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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

GAO-05-856

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Highlights

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

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

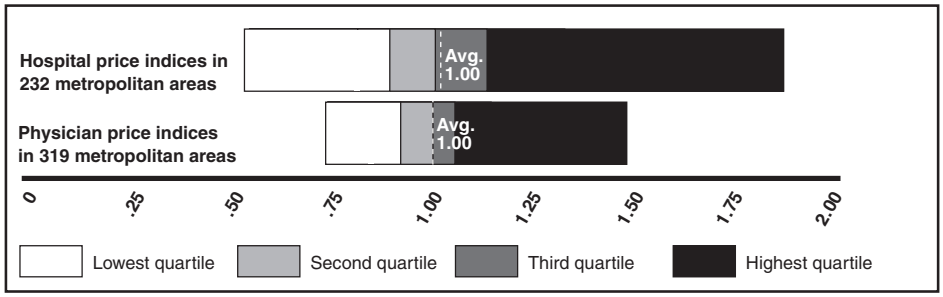
FEHBP PPOs paid substantially different prices for hospital inpatient and physician services across metropolitan areas in the United States. Hospital prices varied by 259 percent and physician prices varied by about 100 percent across metropolitan areas. While there were some areas with very high or 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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Accountability * Integrity * Reliability

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 areas[3] throughout the United States. This final report examines prices and spending in FEHBP PPOs to determine: (1) the extent to which hospital

[1]PPOs 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.

[2]GAO, *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).

[3]A 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

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

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

[6]We 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.

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

[8]Hospital 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

[9]Capitation 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.

[10]The 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.

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

[12]Total 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

[13]Our 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.

[14]We 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.

[15]We 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

[16]Total 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.

[17]We 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 1995-1996[20] and more than five times as many hip and knee replacement surgeries in some markets as in others in 2000-

[18]The 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).

[19]GAO 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 providers[24] 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.

[21]J.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.

[23]C.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.

[24]We 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

[25]See 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).

[26]Hospitals 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).

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

[28]See 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).

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

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

[31]L. 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

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

[33]J.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).

[34]See 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).

[35]See for example, M.A. Morrisey, "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.

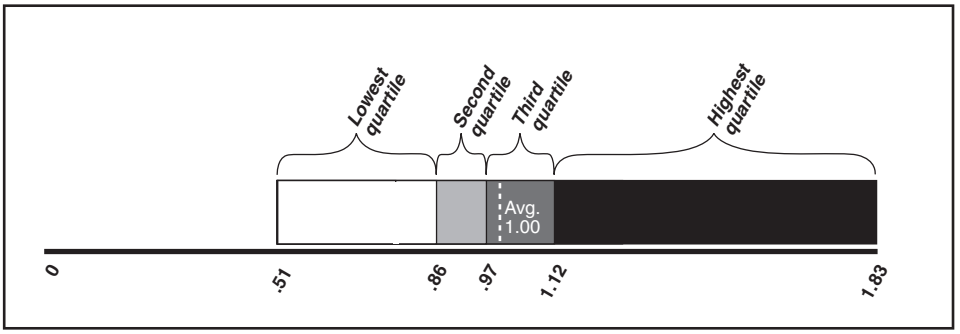
Hospital Prices Varied More than Physician Prices

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.

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

[37]Quartiles 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.

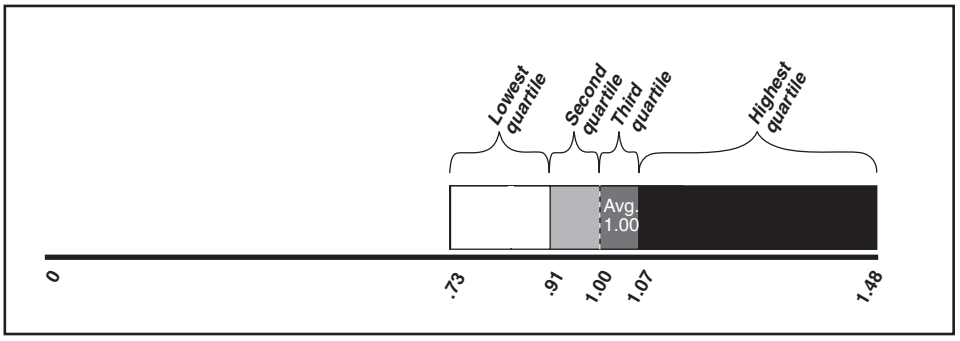
Note: We adjusted hospital prices to remove the effect of geographic differences in the costs of doing business (wages, rents, etc.) and differences in the severity of illnesses and mix of diagnoses among metropolitan areas. We converted hospital prices to an index by dividing the average price for a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

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

[39]We 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.

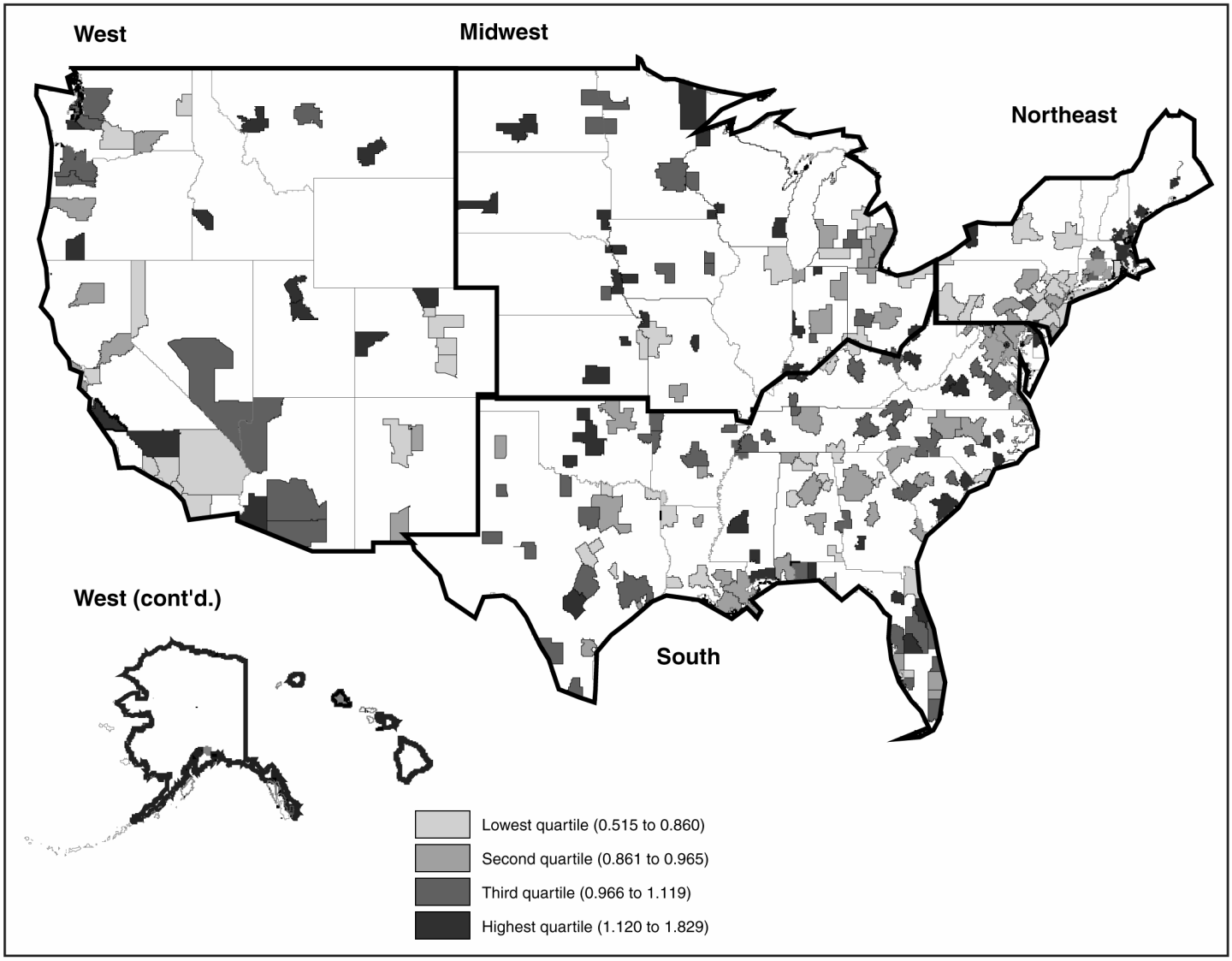
Notes: We adjusted physician prices to remove the effect of geographic variation in the costs of doing business (wages, rents, etc.) and differences in the mix of services among metropolitan areas. We converted physician prices to an index by dividing the average physician price per service in a metropolitan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

[a]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	[a]	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	[a]	224	Anniston, Ala.
10	La Crosse, Wisconsin-Minn.	223	Saginaw-Bay City-Midland, Mich.

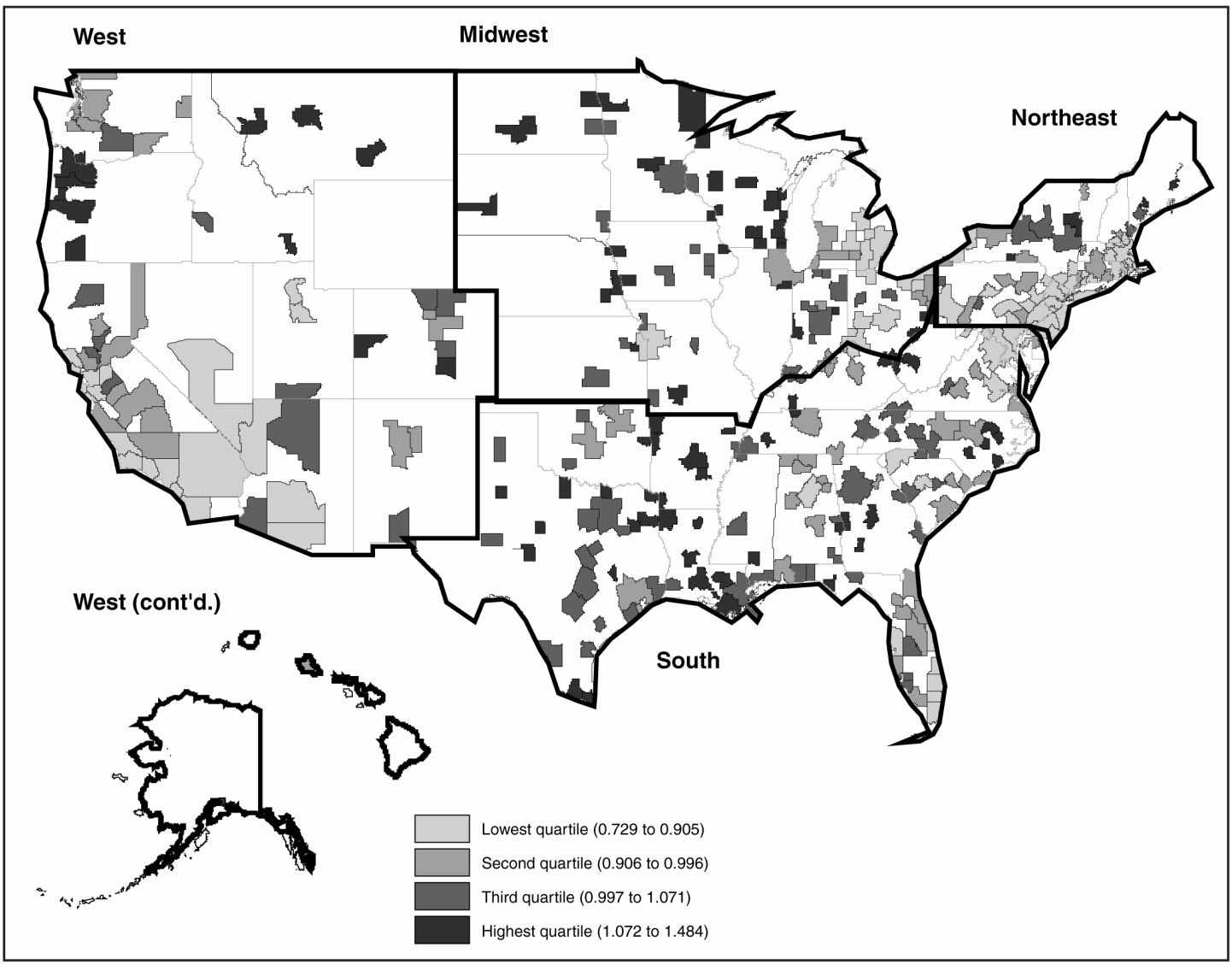
Source: GAO analysis of FEHBP data.

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.

[a]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[a] 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.

[a]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.

[a]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

[40]We 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.

[a]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.

[b]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

[c]The competition quartiles were based on 232 metropolitan areas for the hospital price analysis and 319 metropolitan areas for the physician price analysis.

[d]We 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.

[41]Other 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

[42]Capitation 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.

[a]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.

[b]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.

[c]HMO 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.

[d]We 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.

[43]Other 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

[44]HMO 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.

[45]We 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.

[a]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.

[b]We 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

[46]Other 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.

[47]These 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

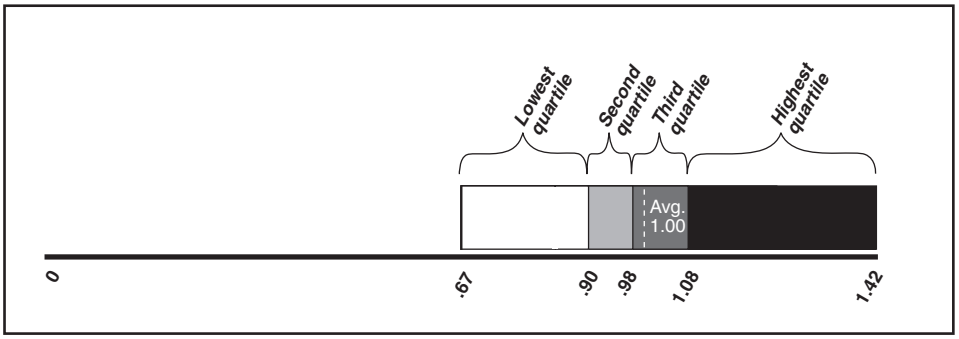
We found that total spending per enrollee varied by 112 percent across the 232 metropolitan areas in this analysis. Total spending per enrollee was the amount spent by FEHBP PPOs per person for all health care services except pharmaceuticals, mental health services, and substance abuse services, after 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

[48]The 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.

[49]Total 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

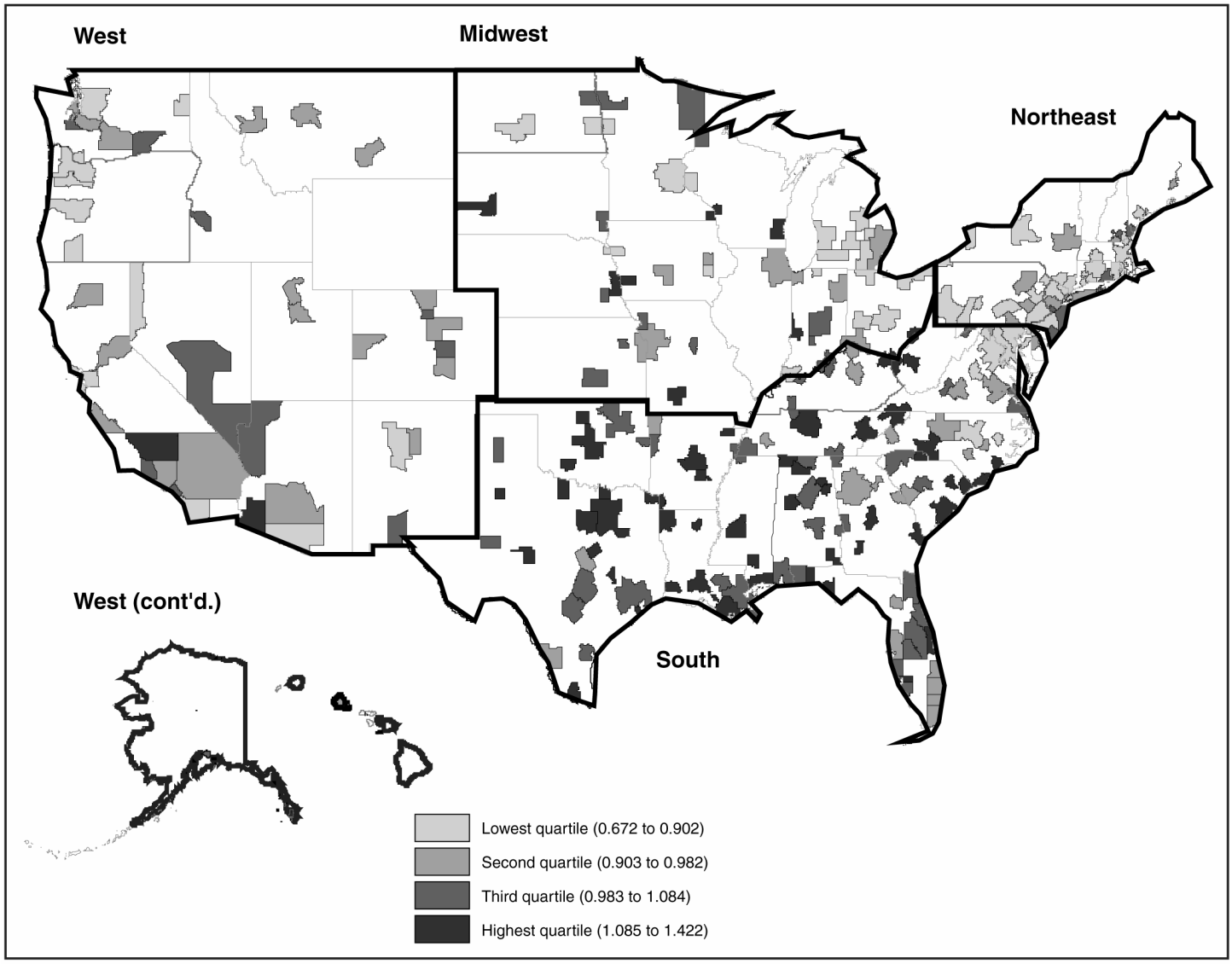


Source: GAO analysis of FEHBP data.

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[a] 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.

[a]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

[50]In 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.

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

[52]The 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.

[a]We 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.

[b]We 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

[53]The 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 off setting 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.

[a]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 232 metropolitan areas. The average physician price index is 1.00.

[b]We 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.

[c]We 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.

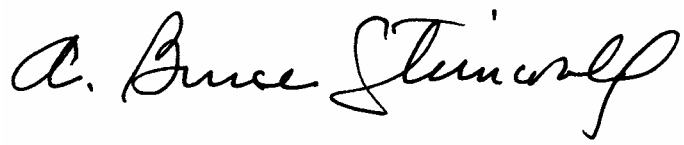
Representatives of the FEHBP PPOs were also given an opportunity to comment on a draft of the report. Representatives of one PPO noted that market dynamics and prices could have changed since 2001.

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. 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 areas[1] 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

[1]Metropolitan 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.

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

[3]We 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 heath 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.

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

[5]Our 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

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

[7]The 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.

[a]If 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.

[b]We 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.

[c]InterStudy Publications based the percent uninsured in a metropolitan area on state uninsured rates.

[d]We 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

[8]If 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.

[9]We 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.

[10]Some 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]

[11]We 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.

[12]In 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

[13]Quartiles 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.

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

[15]P. 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.

Table 12: Results for Hospital Price Regression—Estimated Effects of Selected Factors on Hospital Prices in Metropolitan Areas, 2001

Dependent variable is the logarithm of adjusted hospital stay price[a]			
Factor	**Variable used to measure factor**	**Parameter estimate**	**t-value**
Competition	Percent hospital beds of the two largest hospitals or hospital networks	0.1337	2.11**
HMO capitation	Percent of primary care physicians' compensation from capitation	-0.3213	-2.22**
Cost-shifting	Percent of population uninsured	-0.3621	-0.68
	Average Medicaid payment	0.0026	1.58
	Percent of population enrolled in Medicaid	-0.0538	-0.20
	Percent of population enrolled in Medicare	-0.5267	-1.14
Supply of providers	Hospital beds per capita	21.5968	0.50
Per capita income	Population's real per capita income	0.0000	-0.52
Hospital ownership status	Percent of beds in for profit hospitals	0.0767	0.86
Dummy variable indicator showing the Census Division in which the metropolitan area was located	Census Division 1 – New England	0.0625	0.78
	Census Division 2 – Middle Atlantic	-0.1158	-1.43
	Census Division 3 – East North Central	-0.0572	-0.73
	Census Division 4 – West North Central	0.0418	0.33
	Census Division 5 – South Atlantic	-0.0258	-0.35
	Census Division 6 – East South Central	-0.1845	-1.80*
	Census Division 7 – West South Central	-0.1077	-1.14
	Census Division 8 – Mountain	-0.0428	-0.63
	Census Division 9 – Pacific[b]		
	Intercept	8.8972	45.67***
	R-squared	0.25	
	Observations	228	
	*** significant at the 1% level		
	** significant at the 5% level		
	* significant at the 10% level		

Source: GAO analysis.

[a]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.

[b]The Pacific Census Division was the excluded category. In order for the regression model's parameters to be estimated, we needed to exclude one of the Census Divisions.

Table 13: Results for Physician Price Regression—Estimated Effects of Selected Factors on Physician Prices in Metropolitan Areas, 2001

Dependent variable is the logarithm of adjusted physician services price[a]			
Factor	**Variable used to measure factor**	**Parameter estimate**	**t-value**
Competition	Percent hospital beds of the two largest hospitals or hospital networks	0.1234	4.36***
HMO capitation	Percent of primary care physicians' compensation from capitation	-0.1393	-2.24**
Cost-shifting	Percent of population uninsured	-0.5328	-2.22**
	Average Medicaid payment	0.0041	5.24***
	Percent of population enrolled in Medicaid	0.1081	0.91
	Percent of population enrolled in Medicare	0.0217	0.10
Hospital ownership status	Percent of beds in for profit hospitals	-0.0536	-1.34
Per capita income	Population's real per capita income	0.0000	0.00
Supply of providers	Physicians per capita (physicians per 1000 population)	-0.0002	-0.91
Dummy variable indicator showing the Census Division in which the metropolitan area was located	Census Division 1 – New England	-0.1112	-2.79***
	Census Division 2 – Middle Atlantic	-0.0346	-1.01
	Census Division 3 – East North Central	0.0041	0.14
	Census Division 4 – West North Central	0.0120	0.32
	Census Division 5 – South Atlantic	-0.0470	-1.58
	Census Division 6 – East South Central	-0.0558	-1.61
	Census Division 7 – West South Central	0.0947	3.24***
	Census Division 8 – Mountain	-0.0240	-0.77
	Census Division 9 – Pacific[b]		
	Intercept	3.7808	35.48***
	R-squared	0.46	
	Observations	315	
	*** significant at the 1% level		
	** significant at the 5% level		
	* significant at the 10% level		

Source: GAO analysis.

[a]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.

[b]The Pacific Census Division was the excluded category. In order for the regression model's parameters to be estimated, we needed to exclude one of the Census Divisions.

Our measures of cost-shifting effects were mostly not significant and none of the results supported the claim that more Medicaid enrollees, lower Medicaid payments, more Medicare enrollees, or more uninsured people were associated with higher hospital or physician prices. Ideally, we would have included an indicator of Medicare price levels for each area, such as the wage index or the GPCI. However, we did not include these as separate explanatory variables in the regression models because we had used the wage index and the GPCI to adjust the hospital and physician prices, respectively, for differences in the cost of doing business in different areas. Therefore, our sole measure of the impact of the Medicare program on prices was the percent of the population who were Medicare beneficiaries. In the physician price regression, the average Medicaid payment was significant. However, Medicaid payments were positively associated with prices, which was inconsistent with the negative association we would have expected if cost shifting were occurring. In the physician price analysis, the percent of people uninsured was significantly related to price and the result showed that where there were more uninsured people, prices were actually lower, rather than higher, as would have been predicted by the cost-shifting hypothesis.

Our inclusion of the set of census division dummy variables allowed us to measure factors affecting price that were due simply to location and that were not accounted for by the other variables included in the model. In both price regression models, we ran an F-test that showed that the set of census division dummy variables was jointly significant.

In the cases where our explanatory variables in the regression were significant, we calculated the significant variables' impact on prices by using our regression results to calculate the percent change in price for a given increase in the explanatory variable. To do this, we simulated the effect of increasing the significant explanatory variable from its average in its lowest quartile to its average in its highest quartile, while controlling for other factors. This was accomplished using the following steps: (1) we calculated the average value of the statistically significant explanatory variable for its lowest quartile, and input that value into our estimated regression equation to calculate price, (2) we calculated the average value of the key explanatory variable in its highest quartile, and used that value in our estimated regression model to calculate price again, and (3) we calculated the percent difference in price using the results from (1) and (2). See table 14.

Table 14: Effects of Changes in Explanatory Variables on Prices

Significant explanatory variable	Percent impact on physician price	Percent impact on hospital price
Percent hospital beds of the two largest hospitals or hospital networks	6.64	7.62
Percent of primary care physicians' compensation from capitation	-3.31	-7.17
Average Medicaid payment	9.69	[a]
Percent of population uninsured	-6.05	[a]

Source: GAO analysis.

Note: The percent impact is the change in price that would follow an increase in the explanatory variable from its average value in its lowest quartile to its average value in its highest quartile.

[a]The average cost-adjusted Medicaid fee and the percent uninsured explanatory variables were not statistically significant in the hospital price regression.

We also tested and opted not to include other variables in our regression: specifically, we tried to explain price variations by including the percent of the labor force in the metropolitan area covered by a labor union contract; the mortality rate for persons aged more than one but less than 65 years in the metropolitan area—a proxy for health status; and the effect of certificate-of-need laws.[16] We also used the number of teaching hospital beds per capita to see if this had an independent effect on price, separate from the effects of supply. We included this variable because it was possible that more teaching hospital beds in a metropolitan area might indicate more cutting-edge and higher quality services, or teaching hospitals might conduct more tests or services, which might in turn affect prices. We ultimately excluded labor union, mortality rates, certificate-of-need laws, and teaching hospital variables from our explanatory variables because they were not the focus of our analysis, they were not statistically significant, and their inclusion did not affect the significance of most of the other explanatory variables in the model.

[16]A certificate-of-need law generally requires that a hospital or nursing home obtain approval from the state in which it is located before hospital construction or capital improvements occur.

Spending Analysis

To determine average total spending per enrollee in each metropolitan area, we summed all payments for each enrollee, assigned enrollees to their metropolitan areas of residence, and then calculated the average for each metropolitan area. We adjusted spending service categories for geographic input costs, removed outliers, and accounted for differences in the age and sex distributions across metropolitan areas. After applying our eligibility criteria and removing outliers, we had about 2.1 million enrollees in our study.

We accounted for geographic differences in the costs of providing hospital inpatient,[17] hospital outpatient, home health, rehabilitation, skilled nursing facility, other outpatient, and ambulatory surgery center services by first summing the payments per enrollee by service categories and then applying Medicare's hospital wage index to the labor-related portion of the total payment for each type of service. This approach is similar to the methodology used by Medicare to adjust such provider payments.[18]

We accounted for geographic differences in the cost of providing physician services using a different methodology, but one that generally follows the basic methodology used by Medicare. We applied the appropriate GPCIs to the total physician payments.[19] However, our method varied slightly from Medicare's in that instead of applying the GPCIs at the carrier/locality level, we calculated separate cost indices for each metropolitan area.[20]

We excluded enrollees with high total health care spending because spending for those enrollees could distort average spending in an area with low enrollment. To identify enrollees with high spending, we used a

[17]Medicare adjusts hospital inpatient payments for labor and capital-related variations in costs. In our study, we applied labor and capital adjustments to the hospital inpatient portion of spending and to hospital inpatient price.

[18]We excluded mental health, chemical dependency services, and pharmaceuticals from our spending analysis.

[19]There are three GPCIs reflecting the cost of three different types of inputs to physician services: physician work, physician practice expenses, and expenses for physician liability insurance. Each GPCI is used to adjust for the price level for related inputs in the local market where the service is furnished.

[20]There are 89 carrier/locality regions nationwide and 331 metropolitan areas in the 50 states and District of Columbia. Thus, a carrier/locality area is, on average, much larger than a metropolitan area. We used county-level data for the GPCIs and aggregated those data to the metropolitan area level.

standard statistical distribution (the lognormal). We removed enrollees from this analysis whose spending was at least three standard deviations above the mean.

We adjusted spending for the age and sex distribution of each metropolitan area's population. To do this, we calculated the average age- and sex-specific spending rates of all 232 metropolitan areas combined, and applied these averages to the actual age and sex distribution in each metropolitan area. This yielded an "expected" spending rate for each metropolitan area: the spending in that metropolitan area if it had the study average spending rate, given the age and sex distribution of that metropolitan area's population. We then calculated the ratio of actual cost-adjusted spending to expected cost-adjusted spending. This yielded an index of how much higher or lower spending in the specific metropolitan area was from what would be expected if it had average spending rates, given its age and sex composition. An index value greater than 1.00 implies spending was higher than expected and an index value less than 1.00 implies spending was lower than expected.

Decomposing Spending Variation into Price and Utilization Effects

We estimated the relative contribution of price and utilization variation to spending variation in 232 metropolitan areas. To do this, we first computed measures of price, spending, and utilization for hospital and physician services. We then analyzed price and utilization differences between metropolitan areas in the highest and lowest spending quartiles to decompose spending into its component parts.

We used the same method to adjust hospital and physician spending as we did for total spending. That is, we used the appropriate Medicare cost adjustments and adjustments for age and sex. To estimate hospital and physician prices, we used prices we had computed from our price analysis for the same 232 metropolitan areas.

We defined hospital utilization as the count of hospital stays. We excluded mental health and chemical dependency stays, and other nonacute hospital stays, such as nursing home and rehabilitation services, in each of the 232 metropolitan areas. Our measure of physician utilization was simply the count of services provided by physicians, excluding pathology, radiology, anesthesia, and psychiatric services. We aggregated the data for service use per enrollee up to the metropolitan area, and we then adjusted these data in a similar way to the spending data: that is, we adjusted for age and sex composition of the area by calculating the ratio of actual utilization to expected utilization. We calculated the physician and

hospital utilization indices using the 232 metropolitan areas as the population basis.

For both hospital and physician services, we compared the simple average adjusted spending per enrollee in the highest spending quartile metropolitan areas with the lowest spending quartile metropolitan areas. Similarly, we compared the average adjusted price and the average adjusted utilization per enrollee in the highest versus the lowest spending quartile. The proportional difference in spending between the highest and lowest quartiles can be divided into (1) the proportional difference in price between the highest and lowest spending quartiles, and (2) the proportional difference in utilization between the highest and lowest spending quartiles. In order to divide the variation in spending between price and utilization differences, we compared the values of (1) to (2) above. We estimated the relative contribution of physician price and utilization to spending by analyzing the percentage difference between the average prices and utilization in the highest and lowest spending quartiles, relative to the summed total of the percentage differences, as shown in table 9.

Data Reliability

We used multiple data sources for this report. We obtained 2001 health care claims data from several PPOs participating in FEHBP. In addition, we obtained data describing characteristics of metropolitan areas from several other sources. See table 11. We determined that the data were sufficiently reliable to address the study objectives.

We verified that our claims data were sufficiently reliable and unbiased in several ways. First, we interviewed staff from each of the FEHBP PPOs participating in the study to obtain an understanding of the completeness and accuracy of the data we had requested. Upon receipt of the data from the PPOs, we conducted numerous tests and edit checks to ensure that our data were complete and accurate: we reviewed the documentation that accompanied the data; we checked that essential elements of the data were populated with credible values; we excluded enrollees and claims records that did not match study eligibility criteria; and we examined the internal consistency and validity of the data, coordinating with any PPO that submitted data that required clarification or resubmission of corrected data. To test the validity of the hospital location variable from our claims data, we examined the proportion of hospital stays that occurred outside of the enrollee's state of residence or an adjacent state. For one metropolitan area, we conducted a sensitivity analysis to quantify the impact on our price estimate of removing the admissions from

enrollees in another state. We concluded that our location data were sufficiently reliable for the purposes of our study.

Ultimately, we excluded 12 of the 331 metropolitan areas for one of two reasons. First, in some metropolitan areas, some PPOs made additional "reconciliation" payments that were not recorded in the claims system, and price estimates would have been understated in these areas. Second, if a disproportionate number of enrollees traveled into a metropolitan area to receive care, we excluded the metropolitan area. We also excluded some hospital stays and physician services from our hospital and physician price estimates, respectively, either because there were insufficient data to case-mix adjust these services or because hospital or physician billing conventions were inconsistent across metropolitan areas for those services.

We verified that the data describing market forces and other factors in a metropolitan area were sufficiently reliable and unbiased using methods similar to those we used to verify the claims data. We discussed data quality issues with data suppliers, reviewed the suppliers' documentation and internal data testing, and conducted our own tests for data completeness and credibility. Some limitations came to light through these processes. First, because direct estimates of uninsured rates were unavailable for all metropolitan areas in the study, we used the InterStudy Publications' estimates of the uninsured for metropolitan areas, which were based on statewide uninsured estimates. Similarly, metropolitan area specific Medicaid payment rates were not available, and Medicaid utilization rates were not available to weight the average of Medicaid payments in metropolitan areas. Consequently, we used statewide payment and utilization estimates for California's Medicaid program, which were reported by The Lewin Group.[21]

We performed our work from September 2002 through July 2005 in accordance with generally accepted government auditing standards.

[21]Where metropolitan areas overlapped several states, we prorated state Medicaid payment rates based on U.S. census estimates of Medicaid enrollment in each component county of the metropolitan area. We used utilization rates in California to weight the average Medicaid payment in each metropolitan area because utilization rates were not readily available for any other state.

Appendix II: FEHBP PPO Adjusted Hospital Prices in U.S. Metropolitan Areas, 2001

The adjusted hospital price indices based on FEHBP PPO payments for hospital stays in 232 metropolitan areas are presented below ranked in order from highest to lowest price.

Table 15: Ranking of Metropolitan Areas by Adjusted Hospital Prices, 2001

Rank	Metropolitan area	Predominant state[a]	Adjusted hospital price index
1	[b]	[b]	1.829
2	Dover	DE	1.680
3	Biloxi-Gulfport-Pascagoula	MS	1.591
4	St. Joseph	MO	1.578
5	Milwaukee-Waukesha	WI	1.568
6	Salinas	CA	1.499
7	Buffalo-Niagara Falls	NY	1.451
8	Grand Junction	CO	1.431
9	[b]	[b]	1.419
10	La Crosse, WI-MN	WI	1.385
11	Wichita	KS	1.379
12	Manchester	NH	1.365
13	Bakersfield	CA	1.361
14	Sioux Falls	SD	1.357
15	Bangor	ME	1.340
16	Owensboro	KY	1.326
17	Fort Walton Beach	FL	1.322
18	Portsmouth-Rochester, NH-ME	NH	1.318
19	Lakeland-Winter Haven	FL	1.310
20	South Bend	IN	1.285
21	Honolulu	HI	1.277
22	Albany	GA	1.270
23	Oklahoma City	OK	1.270
24	Nashua	NH	1.266
25	Olympia	WA	1.262
26	Omaha, NE-IA	NE	1.256
27	Duluth-Superior, MN-WI	MN	1.252
28	Rapid City	SD	1.249
29	Terre Haute	IN	1.244
30	Charleston	WV	1.243
31	Wilmington-Newark, DE-MD	DE	1.239
32	Lynchburg	VA	1.237

Rank	Metropolitan area	Predominant state[a]	Adjusted hospital price index
33	Billings	MT	1.235
34	[b]	[b]	1.233
35	Myrtle Beach	SC	1.231
36	Columbia	MO	1.230
37	Topeka	KS	1.225
38	Evansville-Henderson, IN-KY	IN	1.193
39	Lawton	OK	1.192
40	Missoula	MT	1.187
41	Daytona Beach	FL	1.186
42	Medford-Ashland	OR	1.177
43	Roanoke	VA	1.176
44	Bismarck	ND	1.173
45	Charleston-North Charleston	SC	1.161
46	Portland	ME	1.158
47	Sioux City, IA-NE	IA	1.157
48	Jackson	MS	1.151
49	Hattiesburg	MS	1.148
50	Provo-Orem	UT	1.147
51	Fort Collins-Loveland	CO	1.144
52	Boise City	ID	1.138
53	Salt Lake City-Ogden	UT	1.137
54	Enid	OK	1.137
55	Gainesville	FL	1.136
56	San Antonio	TX	1.132
57	Parkersburg-Marietta, WV-OH	WV	1.127
58	Boston, MA-NH	MA	1.123
59	Memphis, TN-AR-MS	TN	1.117
60	Cedar Rapids	IA	1.113
61	Jackson	TN	1.111
62	Houston	TX	1.103
63	Huntington-Ashland, WV-KY-OH	WV	1.102
64	Fayetteville	NC	1.102
65	Springfield	MA	1.101
66	Melbourne-Titusville-Palm Bay	FL	1.099
67	Portland-Vancouver, OR-WA	OR	1.098
68	Iowa City	IA	1.092
69	Florence	SC	1.087

Rank	Metropolitan area	Predominant state[a]	Adjusted hospital price index
70	Fort Pierce-Port St. Lucie	FL	1.086
71	Tacoma	WA	1.086
72	Grand Forks, ND-MN	ND	1.083
73	Lubbock	TX	1.078
74	New Haven-Meriden	CT	1.071
75	Great Falls	MT	1.068
76	Columbus, GA-AL	GA	1.065
77	Fort Myers-Cape Coral	FL	1.061
78	Fargo-Moorhead, ND-MN	ND	1.061
79	Des Moines	IA	1.060
80	Minneapolis-St. Paul, MN-WI	MN	1.057
81	Fort Smith, AR-OK	AR	1.052
82	Bremerton	WA	1.048
83	Richmond-Petersburg	VA	1.041
84	Lincoln	NE	1.040
85	Phoenix-Mesa	AZ	1.039
86	Laredo	TX	1.033
87	Salem	OR	1.031
88	Bloomington	IN	1.029
89	Lexington	KY	1.029
90	Reading	PA	1.028
91	Augusta-Aiken, GA-SC	GA	1.027
92	Fort Worth-Arlington	TX	1.025
93	[b]	[b]	1.024
94	Austin-San Marcos	TX	1.019
95	Asheville	NC	1.016
96	Wichita Falls	TX	1.015
97	Little Rock-North Little Rock	AR	1.015
98	Las Vegas, NV-AZ	NV	1.013
99	McAllen-Edinburg-Mission	TX	1.011
100	Jonesboro	AR	1.006
101	Miami	FL	1.006
102	Charlotte-Gastonia-Rock Hill, NC-SC	NC	1.002
103	Orlando	FL	1.001
104	Seattle-Bellevue-Everett	WA	0.993
105	Pensacola	FL	0.986
106	Odessa-Midland	TX	0.983

Rank	Metropolitan area	Predominant state[a]	Adjusted hospital price index
107	Lansing-East Lansing	MI	0.983
108	Johnson City-Kingsport-Bristol, TN-VA	TN	0.981
109	Charlottesville	VA	0.980
110	Knoxville	TN	0.978
111	Fayetteville-Springdale-Rogers	AR	0.978
112	Clarksville-Hopkinsville, TN-KY	TN	0.975
113	Dayton-Springfield	OH	0.974
114	San Angelo	TX	0.971
115	Tucson	AZ	0.970
116	Tampa-St. Petersburg-Clearwater	FL	0.967
117	Ann Arbor	MI	0.965
118	Scranton—Wilkes-Barre—Hazleton	PA	0.964
119	Eugene-Springfield	OR	0.964
120	Atlantic-Cape May	NJ	0.963
121	Anchorage	AK	0.962
122	Bridgeport	CT	0.961
123	San Francisco	CA	0.960
124	Panama City	FL	0.957
125	Baltimore	MD	0.953
126	Greenville-Spartanburg-Anderson	SC	0.950
127	Trenton	NJ	0.946
128	Redding	CA	0.946
129	York	PA	0.942
130	Amarillo	TX	0.941
131	Lawrence, MA-NH	MA	0.933
132	Springfield	MO	0.932
133	Washington, DC-MD-VA-WV	VA	0.931
134	Las Cruces	NM	0.930
135	Indianapolis	IN	0.928
136	Gary	IN	0.927
137	Detroit	MI	0.927
138	Tulsa	OK	0.921
139	Greensboro—Winston-Salem—High Point	NC	0.919
140	Nashville	TN	0.914
141	Santa Fe	NM	0.912
142	Raleigh-Durham-Chapel Hill	NC	0.911
143	Grand Rapids-Muskegon-Holland	MI	0.906

Rank	Metropolitan area	Predominant state[a]	Adjusted hospital price index
144	Baton Rouge	LA	0.905
145	Columbia	SC	0.900
146	Middlesex-Somerset-Hunterdon	NJ	0.899
147	Sarasota-Bradenton	FL	0.896
148	Cumberland, MD-WV	MD	0.895
149	Waterbury	CT	0.894
150	Atlanta	GA	0.891
151	[b]	[b]	0.889
152	Macon	GA	0.888
153	Birmingham	AL	0.886
154	Harrisburg-Lebanon-Carlisle	PA	0.885
155	Sacramento	CA	0.884
156	Fort Wayne	IN	0.883
157	New London-Norwich, CT-RI	CT	0.876
158	Toledo	OH	0.875
159	New Orleans	LA	0.873
160	Florence	AL	0.870
161	West Palm Beach-Boca Raton	FL	0.870
162	Mobile	AL	0.870
163	Columbus	OH	0.868
164	Hartford	CT	0.867
165	Fort Lauderdale	FL	0.866
166	Corpus Christi	TX	0.866
167	Savannah	GA	0.865
168	Monroe	LA	0.864
169	Montgomery	AL	0.864
170	Houma	LA	0.864
171	Galveston-Texas City	TX	0.862
172	Dallas	TX	0.861
173	Richland-Kennewick-Pasco	WA	0.861
174	Norfolk-Virginia Beach-Newport News, VA-NC	VA	0.861
175	Pittsburgh	PA	0.861
176	Bergen-Passaic	NJ	0.860
177	Denver	CO	0.859
178	Bryan-College Station	TX	0.859
179	Colorado Springs	CO	0.859
180	Monmouth-Ocean	NJ	0.859

Rank	Metropolitan area	Predominant state[a]	Adjusted hospital price index
181	Reno	NV	0.858
182	Texarkana, TX-Texarkana	TX	0.857
183	Punta Gorda	FL	0.853
184	Waco	TX	0.853
185	Flint	MI	0.847
186	Kansas City, MO-KS	MO	0.838
187	Oakland	CA	0.836
188	Killeen-Temple	TX	0.830
189	Tuscaloosa	AL	0.826
190	Philadelphia, PA-NJ	PA	0.820
191	Chattanooga, TN-GA	TN	0.814
192	Providence-Fall River-Warwick, RI-MA	RI	0.813
193	Sherman-Denison	TX	0.812
194	Kalamazoo-Battle Creek	MI	0.808
195	Jacksonville	FL	0.807
196	Boulder-Longmont	CO	0.804
197	Cleveland-Lorain-Elyria	OH	0.803
198	Shreveport-Bossier City	LA	0.799
199	Syracuse	NY	0.797
200	Wilmington	NC	0.794
201	Erie	PA	0.790
202	Jersey City	NJ	0.787
203	Yakima	WA	0.786
204	Los Angeles-Long Beach	CA	0.785
205	Chicago	IL	0.785
206	Huntsville	AL	0.780
207	Hagerstown	MD	0.779
208	Johnstown	PA	0.777
209	Cincinnati, OH-KY-IN	OH	0.776
210	Lafayette	LA	0.772
211	Gadsden	AL	0.769
212	Lake Charles	LA	0.764
213	Louisville, KY-IN	KY	0.761
214	Allentown-Bethlehem-Easton	PA	0.754
215	Spokane	WA	0.746
216	Athens	GA	0.745
217	Albuquerque	NM	0.743

Rank	Metropolitan area	Predominant state[a]	Adjusted hospital price index
218	Nassau-Suffolk	NY	0.740
219	Dothan	AL	0.728
220	San Diego	CA	0.727
221	Riverside-San Bernardino	CA	0.727
222	Newark	NJ	0.725
223	Saginaw-Bay City-Midland	MI	0.712
224	Anniston	AL	0.709
225	Decatur	AL	0.709
226	Altoona	PA	0.678
227	New York	NY	0.676
228	Newburgh, NY-PA	NY	0.675
229	Albany-Schenectady-Troy	NY	0.674
230	Ventura	CA	0.635
231	Pueblo	CO	0.609
232	Orange County	CA	0.515

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.

[a]Some metropolitan areas spanned more than one state. In those cases, we assigned the state that contained the largest proportion of the population of the metropolitan area.

[b]Metropolitan area name withheld because there was only one hospital in the metropolitan area and the data were proprietary.

Appendix III: FEHBP PPO Adjusted Physician Prices in U.S. Metropolitan Areas, 2001

The adjusted physician price indices based on FEHBP PPO payments for physician services in 319 metropolitan areas are presented below ranked in order from highest to lowest price.

Table 16: Ranking of Metropolitan Areas by Adjusted Physician Prices, 2001

Rank	Metropolitan area	Predominant state[a]	Adjusted physician price index
1	La Crosse, WI-MN	WI	1.484
2	Wausau	WI	1.459
3	Eau Claire	WI	1.418
4	Madison	WI	1.414
5	Jonesboro	AR	1.348
6	Janesville-Beloit	WI	1.324
7	Great Falls	MT	1.287
8	Green Bay	WI	1.279
9	Appleton-Oshkosh-Neenah	WI	1.267
10	Racine	WI	1.239
11	Sheboygan	WI	1.231
12	Billings	MT	1.230
13	Wichita Falls	TX	1.224
14	Anchorage	AK	1.221
15	Corvallis	OR	1.220
16	Milwaukee-Waukesha	WI	1.217
17	Jacksonville	NC	1.216
18	Kenosha	WI	1.213
19	Fayetteville-Springdale-Rogers	AR	1.206
20	Texarkana, TX-Texarkana	TX	1.204
21	Fort Smith, AR-OK	AR	1.202
22	Monroe	LA	1.198
23	Pine Bluff	AR	1.194
24	Missoula	MT	1.190
25	Salem	OR	1.187
26	St. Cloud	MN	1.187
27	Eugene-Springfield	OR	1.184
28	Duluth-Superior, MN-WI	MN	1.178
29	Medford-Ashland	OR	1.165
30	Alexandria	LA	1.162
31	Houma	LA	1.159
32	Sherman-Denison	TX	1.159

Rank	Metropolitan area	Predominant state[a]	Adjusted physician price index
33	Wheeling, WV-OH	WV	1.157
34	Shreveport-Bossier City	LA	1.145
35	Grand Junction	CO	1.144
36	Omaha, NE-IA	NE	1.143
37	Bryan-College Station	TX	1.143
38	Little Rock-North Little Rock	AR	1.142
39	Rocky Mount	NC	1.136
40	Springfield	MO	1.135
41	Lafayette	LA	1.134
42	Lubbock	TX	1.129
43	San Angelo	TX	1.129
44	Lincoln	NE	1.129
45	Pueblo	CO	1.128
46	Abilene	TX	1.121
47	Hattiesburg	MS	1.119
48	Kankakee	IL	1.119
49	Fayetteville	NC	1.111
50	Parkersburg-Marietta, WV-OH	WV	1.111
51	Jackson	TN	1.106
52	Charleston	WV	1.105
53	Longview-Marshall	TX	1.103
54	Sioux City, IA-NE	IA	1.101
55	Clarksville-Hopkinsville, TN-KY	TN	1.101
56	Albany	GA	1.098
57	Bismarck	ND	1.097
58	Lawrence	KS	1.096
59	Panama City	FL	1.096
60	Rapid City	SD	1.096
61	Lewiston-Auburn	ME	1.096
62	Bangor	ME	1.095
63	Muncie	IN	1.093
64	Baton Rouge	LA	1.093
65	Grand Forks, ND-MN	ND	1.091
66	Portland-Vancouver, OR-WA	OR	1.085
67	Huntington-Ashland, WV-KY-OH	WV	1.085
68	Elmira	NY	1.084
69	Tyler	TX	1.084

Rank	Metropolitan area	Predominant state[a]	Adjusted physician price index
70	Pocatello	ID	1.083
71	Dubuque	IA	1.082
72	Macon	GA	1.081
73	Terre Haute	IN	1.079
74	Goldsboro	NC	1.078
75	Greenville	NC	1.077
76	Columbus, GA-AL	GA	1.075
77	McAllen-Edinburg-Mission	TX	1.074
78	Brownsville-Harlingen-San Benito	TX	1.072
79	Glens Falls	NY	1.072
80	Johnson City-Kingsport-Bristol, TN-VA	TN	1.072
81	Laredo	TX	1.072
82	Waco	TX	1.069
83	Cedar Rapids	IA	1.067
84	Boise City	ID	1.066
85	Greeley	CO	1.065
86	Fort Walton Beach	FL	1.065
87	Lawton	OK	1.064
88	Iowa City	IA	1.063
89	Hickory-Morganton-Lenoir	NC	1.062
90	Asheville	NC	1.060
91	Lake Charles	LA	1.059
92	Sioux Falls	SD	1.057
93	Enid	OK	1.057
94	Portland	ME	1.055
95	Pensacola	FL	1.051
96	Yuma	AZ	1.051
97	Fort Myers-Cape Coral	FL	1.050
98	Joplin	MO	1.049
99	South Bend	IN	1.049
100	Fort Wayne	IN	1.049
101	Lafayette	IN	1.046
102	St. Joseph	MO	1.046
103	Biloxi-Gulfport-Pascagoula	MS	1.045
104	Auburn-Opelika	AL	1.044
105	Fort Worth-Arlington	TX	1.043
106	Odessa-Midland	TX	1.043

Rank	Metropolitan area	Predominant state[a]	Adjusted physician price index
107	Fargo-Moorhead, ND-MN	ND	1.042
108	Flagstaff, AZ-UT	AZ	1.042
109	Savannah	GA	1.041
110	Knoxville	TN	1.041
111	Colorado Springs	CO	1.040
112	Elkhart-Goshen	IN	1.038
113	Las Cruces	NM	1.037
114	Evansville-Henderson, IN-KY	IN	1.036
115	Beaumont-Port Arthur	TX	1.034
116	Columbia	MO	1.034
117	Topeka	KS	1.034
118	Sharon	PA	1.034
119	Fort Collins-Loveland	CO	1.033
120	Killeen-Temple	TX	1.033
121	Owensboro	KY	1.032
122	Sumter	SC	1.032
123	Corpus Christi	TX	1.030
124	Yuba City	CA	1.029
125	Victoria	TX	1.029
126	Jackson	MS	1.028
127	Waterloo-Cedar Falls	IA	1.027
128	New Orleans	LA	1.026
129	Yakima	WA	1.024
130	Dallas	TX	1.022
131	Austin-San Marcos	TX	1.021
132	Utica-Rome	NY	1.021
133	Portsmouth-Rochester, NH-ME	NH	1.018
134	Brazoria	TX	1.017
135	Memphis, TN-AR-MS	TN	1.016
136	Charlotte-Gastonia-Rock Hill, NC-SC	NC	1.016
137	Wichita	KS	1.013
138	Lima	OH	1.013
139	Amarillo	TX	1.011
140	Minneapolis-St. Paul, MN-WI	MN	1.011
141	Yolo	CA	1.010
142	Dothan	AL	1.010
143	Tallahassee	FL	1.009

Rank	Metropolitan area	Predominant state[a]	Adjusted physician price index
144	Des Moines	IA	1.009
145	El Paso	TX	1.008
146	Atlanta	GA	1.008
147	San Antonio	TX	1.006
148	Bloomington	IN	1.006
149	Syracuse	NY	1.006
150	Redding	CA	1.005
151	Albany-Schenectady-Troy	NY	1.005
152	Altoona	PA	1.003
153	Indianapolis	IN	1.002
154	Lakeland-Winter Haven	FL	1.001
155	Roanoke	VA	1.001
156	Modesto	CA	0.999
157	Punta Gorda	FL	0.999
158	Augusta-Aiken, GA-SC	GA	0.998
159	Mansfield	OH	0.998
160	Ocala	FL	0.997
161	Athens	GA	0.997
162	Anniston	AL	0.994
163	Chico-Paradise	CA	0.994
164	Burlington	VT	0.994
165	Tuscaloosa	AL	0.993
166	Binghamton	NY	0.992
167	Florence	SC	0.992
168	Boulder-Longmont	CO	0.991
169	Naples	FL	0.991
170	Spokane	WA	0.991
171	Albuquerque	NM	0.991
172	Merced	CA	0.991
173	Chicago	IL	0.990
174	Tulsa	OK	0.988
175	Gainesville	FL	0.983
176	Johnstown	PA	0.983
177	Denver	CO	0.983
178	Wilmington	NC	0.982
179	Chattanooga, TN-GA	TN	0.981
180	Lexington	KY	0.980

Rank	Metropolitan area	Predominant state[a]	Adjusted physician price index
181	Tacoma	WA	0.979
182	Galveston-Texas City	TX	0.979
183	Norfolk-Virginia Beach-Newport News, VA-NC	VA	0.975
184	Houston	TX	0.975
185	Gary	IN	0.974
186	Oklahoma City	OK	0.974
187	Kokomo	IN	0.972
188	Raleigh-Durham-Chapel Hill	NC	0.970
189	Sarasota-Bradenton	FL	0.969
190	Mobile	AL	0.966
191	Bremerton	WA	0.965
192	Montgomery	AL	0.964
193	Myrtle Beach	SC	0.964
194	Fresno	CA	0.963
195	Nashville	TN	0.962
196	Bellingham	WA	0.962
197	Florence	AL	0.959
198	Scranton—Wilkes-Barre—Hazleton	PA	0.959
199	Lynchburg	VA	0.959
200	Daytona Beach	FL	0.959
201	Steubenville-Weirton, OH-WV	OH	0.958
202	Stamford-Norwalk	CT	0.958
203	Charleston-North Charleston	SC	0.956
204	Honolulu	HI	0.956
205	Richland-Kennewick-Pasco	WA	0.956
206	Gadsden	AL	0.956
207	Greensboro—Winston-Salem—High Point	NC	0.955
208	Visalia-Tulare-Porterville	CA	0.954
209	Decatur	AL	0.949
210	Danbury	CT	0.949
211	New London-Norwich, CT-RI	CT	0.948
212	Jacksonville	FL	0.947
213	Erie	PA	0.946
214	Rochester	NY	0.946
215	Reno	NV	0.944
216	Bakersfield	CA	0.942
217	Olympia	WA	0.941

Rank	Metropolitan area	Predominant state[a]	Adjusted physician price index
218	Pittsfield	MA	0.941
219	Santa Fe	NM	0.939
220	Louisville, KY-IN	KY	0.938
221	Benton Harbor	MI	0.938
222	Williamsport	PA	0.936
223	Charlottesville	VA	0.935
224	Salinas	CA	0.935
225	Kalamazoo-Battle Creek	MI	0.935
226	Manchester	NH	0.932
227	Youngstown-Warren	OH	0.930
228	Dover	DE	0.926
229	Hartford	CT	0.923
230	Lancaster	PA	0.923
231	Canton-Massillon	OH	0.922
232	Sacramento	CA	0.920
233	Seattle-Bellevue-Everett	WA	0.919
234	Jackson	MI	0.913
235	Springfield	MA	0.913
236	Vallejo-Fairfield-Napa	CA	0.911
237	Orlando	FL	0.909
238	Huntsville	AL	0.909
239	Grand Rapids-Muskegon-Holland	MI	0.909
240	Provo-Orem	UT	0.906
241	Stockton-Lodi	CA	0.904
242	Fitchburg-Leominster	MA	0.904
243	Tucson	AZ	0.904
244	Birmingham	AL	0.903
245	Akron	OH	0.901
246	New Haven-Meriden	CT	0.900
247	Waterbury	CT	0.899
248	Columbus	OH	0.899
249	Tampa-St. Petersburg-Clearwater	FL	0.899
250	Jamestown	NY	0.898
251	Richmond-Petersburg	VA	0.898
252	Cincinnati, OH-KY-IN	OH	0.897
253	Cumberland, MD-WV	MD	0.895
254	York	PA	0.894

Rank	Metropolitan area	Predominant state[a]	Adjusted physician price index
255	Greenville-Spartanburg-Anderson	SC	0.893
256	New Bedford	MA	0.892
257	Riverside-San Bernardino	CA	0.891
258	Saginaw-Bay City-Midland	MI	0.890
259	Columbia	SC	0.888
260	Nashua	NH	0.888
261	Hamilton-Middletown	OH	0.887
262	Harrisburg-Lebanon-Carlisle	PA	0.886
263	Las Vegas, NV-AZ	NV	0.885
264	Toledo	OH	0.885
265	Kansas City, MO-KS	MO	0.884
266	Cleveland-Lorain-Elyria	OH	0.883
267	San Luis Obispo-Atascadero-Paso Robles	CA	0.883
268	Vineland-Millville-Bridgeton	NJ	0.882
269	Reading	PA	0.876
270	Bridgeport	CT	0.874
271	Monmouth-Ocean	NJ	0.873
272	Los Angeles-Long Beach	CA	0.870
273	Ann Arbor	MI	0.870
274	Orange County	CA	0.870
275	Melbourne-Titusville-Palm Bay	FL	0.869
276	Santa Barbara-Santa Maria-Lompoc	CA	0.866
277	Jersey City	NJ	0.865
278	Lawrence, MA-NH	MA	0.861
279	San Diego	CA	0.861
280	Trenton	NJ	0.861
281	State College	PA	0.861
282	Lansing-East Lansing	MI	0.861
283	Barnstable-Yarmouth	MA	0.861
284	Phoenix-Mesa	AZ	0.859
285	Allentown-Bethlehem-Easton	PA	0.856
286	New York	NY	0.854
287	Ventura	CA	0.851
288	Santa Cruz-Watsonville	CA	0.848
289	Worcester, MA-CT	MA	0.846
290	Flint	MI	0.844
291	Pittsburgh	PA	0.841

Rank	Metropolitan area	Predominant state[a]	Adjusted physician price index
292	San Jose	CA	0.837
293	Atlantic-Cape May	NJ	0.835
294	Dayton-Springfield	OH	0.833
295	Salt Lake City-Ogden	UT	0.833
296	Fort Pierce-Port St. Lucie	FL	0.830
297	Philadelphia, PA-NJ	PA	0.828
298	Buffalo-Niagara Falls	NY	0.823
299	Wilmington-Newark, DE-MD	DE	0.823
300	Newburgh, NY-PA	NY	0.822
301	Hagerstown	MD	0.822
302	Newark	NJ	0.818
303	Santa Rosa	CA	0.817
304	Middlesex-Somerset-Hunterdon	NJ	0.816
305	Oakland	CA	0.813
306	Detroit	MI	0.809
307	Bergen-Passaic	NJ	0.807
308	Brockton	MA	0.802
309	Boston, MA-NH	MA	0.785
310	San Francisco	CA	0.772
311	Dutchess County	NY	0.768
312	Providence-Fall River-Warwick, RI-MA	RI	0.763
313	Miami	FL	0.755
314	West Palm Beach-Boca Raton	FL	0.749
315	Fort Lauderdale	FL	0.747
316	Washington, DC-MD-VA-WV	VA	0.746
317	Nassau-Suffolk	NY	0.744
318	Lowell, MA-NH	MA	0.743
319	Baltimore	MD	0.729

Source: GAO analysis of FEHBP data.

Note: 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.

[a]Some metropolitan areas spanned more than one state. In those cases, we assigned the state that contained the largest proportion of the population of the metropolitan area.

Appendix IV: FEHBP PPO Adjusted Health Care Spending Per Enrollee in U.S. Metropolitan Areas, 2001

The adjusted spending per enrollee indices based on FEHBP PPO spending in 232 metropolitan areas are presented below ranked in order from highest to lowest spending per enrollee.

Table 17: Ranking of Metropolitan Areas by Adjusted Health Care Spending Per Enrollee, 2001

Rank	Metropolitan area	Predominant state[a]	Adjusted spending index
1	Biloxi-Gulfport-Pascagoula	MS	1.422
2	Myrtle Beach	SC	1.404
3	Monroe	LA	1.393
4	Hattiesburg	MS	1.393
5	Parkersburg-Marietta, WV-OH	WV	1.343
6	Anniston	AL	1.322
7	Florence	SC	1.298
8	Terre Haute	IN	1.297
9	Bakersfield	CA	1.268
10	San Angelo	TX	1.258
11	Gadsden	AL	1.250
12	Wichita Falls	TX	1.240
13	Houma	LA	1.240
14	Sherman-Denison	TX	1.235
15	Wilmington	NC	1.216
16	Huntington-Ashland, WV-KY-OH	WV	1.216
17	Macon	GA	1.213
18	Lubbock	TX	1.212
19	Dothan	AL	1.211
20	Punta Gorda	FL	1.211
21	Decatur	AL	1.200
22	Milwaukee-Waukesha	WI	1.197
23	Rapid City	SD	1.195
24	Albany	GA	1.194
25	Fort Walton Beach	FL	1.187
26	Texarkana, TX-Texarkana	TX	1.186
27	Oklahoma City	OK	1.182
28	Charleston-North Charleston	SC	1.180
29	Lake Charles	LA	1.169
30	Panama City	FL	1.167
31	La Crosse, WI-MN	WI	1.163
32	Little Rock-North Little Rock	AR	1.163

Rank	Metropolitan area	Predominant state[a]	Adjusted spending index
33	Florence	AL	1.161
34	Knoxville	TN	1.157
35	Jacksonville	NC	1.155
36	Yuma	AZ	1.151
37	Shreveport-Bossier City	LA	1.133
38	Pine Bluff	AR	1.132
39	Lafayette	LA	1.126
40	Galveston-Texas City	TX	1.122
41	Charlotte-Gastonia-Rock Hill, NC-SC	NC	1.120
42	Enid	OK	1.119
43	Johnson City-Kingsport-Bristol, TN-VA	TN	1.118
44	Fort Worth-Arlington	TX	1.117
45	Lawton	OK	1.116
46	Charleston	WV	1.116
47	Jonesboro	AR	1.115
48	McAllen-Edinburg-Mission	TX	1.113
49	Melbourne-Titusville-Palm Bay	FL	1.108
50	Nashville	TN	1.103
51	Tuscaloosa	AL	1.102
52	Dallas	TX	1.101
53	Bryan-College Station	TX	1.097
54	Waco	TX	1.096
55	Omaha, NE-IA	NE	1.092
56	Jackson	MS	1.089
57	Savannah	GA	1.088
58	Springfield	MO	1.088
59	New Orleans	LA	1.082
60	Las Vegas, NV-AZ	NV	1.081
61	Chattanooga, TN-GA	TN	1.079
62	Boulder-Longmont	CO	1.078
63	Duluth-Superior, MN-WI	MN	1.077
64	Greenville-Spartanburg-Anderson	SC	1.077
65	Baton Rouge	LA	1.076
66	Las Cruces	NM	1.074
67	St. Joseph	MO	1.074
68	Owensboro	KY	1.073
69	Corpus Christi	TX	1.073

Rank	Metropolitan area	Predominant state[a]	Adjusted spending index
70	Lakeland-Winter Haven	FL	1.072
71	Sarasota-Bradenton	FL	1.072
72	Jacksonville	FL	1.070
73	San Antonio	TX	1.067
74	Tulsa	OK	1.060
75	Odessa-Midland	TX	1.059
76	Portsmouth-Rochester, NH-ME	NH	1.057
77	Topeka	KS	1.056
78	Orange County	CA	1.049
79	Pensacola	FL	1.049
80	Amarillo	TX	1.048
81	Fort Myers-Cape Coral	FL	1.048
82	Houston	TX	1.045
83	Indianapolis	IN	1.039
84	Colorado Springs	CO	1.036
85	Montgomery	AL	1.034
86	Huntsville	AL	1.033
87	Orlando	FL	1.033
88	Wichita	KS	1.030
89	Memphis, TN-AR-MS	TN	1.027
90	Anchorage	AK	1.025
91	Bloomington	IN	1.022
92	Monmouth-Ocean	NJ	1.021
93	Cumberland, MD-WV	MD	1.020
94	Lincoln	NE	1.020
95	Columbus, GA-AL	GA	1.014
96	Fort Smith, AR-OK	AR	1.012
97	Roanoke	VA	1.012
98	Norfolk-Virginia Beach-Newport News, VA-NC	VA	1.012
99	Mobile	AL	1.011
100	Boise City	ID	1.010
101	Louisville, KY-IN	KY	1.008
102	Austin-San Marcos	TX	1.007
103	Clarksville-Hopkinsville, TN-KY	TN	1.004
104	Ventura	CA	1.004
105	Birmingham	AL	1.000
106	Manchester	NH	0.999

Rank	Metropolitan area	Predominant state[a]	Adjusted spending index
107	Daytona Beach	FL	0.996
108	Sioux Falls	SD	0.994
109	Columbia	SC	0.994
110	Richland-Kennewick-Pasco	WA	0.992
111	Atlantic-Cape May	NJ	0.988
112	Grand Forks, ND-MN	ND	0.988
113	New London-Norwich, CT-RI	CT	0.988
114	Trenton	NJ	0.987
115	Olympia	WA	0.984
116	Columbia	MO	0.984
117	Atlanta	GA	0.983
118	Killeen-Temple	TX	0.982
119	Grand Junction	CO	0.982
120	Kansas City, MO-KS	MO	0.980
121	Gary	IN	0.979
122	West Palm Beach-Boca Raton	FL	0.977
123	Athens	GA	0.977
124	Fayetteville-Springdale-Rogers	AR	0.977
125	Billings	MT	0.975
126	Fort Lauderdale	FL	0.971
127	Great Falls	MT	0.970
128	Dover	DE	0.965
129	Jackson	TN	0.965
130	Lynchburg	VA	0.962
131	Des Moines	IA	0.962
132	Gainesville	FL	0.960
133	Laredo	TX	0.959
134	Augusta-Aiken, GA-SC	GA	0.959
135	Denver	CO	0.958
136	Bremerton	WA	0.957
137	Fort Pierce-Port St. Lucie	FL	0.955
138	Salinas	CA	0.952
139	Pueblo	CO	0.952
140	Tampa-St. Petersburg-Clearwater	FL	0.951
141	Fort Wayne	IN	0.950
142	Hagerstown	MD	0.949
143	Los Angeles-Long Beach	CA	0.947

Rank	Metropolitan area	Predominant state[a]	Adjusted spending index
144	Lexington	KY	0.946
145	Middlesex-Somerset-Hunterdon	NJ	0.942
146	Redding	CA	0.942
147	Bangor	ME	0.941
148	Tacoma	WA	0.941
149	Phoenix-Mesa	AZ	0.935
150	Riverside-San Bernardino	CA	0.935
151	Cedar Rapids	IA	0.934
152	Greensboro—Winston-Salem—High Point	NC	0.932
153	Fayetteville	NC	0.930
154	Miami	FL	0.928
155	Sacramento	CA	0.927
156	Reading	PA	0.927
157	Salt Lake City-Ogden	UT	0.925
158	Cincinnati, OH-KY-IN	OH	0.923
159	Richmond-Petersburg	VA	0.920
160	Detroit	MI	0.920
161	Chicago	IL	0.918
162	Provo-Orem	UT	0.918
163	Fort Collins-Loveland	CO	0.913
164	Yakima	WA	0.913
165	Goldsboro	NC	0.913
166	Albany-Schenectady-Troy	NY	0.913
167	Nashua	NH	0.911
168	Asheville	NC	0.911
169	Nassau-Suffolk	NY	0.909
170	Santa Fe	NM	0.908
171	Scranton—Wilkes-Barre—Hazleton	PA	0.906
172	Missoula	MT	0.904
173	York	PA	0.904
174	Jersey City	NJ	0.904
175	Raleigh-Durham-Chapel Hill	NC	0.901
176	Columbus	OH	0.901
177	Sioux City, IA-NE	IA	0.899
178	Cleveland-Lorain-Elyria	OH	0.899
179	Greenville	NC	0.897
180	Wilmington-Newark, DE-MD	DE	0.897

Rank	Metropolitan area	Predominant state[a]	Adjusted spending index
181	Tucson	AZ	0.897
182	Waterbury	CT	0.896
183	Portland	ME	0.893
184	Salem	OR	0.892
185	Bergen-Passaic	NJ	0.891
186	Eugene-Springfield	OR	0.883
187	Kalamazoo-Battle Creek	MI	0.881
188	Washington, DC-MD-VA-WV	VA	0.881
189	Bismarck	ND	0.880
190	Flint	MI	0.879
191	Newark	NJ	0.878
192	Springfield	MA	0.876
193	Baltimore	MD	0.875
194	New Haven-Meriden	CT	0.874
195	Minneapolis-St. Paul, MN-WI	MN	0.873
196	Philadelphia, PA-NJ	PA	0.870
197	San Diego	CA	0.869
198	Albuquerque	NM	0.868
199	Reno	NV	0.866
200	Altoona	PA	0.866
201	Lawrence, MA-NH	MA	0.862
202	Dayton-Springfield	OH	0.852
203	Portland-Vancouver, OR-WA	OR	0.848
204	Newburgh, NY-PA	NY	0.848
205	New York	NY	0.845
206	Seattle-Bellevue-Everett	WA	0.843
207	Medford-Ashland	OR	0.841
208	Evansville-Henderson, IN-KY	IN	0.836
209	Charlottesville	VA	0.836
210	Providence-Fall River-Warwick, RI-MA	RI	0.834
211	Lansing-East Lansing	MI	0.833
212	Harrisburg-Lebanon-Carlisle	PA	0.832
213	South Bend	IN	0.830
214	Iowa City	IA	0.827
215	Toledo	OH	0.825
216	Allentown-Bethlehem-Easton	PA	0.814
217	San Francisco	CA	0.809

Rank	Metropolitan area	Predominant state[a]	Adjusted spending index
218	Hartford	CT	0.809
219	Oakland	CA	0.807
220	Erie	PA	0.803
221	Syracuse	NY	0.793
222	Spokane	WA	0.789
223	Ann Arbor	MI	0.778
224	Pittsburgh	PA	0.776
225	Fargo-Moorhead, ND-MN	ND	0.766
226	Saginaw-Bay City-Midland	MI	0.753
227	Johnstown	PA	0.746
228	Boston, MA-NH	MA	0.746
229	Bridgeport	CT	0.732
230	Buffalo-Niagara Falls	NY	0.715
231	Honolulu	HI	0.684
232	Grand Rapids-Muskegon-Holland	MI	0.672

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.

[a]Some metropolitan areas spanned more than one state. In those cases, we assigned the state that contained the largest proportion of the population of the metropolitan area.

Appendix V: Comments from the Office of Personnel Management

OFFICE OF THE DIRECTOR

UNITED STATES
OFFICE OF PERSONNEL MANAGEMENT
WASHINGTON, DC 20415-1000

JUL 25 2005

A. Bruce Steinwald
Director, Health Care
U.S. Government Accountability Office
Washington, DC 20548

Dear Mr. Steinwald:

Thank you for providing us with a copy of your proposed report entitled *FEDERAL EMPLOYEES HEALTH BENEFITS PROGRAM: Competition and Other Factors Linked to Wide Variation in Health Care Prices* (GAO-05-856). We appreciate the opportunity to comment on the draft report.

Overall, your findings confirm a longstanding healthcare principle at the U.S. Office of Personnel Management (OPM) which is that market-based competition contributes to the affordable healthcare options available to Federal enrollees. The Federal Employees Health Benefits (FEHB) Program now offers almost 250 health plan choices, including both the fee-for-service preferred provider networks and the health maintenance organizations (HMOs) discussed in your report.

The report discusses geographic variations in spending for hospital and physician services and provides interesting observations about provider price and utilization as factors contributing to the variations. In addition, we note that it shows increased competition at the healthcare delivery level contributes to a lowering of healthcare spending. While most of the FEHB enrollment is in the fee-for-service plans, we have long supported HMO arrangements and contract with a far greater number of HMOs than fee-for-service plans. Therefore, we are pleased that your report shows the capitated arrangements commonly found in HMOs contributed to a lowering of both hospital and physician prices in the metropolitan areas you studied. For reasons discussed in the report, the study omits spending for pharmaceuticals. We estimate this represents about 25 percent of FEHB Program costs.

We have the following comments:

- The report indicates that the national Preferred Provider Organizations (PPOs) offered the same benefits and charged the same premiums regardless of where enrollees lived or obtained their health care. However, the prices that PPOs paid to hospitals and physicians varied. Although this is true, it may be worth noting that in most of the PPO cases, the enrollee pays a percentage of the costs so

that as the PPO's charges rise, the enrollee's charges also rise. In other words, enrollees received the same benefit as a percentage of covered cost; however, they generally do not receive the same services for the same price across the regions.

- The report indicates that physician spending levels appear to be mitigated somewhat in geographic areas where there are higher uninsured populations and lower Medicaid payments. Physicians' prices appear to be more closely linked to consumer (patient) expectations than those of hospitals. It would have been interesting to have observed any such linkage with physician prescribing patterns as well.
- On page 16, the report indicates there was a considerable range of hospital prices within regions. Page 35 of the report indicates as part of the concluding observations that further investigation may help to explain why there were regional patterns which appeared to be associated with private sector price variations (i.e., prices for both hospital stays and physician services tended to be higher in the Midwest and lower in the Northeast). It would also be instructive to investigate the variations within regions mentioned on page 16.
- On page 24, the statement that "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" is found in a footnote to Table 6 and in footnote 43. We would suggest that this is sufficiently relevant to include in the discussion section of the report as well.
- We noted on page 26, the report states "...physician prices were actually lower, on average, in metropolitan areas with lower adjusted Medicaid payment rates and proportionately larger uninsured populations." This appears to be a relevant finding which may merit inclusion in the final discussion in *Concluding Observations* on page 35.

We also have provided some technical comments in the attachment. We appreciate this opportunity to comment.

Sincerely,

Linda M. Springer
Director

Attachment

Appendix VI: GAO Contacts and Staff Acknowledgments

GAO Contacts

A. Bruce Steinwald, (202) 512-7101 or steinwalda@gao.gov

Acknowledgments

In addition to the contact named above, Christine Brudevold, Assistant Director; Jennie F. Apter; Leslie Gordon; Michael Kendix; Daniel Lee; Jennifer M. Rellick; Holly Stockdale; Ann Tynan; and Suzanne Worth made key contributions to this report.

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