>5-10</sup> including improved patient satisfaction<sup>5-11</sup> and health outcomes.<sup>12-16</sup> Support for shared decision making has also been enhanced by changing societal norms that have questioned the traditional paternalistic role of physicians in the patient-physician relationship<sup>5,17</sup> and by increased patient expectations regarding the potential benefits of medical interventions.<sup>18,19</sup>

Shared decision making requires that patients have the information they need to understand the decisions they face. Indeed, most patients exhibit a desire to understand their medical conditions and treatment options.<sup>20,21</sup> However, a smaller fraction of patients have a strong desire to make their own medical decisions, with a substantial fraction preferring to defer decisions to their physician.<sup>21</sup> Patient preferences for involvement in decision making may vary widely based on background, religion, and other factors.<sup>20,22-24</sup>

Whether patient preference to make decisions concerning their care should be expected to increase or decrease resource use is unclear. On the one hand, patient involvement might decrease resource use if it prevents costly interventions that patients do not want, perhaps otherwise selected by physicians practicing defensive medicine or seeking to maximize revenue. This is an important motivation for the inclusion of patient-centered outcomes research within The Patient Protection and Affordable Care Act.<sup>3,4</sup> On the other hand, when physicians or other decision makers have incentives to decrease utilization, such as during prospective payment for hospital care, greater patient involvement in decision making might be expected to increase resource utilization. This study assesses whether patient preference for involvement in decision making is associated with resource use among hospitalized patients.

## Methods

### Data Sources and Study Population

This study used data collected through the University of Chicago Hospitalist Study,<sup>25</sup> which incorporates administrative and patient survey data for hospitalized general medicine

patients. Trained research assistants seek consent from all admitted patients as soon as possible after admission for an inpatient survey that contains 44 questions, including race/ethnicity, educational level, general self-assessed health status, and preference for information sharing and participation in medical decisions.

The sample population for the analysis included 21 754 admissions for which the inpatient survey was completed. Between July 1, 2003, and August 31, 2011, there were 34 471 admissions to the University of Chicago Medical Center general medicine service, of which 3218 were excluded from the inpatient survey because they had already completed the survey during an admission within the past 60 days. Of the remaining 31 253 admissions eligible for interview, 21 754 (69.6%) completed the interview, 3998 (12.8%) refused, and 5405 (17.3%) were discharged before and 96 (0.3%) died before completing or refusing the interview. Compared with participants, nonparticipants were older, less healthy, and more likely to be of African American race/ethnicity and had shorter length of stay (LOS) and lower total hospitalization costs ( $P < .05$  for all).

### Data Elements

The dependent variables were LOS and total hospitalization costs measured by activity-based accounting (TSI, Inc). The primary independent variable was patient preference for participation in medical decision making. Patients were asked to report their preference for participation in medical decision making with a single item (“I prefer to leave decisions about my medical care up to my doctor”), to which patients responded on a 4-point Likert-type scale (definitely agree, somewhat agree, somewhat disagree, or definitely disagree). Patients were also asked to report their level of agreement with the statement “I prefer that my doctor offers me choices and asks my opinion.” However, so few patients disagreed with this statement that it could not be used to distinguish patients' views on information sharing.

Other independent variables included the following: age, sex, race/ethnicity, weekend admission, Charlson Comorbidity Index, the 10 most frequent principal diagnoses, transfer from another health care facility or service, health insurance type (private, Medicare, Medicaid, or no insurance), general self-assessed health status (excellent, very good, good, fair, or poor), and educational level (<high school, high school graduate, some college or junior college, college graduate, or any graduate-level education), as well as categorical variables for admission year and month and attending physicians.

### Statistical Analysis

We estimated the association of patient preference for participation in decision making with resource utilization for the total sample population. We also estimated the association for certain subgroups, including by age, sex, race/ethnicity, educational level, health insurance type, and general self-assessed health status.

For these analyses, we combined the respondents who somewhat or definitely disagreed with delegating decisions to their physician into a single “disagree” group, which created the following 3 subgroups of similar size: definitely agree, somewhat agree, and disagree. Using analysis of variance, we tested for the association between patient preference for

participation in decision making and LOS and costs. We also performed multivariate analysis of the association of patient preference with LOS and costs after controlling for all the independent variables listed above and the categorical variables for admission year and month and attending physicians. Given the skewed nature of the dependent variables, we used generalized linear models with a log-link function and a gamma distribution.<sup>26</sup>

A small amount of missing data (7.1% for educational level, 6.5% for medical decision preferences, 2.6% for general self-assessed health status, and 3.0% for health insurance type) was imputed using the multiple imputation method with 20 iterations, which yields consistent estimates with valid inference in estimation.<sup>27,28</sup> We used an ordered logit model for ordinal variables (educational level, medical decision preferences, and general self-assessed health status) and a multinomial logit model for the nonordinal variable of health insurance type. To confirm the robustness of the imputations, a sensitivity analysis was performed that compared the results with vs without imputations.

The estimation coefficients for medical decision preferences from the generalized linear models were converted into average marginal effects to improve interpretability. The average marginal effect represents the difference in the adjusted predictions of the dependent variable relative to the reference group. The SEs, 95% CIs, and *P* values of average marginal effects were derived by the delta method<sup>29</sup> after multiple imputations. We repeated this analysis for patient subgroups of interest to assess the robustness of our findings within these groups.

## Results

Table 1 gives patient sociodemographic characteristics, general self-assessed health status, medical decision preferences, and LOS and total hospitalization costs for the study participants. The mean patient age was 57.1 years, 59.9% were women, 75.7% were of African American race/ethnicity, more than half had a high school education or less, and almost 80% were insured by Medicare or Medicaid or lacked insurance, all of which produce incentives for reduced LOS. While 96.3% of patients expressed a desire to receive information about their illnesses and treatment options, 71.1% of patients preferred to leave medical decision making to their physician (33.5% somewhat agreed and 37.6% definitely agreed). The mean LOS was 5.34 days, and the mean total hospitalization costs were \$14 576.

Figure 1 shows the association of preference for decision making with LOS and with costs. Patients who did not prefer to delegate decisions to their physician had higher total hospitalization costs (*P* = .001) and a trend toward increased LOS (*P* = .06).

Figure 2 shows decision-making preferences stratified by baseline characteristics. Patients who were younger, more educated, and privately insured expressed a desire for a more active role in decision making (*P* < .001, *t* test for all).

Table 2 gives LOS and costs by several characteristics also shown in Figure 2. The LOS and total hospitalization costs were significantly higher among male patients and among

individuals who had poor health and who were not of African American race/ethnicity ( $P < .001$  for all).

After controlling for all covariates, patients who did not agree with leaving decisions up to their physician had an LOS that was 4.9% longer ( $P = .01$ ) and total hospitalization costs that were 5.9% higher ( $P = .02$ ) compared with patients who definitely agreed (Table 3). In addition, women, uninsured participants, and patients of African American race/ethnicity had shorter LOS and lower hospitalization costs, while patients with public insurance and fair or poor health had longer LOS and higher total hospitalization costs. Despite the strong association of educational level with decision-making preferences, it had no consistent pattern of association with LOS or costs in the multivariate analysis. Hospitalization costs were lower ( $P = .001$ ) among patients having any graduate-level education compared with patients having the least education.

Table 4 gives the average marginal effects of medical decision preferences on LOS and costs for the total sample population and the sample stratified by several characteristics. For the total sample population, patients having a desire to participate in decision making were hospitalized longer by 0.26 day (95% CI, 0.06-0.47 day) and had \$865 (95% CI, \$155-\$1575) in higher costs compared with patients having a strong desire to delegate. The effects were broadly similar in all subgroups examined but were statistically significant ( $P < .05$ ) for LOS and costs only in the elderly, male participants, patients of African American race/ethnicity, and persons with less than a high school education, with public insurance or no insurance, or with at least good general self-assessed health status.

For the sensitivity analysis, the magnitude and statistical significance of our findings were unchanged when the analysis was restricted to 20 999 patients without missing data. The results were also unchanged when monthly variation in survey response rates was controlled for in the multivariate analyses.

## Discussion

Patient participation in decision making is essential to shared decision making, which has been found to have benefits with respect to patient satisfaction and health outcomes. Few studies have examined the effect of shared decision making on resource utilization. Some studies have found that health care utilization and costs are lower when primary care is more patient centered<sup>30</sup> or when patients use decision aids.<sup>31</sup> Other studies<sup>32,33</sup> have found that patient preferences for care (eg, to see a physician or for specialty care) are sometimes but not consistently or strongly associated with increased utilization. However, to our knowledge, this is the first study of the association of patient preference for participation in medical decision making with resource utilization.

Despite the absence of published quantitative evidence of effects of patient involvement in medical decision making on costs, there are theoretical reasons and qualitative evidence to suggest that patient preference for participation in medical decisions might affect resource utilization.<sup>5,17-19,34-37</sup> When physicians have economic incentives to provide care and patients face few costs of care, patient participation might be expected to decrease

utilization. However, because hospitalized patients often face few out-of-pocket costs of further hospital care and because physicians may encounter incentives to decrease utilization, patient preferences for involvement in decision making might be expected to be associated with increased resource use. Consistent with this, we found that 28.9% of the patients we studied expressed a preference to make their own decisions rather than leaving those decisions up to their physician and that patients who preferred to make their own decisions had increased LOS of 0.26 day and increased costs of \$865.

Our results have 2 important policy implications. First, our results suggest that policies that increase patient engagement in decision making may increase LOS and costs, at least in context in which physicians face incentives to decrease utilization. This contrasts with the expectation that patient participation in care decisions might decrease costs and suggests that it is important to evaluate efforts to increase patient engagement in decision making with respect to their effects on outcomes and costs. To scale our results, it is useful to note that, when multiplied by the approximately 35 million annual hospitalizations in the United States,<sup>38</sup> the 28.9% of patients who somewhat or definitely disagreed with delegating decisions to their physician would represent about 10 million hospitalizations, for which an additional 0.26 day and \$865 per hospitalization would total 2.6 million hospital days and about \$8.7 billion in costs.

A second important policy implication of our findings relates to the potential effects on health disparities of efforts to increase patient involvement in decision making. Of particular concern is the lessened tendency to prefer engagement in decision making by older persons, those with public insurance, participants with less education, and patients of African American race/ethnicity. This could cause efforts to make physicians more responsive to medical decision preferences to increase health disparities by having little effect on utilization for these less empowered groups while increasing utilization among more empowered groups, who are already more likely to receive medical care.<sup>34-36</sup> On the other hand, disparities might be reduced if effort is focused on increasing patient engagement in decision making among disadvantaged groups, perhaps by attempts to develop models of shared decision making that are tailored for less empowered groups. Because our results suggest that many of these disadvantaged groups, especially the elderly and less educated persons, experience significant increases in resource utilization with greater preference for participation, there are good reasons to expect that efforts to encourage their participation in decision making may reduce disparities in resource utilization. Nevertheless, efforts to increase physician responsiveness to preferences among less advantaged groups might help reduce disparities.

Some limitations of this study deserve discussion. First, the results of this single-site study may not be generalizable outside of the urban, largely African American population we studied. Second, 31.0% of admitted patients did not participate in the survey. Although there were differences in baseline characteristics between participants and all other nonparticipants, the magnitude of these differences was minimal. Third, we studied hospitalized patients, for whom physicians have large incentives to decrease utilization due to Medicare prospective payment, low payment rates for Medicaid and uninsured patients, and utilization review for private patients. In contexts in which patient and physician

financial incentives are more similar and patient-physician relationships are more durable, the effects of patient participation could be different. However, if the use of prospective payment systems increases in the United States as part of a movement toward the use of accountable care organizations, patient and physician incentives like those we study herein are likely to become increasingly common. Fourth, although shared decision making requires participation of both physicians and patients, we do not have information on physician preferences to engage in shared decision making. However, because physicians on our general internal medicine service are assigned to patients based on a fixed call schedule, the decision-making preferences of physicians should be similar across categories of patient preference for participation in decision making. Our inclusion of physician fixed effects in our multivariate analyses also minimizes potential effects of physician preferences on resource utilization. Fifth, we have not measured the effect of differential resource utilization on health outcomes. If patient preference for participation in decisions improves patient satisfaction and health outcomes, associated increases in expenditures may have important benefits. Patient participation helps physicians exercise “responsible stewardship” that may reduce resource utilization while maintaining or improving outcomes.<sup>39,40</sup> On the other hand, greater patient participation may increase utilization and worsen outcomes if it causes physicians to perform interventions of questionable value to avoid conflicts with patients who have requested them,<sup>34,41,42</sup> to prevent patients from switching physicians,<sup>34</sup> or to reduce the risk of being sued for malpractice.<sup>41,42</sup>

Understanding the benefits and costs of greater patient engagement in medical decision making in various contexts is one of several important areas for future work suggested by our findings. One question is why some patients definitely disagree with leaving decisions up to their physician, despite his or her lack of professional knowledge, while others strongly agree. “Definitely disagree” may reflect the desire of patients to have their preferences incorporated into decision making rather than a rejection of physician authority.<sup>43</sup> Variation in preferences for involvement in decision making by sociodemographic status suggests hypotheses to explain these variations, including differential access to information from nonphysician sources,<sup>34,35</sup> as well as cohort-related norms, economic incentives for physicians or patients, and the degree to which patients trust that physicians share their treatment goals.<sup>44-46</sup> Because patient trust in their physician is associated with patient autonomy, satisfaction, adherence to treatment, and improved health,<sup>47-51</sup> it may be worthwhile to study whether efforts to enhance trust in physicians can increase patient willingness to delegate decisions to their physician, as well as to elucidate the associated effects on outcomes and costs.

We believe that this study adds important insights concerning the association of patient preferences and health care utilization. That patient preference for participation is associated with increased resource use contrasts with some perspectives on shared decision making that emphasize reductions of inappropriate use. However, in the presence of physician incentives to decrease use, such as exist for hospitalized patients and are likely to increase under health reform, increased resource use may occur. Future studies related to patient participation in decision making should examine effects on both outcomes and costs.

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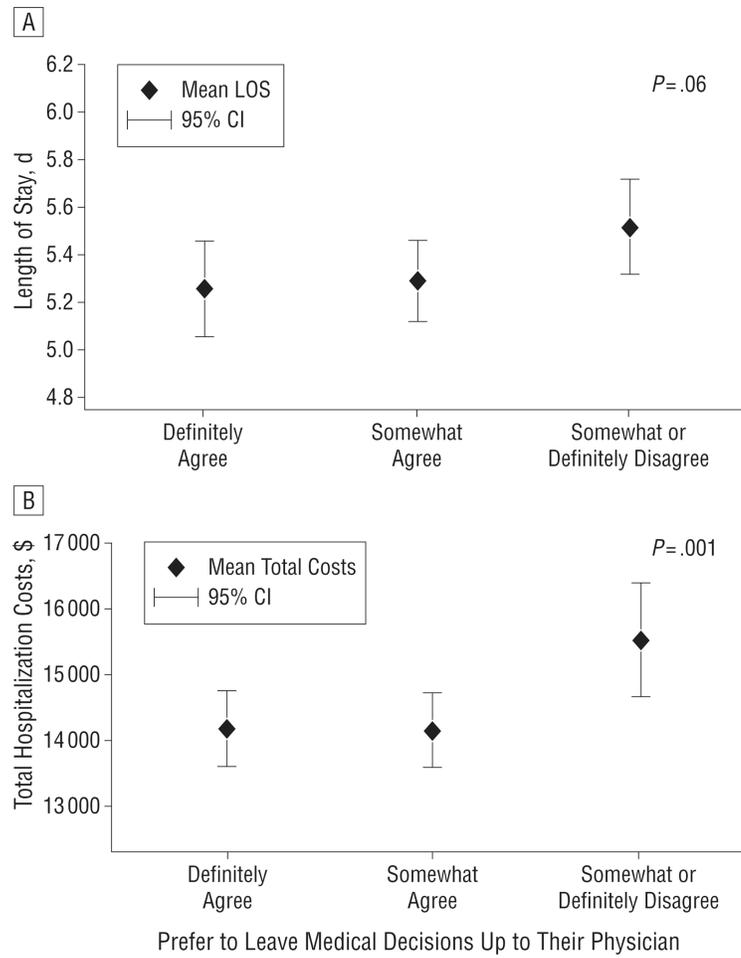
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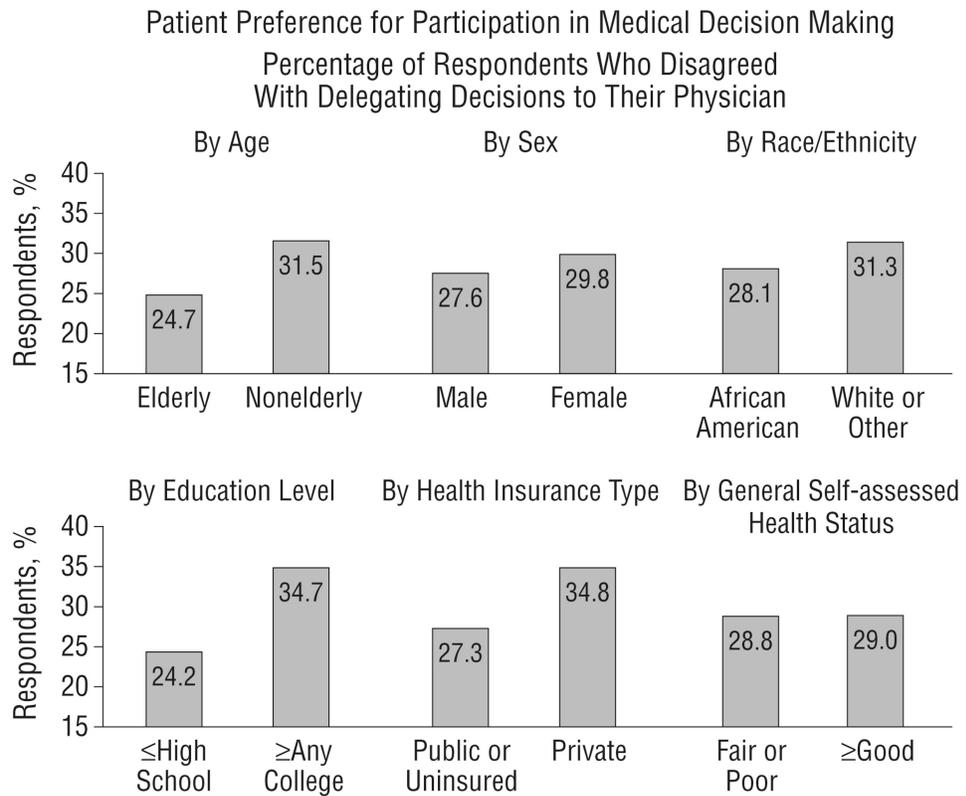
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**Figure 1.** Length of stay (A) and total hospitalization costs (B) according to medical decision preferences. The mean length of stay and total hospitalization costs are adjusted predicted values without controlling for any covariates.



**Figure 2.** Medical decision preferences according to baseline characteristics by age, sex, race/ethnicity, educational level, health insurance type, and general self-assessed health status. By *t* test,  $P < .001$  for all except  $P = .47$  for general self-assessed health status.

**Table 1**  
**Patient and Hospitalization Characteristics<sup>a</sup>**

Characteristic	Value (n = 21 754)
Age, mean (SD),y	57.1 (19.4)
Female sex, No. (%)	13 034 (59.9)
African American race/ethnicity, No. (%)	16 463 (75.7)
Educational level, No. (%) <sup>b</sup>	
<High school	5147 (23.7)
High school graduate	6878 (31.6)
Some college or junior college	5764 (26.5)
College graduate	2397 (11.0)
Any graduate-level education	1568 (7.2)
Health insurance type, No. (%) <sup>b</sup>	
Private	4618 (21.2)
Medicare	11 170 (51.3)
Medicaid	5086 (23.4)
Uninsured	880 (4.0)
General self-assessed health status, No. (%) <sup>b</sup>	
Excellent	1579 (7.3)
Very good	2382 (10.9)
Good	6113 (28.1)
Fair	7059 (32.4)
Poor	4621 (21.2)
Charlson Comorbidity Index, mean (SD)	1.6 (1.7)
10 Most frequent principal diagnoses, No. (%)	
Complications related to procedures, such as hemodialysis catheter	1059 (4.9)
Diabetes mellitus	946 (4.3)
Asthma	815 (3.7)
Acute renal failure	779 (3.6)
Sickle cell anemia	707 (3.2)
Pneumonia, organism unspecified	679 (3.1)
Cellulitis and abscess	632 (2.9)
Pancreatitis and pancreatic pseudocyst	519 (2.4)
Disorders of fluid, electrolyte, and acid-base balance	491 (2.3)
Gastrointestinal hemorrhage	459 (2.1)
Transfer from another health care facility or service, No. (%)	2205 (10.1)
Weekend admission, No. (%)	5290 (24.3)
Medical decision preferences, No. (%)	
“I prefer that my doctor offers me choices and asks my opinion” <sup>b</sup>	
Definitely agree	18 865 (86.7)
Somewhat agree	2079 (9.6)

Characteristic	Value (n = 21 754)
Somewhat disagree	448 (2.1)
Definitely disagree	362 (1.7)
“I prefer to leave decisions about my medical care up to my doctor” <sup>b</sup>	
Definitely agree	8181 (37.6)
Somewhat agree	7286 (33.5)
Somewhat disagree	3350 (15.4)
Definitely disagree	2937 (13.5)
Length of stay, mean (SD), d	5.34 (8.23)
Total hospitalization costs, mean (SD), \$	14 576 (28 018)

<sup>a</sup> Admission year and month and attending physicians are also controlled for in estimation.

<sup>b</sup> We used multiple imputations (20 iterations) and imputed missing values for educational level (7.1%), medical decision preferences (6.5%), general self-assessed health status (2.6%), and health insurance type (3.0%).

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**Table 2**  
**Length of Stay and Total Hospitalization Costs by Baseline Characteristics**

Characteristic	Length of Stay, d		Total Hospitalization Costs, \$	
	Mean (SD)	<i>P</i> Value <sup>a</sup>	Mean (SD)	<i>P</i> Value <sup>a</sup>
By age				
Elderly (n = 8441)	5.34 (9.66)	.99	13 643 (27 164)	<.001
Nonelderly (n = 13313)	5.34 (7.17)		15 167 (28 532)	
By sex				
Male (n = 8720)	5.53 (7.42)	.005	16 021 (34 198)	<.001
Female (n = 13 034)	5.22 (8.73)		13 608 (22 922)	
By race/ethnicity				
African American (n = 16 463)	5.06 (7.03)	<.001	13 434 (26 314)	<.001
White or other (n = 5291)	6.21 (11.12)		18 132 (32 511)	
By educational level				
High school graduate (n = 12 025)	5.34 (6.95)	.94	14 760 (30 163)	.29
Any college (n = 9729)	5.35 (9.57)		14 347 (25 112)	
By health insurance type				
Public or uninsured (n = 17 136)	5.40 (8.65)	.06	14 383 (27 209)	.06
Private (n = 4618)	5.14 (6.43)		15 285 (30 809)	
By general self-assessed health status				
Fair or poor (n = 11 680)	5.83 (9.34)	<.001	15 747 (30 939)	<.001
Good (n = 10 074)	4.78 (6.68)		13 218 (24 127)	

<sup>a</sup>*P* value by *t* test is calculated between each subgroup. For example, the *t* test for length of stay by age was performed between elderly (> 65 years) and nonelderly.

**Table 3**  
**Multivariate Analysis of the Association of Characteristics Among 21 754 Patients With Measures of Resource Utilization<sup>a</sup>**

Characteristic	Length of Stay		Total Hospitalization Costs	
	Coefficient (95% CI)	P Value	Coefficient (95% CI)	P Value
Centered age	0.000 (−0.001 to 0.001)	.83	−0.001 (−0.003 to 0.000)	.02
Centered age squared	0.000 (0.000 to 0.000)	.005	0.000 (0.000 to 0.000)	<.001
Female sex	−0.042 (−0.072 to −0.012)	.007	−0.084 (−0.121 to −0.046)	<.001
African American race/ethnicity	−0.173 (−0.212 to −0.134)	<.001	−0.192 (−0.238 to −0.146)	<.001
Educational level				
<High school				
High school graduate	0.075 (0.035 to 0.115)	<.001	0.055 (0.004 to 0.105)	.04
<Some college or junior college	0.030 (−0.013 to 0.074)	.18	−0.001 (−0.054 to 0.051)	.96
College graduate	0.075 (0.018 to 0.132)	.01	0.035 (−0.038 to 0.108)	.35
Any graduate-level education	−0.041 (−0.119 to 0.037)	.30	−0.124 (−0.201 to −0.048)	.001
Health insurance type				
Private	...	...	...	...
Medicare	0.100 (0.053 to 0.146)	<.001	0.071 (0.013 to 0.129)	.02
Medicaid	0.103 (0.055 to 0.151)	<.001	0.083 (0.022 to 0.144)	.008
Uninsured	−0.102 (−0.172 to −0.031)	.005	−0.186 (−0.263 to −0.109)	<.001
General self-assessed health status				
Excellent	...	...	...	...
Very good	0.029 (−0.042 to 0.100)	.42	−0.001 (−0.085 to 0.083)	.98
Good	0.035 (−0.022 to 0.093)	.23	0.004 (−0.068 to 0.076)	.91
Fair	0.134 (0.078 to 0.191)	<.001	0.111 (0.039 to 0.183)	.003
Poor	0.256 (0.196 to 0.317)	<.001	0.205 (0.127 to 0.282)	<.001
Charlson Comorbidity Index	0.072 (0.063 to 0.081)	<.001	0.087 (0.075 to 0.098)	<.001
Ten most frequent principal diagnoses				
Complications related to procedures such as hemodialysis catheter	0.233 (0.166 to 0.300)	<.001	0.304 (0.216 to 0.391)	<.001
Diabetes mellitus	−0.175 (−0.242 to −0.108)	<.001	−0.272 (−0.353 to −0.191)	<.001
Asthma	−0.471 (−0.528 to −0.414)	<.001	−0.593 (−0.661 to −0.525)	<.001
Acute renal failure	−0.102 (−0.168 to −0.036)	.003	−0.217 (−0.303 to −0.131)	<.001
Sickle cell anemia	0.222 (0.155 to 0.288)	<.001	0.003 (−0.099 to 0.105)	.96
Pneumonia, organism unspecified	−0.226 (−0.292 to −0.159)	<.001	−0.322 (−0.420 to −0.223)	<.001
Cellulitis and abscess	−0.183 (−0.274 to −0.093)	<.001	−0.393 (−0.497 to −0.288)	<.001
Pancreatitis and pancreatic pseudocyst	−0.066 (−0.166 to 0.034)	.20	−0.116 (−0.255 to 0.023)	.10
Disorders of fluid, electrolyte, and acid-base balance	−0.460 (−0.537 to −0.383)	<.001	−0.609 (−0.694 to −0.524)	<.001
Gastrointestinal hemorrhage	−0.402 (−0.474 to −0.330)	<.001	−0.305 (−0.377 to −0.233)	<.001
Transfer from another health care facility or service	0.176 (0.127 to 0.225)	<.001	0.712 (0.656 to 0.769)	<.001
Weekend admission	0.035 (0.002 to 0.068)	.04	0.064 (0.022 to 0.106)	.003

Characteristic	Length of Stay		Total Hospitalization Costs	
	Coefficient (95% CI)	P Value	Coefficient (95% CI)	P Value
"I prefer to leave decisions about my medical care up to my doctor"				
Definitely agree	...	...	...	...
Somewhat agree	0.022 (−0.014 to 0.058)	.23	0.039 (−0.005 to 0.082)	.09
Somewhat or definitely disagree	0.049 (0.011 to 0.088)	.01	0.059 (0.011 to 0.106)	.02

Abbreviation: Ellipsis, not applicable.

<sup>a</sup> Admission year and month and attending physicians are also controlled for in estimation. In all estimations,  $P < .001$  for association with  $F$  statistic (joint test of all coefficients).

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**Table 4**  
**Average Marginal Effects (AME) of Medical Decision Preferences Among 21 754 Patients**  
**on Length of Stay and Total Hospitalization Costs**

"I prefer to leave decisions about my medical care up to my doctor"	Length of Stay, d		Total Hospitalization Costs, \$	
	AME (95% CI) <sup>a</sup>	P Value <sup>a</sup>	AME (95% CI) <sup>a</sup>	P Value <sup>a</sup>
<b>Total Sample Population<sup>b,c</sup></b>				
Definitely agree	...	...	...	...
Somewhat agree	0.12 (−0.07 to 0.31)	.23	563 (−79 to 1206)	.09
Somewhat or definitely disagree	0.26 (0.06 to 0.47)	.01	865 (155 to 1575)	.02
<b>By Age<sup>c,d</sup></b>				
Elderly				
Somewhat agree	0.32 (0.05 to 0.59)	.02	1121 (306 to 1936)	.007
Somewhat or definitely disagree	0.47 (0.16 to 0.79)	.003	933 (25 to 1841)	.04
Nonelderly				
Somewhat agree	0.00 (−0.23 to 0.23)	.99	103 (−750 to 955)	.81
Somewhat or definitely disagree	0.15 (−0.09 to 0.40)	.22	687 (−250 to 1624)	.15
<b>By Sex<sup>c,d</sup></b>				
Male				
Somewhat agree	0.28 (0.00 to 0.56)	.047	922 (−64 to 1907)	.07
Somewhat or definitely disagree	0.48 (0.15 to 0.81)	.005	1628 (430 to 2826)	.008
Female				
Somewhat agree	0.03 (−0.20 to 0.26)	.80	312 (−409 to 1033)	.40
Somewhat or definitely disagree	0.17 (−0.08 to 0.42)	.18	394 (−357 to 1145)	.30
<b>By Race/Ethnicity<sup>c,d</sup></b>				
African American				
Somewhat agree	0.13 (−0.06 to 0.33)	.18	521 (−124 to 1165)	.11
Somewhat or definitely disagree	0.23 (0.02 to 0.44)	.03	695 (−14 to 1405)	.06
White or other				
Somewhat agree	0.09 (−0.34 to 0.52)	.68	480 (−1084 to 2044)	.55
Somewhat or definitely disagree	0.28 (−0.18 to 0.73)	.24	918 (−759 to 2596)	.28
<b>By Educational level<sup>c,d</sup></b>				
High school graduate				
Somewhat agree	0.22 (−0.01 to 0.44)	.06	675 (−105 to 1456)	.09
Somewhat or definitely disagree	0.46 (0.19 to 0.73)	.001	1205 (322 to 2089)	.008
Any college				
Somewhat agree	−0.03 (−0.33 to 0.26)	.82	256 (−691 to 1202)	.60
Somewhat or definitely disagree	0.02 (−0.27 to 0.31)	.88	290 (−705 to 1285)	.57
<b>By Health Insurance Type<sup>c,d</sup></b>				

"I prefer to leave decisions about my medical care up to my doctor"	Length of Stay, d		Total Hospitalization Costs, \$	
	AME (95% CI) <sup>a</sup>	P Value <sup>a</sup>	AME (95% CI) <sup>a</sup>	P Value <sup>a</sup>
Public or uninsured				
Somewhat agree	0.16 (−0.06 to 0.37)	.15	582 (−116 to 1279)	.10
Somewhat or definitely disagree	0.25 (0.02 to 0.48)	.04	640 (−126 to 1406)	.10
Private				
Somewhat agree	0.02 (−0.35 to 0.39)	.90	319 (−980 to 1618)	.63
Somewhat or definitely disagree	0.29 (−0.09 to 0.68)	.14	1364 (−4 to 2771)	.05
<b>By General Self-assessed Health Status<sup>c,d</sup></b>				
Fair or poor				
Somewhat agree	0.09 (−0.19 to 0.37)	.53	606 (−322 to 1534)	.20
Somewhat or definitely disagree	0.17 (−0.13 to 0.46)	.28	861 (−144 to 1865)	.09
Good				
Somewhat agree	0.31 (0.07 to 0.54)	.01	913 (89 to 1737)	.03
Somewhat or definitely disagree	0.54 (0.28 to 0.80)	<.001	1322 (422 to 2222)	.004

Abbreviation: Ellipsis, not applicable.

<sup>a</sup>The 95% CIs and *P* values were derived by the delta method after multiple imputations.

<sup>b</sup>For the total sample population, also controlled for in estimation were age, sex, race/ethnicity, educational level, health insurance type, general self-assessed health status, Charlson Comorbidity Index, 10 most frequent principal diagnoses, weekend admission, transfer from another health care facility or service, and admission year and month and attending physicians.

<sup>c</sup>In all estimations, *P* < .001 for association with *F* statistics (joint test of all coefficients).

<sup>d</sup>For each subgroup, all covariates except its own are controlled for in estimation.