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☞ Details: Informational hearing to discuss GAO report 05-856 and health care cost, quality and access in Southeastern Wisconsin. Hearing held in Milwaukee, Wisconsin on April 11, 2006.

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Senate

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Select Committee on Health Care Reform...

COMMITTEE NOTICES ...

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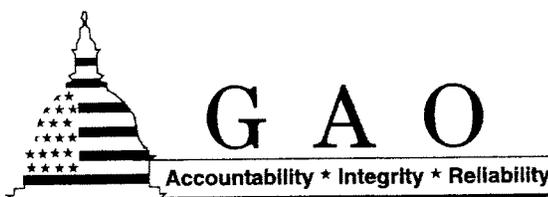
GAO

Report to the Honorable Paul Ryan,
House of Representatives

August 2005

**FEDERAL
EMPLOYEES
HEALTH BENEFITS
PROGRAM**

Competition and
Other Factors Linked
to Wide Variation in
Health Care Prices





Highlights of GAO-05-856, a report to the Honorable Paul Ryan, House of Representatives

FEDERAL EMPLOYEES HEALTH BENEFITS PROGRAM

Competition and Other Factors Linked to Wide Variation in Health Care Prices

Why GAO Did This Study

Congress is concerned about the health care spending burden facing the Federal Employees Health Benefits Program (FEHBP), the largest private health insurance program in the country. Health care spending per person varies geographically, and the underlying causes for the spending variation have not been fully explored. Understanding market forces and other factors that may influence health care spending may contribute to efforts to moderate health care spending.

Health care spending varies across the country due to differences in its components, the utilization and price of health care services. A wide body of research describes extensive geographic variation in utilization. However, less is known about private sector geographic variation in prices.

This report examined prices and spending in FEHBP Preferred Provider Organizations (PPOs) to determine (1) the extent to which hospital and physician prices varied geographically, (2) which factors were associated with geographic variation in hospital and physician prices, and (3) the extent to which hospital and physician price variation contributed to geographic variation in spending.

We analyzed claims data from several large national PPOs participating in FEHBP. We used 2001 data, the most current data available at the time of the study.

www.gao.gov/cgi-bin/getrpt?GAO-05-856.

To view the full product, including the scope and methodology, click on the link above. For more information, contact A. Bruce Steinwald, (202) 512-7101 or steinwalda@gao.gov.

What GAO Found

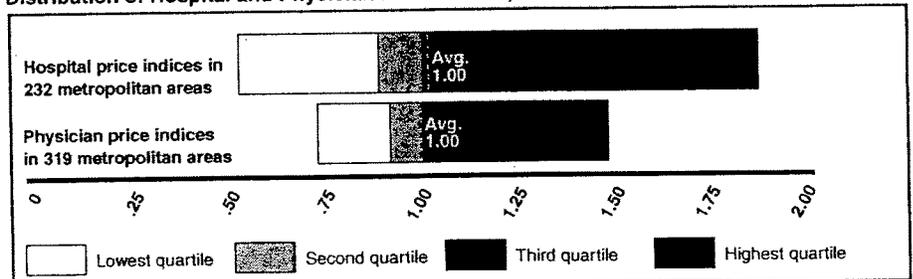
FEHBP PPOs paid substantially different prices for hospital inpatient and physician services across metropolitan areas in the United States. Hospital prices varied by 259 percent and physician prices varied by about 100 percent across metropolitan areas. While there were some areas with very high or low prices, most had prices that were closer to the average.

The variation in prices appeared to be affected by market characteristics. Metropolitan areas with the least competition, areas with a higher percentage of hospital beds in the two largest hospitals or hospital networks, had hospital prices that were 18 percent higher and physician prices that were 11 percent higher than areas with the most competition. The percent of primary care physicians' reimbursement that was paid on a capitation basis in health maintenance organizations (HMO), a proxy for HMO price bargaining leverage, was also associated with geographic variation in prices. Metropolitan areas with the least HMO capitation tended to have hospital and physician prices that were about 10 percent higher than areas with the most HMO capitation. When GAO controlled for other factors that might be associated with geographic variation in prices, more hospital competition and HMO capitation were still associated with lower prices, but the effect was reduced. GAO did not find any evidence that price variation was due to cost shifting, where providers raise private sector prices to compensate for lower prices from other payers.

Total health care spending per enrollee varied by over 100 percent across metropolitan areas. For hospital and physician services, price contributed to about one-third and utilization to about two-thirds of the variation in spending between metropolitan areas in the highest and lowest spending quartiles. Higher physician prices were also associated with lower physician utilization, but higher prices were still typical in higher spending areas.

The Office of Personnel Management provided comments on a draft of this report and agreed with our findings.

Distribution of Hospital and Physician Price Indices, 2001



Source: GAO analysis of FEHBP data.

Note: GAO converted prices to an index by dividing the average price in a metropolitan area by the average price in all study metropolitan areas.

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Abbreviations

APR-DRG	All Patient Refined/Diagnosis Related Group
FEHBP	Federal Employees Health Benefits Program
GPCI	Geographic Practice Cost Index
HMO	Health Maintenance Organization
OPM	Office of Personnel Management
PPO	Preferred Provider Organization

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United States Government Accountability Office
Washington, DC 20548

August 15, 2005

The Honorable Paul Ryan
House of Representatives

Dear Mr. Ryan:

Congress is concerned about the health care spending burden facing the Federal Employees Health Benefits Program (FEHBP), the largest private health insurance program in the country. Previous research has shown that health care spending varies geographically, but has not fully explored the underlying causes. A better understanding of market and other forces that may influence health care spending could assist efforts to moderate health care spending.

Geographic differences in health care spending are due to differences in utilization—the amount and type of health services used—and price—the amount paid to physicians, hospitals, and other providers. Most of the geographic variations research has focused on the utilization of services. However, less is known about the variation in prices, factors that affect price variation, or how price variation contributes to spending variation.

You asked us to analyze geographic variation in prices and spending in FEHBP. In August 2004, we provided you with an interim report about how hospital and physician prices and spending in FEHBP Preferred Provider Organizations (PPO)¹ in Milwaukee compared to other metropolitan areas.² In this report, we have expanded that analysis to include geographic variation in prices and spending in metropolitan areas³ throughout the United States. This final report examines prices and spending in FEHBP PPOs to determine: (1) the extent to which hospital

¹PPOs in our study refer to fee-for-service plans with preferred provider networks. PPOs generally allow enrollees to obtain care from any provider, but charge enrollees less if they obtain care from the plans' networks of preferred providers.

²GAO, *Milwaukee Health Care Spending Compared to Other Metropolitan Areas: Geographic Variation in Spending for Enrollees in the Federal Employees Health Benefits Program*, GAO-04-1000R (Washington, D.C.: Aug. 18, 2004).

³A metropolitan area refers to a metropolitan statistical area, which the Office of Management and Budget defines as a core population of at least 50,000 people with adjacent communities linked socially and economically with that core.

and physician prices varied geographically, (2) which factors were associated with geographic variation in hospital and physician prices, and (3) the extent to which hospital and physician price variation contributed to geographic variation in spending.

To estimate the extent to which hospital and physician prices varied geographically, we analyzed health claims data from several large national insurers participating in FEHBP in 2001, all of which were PPOs.⁴ These 2001 data were the most recent that were available at the time we began our study. We grouped all claims by the metropolitan area where care was delivered. For hospital and physician prices, we removed the effect of geographic differences in the costs of doing business (such as wages and rents) and the mix of services provided, using the same methodology Medicare uses to geographically adjust payments for hospital stays and physician services with some modifications.⁵ We then computed an average adjusted price for hospital stays and an average adjusted price for physician services for each metropolitan area in our study.⁶ Finally, we created hospital and physician price indices that showed how prices in each metropolitan area compared to the average of all the metropolitan areas in our study. The average value for each index was set at 1.00.

To determine which factors might be associated with geographic differences in price, we examined the relationship between price and indicators of market competition, health maintenance organization (HMO) price bargaining leverage, and cost-shifting pressures for each metropolitan area.⁷ To measure competition among hospitals for each metropolitan area, we estimated the percentage of beds in the two largest hospitals or hospital networks as a percent of all acute care hospital beds in the metropolitan area.⁸ The larger the share of the hospital service

⁴Price throughout this report includes both the amount the PPO pays directly and the amount the enrollee is obligated to pay through deductibles and coinsurance.

⁵See app. I for a description of how we adjusted prices.

⁶We had a sufficient volume of hospital stays to analyze hospital prices in 232 metropolitan areas, and we had a sufficient volume of physician services to analyze physician prices in 319 metropolitan areas.

⁷See app. I for a description of all of our data measures and sources.

⁸Hospital networks were defined by the vendor supplying the data, Verispan, L.L.C., as an affiliation between three or more health care organizations, at least one of which is a hospital, with a unified marketing strategy. Where one or both of the two largest hospitals was not affiliated with a network, the percentage of beds in the hospital was used instead of the percentage of beds in a network.

market controlled by a few providers, the greater the likelihood that insurers will have to contract with those providers to ensure enrollee access to care. We used hospital competition as a proxy for physician competition because many physicians are affiliated with hospitals and hospital networks. We also measured the percent of primary care physician compensation from HMOs that was capitated.⁹ Because physicians generally prefer fee-for-service to capitation payments, the use of capitation by HMOs demonstrates that they have the leverage to negotiate capitation contracts with physicians. Therefore, we used HMO capitation as a proxy measure for the strength of HMO presence in a community, and HMOs' ability to negotiate prices with physicians, hospitals, and other providers. We also developed indicators of cost shifting—hospitals and physicians charging higher prices to privately insured patients to compensate for lower payments from other patients. For each metropolitan area, we estimated the proportions of the population who were without insurance or who were enrolled in Medicare or Medicaid.¹⁰ We also estimated average physician Medicaid payment rates in each metropolitan area based on Medicaid rates for 29 common procedures.¹¹ We examined the relationships of these variables to our hospital and physician price variables.

To examine how prices affected spending, we computed the average spending for all covered health care services per enrollee for each metropolitan area, excluding pharmaceuticals, mental health services, and chemical dependency services.¹² We adjusted total spending per enrollee, hospital spending, and physician spending, for differences in the costs of doing business and for differences in the age and sex of the enrollees in each metropolitan area. We calculated the relative contribution of prices

⁹Capitation is a payment method used by managed care organizations where physicians are paid a fixed, predetermined payment for caring for an enrollee for a specified period of time, regardless of the number or type of services ultimately provided.

¹⁰The number of individuals without health insurance in each metropolitan area was obtained from InterStudy Publications, Inc., and was based on statewide data; it does not include differences in the uninsured among metropolitan areas in the same state.

¹¹J. Menges, et al., for The Lewin Group, *Comparing Physician and Dentist Fees Among Medicaid Programs* (Oakland, Calif.: Medi-Cal Policy Institute, 2001).

¹²Total spending per enrollee includes both enrollee deductible and coinsurance obligations and PPO expenditures on behalf of the enrollee.

and utilization to spending for hospital stays and physician services.¹³ See appendix I for a more detailed description of our methodology.

We tested the data we obtained from FEHBP and other sources for consistency and reliability, and determined that they were adequate for our purposes. Our analysis is limited to geographic variation in 2001 spending and prices in the FEHBP PPOs in our study and to the factors listed in appendix I. We performed our work from September 2002 through July 2005 in accordance with generally accepted government auditing standards.

Results in Brief

We found that FEHBP PPO hospital prices differed by 259 percent and physician prices differed by about 100 percent across metropolitan areas in the United States, after we removed the geographic variation associated with the costs of doing business such as rents and salaries, and differences in the types of services provided. While some metropolitan areas had hospital or physician prices that were very low or very high, most had prices that were much closer to the average. Hospital and physician prices tended to vary together, such that areas with higher hospital prices tended to also have higher physician prices. Prices for hospital stays and physician services tended to be higher in metropolitan areas in the Midwest and lower in the Northeast.

In general, less competition and less HMO capitation were associated with higher prices. Metropolitan areas where there was less competition—areas with a higher percentage of beds in the two largest hospitals or hospital networks—had higher prices, on average. Metropolitan areas with the least competition had, on average, 18 percent higher hospital prices and 11 percent higher physician prices than areas with the most competition.¹⁴ Metropolitan areas with the least HMO capitation had hospital and physician prices that were both close to 10 percent higher, on average, than areas with the most HMO capitation.¹⁵ When we controlled for other

¹³Our analysis of hospital spending and utilization may have been limited by the small number of enrollees and admissions in some areas. Ten of the 232 metropolitan areas in this analysis had between 500 and 1,000 enrollees.

¹⁴We defined areas in the lowest 25 percent of competition as having the least competition, and areas in the highest 25 percent of competition as having the most competition.

¹⁵We defined areas in the lowest 25 percent of HMO capitation as the having the least HMO capitation, and areas in the highest 25 percent of HMO capitation as having the most HMO capitation.

factors that might be associated with geographic variation in prices, we found that less hospital competition and HMO capitation were still associated with higher prices, but the effect was reduced. We found no evidence of cost shifting—hospital and physician prices were no higher, on average, in areas with lower Medicaid payments, a higher proportion of the uninsured, or a higher percent of the population enrolled in Medicaid or Medicare. Rather, we found that physician prices were, on average, lower in areas with lower Medicaid payments and a higher percentage of uninsured. We did not find a relationship between hospital prices and Medicaid payments or between hospital prices and the percentage uninsured.

Total adjusted health care spending per enrollee was more than twice as high in the highest-spending metropolitan area as it was in the lowest-spending metropolitan area.¹⁶ Spending in metropolitan areas in the South was about 23 percent higher, on average, than in metropolitan areas in the Northeast. For hospital and physician services, prices contributed to about one-third of the variation in spending between the areas with the highest spending and the areas with the lowest spending, such that higher prices tended to be associated with higher hospital and physician spending.¹⁷ The contribution of physician prices to variation in physician spending was partially offset by utilization of physician services; we found higher prices in areas with lower utilization and lower prices in areas with higher utilization. We did not find a similar offsetting relationship between price and utilization for hospital spending.

Background

FEHBP and Participating PPOs

In 2004, the federal government spent more than \$21 billion on FEHBP, which provides health insurance to federal civilian employees, their families, and retirees. Administered by the Office of Personnel Management (OPM), FEHBP contracts with private insurers to provide

¹⁶Total spending per enrollee includes spending for all health care services except mental health, chemical dependency, and pharmaceuticals. We adjusted total spending per enrollee for differences in costs of providing service and in the age and sex of enrollees across metropolitan areas.

¹⁷We defined areas in the highest 25 percent of spending as areas with the highest spending and areas in the lowest 25 percent of spending as areas with the lowest spending.

health benefits. As such, it is the largest private health insurance program in the country, covering nearly 8 million enrollees. Federal employees enrolled in FEHBP can select from a number of private insurance plans. In 2004, 183 private health insurance plans, including both local HMOs and national PPOs, contracted with FEHBP to provide health insurance. Nearly 75 percent of FEHBP beneficiaries were enrolled in national PPOs in 2004; the remainder were enrolled in local HMOs. The national PPOs offered the same benefits and charged the same premiums regardless of where enrollees lived or obtained their health care. However, the prices the national PPOs paid to the hospitals and physicians in their networks varied across the country depending on the prices negotiated between the PPOs and their hospital and physician providers. Enrollee coinsurance payments, which are based on a percentage of the negotiated prices, also varied.

Geographic Variation in Spending, Utilization, and Prices

Geographic variation in prices and spending in private sector plans, such as those participating in FEHBP, have not been extensively researched. However, a well-established body of research has shown wide variation in fee-for-service Medicare spending and utilization per beneficiary, even after accounting for differences in population demographics and illness.¹⁸ In 1996, Medicare spending per beneficiary was higher in the Midwest and the South, especially in parts of Texas and Louisiana, than in the North and West. Across the country, Medicare spending per beneficiary varied by a factor of 2.9. A more recent examination of Medicare spending showed continued geographic differences in spending per beneficiary across the nation.¹⁹

Geographic differences in utilization have also been found, though the amount of utilization variation depends upon the type of service. For instance, Medicare beneficiaries had more than twice as many nonsurgical hospital discharges in 1995-1996²⁰ and more than five times as many hip and knee replacement surgeries in some markets as in others in 2000-

¹⁸The Center for the Evaluative Clinical Sciences, Dartmouth Medical School, *The Dartmouth Atlas of Health Care 1999: The Quality of Medical Care in the United States: A Report on the Medicare Program* (Chicago, Ill.: AHA Press, 1999).

¹⁹GAO analysis of unadjusted 2003 Medicare spending per beneficiary data.

²⁰*The Dartmouth Atlas of Health Care 1999*, p. 74.

2001.²¹ Geographic differences in the use of inpatient services do not appear to be caused by the substitution of other, less costly services; markets with higher Medicare spending per enrollee for acute care hospital services in 1996 also tended to have higher outpatient and physician spending per enrollee.²² Studies of other populations, such as veterans and enrollees in Blue Cross Blue Shield of Michigan, also showed that regional variation in hospital use occurred in those populations.²³

Unlike in the private sector, where prices may be subject to negotiation, the prices paid to hospitals and physician providers by Medicare are not subject to negotiation. Medicare establishes national prices and adjusts them by using formulas that incorporate estimates of differences in input costs, such as wages and rents across geographic areas. In the private sector, prices are negotiated between providers²⁴ and health insurers. Insurers may negotiate discounted rates with providers in exchange for an anticipated share of patient volume from the insurers' enrollees. The negotiated price may take into account the costs of doing business faced by providers as well as other market characteristics affecting the geographic area. Thus, the geographic differences in price in the Medicare program may not be the same as in the private sector.

Health Care Market Characteristics and Price

Characteristics of the health care markets across the country may affect the prices that private sector insurers pay for health care services. Market characteristics such as the extent of competition among providers, the prevalence of managed care, and whether private sector providers shift costs to compensate for lower reimbursements from some payers all may contribute to variations in prices across the country.

²¹J.N. Weinstein et al., "Trends and Geographic Variations in Major Surgery for Degenerative Diseases of the Hip, Knee and Spine," *Health Affairs*, Web Exclusive, (Oct. 7, 2004). <http://content.healthaffairs.org/cgi/content/full/hlthaff.var.81> (downloaded June 21, 2005).

²²*The Dartmouth Atlas of Health Care 1999*, pp. 11 and 27.

²³C.M. Ashton, et al., "Geographic Variations in Utilization Rates in Veterans Affairs Hospitals and Clinics," *The New England Journal of Medicine*, vol. 340, no. 1 (1999). The Center for the Evaluative Clinical Sciences, Dartmouth Medical School and The Center for Outcomes Research and Evaluation, Maine Medical Center, *The Dartmouth Atlas of Health Care in Michigan*, 2000, pp. 46 and 47.

²⁴We use the term providers to refer to hospitals, physicians, and other providers of health care services unless otherwise specified.

Some but not all studies have shown that recent decreases in competition among providers have been associated with increased prices.^{25,26} Research shows that since 1995, the hospital industry has become increasingly consolidated, and physicians have become increasingly aligned with health systems and hospital networks. For example, in 1995, 51 percent of all private acute care hospitals were part of a hospital system. By 2000, the percent of hospitals in systems had risen to 57 percent.²⁷ Consolidation reduces the number of competitors in a market, giving the consolidated competitors a larger market share. Competition also may be limited in markets with small populations because less populated markets naturally have fewer hospitals or providers and hence few competitors. Some studies have shown that consolidation is associated with cost savings achieved by generating efficiencies and reducing excess capacity.²⁸ For example, consolidated hospitals can streamline operations by centralizing services, such as emergency care or intensive care units.²⁹ However, other studies of hospital mergers and acquisitions have not found evidence that they result in any reductions in costs.³⁰

Other research has shown that the presence of HMOs in a metropolitan area may also influence the price of health care services.³¹ HMOs have

²⁵See for example, A.E. Cuellar and P.J. Gertler, "How the Expansion of Hospital Systems Has Affected Consumers," *Health Affairs*, vol. 24, no. 1 (2005); C. Capps and D. Dranove, "Hospital Consolidation and Negotiated PPO Prices," *Health Affairs*, vol. 23, no. 2 (2004); L.M. Nichols, et al., "Are Market Forces Strong Enough to Deliver Efficient Health Care Systems? Confidence is Waning," *Health Affairs*, vol. 23, no. 2 (2004); and H.R. Spang, G.J. Bazzoli, and R.J. Arnould, "Hospital Mergers and Savings for Consumers: Exploring New Evidence," *Health Affairs*, vol. 20, no. 4 (2001).

²⁶Hospitals may compete on dimensions other than price, such as services, amenities, and quality. See for example, M.A. Morrisey, "Competition in Hospital and Health Insurance Markets: A Review and Research Agenda," *Health Services Research*, vol. 36, no. 1 (2001).

²⁷Cuellar and Gertler, "How the Expansion of Hospital Systems Has Affected Consumers," p. 213.

²⁸See for example, Spang, Bazzoli, and Arnould, "Hospital Mergers and Savings for Consumers," p. 150; and G.J. Bazzoli et al., "Hospital Reorganization and Restructuring Achieved Through Merger," *Health Care Management Review*, vol. 27, no. 1 (2002).

²⁹Bazzoli et al., "Hospital Reorganization and Restructuring Achieved Through Merger," pp. 2 and 6.

³⁰D. Dranove, A. Durkac, and M. Shanley, "Are Multihospital Systems More Efficient?" *Health Affairs*, vol. 15, no. 1 (1996).

³¹L. Baker, "Measuring Competition in Health Care Markets," *Health Services Research*, April (2001); and M.A. Morrisey, "Competition in Hospital and Health Insurance Markets," p. 191.

typically attempted to moderate spending by introducing controls on both utilization and price. One of the controls HMOs have used is to compensate their primary care physicians with a capitated payment—a fixed, predetermined payment for caring for an enrollee for a specified period of time, regardless of the number or type of services ultimately provided. In addition, research indicates HMOs have been able to secure deeper discounts from hospitals and physicians than other insurers. HMOs have tended to have smaller, exclusive provider networks and have been able to channel their enrollees to a limited number of providers in exchange for the lower rates. Toward the end of the 1990s, in response to resistance against managed care from providers and patients alike, HMOs relaxed the policies they had imposed to control utilization, price, and spending. For example, one study reported a sharp decline from 1999 to 2001 in the controls typically used by HMOs. Of more than 50 HMOs in the study, virtually all reported a trend toward broader provider networks and some reported decreased use of financial incentives, such as capitation.³²

Cost shifting—the theory that providers charge higher prices to one set of payers to compensate for lower revenues from other payers—has been debated for decades. Some researchers, for example, have found that when Medicare and Medicaid reimbursements fall, private sector reimbursements rise.³³ Yet, other researchers have found no evidence of cost shifting.³⁴ More recent articles on this subject note that cost shifting is possible, but only when providers have had sufficient and untapped market power to raise prices.³⁵ Without sufficient market power, providers

³²D.A. Draper, et al., “The Changing Face of Managed Care,” *Health Affairs*, vol. 21, no. 1 (2002).

³³J.S. Lee, et al., “Medicare Payment Policy: Does Cost Shifting Matter?” *Health Affairs*, Web Exclusive, (Oct. 8, 2003). <http://content.healthaffairs.org/cgi/content/full/hlthaff.w3.480v1> (downloaded June 21, 2005); and Congressional Budget Office, “Responses to Uncompensated Care and Public Program Controls on Spending: Do Hospitals ‘Cost-Shift’?” (Washington, D.C.: 1993).

³⁴See for example, T. Rice, et al., “Do Physicians Cost Shift,” *Health Affairs*, vol. 15, no. 3 (1996); and J. Hadley, S. Zuckerman, L.I. Iezzoni, “Financial Pressure and Competition: Changes in Hospital Efficiency and Cost-Shifting Behavior,” *Medical Care*, vol. 34, no. 3 (1996).

³⁵See for example, M.A. Morrissey, “Cost Shifting: New Myths, Old Confusion, and Enduring Reality,” *Health Affairs*, Web Exclusive (Oct. 8, 2003). <http://content.healthaffairs.org/cgi/content/full/hlthaff.w3.489v1> (downloaded June 21, 2005); and P.B. Ginsburg, “Can Hospitals and Physicians Shift the Effects of Cuts in Medicare Reimbursement to Private Payers?” *Health Affairs*, Web Exclusive (Oct. 8, 2003). <http://content.healthaffairs.org/cgi/content/full/hlthaff.w3.472v1> (downloaded June 21, 2005).

that cost shift and raise private sector prices might lose privately insured patients. Alternatively, providers might also react to a decrease in prices from payers by lowering private sector prices, as was reported to be the case for Medicaid dependent hospitals in California.³⁶

Large Differences in Hospital and Physician Prices across Metropolitan Areas

Prices paid by FEHBP PPOs varied by 259 percent for hospital stays and by about 100 percent for physician services across the metropolitan areas in our study. Prices for both hospital stays and physician services tended to be higher in metropolitan areas in the Midwest and lower in metropolitan areas in the Northeast.

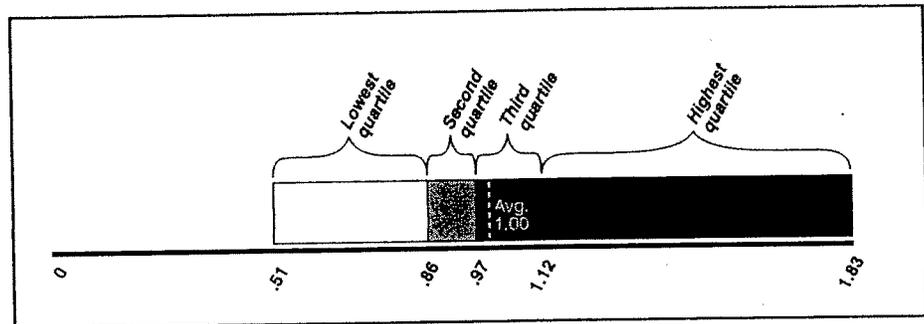
Hospital Prices Varied More than Physician Prices

Adjusted hospital prices paid by FEHBP PPOs varied considerably across metropolitan areas. In the lowest-priced metropolitan area, hospital prices were 51 percent of the national average (index value of 0.51) and in the highest-priced metropolitan area, they were 83 percent above the national average (index value of 1.83)—a difference of 259 percent. In five of the 232 metropolitan areas, FEHBP PPOs paid hospital prices that were more than 50 percent above the national average. While there were other metropolitan areas with very high and very low prices, most had prices much closer to the average. Half of the metropolitan areas in our study, those in the second and third quartiles, had hospital prices that were no more than 14 percent above or below the national average,³⁷ and 80 percent had hospital prices ranging from 22 percent below average to 27 percent above average. The distribution of hospital price indices among 232 metropolitan areas is presented in fig. 1.

³⁶D. Dranove and W.D. White, "Medicaid-dependent Hospitals and Their Patients: How Have They Fared?" *Health Services Research*, (June 1998).

³⁷Quartiles divide the distribution of prices from lowest to highest into four equal groups. The lowest quartile represents metropolitan areas ranked in the lowest 25 percent of price, and the highest quartile represents metropolitan areas ranked in the highest 25 percent of price.

Figure 1: Distribution of Hospital Price Indices across 232 Metropolitan Areas, 2001



Source: GAO analysis of FEHBP data.

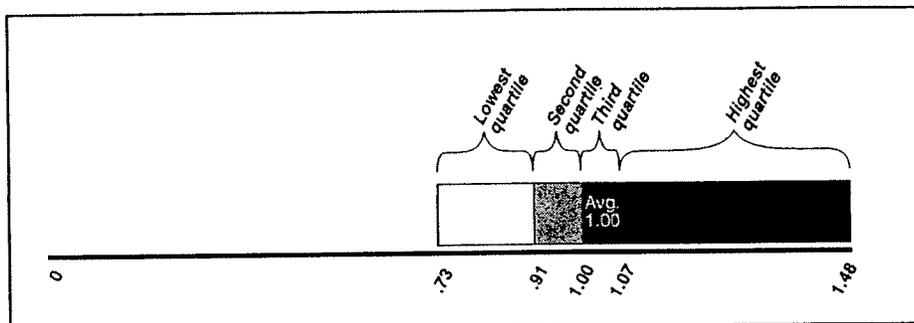
Note: We adjusted hospital prices to remove the effect of geographic differences in the costs of doing business (wages, rents, etc.) and differences in the severity of illnesses and mix of diagnoses among metropolitan areas. We converted hospital prices to an index by dividing the average price for a hospital stay in a metropolitan area by the average price for all hospital stays in 232 metropolitan areas. The average hospital price index value is 1.00.

Prices paid by FEHBP PPOs for physician services also varied substantially but less than hospital prices, after adjusting them for geographic differences in the costs of doing business and the mix of services. In the lowest-priced metropolitan area, Baltimore, Maryland, physician prices were 73 percent of the national average (index value of 0.73), and in the highest-priced metropolitan area, La Crosse, Wisconsin,³⁸ they were nearly 50 percent above the national average (index value of 1.48). Overall, the percentage difference in prices between the lowest- and the highest-priced metropolitan areas was about 100 percent. Half of the metropolitan areas in our study, those in the second and third quartiles, had physician prices that were no more than 9 percent above or below the national average, and 80 percent had physician prices that were no more than 16 percent above or below the national average. The distribution of physician prices among 319 metropolitan areas is presented in fig. 2.³⁹ In addition, metropolitan areas with higher physician prices tended to have higher hospital prices, and metropolitan areas with lower physician prices tended to have lower hospital prices.

³⁸The La Crosse, Wisconsin metropolitan area includes areas in Minnesota.

³⁹We had sufficient data to analyze more metropolitan areas for physician prices than for hospital prices.

Figure 2: Distribution of Physician Price Indices across 319 Metropolitan Areas, 2001



Source: GAO analysis of FEHBP data.

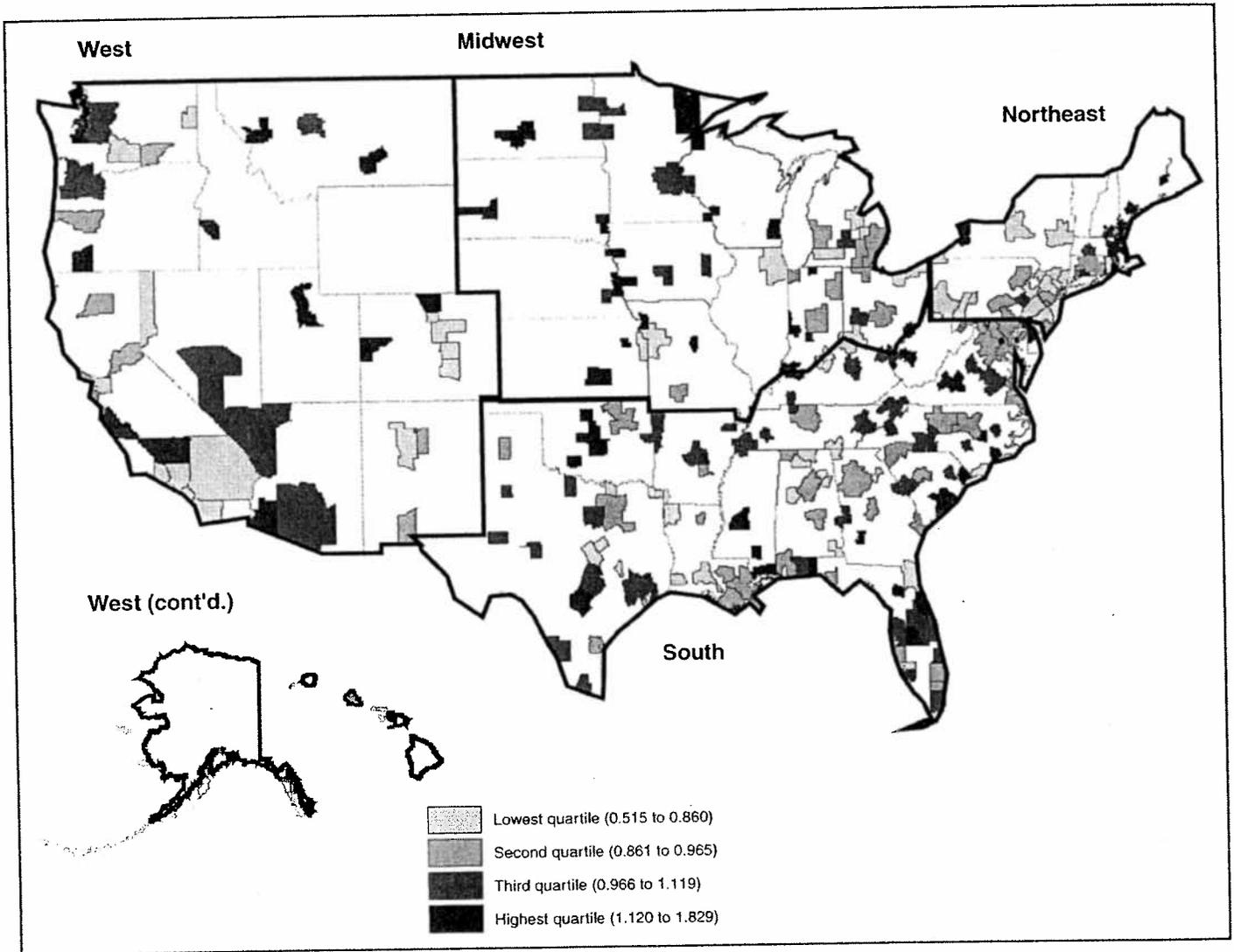
Notes: We adjusted physician prices to remove the effect of geographic variation in the costs of doing business (wages, rents, etc.) and differences in the mix of services among metropolitan areas. We converted physician prices to an index by dividing the average physician price per service in a metropolitan area by the average physician price in 319 metropolitan areas. The average physician price index value is 1.00.

We had sufficient data to analyze more metropolitan areas for physician prices than for hospital prices.

Hospital and Physician Prices Were Generally Higher in the Midwest and Lower in the Northeast

On average, FEHBP PPOs paid higher prices for hospital stays in metropolitan areas in the Midwest and lower prices in the Northeast. (See fig. 3.) Hospitals in the Midwest were paid about 14 percent more, on average, than hospitals in the Northeast (table 1), but there was a considerable range of hospital prices within regions. In fact, several metropolitan areas with hospital prices in the highest quartile were located in the same state as metropolitan areas with hospital prices in the lowest quartile. For example, hospital prices in Buffalo-Niagara Falls, New York were 45 percent higher than average, but prices in Syracuse, New York were 20 percent below average. Similarly, prices in Salinas, California were 50 percent higher than average, but prices in Orange County, California were 48 percent below average. The 10 metropolitan areas with the highest and lowest hospital prices are listed in table 2. Appendix II presents the complete rankings of metropolitan areas by hospital price.

Figure 3: FEHBP PPO Adjusted Hospital Price Index Quartiles in 232 Metropolitan Areas, 2001



Source: GAO analysis of FEHBP data.

Table 1: FEHBP PPO Hospital Price Indices in Metropolitan Areas Grouped by Census Region, 2001

Region	Average hospital price index* for region
Midwest	1.07
West	1.00
South	1.00
Northeast	0.94
Percent by which prices in the Midwest exceed prices in the Northeast	13.83

Source: GAO analysis of FEHBP data.

*We adjusted hospital prices to remove the effect of geographic differences in the costs of doing business (wages, rents, etc.) and differences in the severity of illnesses and mix of diagnoses among metropolitan areas. We converted hospital prices to an index by dividing the average hospital price in a metropolitan area by the average hospital price for all 232 metropolitan areas. The average hospital price index is 1.00.

Table 2: Metropolitan Areas with the Highest and Lowest Hospital Price Indices in FEHBP PPOs, 2001

Rank	Highest-priced metropolitan areas	Rank	Lowest-priced metropolitan areas
1	*	232	Orange County, Calif.
2	Dover, Del.	231	Pueblo, Colo.
3	Biloxi-Gulfport-Pascagoula, Miss.	230	Ventura, Calif.
4	St. Joseph, Mo.	229	Albany-Schenectady-Troy, N.Y.
5	Milwaukee-Waukesha, Wisc.	228	Newburgh, New York-Penn.
6	Salinas, Calif.	227	New York, N.Y.
7	Buffalo-Niagara Falls, N.Y.	226	Altoona, Penn.
8	Grand Junction, Colo.	225	Decatur, Ala.
9	*	224	Anniston, Ala.
10	La Crosse, Wisconsin-Minn.	223	Saginaw-Bay City-Midland, Mich.

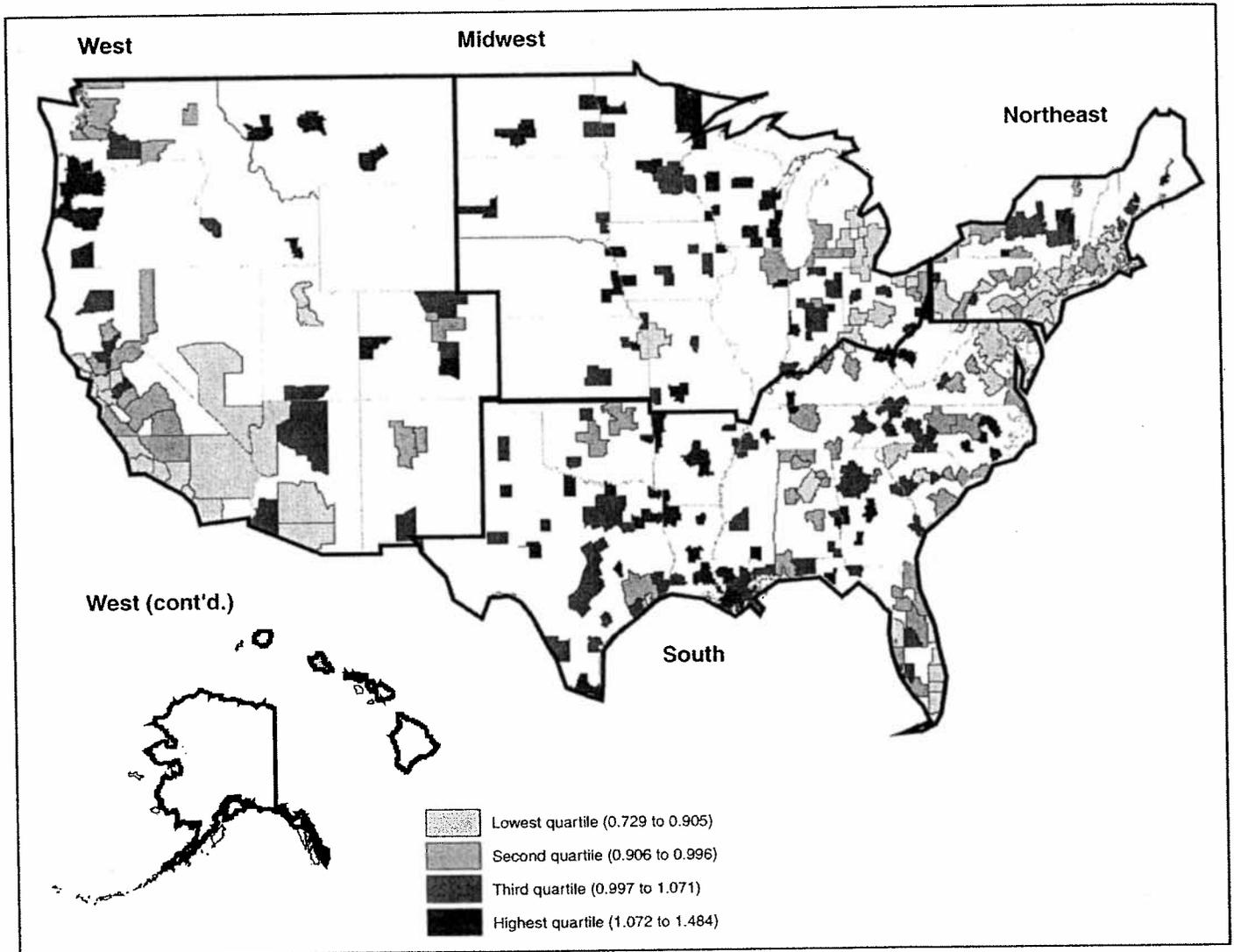
Source: GAO analysis of FEHBP data.

Note: We adjusted hospital prices to remove the effect of geographic differences in the costs of doing business (wages, rents, etc.) and differences in the severity of illnesses and mix of diagnoses among metropolitan areas.

*Name withheld to protect proprietary data where the metropolitan area had only one hospital in 2001.

As with hospital prices, FEHBP PPOs paid higher average physician prices in metropolitan areas in the Midwest and lower average physician prices in metropolitan areas in the Northeast (see fig. 4). Prices for physician services were 15 percent higher, on average, in metropolitan areas in the Midwest than in metropolitan areas in the Northeast (table 3). Metropolitan areas in Wisconsin had physician prices ranked among the highest in our study: of the 10 metropolitan areas with the highest physician prices, eight were located in Wisconsin (table 4). About 80 percent of the metropolitan areas in the Northeast had below-average prices for physician services. Also, physician prices tended to be less variable within states than hospital prices. For example, among metropolitan areas in New Jersey, physician prices ranged from 12 percent below average to 19 percent below average, but hospital prices ranged from about 4 percent below average to about 27 percent below average. Appendix III contains a complete ranking of physician prices in 319 metropolitan areas.

Figure 4: FEHBP PPO Adjusted Physician Price Index Quartiles in 319 Metropolitan Areas, 2001



Source: GAO analysis of FEHBP data.

Table 3: FEHBP PPO Physician Price Indices in Metropolitan Areas Grouped by Census Region, 2001

Region	Average physician price index* for region
Midwest	1.05
South	1.02
West	0.99
Northeast	0.91
Percent by which prices in the Midwest exceed prices in the Northeast	15.38

Source: GAO analysis of FEHBP data.

*We adjusted physician prices to remove the effect of geographic differences in the costs of doing business (wages, rents, etc.) and differences in the mix of services among metropolitan areas. We converted physician prices to an index by dividing the average physician price per service in a metropolitan area by the average physician price in 319 metropolitan areas. The average physician price index value is 1.00.

Table 4: Metropolitan Areas with the Highest and Lowest Physician Price Indices in FEHBP PPOs, 2001

Rank	Highest-priced metropolitan areas	Rank	Lowest-priced metropolitan areas
1	La Crosse, Wisconsin-Minn.	319	Baltimore, Md.
2	Wausau, Wisc.	318	Lowell, Massachusetts-N.H.
3	Eau Claire, Wisc.	317	Nassau-Suffolk, N.Y.
4	Madison, Wisc.	316	Washington, D.C.
5	Jonesboro, Ark.	315	Fort Lauderdale, Fla.
6	Janesville-Beloit, Wisc.	314	West Palm Beach-Boca Raton, Fla.
7	Great Falls, Mont.	313	Miami, Fla.
8	Green Bay, Wisc.	312	Providence-Fall River-Warwick, Rhode Island-Mass.
9	Appleton-Oshkosh-Neenah, Wisc.	311	Dutchess County, N.Y.
10	Racine, Wisc.	310	San Francisco, Calif.

Source: GAO analysis of FEHBP data.

Note: We adjusted physician prices to remove the effect of geographic differences in the costs of doing business (wages, rents, etc.) and differences in the mix of services among metropolitan areas.

*The Washington, District of Columbia metropolitan area includes parts of Maryland, Virginia, and West Virginia.

Less Competition and Less HMO Capitation Linked to Higher Health Care Prices

FEHBP PPOs paid higher average hospital and physician prices in metropolitan areas with less competition among hospitals.⁴⁰ Many metropolitan areas we studied had low levels of competition; about one in four metropolitan areas had only one or two hospitals or hospital networks serving the entire market. Also, FEHBP PPOs paid higher average hospital and physician prices in metropolitan areas with less HMO capitation. HMOs did not have capitated arrangements in more than one-third of the metropolitan areas we studied. We found no evidence of cost shifting—higher hospital or physician prices where there were lower Medicaid payments or larger uninsured, Medicare, or Medicaid populations.

Prices Were Higher in Metropolitan Areas with Less Competition

FEHBP PPO hospital and physician prices were higher, on average, in metropolitan areas with less competition among hospitals. In the least competitive metropolitan areas—those in the quartile with the least competition—hospital prices tended to be about 18 percent higher and physician prices tended to be nearly 11 percent higher than in the most competitive metropolitan areas—those in the quartile with the most competition. See table 5. For example, Rapid City, South Dakota, was in the quartile with the least competition; its hospital prices were 25 percent above average, and its physician prices were 10 percent above average. In contrast, Pittsburgh, Pennsylvania, a metropolitan area in the quartile with the most competition, had hospital prices 14 percent below average and physician prices 16 percent below average. When we conducted a separate analysis that simulated the effect of increasing the level of competition while controlling for the effects of other factors, we found that less competition was still associated with higher prices, although the difference was reduced by 58 percent for hospital prices and 38 percent

⁴⁰We measured competition as the percentage of hospital beds in a metropolitan area (market share) held by the two largest hospitals or hospital networks, where higher percentages indicated less competition and lower percentages indicated more. Physicians are often aligned with health systems and hospital networks. Therefore, we approximated physician competition by measuring competition among hospitals and hospital networks in a metropolitan area.

for physician prices.⁴¹ See appendix I for a complete description of the other factors we analyzed.

Table 5: FEHBP PPO Price Indices in the Least and Most Competitive Metropolitan Areas, 2001

Competition quartile	Average hospital price index ^a	Average physician price index ^b
Least competitive ^c	1.10	1.04
Most competitive ^c	0.93	0.94
Percent by which prices in the least competitive areas exceed prices in the most competitive areas^d	18.28	10.64

Source: GAO analysis of FEHBP data.

^aWe adjusted hospital prices to remove the effect of geographic differences in the costs of doing business (wages, rents, etc.) and differences in the severity of illnesses and mix of diagnoses among metropolitan areas. We converted hospital prices to an index by dividing the average price for a hospital stay in a metropolitan area by the average price for all hospital stays in 232 metropolitan areas. The average hospital price index value is 1.00.

^bWe adjusted physician prices to remove the effect of geographic differences in the costs of doing business (wages, rents, etc.) and differences in the mix of services among metropolitan areas. We converted physician prices to an index by dividing the average physician price per service in a metropolitan area by the average physician price in 319 metropolitan areas. The average physician price index value is 1.00.

^cThe competition quartiles were based on 232 metropolitan areas for the hospital price analysis and 319 metropolitan areas for the physician price analysis.

^dWe simulated the effect of increasing competition in these metropolitan areas from the average level of competition in the lowest quartile to the average level of competition in the highest quartile, while controlling for other factors such as our measures of competition, HMO capitation, cost shifting, per capita income, percent of for-profit beds, provider supply, and census divisions. We found that, on average, the effect of increasing competition was to reduce the hospital price index in a metropolitan area by 7.62 percent and the physician price index in a metropolitan area by 6.64 percent. See app. I for a complete list of control factors.

⁴¹Other factors included in our analysis were our measures of competition, HMO capitation, cost shifting, per capita income, percent of for-profit beds, provider supply, and census division. See app. I for a detailed description of each factor. When we simulated the effect of increasing competition from the average level of competition in the lowest quartile to the average level of competition in the highest quartile, while controlling for other factors, our estimate of the percent difference in the average hospital price index between the highest and lowest competition quartiles was 7.62 percent, and our estimate of the percent difference in the average physician price index between the highest and lowest quartiles was 6.64 percent.

Overall, many metropolitan areas in our study had low levels of competition. Several of the metropolitan areas in our study had few competing hospitals or hospital networks. In approximately one quarter of the 319 metropolitan areas in our study, 100 percent of the market share was held by one or two hospitals or hospital networks. In the most competitive metropolitan areas, about 44 percent of the market share, on average, was held by the two largest hospitals or hospital networks. Across all metropolitan areas, about 75 percent of the market share, on average, was held by the two largest hospitals or hospital networks. The least competitive metropolitan areas also tended to have smaller populations. In the quartile with the least competition, the average population was about 160,000. The average population of the metropolitan areas in the quartile with the most competition was more than 1.8 million.

Prices Were Higher in Metropolitan Areas with Less HMO Capitation

FEHBP PPO hospital and physician prices were higher, on average, in metropolitan areas with less HMO capitation.⁴² On average, both hospital prices and physician prices were more than 10 percent higher in metropolitan areas in the quartile with the least HMO capitation than in the quartile with the most HMO capitation (table 6). For example, Hattiesburg, Mississippi, which had no HMO capitation, had both hospital and physician prices in the highest quartile. In contrast, Philadelphia, Pennsylvania, was in the highest quartile of HMO capitation and in the lowest quartiles of both hospital and physician prices. When we conducted a separate analysis that simulated the effect of increasing the level of HMO capitation while controlling for the effects of other factors, less HMO capitation was still associated with higher prices, but the difference was

⁴²Capitation is a payment method where physicians are paid a fixed, predetermined payment for caring for an enrollee for a specified period of time, regardless of the number or type of services provided. Physicians often try to resist capitation payments. The use of capitation by HMOs demonstrates that they have the leverage to negotiate capitation contracts with physicians. We used HMO capitation as a proxy measure for the strength of the HMO presence in a community, and its ability to negotiate prices with physicians, hospitals, and other providers.

reduced by about one-third for hospital prices and two-thirds for physician prices.⁴³ See appendix I.

Table 6: FEHBP PPO Price Indices in Metropolitan Areas with the Least and Most HMO Capitation, 2001

HMO capitation quartile	Average hospital price index ^a	Average physician price index ^b
Least HMO capitation ^c	1.05	1.06
Most HMO capitation ^c	0.95	0.96
Percent by which prices in areas with the least capitation exceed prices in areas with the most capitation^d	10.53	10.42

Source: GAO analysis of FEHBP data.

^aWe adjusted hospital prices to remove the effect of geographic differences in the costs of doing business (wages, rents, etc.) and differences in the severity of illnesses and mix of diagnoses among metropolitan areas. We converted hospital prices to an index by dividing the average price for a hospital stay in a metropolitan area by the average price for all hospital stays in 232 metropolitan areas. The average hospital price index value is 1.00.

^bWe adjusted physician prices to remove the effect of geographic differences in the costs of doing business (wages, rents, etc.) and differences in the mix of services among metropolitan areas. We converted physician prices to an index by dividing the average physician price per service in a metropolitan area by the average physician price in 319 metropolitan areas. The average physician price index value is 1.00.

^cHMO capitation quartiles were based on 232 metropolitan areas for the hospital price analysis. HMO capitation data were not available in 4 of the 319 metropolitan areas in physician price analysis, and the HMO capitation quartiles were based on 315 metropolitan areas for the physician price analysis.

^dWe simulated the effect of increasing HMO capitation in these metropolitan areas from the average level of HMO capitation in the lowest quartile to the average level of HMO capitation in the highest quartile, while controlling for other factors such as the level of competition, cost shifting, income, percent of for-profit beds, provider supply, and census divisions. We found that, on average, the effect of increasing HMO capitation was to reduce the hospital price index in a metropolitan area by 7.17 percent and the physician price index in a metropolitan area by 3.31 percent. See app. I for a complete list of control factors.

⁴³Other factors included in our analysis were our measures of competition, HMO capitation, cost shifting, per capita income, percent of for-profit beds, provider supply, and census division. See app. I for a detailed description of each factor. When we simulated the effect of increasing the level of HMO capitation from the average level of HMO capitation in the lowest quartile to the average level of HMO capitation in the highest quartile, while controlling for other factors, our estimate of the percent difference in the average hospital price index between the highest and lowest HMO capitation quartiles was 7.17 percent and our estimate of the percent difference in the average physician price index between the highest and lowest quartiles was 3.31 percent.

Many of the metropolitan areas in our study had low levels of HMO capitation.⁴⁴ More than a third of the metropolitan areas had almost no HMO capitation; on average, less than 1 percent of the payments to primary care physicians in these areas were paid on a capitated basis. In the metropolitan areas in the highest quartile of HMO capitation, 23 percent of primary care physicians' compensation was capitated, on average. Among all metropolitan areas, about 8 percent of primary care physicians' compensation was capitated, on average. As we found with competition, metropolitan areas with the least HMO capitation tended to be the less populated areas. Of the metropolitan areas that had almost no HMO capitation, the average population was about 250,000, while those in the highest quartile of HMO capitation had an average population of nearly 1.1 million.

No Evidence of Cost Shifting Due to Medicaid, Medicare, or the Uninsured

We found no evidence of cost shifting. FEHBP PPOs did not pay higher prices in metropolitan areas with a higher percentage of Medicaid or Medicare beneficiaries, a larger uninsured population, or lower Medicaid payments.⁴⁵ When we controlled for other factors that might have been associated with price, none of our cost-shifting factors were significantly related to higher prices. See appendix I.

While none of these cost-shifting factors were significantly associated with higher hospital or physician prices, physician prices were actually lower, on average, in metropolitan areas with lower adjusted Medicaid payment rates and proportionately larger uninsured populations. Physician prices were nearly 10 percent lower in the metropolitan areas in the quartile with the lowest Medicaid payment index (average of 0.65) than in the quartile with the highest Medicaid payment index (average of 1.29). See table 7. When we conducted a separate analysis that simulated the effect of increasing the level of Medicaid payments, while controlling for the effects of other factors, we found that other factors did not significantly affect the

⁴⁴HMO capitation data were not available in 4 of the 319 metropolitan areas in our study. Accordingly, our analysis of HMO capitation was based on 315 metropolitan areas.

⁴⁵We estimated Medicaid payment rates for each metropolitan area by taking the average physician payment for a set of common services. Medicaid payment rate estimates for metropolitan areas were based on statewide payment rates. We adjusted Medicaid payment rates to remove the effect of geographic differences in input costs and in the mix of services across metropolitan areas. See app. I.

observed relationship between physician prices and Medicaid payments.⁴⁶ There was no significant association between Medicaid payments and hospital prices. See appendix I.

Table 7: FEHBP PPO Price Indices in Metropolitan Areas in the Lowest and Highest Medicaid Payment Quartiles, 2001

Medicaid payment quartile	Average physician price index ^a
Lowest	0.92
Highest	1.02
Percent by which prices in the lowest Medicaid payment areas were lower than prices in the highest Medicaid payment areas^b	9.80

Source: GAO analysis of FEHBP data.

^aWe adjusted physician prices to remove the effect of geographic differences in the costs of doing business (wages, rents, etc.) and differences in the mix of services among metropolitan areas. We converted physician prices to an index by dividing the average physician price per service in a metropolitan area by the average physician price in 319 metropolitan areas. The average physician price index value is 1.00.

^bWe simulated the effect of increasing Medicaid payments in these metropolitan areas from the average Medicaid payment in the lowest quartile to the average Medicaid payment in the highest quartile, while controlling for other factors such as our measures of competition, HMO capitation, other cost-shifting variables, income, percent of for-profit beds, provider supply, and census divisions. We found that, on average, the effect of increasing Medicaid payments was to increase the physician price index in a metropolitan area by 9.69 percent. However, there was no significant association between the Medicaid payments and hospital prices. See app. I for a complete list of control factors.

The relationship between the percentage of the population uninsured and physician price was only evident when we controlled for other factors. We simulated the effect of increasing the percentage of the population uninsured from the average percent uninsured in the lowest quartile to the average percent uninsured in the highest quartile, while controlling for other factors.⁴⁷ In this simulation, we found that the physician prices were 6 percent lower, on average, in the quartile with the highest percent

⁴⁶Other factors included in our analysis were measures of competition, HMO capitation, cost shifting, per capita income, provider supply, and census division. See app. I for a detailed description of each factor. When we simulated the effect of increasing Medicaid payments from the average Medicaid payment in the lowest quartile to the average Medicaid payment in the highest quartile, while controlling for other factors, we found that the physician price index was 9.69 percent higher, on average.

⁴⁷These factors included our measures of competition, HMO capitation, other cost-shifting variables, per capita income, percent of for-profit beds, provider supply, and census divisions.

uninsured (average uninsured percent of 19.5) than in the quartile with the lowest percent uninsured (average percent uninsured of 8.5). There was no significant association between the percent uninsured and hospital prices. See appendix I for a complete list of control factors.⁴⁸

Total Spending Varied 112 Percent; Price Variation Contributed to One-third of the Variation in Hospital and Physician Spending

FEHBP PPO total spending per enrollee was more than twice as high in some areas as in others.⁴⁹ Metropolitan areas in the South tended to have higher spending per enrollee, while metropolitan areas in the Northeast tended to have lower spending per enrollee. For both hospital and physician services, variation in price contributed about one-third of the difference in spending per enrollee between metropolitan areas in the highest and lowest quartiles of spending. Metropolitan areas with higher physician prices tended to have lower physician utilization, which offset the impact of physician price on physician spending to some extent. We found no such offsetting relationship between hospital prices and hospital utilization.

Spending per Enrollee Varied by 112 Percent across Metropolitan Areas

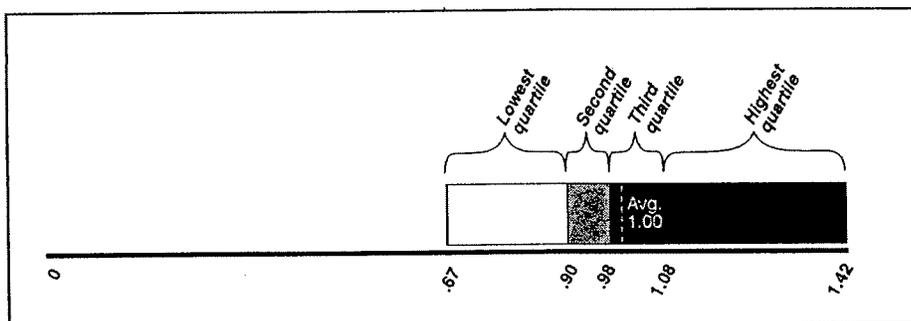
We found that total spending per enrollee varied by 112 percent across the 232 metropolitan areas in this analysis. Total spending per enrollee was the amount spent by FEHBP PPOs per person for all health care services except pharmaceuticals, mental health services, and substance abuse services, after adjusting for enrollee age and sex differences as well as geographic differences in the costs of doing business. Spending per enrollee in the metropolitan area with the lowest spending per enrollee, Grand Rapids-Muskegon-Holland, Michigan, was 67 percent of the national average (index value of 0.67). Spending per enrollee in the metropolitan area with the highest spending per enrollee, Biloxi-Gulfport-Pascagoula, Mississippi, was 42 percent above the average (index value of 1.42). Half of the metropolitan areas in our study, those in the second and third quartiles, had spending per enrollee that was no more than 10 percent above or below the national average, and 80 percent had spending per enrollee ranging from about 16 percent below average to about 19 percent

⁴⁸The percent of the population that was uninsured was based on statewide data and does not include differences in uninsured rates among metropolitan areas in the same state. See app. I for a description of our regression methodology and results.

⁴⁹Total spending per enrollee includes spending for all health care services except mental health, chemical dependency, and pharmaceuticals. We adjusted total spending per enrollee for differences in costs of providing service and in the age and sex of enrollees across metropolitan areas.

above average. The distribution of spending per enrollee indices among 232 metropolitan areas is presented in figure 5. Appendix IV contains the spending per FEHBP enrollee ranking for 232 metropolitan areas.

Figure 5: Distribution of FEHBP PPO Spending Per Enrollee Indices across 232 Metropolitan Areas, 2001

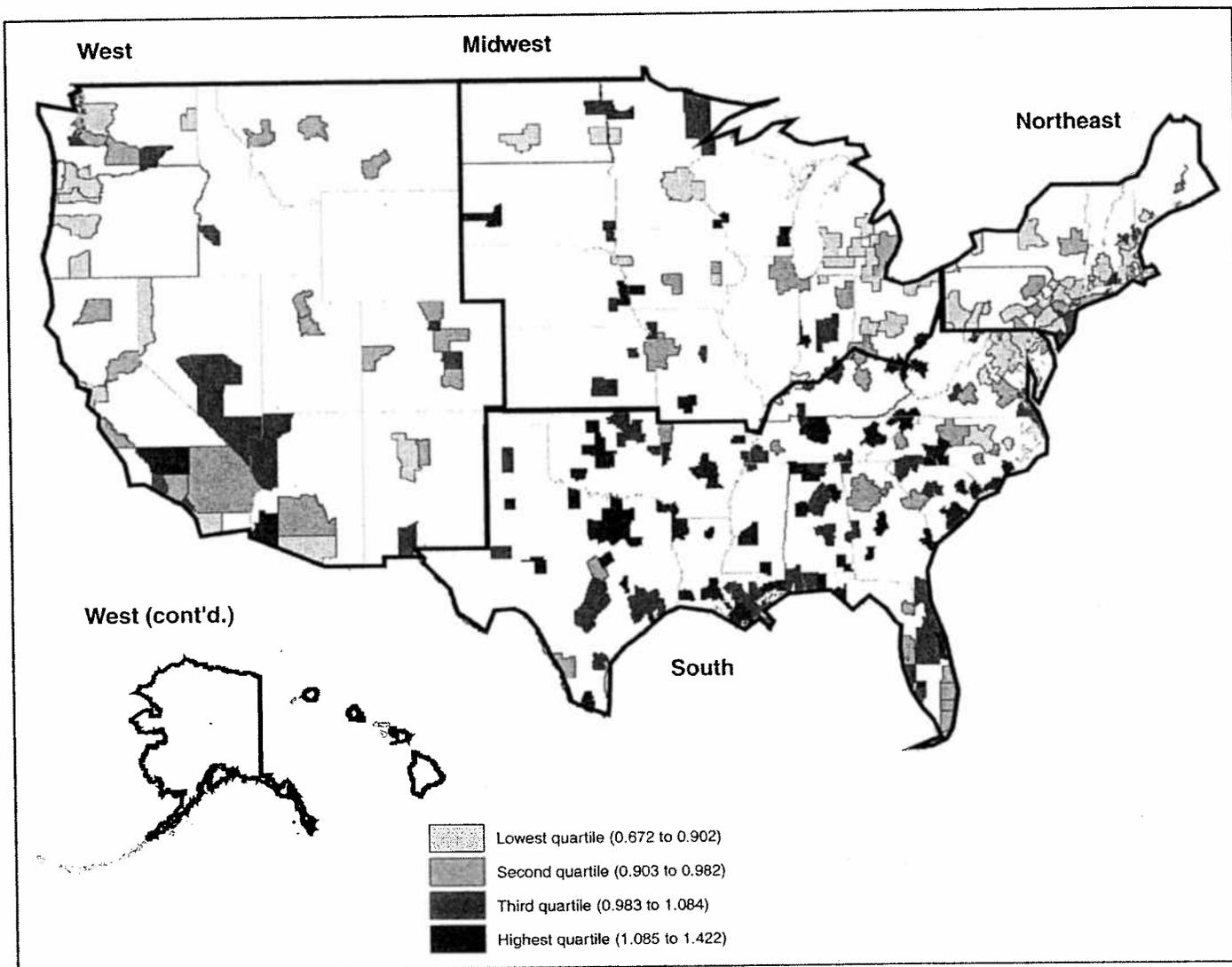


Source: GAO analysis of FEHBP data.

Note: Total spending per enrollee includes spending for all services except mental health, chemical dependency, and pharmaceuticals. We adjusted total spending per enrollee to remove the effect of geographic differences in enrollee age and sex, as well as geographic differences in the costs of doing business (such as wages and rents). The spending per enrollee index compares spending per enrollee in a metropolitan area to the average spending per enrollee in all study metropolitan areas, adjusted for patients' age and sex composition, and costs. The average spending index was 1.00.

Total spending per enrollee in FEHBP PPOs was, on average, highest among metropolitan areas in the South and lowest in metropolitan areas in the Northeast. About 86 percent of the metropolitan areas in the highest spending quartile were located in the South (see fig. 6). Nearly 38 percent of the metropolitan areas in the lowest spending quartile were located in the Northeast, and none of the metropolitan areas in the highest spending quartile were in the Northeast. Spending per enrollee was about 23 percent higher in metropolitan areas in the South than in the Northeast, on average (see table 8).

Figure 6: FEHBP Adjusted Spending Per Enrollee Quartiles in 232 Metropolitan Areas, 2001



Source: GAO analysis of FEHBP data.

Table 8: FEHBP PPO Spending Per Enrollee Indices in Metropolitan Areas by Census Region, 2001

Region	Average spending per enrollee index* or region
South	1.08
Midwest	0.95
West	0.94
Northeast	0.88
Percent by which spending in the South exceeds spending in the Northeast	22.73

Source: GAO analysis of FEHBP data.

*Total spending per enrollee includes spending for all services except mental health, chemical dependency, and pharmaceuticals. We adjusted total spending per enrollee to remove the effect of geographic differences in enrollee age and sex, as well as geographic differences in the costs of doing business (wages, rents, etc.). The spending per enrollee index compares spending per enrollee in a metropolitan area to the average spending per enrollee in all study metropolitan areas, adjusted for patients' age and sex composition, and costs. The average spending index value was 1.00.

Price Contributed to One-third of the Variation in Spending, but the Contribution of Price to Spending Was Partially Offset by Utilization of Physician Services

In FEHBP PPOs, hospital price variation contributed to about one-third of the difference in average hospital spending per enrollee between the highest and lowest hospital spending quartiles.⁵⁰ Similarly, physician price variation contributed to about one-third of the difference in average physician spending per enrollee between the highest and lowest physician spending quartiles. Variation in utilization contributed about two-thirds of the difference between metropolitan areas in the highest and lowest quartiles of spending per enrollee for both hospital and physician services.⁵¹ Hospital prices and hospital utilization (hospital stays per enrollee) were, on average, 26 percent higher and 55 percent higher, respectively, in metropolitan areas in the highest hospital spending quartile compared to metropolitan areas in the lowest hospital spending quartile.⁵² Physician prices were 12 percent higher, on average, in the

⁵⁰In order to analyze the contribution of price to geographic variation in spending, we focused on hospital and physician spending (not total spending), price, and utilization.

⁵¹We did not analyze factors associated with this variation in utilization as it was outside the scope of our research objectives.

⁵²The 26 percent difference between hospital prices in the highest and lowest quartiles contributed to about one-third of the difference in hospital spending. The 55 percent difference between hospital utilization in the highest and lowest hospital spending quartiles contributed to about two-thirds of the difference in hospital spending.

metropolitan areas in the highest than in the lowest physician spending quartile. Physician utilization was 26 percent higher in the highest physician spending quartile than it was in the lowest.⁵³ See table 9.

Table 9: Price and Utilization Indices in Metropolitan Areas in the Highest and Lowest Quartiles of Hospital and Physician Spending, 2001

Type of spending	Spending quartile	Average price index ^a	Average utilization index ^b
Hospital stays	Highest	1.12	1.24
	Lowest	0.89	0.80
	Percent by which highest hospital spending areas exceed lowest hospital spending areas	25.84	55.00
Physician services	Highest	1.05	1.12
	Lowest	0.94	0.89
	Percent by which highest physician spending areas exceed lowest physician spending areas	11.70	25.84

Source: GAO analysis of FEHBP data.

^aWe adjusted physician and hospital prices to remove the effect of geographic differences in the costs of doing business (wages, rents, etc.) and differences in the mix of services among metropolitan areas. For this analysis, we converted both hospital and physician prices to an index by dividing the average price in a metropolitan area by the average price in 232 metropolitan areas. The average price index is 1.00.

^bWe removed the effect of geographic variation in enrollee age and sex in metropolitan areas from utilization. The utilization of hospital and physician services indices compare utilization of hospital and physician services in a metropolitan area to the average utilization of hospital and physician services in all study metropolitan areas, adjusted for age and sex. The average utilization index for both hospital and physician utilization was 1.00.

Although metropolitan areas with higher hospital and physician FEHBP PPO spending per enrollee also tended to have higher hospital and physician prices, respectively we found a modestly sized but statistically significant inverse relationship between physician prices and physician utilization. In general, there was lower utilization of physician services where the price of physician services was higher, and higher utilization of

⁵³The 12 percent difference between physician prices in the highest and lowest quartiles contributed to about one-third of the difference in physician spending. The 26 percent difference between physician utilization in the highest and lowest physician spending quartiles contributed to about two-thirds of the difference in physician spending.

physician services where the price of physician services was lower. For example, Anchorage, Alaska and Bakersfield, California had similar physician spending per enrollee, with both ranked in the highest spending per enrollee quartile. Yet, Anchorage had below average utilization of physician services and above average physician prices, while Bakersfield had above average utilization of physician services and below average physician prices. See table 10. The similar spending per enrollee in Anchorage and Bakersfield occurred despite these areas having different prices and utilization levels because of the offsetting relationship between physician prices and physician utilization. While the offsetting relationship between physician price and physician utilization dampened slightly the overall effect of physician price on spending, there was still a statistically significant relationship between higher prices and higher spending for both physician and hospital inpatient sectors. For hospital services, we did not find an offsetting relationship between price and utilization.

Table 10: Example of the Offsetting Effect of Physician Price and Utilization on Physician Spending in Two Metropolitan Areas in the FEHBP, 2001

	Anchorage, Alaska	Bakersfield, California
Physician price index ^a	1.22	0.94
Physician utilization index ^b	0.78	1.20
Physician spending index ^c	1.23	1.34

Source: GAO analysis of FEHBP data.

^aWe adjusted physician prices to remove the effect of geographic differences in the costs of doing business (wages, rents, etc.) and differences in the mix of services among metropolitan areas. We converted physician prices to an index by dividing the average physician price per service in a metropolitan area by the average physician price in 232 metropolitan areas. The average physician price index is 1.00.

^bWe removed the effect of geographic variation in enrollee age and sex in metropolitan areas from utilization. The utilization of physician services index compares utilization of physician services in a metropolitan area to the average utilization of physician services in all study metropolitan areas, adjusted for age and sex. The average utilization index is 1.00.

^cWe removed the effect of geographic differences in enrollee age and sex, as well as geographic differences in the costs of doing business (wages, rents etc.) from physician spending. The physician spending per enrollee index compares physician spending per enrollee in a metropolitan area to the average physician spending per enrollee in all study metropolitan areas, adjusted for patients' age and sex, and costs. The average physician spending index is 1.00.

Concluding Observations

Our analysis shows that an understanding of price variation is essential to understanding geographic variation in health care spending in the private sector. We found that market forces, not just the underlying costs of doing business providers face, help to determine the prices FEHBP PPOs ultimately pay hospitals and physicians. In metropolitan areas where there was less competition among hospitals, FEHBP PPOs paid a higher price to hospitals and physicians than in metropolitan areas where hospitals and physicians had more competition. In metropolitan areas with less HMO capitation, FEHBP PPOs paid higher prices, which also suggests that hospitals and physicians in those metropolitan areas had less competition for patient share. We found no evidence that hospitals or physicians shifted costs, which suggests that FEHBP PPOs may have been influenced by market forces when establishing prices, regardless of the amount of uncompensated or undercompensated care in a metropolitan area. Further investigation may help to explain why there were regional patterns that appeared to be associated with private sector price variation.

Agency and Other Comments

In written comments on a draft of this report, OPM officials agreed with our findings that competition and other factors were linked to variation in prices, stating that the findings confirm a long-held view of the agency. In addition, they suggested that several issues warranted further study and discussion. They pointed out that it would have been interesting to examine the relationships between physician prices, Medicaid payments, percentage of the population uninsured, and physician-prescribing patterns. They also noted that it would be instructive to investigate unexplained regional variations and intraregional variations. They thought some findings could have been addressed in greater detail within the text and in the concluding observations.

Representatives of the FEHBP PPOs were also given an opportunity to comment on a draft of the report. Representatives of one PPO noted that market dynamics and prices could have changed since 2001.

We agree this report addressed important issues but investigating them in further detail was beyond the scope of our work. We agree that market dynamics and prices could have changed since 2001, but we used the most recent data available at the start of the study and maintain that the relationship among the variables, specifically the linkage between competition, HMO capitation, and prices is less likely to have changed. Other comments provided by OPM and representatives of the FEHBP PPOs were incorporated into the draft, as appropriate.

As arranged with your office, unless you publicly announce the contents of this report earlier, we plan no further distribution of it until 30 days after its issue date. At that time, we will send copies of this report to the Director of the Office of Personnel Management and other interested parties. We will also provide copies to others upon request. In addition, the report is available at no charge on the GAO Web site at <http://www.gao.gov>.

If you or your staff have any questions about this report, please contact me at (202) 512- 7101 or steinwalda@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made major contributions to this report are listed in Appendix VI.

Sincerely yours,

A handwritten signature in black ink that reads "A. Bruce Steinwald". The signature is written in a cursive, flowing style.

A. Bruce Steinwald
Director, Health Care

Appendix I: Scope and Methodology

In this appendix we describe the data and methods we used to compare geographic variations in prices and spending in metropolitan areas¹ across the United States, and to analyze patterns in the factors that affect hospital and physician prices in these areas. We compared differences in hospital and physician prices and in per-enrollee spending across metropolitan areas using medical claims data from enrollees in selected national preferred provider organizations (PPO) participating in the Federal Employees Health Benefits Program (FEHBP). We identified potential factors that contributed to hospital price and physician price variation. We then examined the relationship between these factors and our measures of hospital and physician prices. Finally, we compared total spending per enrollee across metropolitan areas, and we examined the contribution of hospital and physician prices to hospital and physician spending.

FEHBP Data and Study Eligibility Criteria

We compared hospital prices, physician prices, and health care spending per enrollee in metropolitan areas using 2001 health claims data from FEHBP. These 2001 data were the most recent that were available at the time we began our study. FEHBP, the health insurance program administered by the Office of Personnel Management for federal civilian employees and retirees, covered about 8.5 million people in 2001. FEHBP negotiates with private insurers to provide health benefits. It is the largest employer-sponsored insurance program in the United States.

Our study included claims data from federal civilian employees under the age of 65 and their dependents who enrolled in selected national PPOs as their primary insurers.^{2,3} We selected these PPOs because they had a similar benefit structure with respect to coverage and out-of-pocket requirements. We prorated the data for enrollees with partial year enrollment based on their days of eligibility during 2001. We checked the dates of service on claims to ensure that they were included only if the service was delivered during a period when the member had insurance coverage. We excluded pharmaceutical claims from the study, as well as

¹Metropolitan areas refer to metropolitan statistical areas, which the Office of Management and Budget defines as a core population of at least 50,000 people and the adjacent communities linked socially and economically with that core.

²Our study may also have included some federal retirees under the age of 65, whose primary insurer was an FEHBP PPO.

³We excluded PPO enrollees age 65 and over because Medicare, not FEHBP, was their primary insurer, and consequently the PPOs did not have records of all claim payments.

mental health and chemical dependency claims, because these services were subcontracted to other organizations by at least one of the PPOs in our study, and the associated claims for all service types were not available.

We aggregated payments from our claims data to metropolitan areas. Metropolitan areas are designed to approximate market areas in general. Actual health care markets may include larger or smaller geographic areas and may not coincide exactly with metropolitan areas. However, we chose metropolitan areas for our analysis because they correspond fairly closely with health care markets and we were able to obtain claims and other data (see table 11) at the metropolitan area level. We did not examine prices or spending outside of metropolitan areas because nonmetropolitan areas are expansive and could include multiple markets that we would not be able to distinguish between.

In 2001, there were 331 metropolitan areas in the 50 states and the District of Columbia. We excluded some metropolitan areas from our study because we could not obtain complete claims information due to payment adjustments that occurred outside of the claims system or because there was an insufficient number of hospital stays to support our price analyses.⁴ In addition, we excluded one metropolitan area because it had a high proportion of claims from enrollees that lived outside of the area. In our physician price analyses, we had adequate data to make comparisons among 319 metropolitan areas. The population of these 319 metropolitan areas accounted for 98 percent of the population living in all metropolitan areas. In all other analyses, including physician spending and utilization, we had adequate data to make comparisons among 232 metropolitan areas.⁵ The population of these 232 metropolitan areas accounted for 88 percent of the population living in all metropolitan areas.

⁴We excluded metropolitan areas that had fewer than 38 hospital stays.

⁵Our analysis of hospital spending and utilization may have been limited by the small number of enrollees and admissions in some areas. Ten of the 232 metropolitan areas in this analysis had between 500 and 1,000 enrollees.

Hospital and Physician Price Estimates

We calculated price indices for hospital and physician services. We selected these services because together they represented nearly two-thirds of total health care spending and we could identify standard units of service—hospital stays and physician procedures—to which we could link prices. We derived our price estimates for each metropolitan area by aggregating payments from individual claims to the metropolitan area where the service was provided.⁶

To estimate the price of a hospital stay, we first aggregated payments from separate hospital claims to determine the total payments for that stay. This involved combining hospital claims for the same enrollee that had contiguous dates of service from the same provider. We excluded stays that involved multiple hospital providers, and mental health or chemical dependency services.

To account for differences in the types of hospital stay cases—known as “case mix”—across metropolitan areas, we first classified each stay into an All Patient Refined/Diagnosis Related Group (APR-DRG), using information on length of stay, diagnoses, procedures, and the patients’ demographic characteristics.⁷ Each APR-DRG is associated with a weight that reflects the expected resources required to treat a typical privately insured patient under age 65 in the same APR-DRG, relative to the average resources required for that representative group. We used the APR-DRG weight to adjust the hospital price for case mix. We excluded stays from the analysis for which there was insufficient information on the claim to assign a valid APR-DRG.

We adjusted hospital prices for differences in local costs of doing business by applying Medicare’s methodology of cost-adjusting hospital payments. We applied the Medicare hospital wage index to 65 percent of the price, which is Medicare’s estimate of the wage-related component of the costs, and applied the geographic adjustment factor to 9 percent of the price, which is Medicare’s estimate of the capital cost component. We excluded hospital stays that had either extremely high or low prices, because these high or low prices could distort average prices in an area. We trimmed the cost- and service-mix-adjusted data for outliers using a standard statistical

⁶Price throughout this report includes both the amount the PPO pays directly and the amount the enrollee is obligated to pay through deductibles and coinsurance.

⁷The APR-DRG software was provided to GAO by 3M Health Information Systems in Murray, Utah.

distribution (the lognormal) to remove observations more than three standard deviations above or below the mean.

For our physician price analysis, we excluded laboratory, radiology, anesthesiology, mental health and chemical dependency, unspecified services, and services billed with certain modifiers and codes, because these services were not uniformly classified or billed across the PPOs in our study. This minimized the potential for aberrant billing practices in some areas to inappropriately affect our results. We aggregated the prices for the remaining services to the metropolitan area based on the provider's place of service. To account for differences in the mix of physician services across metropolitan areas, we applied the Medicare methodology used to adjust physician payments. For each service, we applied the appropriate relative value unit to reflect the resources required to perform a specific service relative to an intermediate office visit.

To adjust physician prices for geographic differences in the cost of doing business, we applied the Medicare methodology used to adjust physician payments. We applied the appropriate Geographic Practice Cost Index (GPCI) to each physician payment. However, instead of applying the GPCIs used for Medicare payments, which are often based on geographic areas larger than a metropolitan area, we aggregated county-level cost indices to metropolitan areas and then applied them. We trimmed the cost and service-mix-adjusted data using the same method we used to trim our hospital price data, namely, using the lognormal distribution to identify and remove observations more than three standard deviations above or below the mean.

Factors Affecting Health Care Prices

We identified factors that might explain geographic differences in hospital and physician prices to use in our analysis, including measures that approximated provider competition and health maintenance organization (HMO) capitation. We also included measures sometimes associated with cost shifting, measures of provider supply, per capita income, and hospital ownership status. See table 11 for a list of factors and data sources.

Table 11: Factors Included in Analysis of Hospital and Physician Price, 2001

Factor	Measurement	Source of data to calculate measurement
Competition	Percent hospital beds of the two largest hospitals or hospital networks ^a	Verispan, L.L.C.
HMO capitation	Percent of primary care physicians' compensation from capitation ^b	InterStudy Publications and U.S. Census Bureau
Cost shifting	Percent of population enrolled in Medicare	InterStudy Publications and U.S. Census Bureau
	Percent of population enrolled in Medicaid	InterStudy Publications and U.S. Census Bureau
	Percent of population uninsured ^c	InterStudy Publications and U.S. Census Bureau
	Average Medicaid payment	The Lewin Group, Centers for Medicare and Medicaid Services, and U.S. Census Bureau
Supply of providers	Hospital beds per capita	Verispan, L.L.C. and U.S. Census Bureau
Per capita income	Population's real per capita income ^d	Bureau of Economic Analysis and Centers for Medicare and Medicaid Services
Hospital ownership status	Percent beds in for-profit hospitals	Verispan, L.L.C.
Census division	Indicator of the presence or absence of the metropolitan area in the census divisions	U.S. Census Bureau

Source: GAO analysis of FEHBP data.

^aIf a hospital was a member of more than one hospital network in a metropolitan area, we averaged the percent of hospital beds in the two largest hospitals or hospital networks across each combination of network affiliation.

^bWe estimated the percent of primary care physicians' compensation from capitation in each metropolitan area by multiplying the percent of HMO compensation to primary care physicians on a capitation basis by the percent of the population enrolled in HMOs.

^cInterStudy Publications based the percent uninsured in a metropolitan area on state uninsured rates.

^dWe computed real income by dividing per capita income by the Centers for Medicare and Medicaid Services hospital wage index for each metropolitan area.

We measured health care provider competition by the percentage of hospital beds in a metropolitan area that were owned by the two largest hospitals or hospital networks.⁸ While this value specifically measures concentration in the hospital services market, we used this same variable to explain both hospital and physician prices because physicians are often aligned with health systems and hospital networks.

We measured HMO capitation by the percentage of physician compensation that came from capitated payments.⁹ Physicians generally tend to prefer fee-for-service arrangements to capitation, which requires them to assume the financial risk of treating patients whose costs may exceed the capitation amount paid by the insurer. Therefore, we assumed that areas that had a higher percentage of physicians paid under capitation had a strong HMO presence with leverage to negotiate prices with physicians.

We examined our data for evidence of cost shifting—hospitals and physicians charging higher prices for privately insured patients in order to offset lower payments from other patients. We used several variables to determine whether there was cost shifting. To estimate Medicare's influence on prices, we analyzed the relationship between hospital and physician prices, and the percentage of the metropolitan area's population who were Medicare beneficiaries. To measure Medicaid's impact, we analyzed the relationship between prices, and both the percentage of Medicaid beneficiaries and the average Medicaid payment. Our measure of the average Medicaid payment in an area was constructed by first identifying commonly provided physician services and Medicaid payment rates for those services using data reported by The Lewin Group, and then applying the GPCI and relative value units unique to each service.¹⁰ We then weighted each Medicaid service using utilization estimates from the

⁸If a hospital was a member of more than one hospital network in a metropolitan area, we averaged the percent of hospital beds in the two largest hospitals or hospital networks across each combination of network affiliation.

⁹We estimated the percent of primary care physicians' compensation by multiplying the percent of HMO compensation to primary care physicians on a capitation basis by the percent of the population enrolled in HMOs.

¹⁰Some Medicaid payments for a given service varied depending on criteria such as patient age, sex, provider specialty, and practice setting. Researchers at The Lewin Group, who developed the statewide payments that we used in estimating metropolitan area Medicaid prices, reported that they focused on the payments most commonly made to a physician in private practice.

state of California. Our analysis assumed that the relative difference in payments across metropolitan areas for common procedures included in our Medicaid price variable was similar to that for other procedures not included in our analysis. We used the statewide percentages of people without health insurance in an area to estimate the impact of uncompensated or charity care on hospital and physician prices.¹¹

We included variables to account for the effect that the supply of health services or health service providers had on hospital and physician prices. Metropolitan areas with larger numbers of physicians or hospital beds per capita may have lower prices because larger numbers of providers compete for a given amount of business. In our analysis of hospital prices, we used hospital beds per capita to estimate this effect, and in our physician price analysis, we used the number of physicians per capita. We also experimented with other measures of supply, in particular, teaching hospital beds per capita and the number of physician specialists per capita.

We included a measure of income because variations in income can affect beneficiaries' ability to pay and thus may affect prices. Income data were unavailable for FEHBP enrollees, so we used per capita income in the metropolitan area. However, to account for geographic differences in purchasing power, specifically that the cost of living was higher in some metropolitan areas than others, we used the Centers for Medicare and Medicaid Services wage index as a proxy for the cost of living and divided this into dollar per capita income to calculate our income variable. We also included hospital ownership status in our analysis. We included the percent of hospital beds in for-profit hospitals and determined whether this had an impact on hospital and physician prices. Finally, we included dummy variables for each of the U.S. census divisions to account for regional effects.¹²

¹¹We were unable to find uninsured data at the metropolitan area level. Therefore we used the number of uninsured from InterStudy Publications. The estimates from InterStudy Publications of the uninsured are based on state numbers.

¹²In order for the regression to be estimated we had to omit one of the census division dummies from our model: we chose to omit Census Division 9.

Analytical Approach

We conducted two analyses to examine the relationship between our price variables and the factors described above. First, we grouped the metropolitan areas into quartiles for each of the factors.¹³ This enabled us to then compare the average prices in metropolitan areas, for example, with the highest levels of competition to those with the lowest. In addition, we also conducted regression analyses to examine the effect of each of the factors on price. To simplify the presentation of our results in the body of the report, we presented only those factors that were statistically significant in our regression analysis.¹⁴

Price Regression Analysis—Methods and Results

We used separate regression models to estimate the impact of our variables on hospital and physician prices. To simplify the calculation of independent variables' effects and to match the statistical distribution assumption we made in our data trimming of prices, we used a log-linear model: that is, we regressed the logarithm of price (hospital price and physician price) on the levels of our independent variables. We were concerned that our measures of provider supply—hospital beds per capita and physicians per capita in the case of hospital and physician price, respectively—were endogenous. For example, larger numbers of physicians could lead to lower physician prices, but lower physician prices could also make a metropolitan area less attractive to physicians and reduce their number. In order to address this issue we used the method of instrumental variables: a standard method to account for an endogenous explanatory variable.¹⁵ We also tested whether the HMO capitation variable was endogenous and found that it was not.

Tables 12 and 13 show the results for estimating the determinants of hospital and physician prices, respectively. The set of explanatory variables was the same for both hospital and physician prices except that we used hospital beds per capita and physicians per capita to measure provider supply in the hospital and physician price models, respectively. Our regression results for hospital price showed significant effects of

¹³Quartiles divide the distribution of prices from lowest to highest into four equal groups. The lowest quartile represents metropolitan areas ranked in the lowest 25 percent of price, and the highest quartile represents metropolitan areas ranked in the highest 25 percent of price.

¹⁴We did not perform an analysis comparing prices inside and outside of those census divisions that were significant in our regressions.

¹⁵P. Kennedy, *A Guide to Econometrics*, 5th ed. (Cambridge, Mass. MIT Press, 2003), p. 188.

provider market share and managed care presence on prices: both of these effects were consistent with the idea that raising market competitiveness lowers prices. Our variable measuring the market share of the two largest networks was positively related to price: that is, when the market became more concentrated (less competitive), price tended to be higher. Also, our HMO presence variable, the percentage of physician compensation from capitation payments, was negatively associated with price: that is, less HMO presence tended to increase price.