An Analysis of Total Medical Spending and Hospital Expenditures in the United States: The Effects of HMOs, Competition, and Aging

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Abstract: Real per capita hospital expenditures in the United States increased 41 percent from 1990 to 2002, while real per capita total medical expenditures increased 58 percent over that time period (1996 dollars, GDP deflator). This paper analyzes the determinants of these increases using panel data from all fifty states for 1990 to 1998, so that it may be easier to identify methods of controlling expenditures. The results show that hospital ownership, a measure of competition, is an important factor for both expenditures, as is real per capita income, aging, obesity, alcoholism, new drug approvals, and insurance coverage. HMO enrollment has a significant effect on real per capita hospital expenditures, but not total medical expenditures.

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I. Introduction

Real per capita total medical expenditures in the United States have increased by 58 percent from 1990 to 2002 (1996 dollars, GDP deflator). More recently, total medical expenditures have also experienced over eight percent growth in 2001 and 2002. This far exceeds GDP growth rates for those years, which were 3.17 and 3.37 percent, respectively (Bureau of Economic Analysis 2006; Centers for Medicare and Medicaid Services 2006). Hospital expenditures made up an average of 38 percent of total medical expenditures between 1990 and 2002, which was by far the largest sector of total medical expenditures. Real per capita hospital expenditures in the United States have increased by 41 percent over the thirteen-year span (1996 dollars, GDP deflator). Moreover, in 2001 and 2002 hospital expenditures also grew at rates of over eight percent (Centers for Medicare and Medicaid Services 2006).

With total medical spending in the U.S. at $1.56 trillion in 2004, it is not surprising that the debate over medical care expenditure includes a relatively large number of important issues. These issues include the effectiveness of HMOs and hospital competition in controlling costs, the effect of the uninsured on overall medical spending, and the impact of new drugs and differences in public health. Controlling medical expenditures has been an issue and various policies and programs have been implemented in an effort to resolve this. One attempt has been the use of managed care plans, such as HMOs. HMOs attempt to control costs through the often controversial use of utilization review. Utilization review is the review of how certain medical

services are requested and performed. HMOs either perform the review themselves or hire a third party specialist to do it for them. They attempt to ensure economic efficiency through pre-reviews, which are done before the patient even undergoes any procedures.

Many contend that in addition to utilization review, competition is an effective method for decreasing expenditures. Some previous studies have shown that investor ownership of hospitals can increase medical productivity; decreasing expenditures with virtually the same health outcomes. (Kessler and McClellan 2002, Geppert and Kessler 2005). While those studies look at individual hospital and patient independent variables, this paper studies the effects of a wider range of variables, outside the scope of what affects an individual hospital.

The goal of this study is to analyze the health, social, and economic factors that have caused the excessive increases in medical expenditures in recent years so that methods of controlling these expenditures can be more easily determined. Assuming medical care is a normal good, rises in per capita income may explain a sizeable portion of expenditure increases. However, many other factors will be considered. These factors include HMO enrollment and hospital competition, as well as public health factors (obesity, smoking, and alcoholism), aging (population 65 years and older), and health insurance coverage.

Vandegrift and Datta (2006) have found substantial evidence that public health factors affect prescription drug expenditures, a significant contributor to per capita total medical expenditures. They also find that population aging increases prescription drug expenditures, which is especially important to analyze with the “baby boomers” nearing the age of 65, as well as overall life expectancy at an all time high and still increasing (Nation’s Health 2006). These factors will be analyzed using panel data across fifty states over a period of thirteen years (1990-2002).

The paper is organized as follows: section II discusses background and previous studies; section III discusses the fixed effects regression model and sources of the data; and section IV discusses the results of the total medical expenditure and the hospital expenditure model. Section V concludes.

II. Literature Review

The rapid rise in per capita total medical expenditures creates cause for concern, as it becomes more and more difficult for the government, insurance companies, and other consumers of medical goods and services to finance these expenditures. However, Newhouse (1992) asserts that the rising medical expenditures are not cause for concern because it does not create that much welfare loss. He states that medical expenditures have been increasing at high rates for over fifty years. In Newhouse's study, he points out numerous causes for the increase in per capita total medical expenditures; however he does not empirically test their relationships with the increase in expenditures. He hypothesizes that an aging population, increased insurance, and increased income as important factors in accounting for the increase in medical expenditures.

The population of the United States has been aging rapidly. As the "baby boomers" begin to become senior citizens, the rate will continue to increase in the future. From 1960 – 2000, average life expectancy has increased seven years. However, each additional year comes at a higher medical cost (Nation's Health 2006). This suggests that per capita total medical expenditures are affected by the percentage of the population that is elderly.

Another aspect of Newhouse's explanation of the increase in medical expenditures is the spread of medical insurance. The increase in insurance has decreased the cost to consumers of medical care, driving up demand and increasing expenditures. Similarly, Thomasson (2006)

finds that the percentage of individuals who are insured affects the level of per capita total medical expenditures.

Increased incomes have also been a factor in increasing medical expenditures according to Newhouse. The increase in average income must be considered in the explanation of the increase in medical expenditures; however, medical expenditures have increased at a much higher rate than GDP has. Therefore, income can only account for a small portion of the increase in per capita total medical expenditures.

In an effort to "contain" medical costs, Newhouse mentions the impact of managed health care plans, of which the most common is an HMO. A health maintenance organization, or HMO, is a form of health insurance designed to decrease medical costs. Evidence suggests that, compared with patients who have indemnity insurance, individuals who enroll in an HMO have lower rates of hospitalization, inpatient diagnostic testing, elective surgery, and costly tests and procedures, shorter hospital stays, and lower medical care expenditures (Miller and Luft 1994). Also, Baker (1997) concludes that an increase in HMO market share in a given area is associated with a significant reduction in overall medical expenditures. A later revisit of this study finds that an increase in HMO market share resulted in the reduction of hospital expenditures (Batata 2004). However, another study indicates that an HMO does not guarantee a reduction in medical expenditures (Escarce et al. 2001).

The majority of current literature on hospital expenditures focuses on costs in individual hospitals rather than aggregate expenditures (Kessler and McClellan 2002, Tay 2003, Geppert and Kessler 2005). The factors that have caused increases in aggregate medical expenditures have been explored, as well as explanations of increasing prescription drug expenditures (Newhouse 2003, Vandegrift and Datta 2006).

Multiple recent studies have emphasized the importance of hospital competition in reducing the costs of hospitalization and increasing the quality of hospital care (Geppert and Kessler 2005, Tay 2003). Geppert and Kessler find that hospital competition is welfare-enhancing, insofar as it decreases expenditures and it outcome-beneficial. In an earlier study, Kessler and McClellan (2002) stress the importance of hospital ownership on expenditures. They find that for-profit hospitals spend significantly less than others and have virtually the same patient outcomes.

Additionally, public health factors, such as obesity, have been shown to have an effect on medical expenditures (Vandegrift and Datta 2006). Obesity has been increasing at extremely high rates in the United States in recent years, and is associated with high medical, psychological, and social costs (Nestle and Jacobsen 2002). Numerous studies point to the rise in obesity rates to explain a large percentage of the increase in medical expenditures (Strum 2002, Finkelstein et al. 2003, Thorpe et al. 2004). Strum also finds that problem drinking and smoking have a significant effect on increasing expenditures.

The introduction of new drugs to the pharmaceutical market has been shown to increase prescription drug expenditures (Vandegrift and Datta 2006). Prescription drug expenditures, like per capita hospital expenditures, make up a significant part of per capita total medical expenditures. Therefore, the introduction of new drugs may also have a significant effect on medical expenditures.

III. Data and Methods

In order to identify the determinants of per capita total medical expenditures and per-capita hospital expenditures, we will employ a fixed-effects panel data model. The fixed-effects

model assumes that time-invariant differences across states are captured by differences in the constant term (α_i). Equations for the models are as follows:

(1) $MedExp_{it} = X'_{it}\,\delta + \alpha_i + u_{it}$

(2) $HospExp_{it} = X'_{it}\,\delta + \alpha_i + u_{it}$

where $MedExp_{it}$ represents real per capita total medical expenditures; $HospExp_{it}$ represents real per-capita hospital expenditures; X'_{it} is a vector of explanatory variables; α_i the time-invariant, unobserved state effects; and u_{it} is the transitory error term that varies across states and time-periods. In both equations (1) and (2), *i* indexes states and *t* indexes year.

Based on the discussion from the previous section, we regressed real per capita total medical expenditures (MedExp) and per capita hospital expenditures (HospExp) on real per capita income in thousands of 1996 dollars (Income), percentage of the total population over 65 years of age (65+ Years), percentage of the total population enrolled in an HMO (HMO), percentage of the population over 18 years of age that smokes (Smoke), percentage of the population over 18 years of age that is obese (Obese), percentage of the population over 18 years of age that classified as a chronic drinker (Alcohol), and percentage of the total population that is uninsured (Uninsured).

Creating a variable to measure hospital competition was less straightforward. It is important not to simply measure the number of hospitals in a given area, as Tay (2003) points out that geographic market concentration is not an appropriate measure of hospital competitiveness. In order to measure the level of competition amongst hospitals, I observed the type of ownership of each hospital in each state. Investor-owned hospitals are inclined to be more competitive than state and local government owned hospitals and not-for-profit hospitals because the private investors are attempting to make money through the hospital, whereas the

ownership of government and not-for-profit hospitals are less motivated to compete. The level of competition is then best measured by the percentage of all hospitals that are investor-owned (HospOwn).

The introduction of new drugs can be measured using FDA approvals of new molecular entities (NME). However, the effect of an FDA approval of a new drug may not be felt in the market immediately. Vandegrift and Datta (2006) find that they have a stronger effect on prescription drug expenditures two years after their approval. Therefore, per capita total medical expenditures will also be regressed on a two year lagged variable of new molecular entities.

Per capita hospital expenditures will also be regressed on NMEs, both with no lag and with a two year lag. However, per capita hospital expenditures are expected to decrease with the introduction of new drugs, because the new technology may allow patients who would have been hospitalized a few years earlier to be treated with prescription drug medication rather than hospitalization. This tradeoff may be expected to cause per capita total medical expenditures to be unaffected by NMEs, as prescription drugs are simply substituted for hospitalization.

The effect on per capita total medical expenditures and per capita hospital expenditures is expected to be similar for every variable except NME. An increase in the Income, 65+ Years, Smoke, Obese, and Alcohol variables is expected to cause an increase in per capita total medical expenditures and per capita hospital expenditures. An increase in the HospOwn, HMO, and Uninsured variables, however, should be associated with a decrease in both of the dependent variables. Increased competition is expected to cause competitive pricing, which would decrease expenditures. The purpose of an HMO is to manage the medical care options of its enrollees to decrease expenditures. Finally, uninsured individuals are likely to spend less on medical expenses than those who are insured.

Data for the study was collected from the Centers for Medicare and Medicaid Services website (per capita total medical expenditures and per capita hospital expenditures), *The Statistical Abstract of the U.S.* (per capita income and percentage of the population over 65), and the Census Bureau (percentage of population with insurance coverage). Real per capita total medical expenditures, real per capita hospital expenditures, and real per capita income are in 1996 dollars, converted using the GDP deflator, and include both public and private spending. The American Hospital Association provided hospital ownership data.

HMO enrollment rates were collected from Inter-study Competitive Edge *HMO Industry Report*. The Centers for Disease Control and Prevention's Behavioral Risk Factor Surveillance System supplied the data on smoking, chronic drinking, and obesity rates. Obesity is based on Body Mass Index (BMI) where BMI is weight in kilograms divided by height in meters squared. An individual with a BMI of thirty or higher is considered obese. The U.S. Food and Drug Administration Center for Drug Evaluation and Research provided data on new molecular entities.

The data contains annual observations for each of the fifty states in the U.S. from 1990 to 2002. Hence the panel data is made up of fifty cross sections and thirteen years. Per capita total medical expenditures increased steadily from 1990 to 2002, however there was also substantial variety among cross sections. Nominal per-capita total medical expenditures in for 2002 ranged from Massachusetts ($6037.71), New York ($5697.58), and Connecticut ($5674.21) on the high end, to Arizona ($3665.16), Idaho ($3615.36), and Utah ($3565.47) on the low end. Per-capita hospital expenditures were similarly distributed across states. The largest spenders in 2002 were North Dakota ($2569.25), Alaska ($2304.29), and Massachusetts ($2284.63), while the lowest per-capita hospital expenditures were in Utah ($1297.55), Idaho ($1287.69), and Arizona

($1283.48). Definitions for each of the dependent and independent variables can be found in Table 1, along with their means, standard deviations, maximum and minimum values. The District of Columbia is excluded because estimates of its HMO enrollment are not reliable.

IV. Discussion of Results

Tables 2 and 3 display the results of the fixed-effects regressions. Table 2 shows the effects of percentage of HMO enrollment rates, percentage of investor-owned hospitals, real per-capita income, percentage of the population over 65 years of age, smoking rates, obesity rates, chronic drinking rates, percentage of he population uninsured, and new drug approvals (NMEs) on real per capita total medical expenditures. Table 3 shows the effects of the same independent variables on real per-capita hospital expenditures.

While Vandegrift and Datta (2006) find that a two-year lagged NME had a strong effect on prescription drug expenditures, we find that contemporary new drug approvals (rather than lagged approvals) show a significant effect on real per-capita hospital expenditures and real per capita total medical expenditures. For this reason, the contemporary NME models will be used for the purposes of this discussion. The results show, however, that there is little difference between the two regressions on the other parameter estimates.

An increase in NMEs causes an increase in both per-capita hospital and total medical expenditures. An additional new drug approval raises per-capita total medical spending by $2.25 and per-capita medical expenditures by $0.90. Thus, one new drug approval raises total spending only 0.07% and hospital spending by 0.07%. In a typical year about 30 new drugs are approved. Thus, new drugs account for about a 2.1% increase in per-capita medical and hospital expenditures. The results also suggest that new drugs are complements for hospital care and not

substitutes. The introduction of a new drug may make some conditions treatable for hospitals that were not treatable before the drug was approved.

HMO enrollment shows a significant effect on real per capita hospital expenditures, but not on real per capita total medical expenditures. A one percentage-point increase in HMO enrollments will reduce per-capita hospital spending by about $3 (or about 0.2%). The "managed care" policy of HMOs require their members to obtain approved referrals before undergoing many procedures at hospitals that non-HMO enrollees might choose have on their own, such as some surgical procedures and diagnostic tests (Escarce et al. 2001). A likely explanation for the difference in results between the two dependent variables is that HMOs are effective in decreasing per-capita hospital expenditures by replacing hospitalization with alternate forms of treatment. However, the hospitalization savings are eliminated by more intensive use of other forms of health care.

Hospital ownership had a significant effect on both per-capita total medical expenditures and per capita hospital expenditures. An increase in the percentage of hospitals that are investor-owned (for-profit) hospitals creates an increase in competition among hospitals. An increase in competition by one percentage point of for-profit hospitals decreases per-capita total medical expenditures by approximately $12 (about 0.4%), and per-capita hospital expenditures by about $3 (about 0.2%). Because an increase in investor-owned hospitals decreases hospital expenditures without increasing overall medical expenditures, we may conclude that competition increases medical productivity. If the quality of healthcare declined with this decrease in expenditures, there would most likely be an increase in other medical expenditures with an increase in competition. This fact implies that hospital competition is overall welfare enhancing.

Increases in real per-capita income are expected to cause increases in real per-capita total

medical expenditures and real per-capita hospital expenditures because medical care and hospital care are most likely normal goods. A substantial amount of the rise in real per-capita total medical expenditures and real per capita hospital expenditures over the thirteen-year period is explained by the rise of real per-capita income. A one thousand dollar increase in real per-capita income results in a $103 increase in real per-capita total medical expenditures, as well as a $20 increase in real per capita hospital expenditures. Thus a one thousand dollar increase in real per-capita income causes a 3.1% increase in real per-capita total medical expenditures, and a 1.5% increase in real per-capita hospital expenditures. Overall medical spending may be more sensitive to income than hospital spending because hospital expenditures are less discretionary than overall medical spending.

Another variable that had a significant effect on real per-capita total medical expenditures and real per-capita hospital expenditures is the percentage of the population that is 65 years of age or over. Population aging shows a large positive effect on both total medical and hospital spending. A one percentage-point increase in the percentage of the population that is 65 or older results in a $212 increase in per-capita overall medical spending (about 6.5%), and a $72 increase in per-capita hospital spending (about 5.5%).

Turning to public health factors, both obesity and chronic drinking have significant positive effects on real per-capita hospital expenditures and real per-capita total medical expenditures. The percentage of the population that smokes has no effect on expenditures. It is still possible that smoking does increase medical expenditures, but it may take many years before it has an impact. Obesity is associated with many severe health consequences, including a variety of cardiovascular disorders and other diseases that require hospitalization or intensive medical care, which could explain their effect on per capita hospital and medical expenditures

(Must et al. 1999). A one percentage point increase in the obese population causes a $57 increase (about 1.7%) in total per-capita medical spending and a $22 increase (about 1.7%) in per-capita hospital spending.

Chronic drinking is also associated with a variety of health risks, which causes an increase in per-capita expenditures. A one percentage-point increase in the population classified as a chronic drinker results in a $58 increase in real per-capita total medical expenditures, and a $18 increase in real per-capita hospital expenditures. Thus, a one percentage-point increase in the number of chronic drinkers raises total spending only 1.7% and hospital spending by 1.4%.

The percentage of the population that is uninsured has a significant effect on both real per-capita total medical expenditures and real per-capita hospital expenditures, but their effect is not consistent with predictions from previous studies. The spread of insurance was expected to increase medical expenditures. However, an increase in the uninsured portion of the population by one percentage point causes an increase of $9 in per-capita total medical spending (about 0.25%) and an increase of $8 in per-capita hospital spending (about 0.6%). Because hospital spending is included in total medical spending, we may conclude that nearly all of the impact of the uninsured on costs is hospital costs. One possible explanation is that other medical costs are more discretionary than hospitalization.

As noted above, a larger uninsured population raises rather than lowers overall medical and hospital expenditures. This suggests a number of possibilities. One, the uninsured population as a whole may be sicker than the insured population, and hence requires medical care that is more extensive. Two, uninsured individuals wait longer than insured individuals would wait to treat their conditions, hoping it will subside and they will not have to pay for medical care. This causes many conditions to worsen, forcing the uninsured to be hospitalized more frequently, and

subsequently spend more on medical care. It is also possible that insurance companies get a discount on hospitalization and other medical care expenses, which is greater than the increase in demand for these services caused by the spread of medical insurance.

It is unlikely, however, that having insurance coverage does not increase demand for medical goods and services. Since the price of medical care decreases for a patient if he or she has insurance, demand should increase since it has been shown by this study that medical care and hospitalization are normal goods. Therefore, the results may still be consistent with parts of current literature which suggest that the spread of insurance has increased demand.

V. Conclusion

Real per-capita total medical expenditures and real per-capita hospital expenditures in the United States have increased 58 and 41 percent, respectively, from 1990 to 2002. This paper examines the factors that have caused these increases so that it may be easier to identify methods of controlling expenditures. The results show that an important determinant of real per-capita hospital expenditures is HMO enrollments. This variable does not, however, affect per-capita total medical expenditures. This implies HMOs are effective in reducing hospitalization for their enrollees; however the reduction in hospitalization costs is offset by whichever alternative form of medical care that replaces hospitalization.

The results also show that the percentage of investor-owned (for-profit) hospitals is a significant determinant of total medical expenditures and hospital expenditures. This suggests that competition reduces hospital spending without detrimental effects to patient outcomes, since other forms of medical care spending do not increase. Although the measured variable is not a direct measure of competition, the presence of for-profit hospitals undeniably reduces total

medical care spending. This is consistent with previous studies, which show that increasing concentration of investor-owned hospitals is welfare enhancing.

The effect of aging is significant on both per-capita total medical expenditures and per-capita hospital expenditures. The 65-and-older population require more medical care and hospitalization on average than the rest of the population. This will be an important variable to observe as the "baby boomers" begin reach old age. The rate at which the population will hit 65 years of age is expected to increase rapidly in the near future. The results of this study imply that this increase will be accompanied by sizeable increases in medical expenditures.

Similarly, obesity and chronic drinking are significant determinants of real per-capita hospital expenditures and real per-capita total medical expenditures. Increases in these public health indicators cause increases in expenditures. Chronic drinking and obesity are both associated with a variety of health risks, so it is logical that a decrease in either of those variables can cause a reduction in hospital and medical care costs.

Another determinant of both hospital and total medical spending is contemporary new drug approvals (NMEs). The approval of new types of medication has a more immediate impact on hospital expenditures than prescription drug expenditures, which take approximately two years to be affected by NMEs. Since hospital expenditures make up a much larger portion of total medical expenditures, it makes sense that contemporary NMEs have a stronger effect on total medical expenditures than NMEs with a two year lag.

Finally, increases in real per-capita income played a significant role in the increases in real per capita total medical expenditures and real per capita hospital expenditures. This confirms that these expenditures are normal goods. One unexpected result was the effect of insurance. As the percentage of the population that is uninsured increases, total medical and per

capita hospital expenditures increase. Possible explanations include that the uninsured population is “sicker” than the insured population; uninsured individuals wait longer to have conditions treated, causing them to worsen; or that insurance companies spend less for the same medical care as an uninsured consumer.

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Table 1. Descriptive Statistics

Variable	Mean	Standard Deviation	Minimum	Maximum
MedExp	3361.47	609.40	1962.10	5438.80
HospExp	1317.15	224.15	746.87	2314.39
HMO	17.71	12.41	0	54.2
HospOwn	11.62	11.49	0	47.52
Income	23.71	5.11	13.09	42.92
65+ Years	12.63	2.00	3.98	18.56
Smoke	23.19	2.95	12.8	32.6
Obese	16.54	3.98	6.9	27.5
Alcohol	3.75	1.37	1.2	8.7
Uninsured	13.80	4.04	2.1	25.8
NME	29.92	8.08	22	53
NME (-2)	29.00	8.84	18	53

$MedExp_{it}$: Real per-capita total medical expenditures (1996 Dollars) for state i in year t.
$HospExp_{it}$: Real per-capita hospital expenditures (1996 Dollars) for state i in year t.
$HospOwn_{it}$: Percentage of hospitals that are investor-owned (for-profit) for state i in year t.
$Income_{it}$: Real per-capita income (thousands of 1996 Dollars) for state i in year t.
$65+\ Years_{it}$: Percentage of the total population 65 years and older for state i in year t.
HMO_{it}: Percentage of the total population enrolled in an HMO for state i in year t.
$Smoke_{it}$: Percentage of the population 18 years and older that smoke for state i in year t.
$Obese_{it}$: Percentage of the population 18 years and older that is obese (BMI $\geq$ 30) for state i in year t.
$Alcohol_{it}$: Percentage of the population 18 years and older that is a chronic drinker for state i in year t.
$Uninsured_{it}$: Percentage of the total population uninsured for state i in year t.
NME_{t}: Number of new molecular entities approved by the FDA in year t.
$NME(-2)_{t}$: Number of new molecular entities approved by the FDA in year t-2.

Table 2. Fixed Effects Regression Results for Real per-capita total medical expenditures

	Per-Capita Total Medical Expenditures	Per-Capita Total Medical Expenditures
Variable	Contemporary NME	2-Year Lagged NME
HMO	-0.511	0.466
	(1.548)	(1.529)
HospOwn	-12.599***	-11.788***
	(2.868)	(2.868)
Income	103.377***	103.024***
	(7.317)	(7.554)
65+ Years	211.529***	217.155***
	(24.856)	(25.042)
Smoke	-8.023	-5.433
	(5.395)	(5.321)
Obese	56.801***	57.465***
	(4.256)	(4.284)
Alcohol	57.620***	52.658***
	(9.201)	(9.259)
Uninsured	8.759**	9.494**
	(3.899)	(3.952)
NME	2.246**	
	(0.900)	
NME (-2)		-0.291
		(0.949)
N	650	650
R2 (group effects only)	0.51	0.52
R2 (*X* effects only)	0.89	0.88
R2 Overall	0.65	0.65
F value	491.44***	485.54***

Dependent variable: $MedExp_{it}$ = Real per capita total medical expenditures (1996 dollars) for state i in year t. Standard errors in parentheses.

*** = significant at 0.01, ** = significant at 0.05, * = significant at 0.1.

Table 3. Fixed-Effects Regression Results for Real per capita hospital expenditures

	Per-Capita Hospital Expenditures	Per-Capita Hospital Expenditures
Variable	Contemporary NME	2-Year Lagged NME
HMO	-3.304***	-2.950***
	(0.717)	(0.707)
HospOwn	-3.181**	-2.869**
	(1.329)	(1.327)
Income	19.604***	19.141***
	(3.389)	(3.494)
65+ Years	72.281***	74.089***
	(11.512)	(11.584)
Smoke	-2.648	-1.581
	(2.499)	(2.461)
Obese	21.776***	21.986***
	(1.971)	(1.982)
Alcohol	17.716***	16.044***
	(4.261)	(4.283)
Uninsured	7.729***	7.925***
	(1.806)	(1.828)
NME	0.907**	
	(0.417)	
NME (-2)		0.056
		(0.439)
N	650	650
R2 (group effects only)	0.71	0.71
R2 (*X* effects only)	0.18	0.17
R2 Overall	0.33	0.33
F value	155.70***	153.90***

Dependent variable: $HospExp_{it}$ = Real per capita total medical expenditures (1996 dollars) for state i in year t. Standard errors in parentheses.

*** = significant at 0.01, ** = significant at 0.05, * = significant at 0.1.