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Abstract: Almost 20 percent of the total U.S. population and 42 percent of the population over the age of sixty-six are disabled. Research has shown that the presence of a disability can crowd out treatment for medical conditions not necessarily related to the disability and that states that are disproportionately African-American have a lower quality of hospital care. This paper uses quality of care data from the Centers for Medicare and Medicaid Services (CMS) to determine whether disability also explains state-level differences in quality of hospital care. The quality of Medicare beneficiary hospital care was measured using process measures for several medical conditions, including acute myocardial infarction, heart failure, stroke, and pneumonia, that are the leading causes of mortality. We use nonlinear least squares to assess the association between Medicare beneficiary quality of care and state- and medical system–level characteristics. The result for the key variable of interest—disability—reveals that a 1 percent increase in a state's disability rate leads to a 1 percentage point reduction in the score of the state's quality of hospital care. Without explicitly incorporating strategies to eliminate disparities in care incurred by people with disabilities, CMS may not adequately promote the goal of delivering the highest quality of care to all Medicare beneficiaries.

JEL classification: I11

Key words: disability, process measures, Medicare

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I. Introduction

There were 49.7 million people (19.3 percent of the population) with disabilities counted in the 2000 Census, including 14 million individuals aged 65 and older (42 percent). Reports suggest that the disability rates for those over the age of 65 are on a downward trend (Freedman et al. 2002), which bodes well for Medicare's long-run solvency. However, the increase in disability rates among the working age population (Bhattacharya et al. 2005), if permanent, does not. While the effect of disability on Medicare's solvency may be of second order as long as the growth rate in medical expenditures outpaces inflation (Skinner 2006), it is of significant policy concern for Medicare in terms of the quality of beneficiary medical care.

Containing the growth rate in health care expenditures is a key public policy issue. Policy strategies to slow the growth rate in health care expenditures have tended to focus on providers, or the supply side of medical care. However, the provider focus, particularly the use of financial incentives to reduce resource use, has raised public concerns that such health care cost containment strategies have contributed to the low quality of patient medical care (Armour et al 2001). In addition, the public health report, *Healthy People 2010*, documented underutilization of preventive medical services and numerous studies and reports have also identified unmet health care needs among the elderly as a cause of mortality and disability (AHRQ 2003). Making the quality of health care a national priority has been the focus of both a presidential commission (President's Advisory Commission 1998) and a panel from the Institute of Medicine (Chassin and Galvin 1998). The Department of Health and Human Services also sees improving quality, through the promotion of hospital competition and the increased transparency on

hospitals adherence to recommended processes of care, as a way to reduce the growth rate in healthcare expenditures.[1]

Ten years ago, the Centers for Medicare and Medicaid Services (CMS) created a national monitoring system that uses evidence-based process measures of clinical performance to assess the quality of care for Medicare beneficiaries in each state. The CMS data, which indicate the percentage of patients receiving the recommended process of care within each state, reveal distinct regional differences in the performances of the states, with the southern states, which have relatively large minority populations and a relatively large share of their population in poverty, ranking below the northern states (Jencks et al. 2000) (Figure 1). These regional differences have been attributed, in part, to racial disparities in the quality of care (Etchason et al., 2001). This is consistent with research that finds differences in demographic characteristics such as socioeconomic status and race contribute to disparities in health care outcomes (see Smedley et al. (2003) for an overview of the literature).

However, in addition to differences in the racial distribution and socioeconomic status, the southern states also have disproportionately larger disabled populations (Figure 2). Disability has long been viewed both as a potential adverse health outcome resulting from poor quality of care and as leading to higher costs of care. Recently, it has also been suggested that health care needs associated with the disabling medical condition might also crowd out the quality of overall health care among people with disabilities (Lawthers et al. 2003). In addition, the recent Surgeon General *Call to Action* suggests that the preventive healthcare needs of people with disabilities must be improved in order to promote their health and wellness (SGR 2005).

The goal of this research is to assess the association between the characteristics of a state's elderly population, the medical system and the quality of Medicare beneficiary inpatient care. In addition to information made available by the CMS's national monitoring system, data from the U.S. Census Bureau was used to determine whether disability prevalence is associated with the provision of a lower quality of hospital inpatient care, *ceteris paribus*.

II. Data

A. Hospital Inpatient Quality of Care Measures

The data used to measure the quality of Medicare beneficiary hospital inpatient care were obtained from CMS for the period 1997-1999.[2] In general, CMS chose to focus on four prevalent inpatient medical conditions that are among the leading causes of morbidity and mortality in the Medicare population. The conditions included acute myocardial infarction (AMI), heart failure (HF), stroke, and pneumonia (Jencks et al, 2000). Rather than focus on outcomes, such as mortality, which might take years to assess, CMS chose to focus on Medicare beneficiary process of care measures. These process measures, also referred to as quality indicators, are related to primary prevention, secondary prevention, or treatment. For all of these indicators there is both a professional consensus and scientific evidence that administering these processes of care will improve health outcomes. A description of the quality indicators used by CMS to assess inpatient quality of care and the sampling methods are shown in Table 1.[3]

CMS reviewed medical records for fee-for- service inpatients with AMI, HF, stroke, and pneumonia in each state to determine receipt of the recommended process, if appropriate, and ranked each state on each quality indicator (Jencks et al, 2000). In this

study, the CMS data are used to create a quality of care score that represents the percentage of Medicare beneficiaries with these conditions in each state that received the recommended care.

The state-level quality of care scores and regional means are reported in Table 2. The representative state adheres to recommended procedures less than two-thirds of the time. The Southern states Mississippi and Louisiana had the lowest quality of care scores of 59.06 percent and 59.50 percent, respectively, while the northeastern states New Hampshire and Maine had the two highest scores, with values of 71.22 percent and 70.29 percent, respectively.

B. Definition of Disability

Although the Census Bureau estimates that there were almost 50 million people with disabilities in 2000, other estimates suggest that there may be as many as 53 million people with disabilities in the United States (U.S. Census Bureau 2000). The lack of precision is, in part, attributable to competing definitions of disability. A search of federal statutory definitions of disability as contained in the United States Code reveals 67 acts or programs which define disability, with some but not full overlap in definition. Disability is, in part, ill defined because many federal programs attached to transfer payments are designed to be exclusive. For example, Social Security defines disability in terms of a physical or mental impairment that limits a person's ability to be employed. However, other programs that have no transfer payments attached use a more inclusive definition of disability. For example, the Americans with Disabilities Act (ADA) defines disability as a physical or mental impairment that substantially limits one or more major life activity, with no reference to the ability to work.[4] In addition to impairments, there are medical

conditions that one might intuitively associate with disability (e.g. person with a spinal cord injury who uses a wheel chair) and terms linked to physical functioning, mobility, and cognitive reasoning (e.g. activities of daily living and instrumental activities of daily living) that are used interchangeably with the term disability.

Nagi (1964) was among the first to delineate the difference between illness, a medical condition, impairment, and disability. He described how a medical condition (e.g. rheumatoid arthritis that inflames the joints) may lead to impairment (e.g. limited motion), that adversely affects functioning (e.g. the inability to type) and might result in a disability (e.g. the inability to do secretarial work). Subsequent work by Nagi (1965, 1976, and 1991), pointed out that work disability was but one dimension of disability and emphasized the importance of individual attributes and environment in affecting disability. Nagi's work was a cornerstone of the 1991 Institute of Medicine report that expanded the definition of disability to include the concepts of quality of life and secondary medical conditions. Secondary medical conditions, which are causally related to the primary disabling condition, include, among other things, weight problems, oral health problems, joint and muscle pain, and mobility problems, all of which are risk factors for many diseases that are prevalent among the Medicare population, including acute myocardial infarction, heart failure, and stroke.

Data on state-level disability rates for the population 65 years of age and older were obtained from the Census 2000 sf-3 files.[5] The U.S Census Bureau defines disability as either having a long-lasting vision or hearing impairment or a limitation in the ability to perform certain tasks. For the primary analysis in this study, the broadest definition of disability is used. Thus, an individual is considered to be disabled if they

have any one of the following disabilities: self-care, mental, sensory, difficulty going outside, or physical.[6] Self-care is defined as having difficulty dressing, bathing, or getting around inside the home; Mental disability is defined as having difficulty learning, remembering, or concentrating; Sensory disability is determined by whether the individual is blind, deaf, or has a severe vision or hearing impairment; Difficulty going outside implies that the individual cannot shop or visit a doctor's office on their own; and finally, an individual is deemed to have a physical disability if they have substantial limitations in their ability to walk, climb stairs, reach, lift or carry.

The sample means for all definitions of disability are included in Table 3. In general, the representative southern state has higher rates for all categories of disability relative to the states in other regions. The rate for physical disability (27.4%) is the highest, while self-care is the lowest (8.9%)

C. Population Characteristics

Population characteristics came from the U.S. Census Bureau, Census 2000, and information on Medicare Enrollment was obtained from the Medicare Enrollment Report for the year 2000. [7] The means for the population characteristics, at both the national and regional level, are presented in Table 3. The representative Southern state, in addition to having a larger disabled population relative to the representative state in other regions, has a larger share of their population who are black (16.7 percent) and in poverty (13.0 percent). The representative Western state has a larger share of their population that is Hispanic (6.1 percent) relative to the representative state in other regions. States in the Northeast have both higher levels and shares of their population covered by Medicare.

D. Medical System Characteristics

The number of general medical and surgical hospitals per 100,000 members of the population as well as the percentage of these hospitals operated for-profit, not-for profit, and government-administered were obtained from the 1997 Economic Census on Health Care and Social Assistance.[8] Data on the number of non-federal physicians and nurses per 100,000 members of the population in 1998 were obtained from the *Statistical Abstract of the United States, 2000*.

The means for the medical system characteristics are also reported at the national and regional level in Table 3. The representative state has 2.6 hospitals for every 100,000 persons. Although the Northeastern states have the least number of hospitals per capita, they have the greatest number of physicians and nurses per capita. The Midwestern states have the most hospitals per capita while the Western states have the fewest physicians and nurses per capita. The Western states have the highest share of hospitals operated by the government while the Southern states have the largest share of for-profit hospitals.

III. Empirical Analysis

The values for the dependent variable ranges from zero to one, thus a logistic transformation is used in order to avoid the possibility of having predicted values fall outside this range. Nonlinear least squares was used to estimate the parameters of the following regression equation for each separate quality indicator:

$$R_s = \frac{e^{X_s'B}}{1 + e^{X_s'B}} + \varepsilon_s \qquad (1)$$

R refers to the overall quality of hospital inpatient care score for state *s* and X includes the characteristics of the Medicare population and the medical system within state *s* that are deemed to be related to the quality of medical care for Medicare beneficiaries. The error term, ε_s, is assumed to be *i.i.d.* with a mean zero and unknown variance-covariance matrix (Gallant 1987).

A. Population Characteristics

The Medicare population characteristics include the percent disabled, percent African-American, percent Hispanic, and percent in poverty as well as the percent of the total population that is covered by Medicare and the level of Medicare enrollment.

There are several factors that affect the quality of care for people with disabilities and include transportation barriers, financial barriers, and medical care for the primary disabling condition crowding out preventive health care needs (see Lawthers et al. (2003) for a review of this literature). Thus it is expected that states with a higher share of disabled beneficiaries will have a lower quality of care.

The effect of racial, ethnic, and socioeconomic differences on the quality of health care, in terms of treatment and outcomes, has been well-documented (see the IOM report edited by Smedley et al. (2003) for a review of this literature). Recent evidence suggests that disparities in the quality of care between hospitals is problematic, whereas, disparities within hospitals is not. Skinner et al. (2005) found that quality of care, as measured by mortality, was lower for all patients in hospitals that disproportionately served African-Americans. Barnato at al. (2005) found that hospital effects explained more of the differential than race and dampened the negative effect of African-American on the quality of care, as measured by adherence to process of care measures. In

addition, Chandra and Skinner (2003) and Baiker et al. (2005) found that quality, also measured by adherence to process of care measures, is lower for all patients in geographic areas with large African-American populations.

There is no definitive explanation for racial disparities in care. However, possible explanations include differences in demand-side characteristics (e.g. consumer preferences, individual distrust of the system, and insurance status) and supply side issues (e.g. the inability to access care and provider bias and discontinuity of care (Carlisle 1997, Weddington et al. 1992, and Mayberry et al. 2000, Lillie-Blanton, Martinez, and Salganicoff 2001).

Medical providers may be reimbursed at a lower rate for Medicare patients than for privately insured patients (Boccuti and Moon 2003). Thus, increasing the number and/or share of total patients that are covered by Medicare might lead to medical care provider cost containment strategies that reduce the quality of patient care. Conversely, an IOM report on insurance coverage indicated that having a greater share of the population without insurance will lower the quality for all patients in the area. Thus the signs on these variables cannot be determined a priori.

B. Medical System Characteristics

State medical system characteristics include the distribution of ownership status of hospitals within each state, the number of hospitals per capita, and information on the number of physicians and nurses available to provide care.

There is no consensus in the theoretical literature on the effect of hospital ownership on quality. Arrow (1963) theorizes that market failure results in non-profits providing the most social benefit. Because non-profit hospitals do not as there name

suggests profit-maximize, they might be better able to address market failures brought about by information asymmetry and will thus be able to provide more appropriate levels of care (Kessler and McClellen 2002). However, there is concern that the lack of profit-maximization may lead to increases in consumer welfare that decrease social welfare (Newhouse 1970).

The empirical work on the relationship between hospital ownership and quality of care is also mixed. In their review of the literature, Devereaux et al (2002), found a positive association between hospital mortality rates and for-profit status. However, Keeler et al (1992), which measured quality in terms of diagnosis, therapeutic procedures, and mortality, along with Sloan et al. (1999, 2001) and Sloan and Taylor (1999), which measured quality in terms of outcomes such as survival, functional status, cognitive status, and living arrangements, found no statistical differences in health outcomes between for-profit and not-for profit hospitals but did find public hospitals to have a lower quality of care.

Another characteristic that could potentially affect hospital quality is the amount of competition. In general, hospital competition is viewed as resulting in more efficient production. However, given the concerns with asymmetric information and insurance coverage that arise in a hospital setting, it is unclear from a theoretical perspective whether hospital competition is welfare increasing or decreasing (Kessler and McClellan 2002).

The limited empirical evidence on hospital competition is also mixed. One line of research has found no significant relationship between competition and quality for hospitals (see Shortell and Hughes 1988, Ho and Hamilton (2000) and Mukamel,

Zwanzinger, and Tomaszewski 2001). However, the expansion of Health Maintenance Organizations (HMOs) appears to have changed this relationship. Kessler and McClellan (2002) found that mortality declined with competition in the early 1990s for states with above-median HMO penetration and Gowrisankaran and Town (2003) found that competition increased hospital quality of care, as measured by mortality rate, for HMO patients but resulted in reduced quality for Medicare patients under the prospective payment system.

There is a growing body of evidence that having more nurses in a hospital results in a higher quality of care. Higher nurse-to-patient ratios has been found to decrease mortality rates, pneumonia rates for surgical patients, and urinary tract infections, along with other nonfatal adverse outcomes, as well as reducing the length of hospital stays (see Stanton and Rutherford 2004 for an overview of this research). The effect of having more physicians available is not as clear, largely because the majority of physicians are not employed by hospitals. However, Baiker and Chandra (2004) find a negative correlation between adherence to process measures and the number of specialists in a state with an offsetting positive correlation between quality and the number of general practitioners.

IV. Results

The nonlinear least squares estimates of Equation 1 are presented in Table 4. There are two characteristics of the Medicare population that significantly influence the quality of the hospital inpatient care received. States with higher disability rates have a lower quality of inpatient care, with a one percentage point increase in the share of the population that is disabled resulting in a matching one percentage point decrease in the

quality of hospital inpatient care score. This suggests that, at the individual level, the health needs associated with the primary disabling condition crowds out the quality of care for other medical conditions. However, the data does not allow us to identify whether the effect is specific to disabled patients or whether all patients are adversely affected by having a larger disabled population.

The coefficient on the share of the population that is black is also negative. The marginal effect of a one percent increase in the percentage of a state's Medicare population that is black is to lower the quality of inpatient care by 0.37 percentage points.[9] This result also supports previous findings that state level differences in racial distribution most likely contribute to state level differences in the quality of medical care (Etchason et al. 2001, Chandra and Skinner 2003).

States with larger Medicare beneficiary populations, both in terms of levels and as a share of the overall population, have lower quality of care. [10] This indicates that the lost revenue effects due to lower reimbursement rates by Medicare may be resulting in a lower quality of care. The poverty rate for the older population does not significantly affect the quality of care, likely reflecting the homogeneity in insurance coverage across socioeconomic groups due to Medicare.

The characteristics of the medical system in the state are also found to influence the quality of care. Consistent with prior research, having more competition is associated with lower quality of care for fee-for-service patients, as is having a greater share of public hospitals. More nurses per capita are associated with a higher quality of care, while having more for-profit hospitals or more physicians does not significantly influence the quality of care.

A. Alternative Definitions of Disability

Given that disability is ill defined, we re-estimated the model using the individual components of the disability definition (self-care, mental, sensory, difficulty going outside, and physical). No matter the definition of disability used, a higher disability rate is significantly associated with a lower quality of care, with similar marginal effects for all definitions with one exception, self-care. Self-care has a marginal effect that is two and one-half times larger than the effects found using the other definitions of disability. The inability to care for one's self might be a proxy for the severity of one's disability; thus suggesting that the more limiting the disability the lower the overall quality of care.

V. Summary and Conclusions

We find that disability is a predictor of state level differences in the quality of inpatient medical care and suggest that without explicitly incorporating strategies to eliminate disparities in care incurred by people with disabilities or in areas with larger disabled populations, CMS may not adequately promote the goal of delivering the highest quality care to all Medicare beneficiaries. We are unable to determine if disparities in the quality of inpatient care occurs in all hospitals across the state or whether the quality of care is lower in hospitals that disproportionately treat people with disabilities. Facility level data that identifies patients with disabilities would allow for the quantification of the relationship between an individual's disability and the quality of care received by the patient and any potential spillover to other patients as well. If future work confirms that disability adversely affects the quality of care for the disabled individual, perhaps consideration could also be given to how lower quality of care affects the duration, permanence, and severity of the primary disabling condition. Furthermore, determining

how lower quality of care among people with disabilities might have contributed to the growth in health care expenditures through increased hospital admissions and lengths of stay, as well as increased probability of nursing home entry, is needed.
In addition, if the evidence is suggestive of negative externalities to other patients then hospital procedures, such as staffing needs for populations with a large disabled population, should be reviewed.

Overall, the Medicare beneficiary hospital inpatient quality of care score is approximately 67%. This seems surprising low, given that the recommended procedures are noninvasive, largely evidence based, and that none of the demand side factors are at play (i.e. patients are already hospitalized and any with contradictions for a particular process measure have been excluded).[11]

The Department of Health and Human Services has set a goal of changing the way the health care markets work in order to improve quality. This program, Value-Driven Health Care, focuses on encouraging employers, unions, and all levels of government to reduce asymmetric information through increased transparency about the cost and quality of health care. In particular, the availability of hospital specific information on the quality of care, measured by adherence to recommended procedures, might allow consumers to make better informed decisions about their health and thus, improve the quality of medical care. However, policy makers should note that the effectiveness of this initiative could be hampered if a disability limits Medicare beneficiary decision making. Thus, accommodations need to be made to ensure that individuals with disabilities can effectively utilize the information provided by this program.

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Figure 1. Medicare Inpatient Quality of Care Scores by State, 1997-1999.

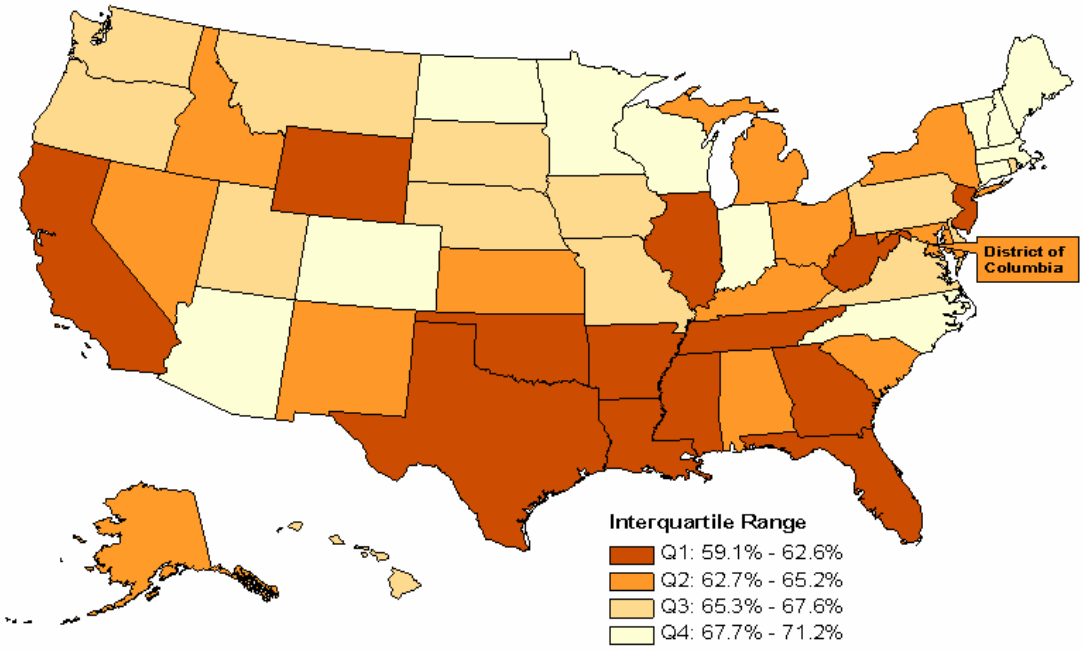

Figure 2. Disability Rates for Persons 65 Years of Age and Older by state, 2000.

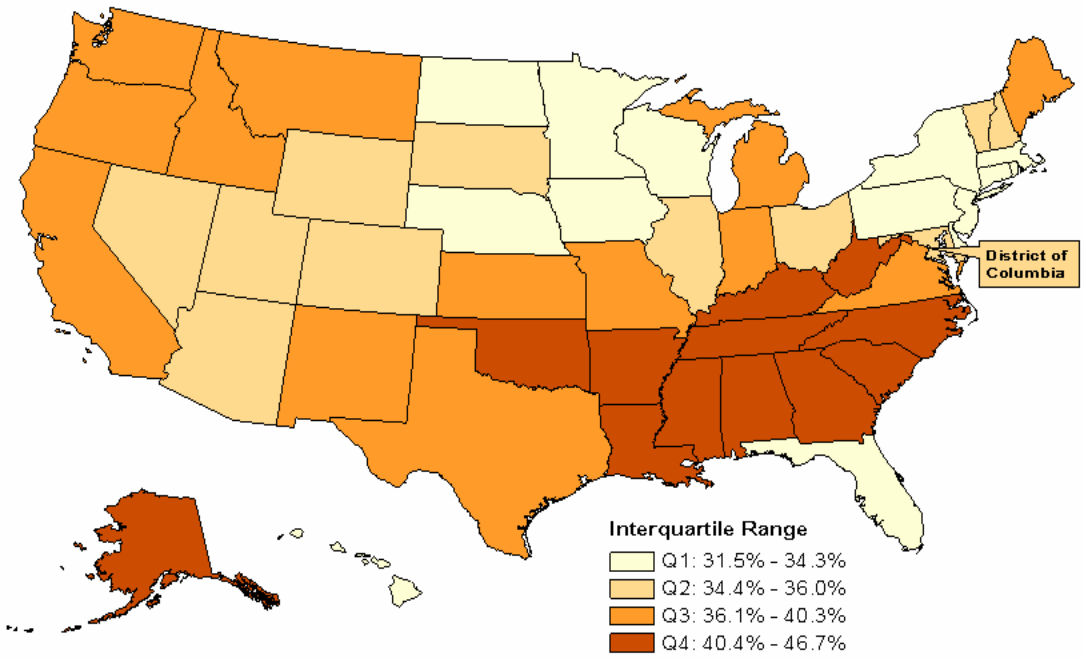

Table 1 - Medicare Beneficiary Inpatient Quality Indicators[a]

Clinical Topic	Quality Indicator	Sample Size
Acute myocardial Infarction	Admin. of Aspirin w/in 24 hours of Admission	Random sample of up to 750 records per state
	Aspirin prescribed at discharge	
	Admin. of Beta-blocker w/in 24 hours of Admission	
	Beta-Blocker prescribed at discharge	
	Ace-Inhibitor prescribed at discharge for patients with left ventricular ejection fraction <40%	
	Smoking cessation counseling given during hospitalization	
	Time to angioplasty[b]	
	Time to thrombolytic therapy[b]	
Heart Failure	Evaluation of left ventricular ejection fraction	Random sample of up to 800 records per state
	Ace-Inhibitor prescribed at discharge for patients with left ventricular ejection fraction <40%	
Stroke	Warfarin prescribed for patients with atrial fibrillation	Random sample of up to 750 records per state
	Antithrombotic prescribed at discharge for patients with acute stroke or transient ischemic attack	
	Avoidance of sublingual nifedipine for patients with acute stroke	
Pneumonia	Antibiotic w/in 8 hours of arrival at hospital	Random sample of up to 750 records per state
	Antibiotic consistent with current recommendations	
	Blood culture drawn if dome before antibiotic given	
	Patient screened or given influenza vaccine	
	Patient screened or given pneumoccoccal vaccine	

a. Jencks et al. (2000), These process measures were endorsed by a number of medical societies and colleges including the American Heart Association, the American College of Cardiology, the Infectious Disease Society of America, and the American Thoracic Society.

b. These categories were dropped due to no observations in some states and insufficient sample size in others.

Table 2 - State Level Scores and Regional Means by Category of Care[a]

Region/State	Score	Region/State	Score
Northeast Region	67.17 (3.33)	**Midwest Region**	66.07 (2.52)
Connecticut	68.72	Illinois	61.58
Maine	70.29	Indiana	67.70
Massachusetts	68.24	Iowa	67.40
New Hampshire	71.22	Kansas	62.66
New Jersey	61.00	Michigan	65.00
New York	63.58	Minnesota	69.39
Pennsylvania	66.74	Missouri	65.64
Rhode island	65.39	Nebraska	65.48
Vermont	69.37	North Dakota	69.09
		Ohio	63.97
		South Dakota	66.16
		Wisconsin	68.78
South Region	63.02 (2.69)	**West Region**	65.04 (2.19)
Alabama	62.87	Alaska	64.10
Arkansas	59.74	Arizona	67.93
Delaware	66.65	California	61.06
District of Columbia	63.87	Colorado	67.61
Florida	61.02	Hawaii	66.79
Georgia	61.46	Idaho	62.88
Kentucky	64.42	Montana	65.40
Louisiana	59.50	Nevada	63.22
Maryland	65.23	New Mexico	65.14
Mississippi	59.06	Oregon	65.78
North Carolina	67.99	Utah	65.72
Oklahoma	62.56	Washington	67.57
South Carolina	63.74	Wyoming	62.37
Tennessee	61.95		
Texas	61.57		
Virginia	67.53		
West Virginia	62.14		
United States	64.99 (3.02)		

a. Standard deviation in parentheses.

Table 3-Sample Means
By Region
(std. dev.)

Region	All	Northeast	South	Midwest	West
Variable	Mean (Std Dev)	Mean (Std Dev)	Mean (Std. Dev)	Mean (Std. Dev)	Mean (Std. Dev)
Medical System Characteristics					
Physicians Per Capita	234.2719 (83.4699)	304.0966 (60.2449)	241.4227 (119.5792)	213.3404 (24.8981)	195.9020 (34.8496)
Nurses Per Capita	853.7978 (178.0862)	974.4976 (126.3494)	821.4707 (194.1773)	932.3374 (101.6305)	740.0122 (170.7607)
Hospitals Per Capita	2.6461 (1.5899)	1.7634 (0.6916)	2.3580 (0.8307)	3.7372 (2.3223)	2.6269 (1.5676)
Share of Hospitals Owned by Government	0.3042 (0.1817)	0.1076 (0.0598)	0.2983 (0.1455)	0.3077 (0.1830)	0.4449 (0.1605)
Share of Hospitals Operating For a Profit	0.1117 (0.1119)	0.0182 (0.0252)	0.2143 (0.1092)	0.0407 (0.0392)	0.1080 (0.0890)
Population Characteristics					
Medicare Enrollment	759,781 (797,671)	904,078 (945,685)	815,012 (708,340)	769,433 (556,748)	578,750 (1,022,879)
Share of Population Who are on Medicare	0.1404 (0.0209)	0.1530 (0.0122)	0.1432 (0.0206)	0.1476 (0.0102)	0.1215 (0.0223)
Share Over age 65 Who are in Poverty	0.1000 (0.0298)	0.0896 (0.0151)	0.1296 (0.0303)	0.0865 (0.0130)	0.0809 (0.0167)
Share Over age 65 Who are Disabled	0.3719 (0.0389)	0.3411 (0.0168)	0.4048 (0.0410)	0.3480 (0.0226)	0.3722 (0.0245)
Sensory	0.1408 (0.0197)	0.1274 (0.0129)	0.1269 (0.0085)	0.1473 (0.0198)	0.1544 (0.0182)
Physical	0.2736 (0.0363)	0.2438 (0.0134)	0.2504 (0.0227)	0.3077 (0.0352)	0.2712 (0.0197)
Mental	0.1011 (0.0219)	0.0865 (0.0065)	0.0817 (0.0120)	0.01214 (0.0194)	0.1024 (0.0148)
Self-Care	0.0884 (0.0185)	0.0796 (0.0072)	0.0751 (0.0111)	0.1072 (0.0166)	0.0822 (0.0113)
Difficulty Going Outside	0.0189 (0.0261)	0.1768 (0.0164)	0.1724 (0.0155)	0.2148 (0.2123)	0.1791 (0.0199)
Share Over age 65 Who are Black	0.0765 (0.1104)	0.0394 (0.0389)	0.1669 (0.1508)	0.0423 (0.0385)	0.0156 (0.0157)
Share Over age 65 Who are Hispanic	0.0299 (0.0499)	0.0220 (0.0231)	0.0242 (0.0432)	0.0101 (0.0082)	0.0610 (0.0770)
Regional Dummy Variables					
South	0.3333 (0.4761)				

Midwest	0.2353 (0.4284)				
West	0.2549 (0.4401)				

Table 4
Nonlinear Least Squares Regression Results
(Dependent Variable: Quality of Care Score)

Variable	Coefficient (Std. Error)
Constant	1.2641*** (0.2594)
Medical System Characteristics	
Physicians Per 100,000	-0.0001 (0.0003)
Nurses Per 100,000	0.0002* (0.0001)
Hospitals Per 100,000	-0.0278** (0.0114)
Percent of Hospitals Owned by Government	-0.2218*** (0.0808)
Percent of Hospitals Operating For a Profit	-0.2067 (0.1628)
Population Characteristics	
Medicare Enrollment/100,000	-0.00603*** (0.00157)
Percent of Population Who are on Medicare	-1.0672* (0.5757)
Percent Over age 65 Who Are in Poverty	1.5395 (1.1366)
Percent Over age 65 Who are Disabled	-1.5060*** (0.5893)
Percent Over age 65 Who are Black	-0.5666* (0.3104)
Percent Over age 65 Who are Hispanic	-0.1751 (0.2351)
Regional Dummy Variables	
South	0.0299 (0.0737)
Midwest	0.0521 (0.0663)
West	0.0547 (0.0725)
£	
n	51

* Significant at the 90% confidence level. ** Significant at the 95% confidence level.

[1] The website for the U.S. Department of Health and Human Services Value-Driven Health care initiative can be found at http://www.hhs.gov/transparency/. (verified May 31, 2007)

[2] Centers for Medicare and Medicaid Services. Quality of Care-PRO Priorities: National Clinical Topics (Task 1).

[3] The data are limited to care received by fee-for-service Medicare patients. Thus the results may not be generalizable to the 15 percent of Medicare beneficiaries enrolled in managed care plans at the time the data was collected.

[4] This information is part of a report prepared by CESSI for the The Interagency Committee on Disability Research (http://www.icdr.us/documents/definitions.htm#table1). (Verified May 31, 2007)

[5] The state-level Medicare disability rate could not be used as it only includes disability rated for individuals under the age of 65.

[6] For the population over age 65, work limitation is not used as a definition of disability by the U.S . Census Bureau.

[7] U.S. Census Bureau; Census 2000, Summary File 3; generated using American FactFinder; <http://factfinder.census.gov>; (9 December 2005)

[8] The information from the 1997 Economic Census on Health Care and Social Assistance, Tables 1a and 1b for each state, is made available at the following web address: http://www.census.gov/epcd/www/97EC62.HTM (verified March 24, 2006).

[9] As a result of using the logistic transformation, the coefficients do not represent the true effect of the independent variables. The marginal effects are the average of the marginal effects estimated across the states.

[10] As a robustness check, the estimation was also performed using population level characteristics rather than the Medicare population characteristics. The results were very similar; with a noted exception being the population level disability rate was not significantly associated with quality of care.

[11] Although Jencks et al. (2003) found some improvements in a follow up study.