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**An Analysis of Private-Sector Prices for
Physicians' Services**

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Abstract

Physicians' services account for a substantial portion of health care spending in the United States. Using 2014 claims data from three major insurers, we analyzed the prices paid for 20 common services and compared those prices with the estimated amounts that Medicare's fee-for-service (FFS) program would pay for the same services. We found that average commercial prices were substantially higher than Medicare FFS prices and were up to three times higher out of network than in network. In contrast, average prices paid by those insurers in their Medicare Advantage plans were close to Medicare FFS prices and were similar in and out of network. When measured in relation to Medicare FFS prices, commercial prices varied widely among and within geographic areas, but Medicare Advantage prices varied minimally. Those results suggest that insurers are able to use statutory limits on out-of-network charges in Medicare Advantage to negotiate lower in-network prices in those plans. In contrast, without those limits on out-of-network prices, in-network prices in commercial plans are much higher.

Keywords: Physician prices, Medicare Advantage, commercial insurance, insurer networks

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1. Summary

The prices that private insurers pay for physicians' services are important because those prices ultimately affect the premiums paid by beneficiaries. The variation in physicians' prices also is relevant because substantial price dispersion for a single service —after adjusting for certain observable characteristics of those services— may suggest that physicians have bargaining power with insurers. The prices that insurers pay in Medicare Advantage plans are of particular interest because they affect those insurers' costs of delivering Medicare benefits, which in turn affects plan enrollments and federal spending. They also may illuminate the process through which insurers and physicians negotiate prices.

Recent evidence suggests that private insurers typically pay more for physicians' services in commercial plans—or plans that serve people with employment-based or nongroup coverage—than the Medicare fee-for-service (FFS) program pays. For some services and specialties, insurers pay more than double Medicare FFS prices, and there is substantial variation in prices for the same service. Much less is known about the prices insurers pay for physicians' services in Medicare Advantage plans, the private plans serving Medicare beneficiaries. The evidence suggests that Medicare Advantage plans' prices are similar to Medicare FFS prices and often are substantially lower than prices paid by the same insurer in the commercial market. However, to date, there has been only one other quantitative study of Medicare Advantage prices for physicians' services, and that study drew data from a single insurer.

For this study, we used a large health care claims database to examine the prices that insurers paid for physicians' services in their commercial and Medicare Advantage plans. Those data are useful for characterizing physicians' prices because they capture the final prices that insurers paid (net of any adjustments) rather than estimated prices or providers' charges. The data also provide a detailed picture of variation in prices because they contain a large number of claims, drawn from different insurers. Specifically, the data used in this paper contain prices for 890 million services provided to nearly 39 million patients covered by three large insurers in 2014.

To limit the scope of the analysis, we focused on 20 services that were either very common or both common and costly. We calculated prices for those services by summing what the insurer and the patient paid. We compared those prices with Medicare FFS by calculating the Medicare FFS price for each observation in the data, using the Medicare physician fee schedule and other rules affecting Medicare's payments to physicians. (The resulting FFS prices include both what Medicare would have paid and beneficiaries' cost sharing.) Because we calculated a Medicare FFS price for each observation in the private claims data, rather than estimating average prices from FFS claims, price differences between private plans and Medicare FFS should not be confounded by differences in patient health or providers' practice patterns.

We then examined variation in private prices across metropolitan areas, among providers within metropolitan areas, and in and out of insurer's networks. We sought to minimize variation in prices attributable to observable characteristics of claims, in two ways. First, we analyzed price variation within narrowly defined, standardized services, as identified by specific procedural codes. Examining variation within those narrowly defined services limits the variation in prices that is attributable to differences in the intensity of services or the quantity of services provided. Second, we used Medicare FFS prices as a basis for comparison when describing variation. That is, we described variation across and within areas in terms of the ratio of private prices to Medicare FFS prices. Medicare FFS prices are designed to reflect differences in the costs of providing a service—including the physician's effort in providing that service—and are further adjusted to reflect variation in input costs across areas, clinical settings, and specific clinical situations. Describing price variation in terms of the ratios of private to Medicare FFS prices should reduce the variation attributable to those factors.

We found that average commercial prices for the selected services were higher than Medicare FFS prices and that the differences between commercial and Medicare FFS prices were much greater for specialty care than for more routine services. Nationwide, average commercial prices ranged from 11 percent more than Medicare FFS for an office visit with an existing patient to more than double the price that Medicare FFS would pay for a brain magnetic resonance image, or MRI.

Commercial prices for the services we examined also varied widely across and within metropolitan areas. The average ratios of commercial prices to Medicare FFS prices in the costliest metropolitan areas were at least 70 percent higher than the average price ratios in the least costly areas for all services. For 10 of the 20 services, the most costly areas were twice as expensive as the least costly. Similar variation was observed among providers within areas. For all 20 services, the most expensive providers were paid 50 percent more than the least expensive in at least half of all metropolitan areas.

In contrast, the insurers in our study paid much lower prices in their Medicare Advantage plans. Average prices paid by Medicare Advantage plans for the 20 services we examined ranged from 8 percent less expensive than Medicare FFS to 8 percent more expensive, and, for all 20 services, the median Medicare Advantage price was almost precisely the same as the Medicare FFS price. Variation in the ratios of Medicare Advantage to Medicare FFS prices across and within areas was also much more limited than similar variation in the commercial population. Additionally, variation in Medicare Advantage prices was closely correlated with variation in Medicare FFS prices among metropolitan areas; commercial prices were less closely correlated with Medicare FFS prices.

Finally, we compared prices for in- and out-of-network services. We found that, although commercial insurers pay much higher prices for services received outside their networks,

Medicare Advantage prices are similar in and out of network. Those findings show that federal regulations capping prices for out-of-network Medicare Advantage services limit payments to physicians; those caps may, in turn, help Medicare Advantage insurers secure lower in-network prices.

Physicians' prices are of interest to the Congressional Budget Office because they ultimately affect premiums and cost-sharing requirements in private insurance plans, which are federally subsidized in several ways. For the commercially insured population, insurance plans are subsidized both by the preferential tax treatment of employment-based insurance and by direct subsidies for premiums and cost sharing in the health insurance marketplaces established under the Affordable Care Act. The prices insurers pay physicians affect commercial premiums and cost sharing, which in turn affect those subsidies and tax exclusions. Physicians' prices also affect the bids and premiums of Medicare Advantage plans, which in turn affect enrollment in and federal spending on those plans. CBO's efforts to analyze proposals affecting Medicare Advantage are aided by its understanding of physicians' prices in Medicare Advantage plans.

2. Background on Pricing of Physicians' Services

Although our study adds new information, other researchers also have examined various features of physicians' prices, including the methods that private insurers use to pay doctors and the rates they pay in commercial and Medicare Advantage plans. In general, the research has shown that although private plans typically use Medicare's FFS payment system to structure payments, physicians' prices are affected by negotiation between insurers and physician practices. As a result, prices for physicians' services often are much higher than Medicare FFS in commercial plans. In contrast, Medicare Advantage prices are much closer to Medicare FFS, perhaps because insurers can use Medicare FFS as a benchmark in bargaining with physicians.

Structure of Physician Payments

In Medicare's FFS program, physicians are paid a fixed amount for each service provided. Prices are set by the Medicare physician fee schedule, which defines payments for some 7,000 discrete services using a system of weights called relative value units (RVUs). RVUs reflect the resources associated with each service, where each service has three component RVUs: The *work component*, or the amount of effort and skill a service entails; the *practice expense component*, or the costs to a practice of the equipment, facilities, nonphysician staff, and supplies needed to provide a service; and the *liability coverage component*, or the cost of obtaining medical malpractice insurance for a service.

Each component is adjusted to reflect geographic variations in input prices (such as staff salaries and office rent), and the components are then summed and multiplied by a conversion factor to arrive at a dollar amount. Medicare FFS prices can be adjusted further on the basis of other factors, including the type of provider delivering the service, the site of the service, and the mix

of services reported on one claim. Beyond those adjustments, however, Medicare's prices for each service are fixed.

Most private insurers also pay providers on a fee-for-service basis.¹ Many insurers adopt a system of RVUs that resembles Medicare's system and then negotiate with physicians over specific conversion factors that translate RVUs into dollars.² For instance, one survey showed that 20 out of 33 health plans adopted the Medicare RVU schedule with minimal modification, and all of the plans used a system that was at least loosely based on the Medicare physician fee schedule (Medicare Payment Advisory Commission 2003b). Similarly, Clemens, Gottlieb, and Molnar (2017) report that between 70 percent and 80 percent of the prices for specific services in a large health plan were benchmarked to the Medicare physician fee schedule. (That is, insurers paid prices that were a constant mark-up over the Medicare FFS price.) Finally, Clemens and Gottlieb (2017) show that changes in commercial prices closely reflect changes in Medicare FFS prices. All three studies also reported that commercial prices were generally much higher than Medicare FFS prices, even though the pricing systems had similar structures.

Studies of Physicians' Prices in Commercial Insurance Plans

Studies to date show that commercial prices are higher than Medicare FFS prices and vary greatly across service, specialty, and region. Several studies have found that average commercial prices in the past decade were between 10 percent and 33 percent higher than Medicare FFS prices.³ For instance, in 2017, the Medicare Payment Advisory Commission (MedPAC) reported that average commercial prices were about 28 percent higher than Medicare FFS prices and that the difference has increased slightly since 2010 (Medicare Payment Advisory Commission 2017). Two other MedPAC studies showed that average commercial prices in 2002 were 12 percent to 21 percent higher than Medicare FFS prices (Medicare Payment Advisory Commission 2003a, b).

Estimates of the average difference between commercial and Medicare FFS prices mask substantial variation across services and specialties. For instance, several studies have shown

¹ Zuvekas and Cohen (2016) found that in 2013, 95 percent of patient visits were paid for using a fee-for-service system.

² An insurer often will negotiate different conversion factors with each physician practice or hospital. Some have separate conversion factors for different specialties within a practice (Ginsburg, 2010; Medicare Payment Advisory Commission 2003b).

³ Before 2000, commercial prices were higher than they are now, relative to Medicare FFS prices. Specifically, Clemens and Gottlieb (2017) reported that commercial prices were 39 percent higher than Medicare FFS prices between 1995 and 2002, and a study conducted for the Medicare Payment Advisory Commission showed that the gap between commercial and Medicare FFS prices narrowed from 52 percent to 20 percent between 1994 and 2001 (Medicare Payment Advisory Commission 2003a). Those changes were caused by statutory increases in Medicare's payment rates and by flat growth in commercial prices driven by rising enrollment in managed care plans.

that, although commercial prices for surgical and radiological services are often twice as high as Medicare FFS prices, prices for physician office visits or evaluation and management services are only slightly above Medicare FFS prices (see, for example, Medicare Payment Advisory Commission 2003b; Trish and others 2017).

Prices can vary for many reasons. Anecdotal reports from technical experts at health plans suggest that at least some differences arise from variation in physicians' bargaining power. Specifically, although many small practices accept the prices an insurer offers, larger group practices often can negotiate higher prices by threatening to leave an insurer's network. Similarly, adequate networks require participating specialists, so specialty group practices and specialists operating in hospitals often can negotiate higher prices by threatening to leave insurers' networks. Perhaps as a result, physicians who are affiliated with hospitals, such as anesthesiologists, radiologists, and emergency physicians, can sometimes command particularly high prices (Berenson and others 2012; Ginsburg 2010; Medicare Payment Advisory Commission 2003b).

Studies of Variation in Physicians' Prices in Commercial Insurance Plans

Even within a relatively homogeneous set of services, commercial prices for physicians' services can vary substantially both across and within geographic areas. For instance, when Baker, Bundorf, and Royalty (2013) examined variation in prices for routine physician office visits, they found that, even within very narrowly defined services, the prices paid to the most expensive providers were generally double the prices paid to the least expensive. Roughly a third of the variation across providers could be explained by geographic differences; the remaining two-thirds of the variation occurred within a given region. Similarly, Newman and others (2016) describe variation across and within states for 242 common bundles of services. They found two- to threefold variation among states in the prices for a given service bundle and as much as threefold variation within states in prices for service bundles.

Prices for relatively homogeneous services could vary across areas for a many reasons, including variations in the costs of labor and materials, the quality of care provided, or the health of the patients being treated. Research also suggests that substantial amounts of variation could be driven by differences in physicians' bargaining power across and within markets. Several groups of researchers have found that increases in market concentration—where a larger share of a market is controlled by a few physician practices or groups—led to higher prices (Baker, Bundorf, and Royalty 2014; Dunn and Shapiro 2014; Kleiner, White, and Lyons 2015; Sun and Baker 2015). That finding has been replicated using a variety of data and methods, and it holds true for a range of specialties and services. Other research suggests that increased integration between physicians and hospitals—which might increase physicians' bargaining leverage with insurers—also has led to higher prices (see, for example, Baker, Bundorf, and Kessler 2014; Capps, Dranove, and Ody 2015; Neprash and others 2015).

Private prices for physicians' services also are higher in the United States than prices for the same services in other countries, particularly for specialty services. Laugesen and Glied (2011) compared public and private prices for 15-minute primary care office visits and hip replacement surgeries in Australia, Canada, France, Germany, the United Kingdom, and the United States. They found that prices paid by private insurers for office visits in the United States were higher than in all other countries, although the differences often were small. In contrast, they found that prices paid by private insurers for hip replacements in the United States were at least 85 percent higher than those in all other countries for which they had data.

Studies of Physicians' Prices in Medicare Advantage Plans

Although there is limited information on physician prices for Medicare Advantage patients, the evidence suggests that Medicare Advantage prices for physicians' services often are similar to Medicare FFS prices. Most recently, a study by Trish and others (2017) compared the prices one large insurer paid in its Medicare Advantage plans with average prices from Medicare FFS claims between 2007 and 2012. They reported that Medicare Advantage prices were slightly lower than Medicare FFS prices for most services. For instance, the insurer in their study paid 3 percent less than Medicare FFS did for office visits and 7 percent to 9 percent less than Medicare FFS for cataract surgery. That insurer paid substantially more, however, for the same services in its commercial insurance policies. Those findings are consistent with recent research showing that prices paid by Medicare Advantage plans and Medicare FFS for hospital services are similar (Baker and others 2016; Curto and others 2017; Maeda and Nelson 2017).

Older qualitative work broadly supports the findings of Trish and colleagues (2017) but also suggests that there could be more variation in Medicare Advantage prices than Trish and colleagues observe. Specifically, in interviews conducted in 2002 with the leaders of 16 Medicare Advantage plans, 4 plans reported paying physicians the same prices as Medicare FFS; 9 plans reported paying prices that were between Medicare FFS and commercial prices; and the other 3 insurers declined to describe the prices paid to physicians in their Medicare Advantage plans.

Recent qualitative work on prices in hospital markets sheds light on how insurers are able to secure Medicare Advantage prices that are close to Medicare FFS (Berenson and others 2015). In interviews with hospital and insurance executives, respondents described several reasons that Medicare Advantage prices for hospital services were close to Medicare FFS prices. Frequently, they cited the statutory limit placed on Medicare Advantage plans' out-of-network hospital payments: In Medicare Advantage, such payments are capped under current law at the Medicare

FFS price.⁴ The statutory limit on out-of-network prices weakens hospitals' leverage to negotiate higher payment rates with Medicare Advantage plans, because Medicare Advantage insurers can exclude hospitals from their networks and pay them Medicare FFS prices.

Respondents also noted that Medicare's benchmark payments to Medicare Advantage plans are essentially capped at amounts that equal or are close to per capita spending in the Medicare FFS program. Those administrative limits on payments to Medicare Advantage plans may constrain the amounts that insurers can pay hospitals, given that they must compete with the Medicare FFS program for enrollees. Although the two explanations cited above pertain specifically to hospital services, they also could reasonably apply to physicians' services. That is, the Social Security Act also caps out-of-network prices for physicians' services at the Medicare FFS price, and insurers could plausibly cite the limits on Medicare's payments to Medicare Advantage plans as a reason they cannot pay substantially more to physicians.

3. Data and Methods

We used claims data from the Health Care Cost Institute (HCCI) to describe commercial and Medicare Advantage prices for physicians' services. HCCI data contain detailed claims for beneficiaries covered by three major insurers: Aetna, Humana, and UnitedHealthcare. For physicians' services, each observation in the data represents a specific, itemized service on a claim—called a claim-line. Each claim-line provides detailed information on the services provided and the final amounts paid to physicians, including any adjustments or denials of charges. In 2014, the year used for this analysis, the physician claims data contain information from nearly 39 million beneficiaries from all 50 states and the District of Columbia.

Study Samples

To describe physician prices, we selected a sample of claim-line observations from the HCCI data that were provided by physicians, were easily compared with Medicare FFS, and were likely to be representative of the average prices paid by insurers. We divided this subsample into two groups: one for the commercially insured population and one for the Medicare Advantage population. Finally, we selected a set of services, as identified by specific procedural codes, and analyzed variation within those services.

Selecting the Initial Sample. To obtain a sample of physicians' services, we used the HCCI data on physician claims in 2014, which contain 890 million claim-line observations, provided to 39

⁴Section 42 U.S.C. §1395cc(a)(1)(O) (2012) of the Social Security Act stipulates that out-of-network prices for hospitals will be exactly the same as Medicare FFS prices. Section 42 U.S.C. §1395mm(j)(1) (2012) is a similar provision that applies to physicians.

million patients by 1.5 million providers (as identified by national provider identifiers, or NPIs).⁵ We excluded the 13 percent of observations that had been provided by nonphysician professionals (nurses, nurse practitioners, and dentists) and the 18 percent of the original sample that involved nonphysician products and services (pharmaceuticals, ambulance services, durable medical equipment, and home health care). Tables summarizing details of the sample selection process are included in the appendix.

We then limited the sample so that prices for selected observations could be easily compared with Medicare FFS prices. Specifically, we included only services provided in four specific settings: physicians' offices, hospital outpatient departments, hospital inpatient departments, and ambulatory surgery centers.⁶ We excluded pediatricians because services provided to patients under 18 were outside the scope of our analysis, and we excluded anesthesiologists, for whom Medicare FFS pricing rules are complex. Limiting the sample to specific places of service reduced the sample size by 8 percent; excluding pediatricians and anesthesiologists reduced the sample by another 7 percent.

We also excluded observations that might not be representative of the typical service—in particular, services provided by low-volume physicians and claims for which the HCCI insurer was the secondary payer (that is, another party paid most of the bill for the service).⁷ Those choices all had relatively small effects: The exclusion of low-volume providers reduced the sample size by 1.7 percent, and the exclusion of secondary-payer claims reduced it by 2.3 percent.

Finally, we focused on services provided in metropolitan statistical areas (MSAs). (Observations provided outside MSAs made up 3.6 percent of the original sample.) That choice allowed us to describe variation both between and within defined markets. Those steps resulted in a sample of approximately 416 million claim-line observations, for 31 million patients and around 670,000 unique providers (as identified by NPI).

⁵ Because of data restrictions, we could identify providers only by NPI. Although NPIs are unique to physicians, one physician can have more than one NPI. Accordingly, the number of NPIs is an overestimate of the number of physicians in our sample.

⁶ When a service is provided in a facility (hospital or ambulatory surgery center), Medicare FFS and many private insurers pay one fee to the physician and a separate fee to the facility for the costs of overhead. Our analysis includes only payments to physicians, not the separate payments made to facilities. In additional analysis discussed in the appendix, we explore whether the exclusion of facility fees biases our comparison of private insurers' prices with Medicare prices and conclude that it does not.

⁷ We considered doctors who provided fewer than 50 claim-lines in our data to be low-volume providers. Because a doctor can have more than one NPI, this restriction is conservative.

Selecting Commercial and Medicare Advantage Samples. We divided the selected sample into enrollees who were either in a commercial plan or in a Medicare Advantage plan. The commercial sample included all observations provided to patients between the ages of 18 and 64 in large- or small-group plans. We excluded the nongroup market so we could be consistent with other research on private prices (Baker, Bundorf, and Royalty 2013; Dunn and Shapiro 2014; Maeda and Nelson 2017). Our Medicare Advantage sample included observations provided to patients 65 years or older in Medicare Advantage plans; that is, it excluded Medicare Advantage enrollees who were younger than 65 and patients who were older than 65 and enrolled in a commercial plan. For both populations, we limited the sample to enrollees in health maintenance organizations, preferred provider organizations, exclusive provider organizations, and point-of-service plans because other plan types often have special payment rules that affect prices. For instance, indemnity plans often pay charges, which are set by the physician, and prices in Medicare Advantage private fee-for-service plans are sometimes set by law at Medicare FFS prices.

Our resulting commercial sample included approximately 230 million claim-line observations, provided to 19 million patients by more than 600,000 providers. The Medicare Advantage sample included approximately 90 million observations, provided to nearly 4 million patients by approximately 470,000 providers. Both samples included data from 381 MSAs.

Selecting Services. We chose a set of services within which to analyze price variation. The services were identified by current procedural terminology (CPT) codes, which describe narrowly defined, standardized services—such as a routine 15-minute office visit with a new patient or an abdominal MRI with contrast dye. Because CPT codes define services very specifically, price variation within a given code is not likely to arise from variation in patient health or the intensity of a service.

We focused on services that were either common or that were both common and costly in our subsamples. Specifically, we chose services from the set of those that occurred more than 50,000 times in the commercial sample and cost at least \$450 on average; those that occurred more than 20,000 times in the Medicare Advantage sample and cost more than \$300 on average; or those that were in the top 10 most frequently billed codes in both samples. (We used different price and population thresholds in the Medicare Advantage and commercial samples because the Medicare Advantage population is smaller and average prices are lower.) From those services, we selected a subset that represented well-defined services, could reasonably be compared with Medicare FFS, and were meaningfully different from each other.

In the commercial sample, 17 services met the initial criteria for inclusion. Of those, we excluded two CPT codes for obstetric and neonatal services, because those services are rare in the Medicare FFS population, and two codes for sleep studies, because there is sometimes variation in the set of services provided under those codes. We also included a fifth service, high-intensity

emergency department evaluation and management (E&M), but only in supplementary analysis of prices in and out of network. That service occurred frequently in the selected settings in the commercial sample but occurred primarily in emergency departments in the Medicare Advantage sample. (Services provided in emergency departments were not included in the main analysis). Excluding those five services resulted in the selection of 12 services for analysis from the commercial sample.

In the Medicare Advantage sample, 11 services occurred more than 20,000 times and cost an average of \$300 or more. Of those, 5 already met the selection criteria in the commercial sample. Three more were excluded because they were clinically similar to services already included for analysis.⁸ That left 3 additional services to add to the 12 services selected from the commercial sample.

We augmented those 15 services with 5 more services from among the top 10 most frequently billed codes in either population: 2 CPT codes for office visits with an established patient, 1 CPT code for office visits with a new patient, 1 code for subsequent hospital care, and 1 more for routine electrocardiograms (EKGs) conducted in an office. Those codes did not meet our previous selection criteria because their average prices are lower, but they are of interest because they are very common and account for a substantial portion of total spending.

Our selection criteria ultimately yielded a list of 20 services that we included in main analysis (see Table 1). Nine of the 20 services were surgical services, 4 were radiologic services, and 7 were medical services. The selected services accounted for approximately 24 percent of spending on physicians' services in the commercial sample and 33 percent of such spending in the Medicare Advantage sample. They are provided across a range of settings, by a range of provider specialties, and are similar to those that have been examined by other researchers (see Austin and Baker 2015; Baker, Bundorf, and Royalty 2013; Trish and others 2017).

Calculation of Private and Medicare FFS Prices

Private prices for each observation in our data were calculated by combining the amount paid by the insurer with the patient's cost sharing (copayments, coinsurance, and deductibles). To ensure that those amounts reflected the final price, net of any adjustments, we aggregated claim-lines with the same patient-date-provider-CPT code and clinical modifier combination.⁹ We then excluded any observation for which the combined insurer and patient payments summed to zero

⁸ For instance, we chose not to include the CPT code that physicians use to bill for planning intensity modulation radiation therapy because we already included the CPT code for the delivery and interpretation of intensity modulation radiation therapy.

⁹ Clinical modifiers are two-digit alphanumeric codes appended to a claim-line to convey extra information about the service provided.

or less—which might be pricing errors or reimbursements for earlier overcharges—or for which the only payment made was a patient’s copayment. (That is, the insurer made no payment and the patient paid none of the deductible, perhaps reflecting a capitated claim or pricing error.)¹⁰

We then calculated the Medicare FFS price (including beneficiary cost sharing) for each observation in our data, using the Medicare fee schedule. First, we calculated the base RVU that Medicare FFS would assign to each service. RVUs are intended to reflect the total costs to a physician of providing a service and vary according to the effort and resources required to perform those services. RVUs also vary based on whether the service was provided in an office or a hospital facility and the specific components of the service provided.¹¹ We calculated the base RVU to reflect those factors and then adjusted that RVU to account for the geographic area in which a service was provided. We then used the 2014 Medicare conversion factor to convert adjusted RVUs to dollar amounts and reduced prices to reflect the effects of sequestration, which in 2014 applied a 2 percent reduction in physicians’ payments.¹²

We further adjusted our estimated Medicare FFS price to account for various Medicare payment rules, including price increases for bilateral services (services that involve opposing sides of the body), price decreases that apply when a provider is the assistant at surgery rather than the main surgeon, and price decreases that apply when a physician provides only pre- or postoperative care. We also applied Medicare’s multiple-procedure payment rules, which reduce the price for services that are provided to the same patient on a single day.¹³ After calculating Medicare FFS prices, we trimmed observations that were above the 99th or below the 1st percentile of ratios of

¹⁰ Providers who are paid using capitation are paid a fixed fee for each patient they accept rather than each service they provide. However, patients often still make a copayment for each service, even when an insurer does not make a payment for each service. Hence, a claim with a copayment but no insurer payment might reflect a capitated payment. Coinsurance, copayments, and deductibles are identified separately in the HCCI data, which allowed us to identify potentially capitated claims.

¹¹ The Medicare fee schedule distinguishes between the professional and technical components of many services. The professional component accounts for physician time and expertise and the technical component reflects the materials, facility costs, and nonphysician staff required to provide a service. Depending on the situation, a physician practice might bill for either component alone or for both components together. For instance, a doctor providing an MRI might bill for the time spent interpreting the results (the professional component), the staff and supplies needed to provide the MRI (the technical component), or both.

¹² Sequestration excluded patient cost sharing from the 2 percent physician fee cut. To reflect this, we estimated that a patient would pay the 20 percent Medicare Part B coinsurance for all services and reduced our estimated Medicare FFS prices by 1.6 percent (80 percent of 2 percent) instead of 2 percent.

¹³ There are several adjustments to Medicare FFS physician payments that we did not make. For instance, we did not include Medicare’s bonus payments to providers in health professional shortage areas or bonuses for meaningful electronic health record use, in part because those bonuses sometimes apply only to certain providers or to certain populations and in part because private payers are unlikely to make analogous adjustments. Applying such adjustments would increase variation in the ratios of private to Medicare FFS prices.

private prices to Medicare FFS prices. (The appendix includes detailed descriptions of all adjustments and exclusions.)

Strengths and Limitations of the Methodology

Throughout this report, we describe variation in private prices by comparing those prices with what Medicare FFS would have paid for each observation in our data. Our approach has several advantages. First, using Medicare FFS prices as a basis for comparison reduces variation that stems from observable differences in claims, because FFS prices are constructed to reflect the relative costs of providing a service, including variation across clinical settings, geographic areas, and specific clinical situations.¹⁴ Additionally, we construct Medicare FFS prices for each observation in our data, rather than using average prices for Medicare FFS claims data. This approach makes it unlikely that the comparison between private and Medicare FFS prices is confounded by differences in the health of private and Medicare FFS populations or differences in which providers the two populations visit.

Our approach of using claims data and comparing private prices to Medicare FFS has several drawbacks, however. First, claims data do not necessarily reflect all payments made to physicians. The HCCI data specifically exclude fully capitated providers, who are paid only a fixed fee per patient.¹⁵ Because of that exclusion, our results are uninformative about spending in plans that pay the majority of their providers using capitation. Additionally, it is possible that insurers make other adjustments to payments—such as quality bonuses or risk sharing—that are not captured by claims. If the HCCI insurers commonly use such mechanisms to compensate physicians, there may be additional variation in prices beyond what we observe in claims data. Finally, physicians who are not in the insurer’s provider network sometimes “balance bill” patients—that is, they bill patients for outstanding charges if their price exceeds the insurer’s payment rate. Such charges are not recorded by insurers and thus do not appear in claims data. Balance billing is not a concern in Medicare Advantage because providers who accept Medicare are permitted to balance bill only their Medicare Advantage patients in private fee-for-service plans, which were excluded from this analysis. Balance billing also is unlikely to be a concern for in-network commercial services because insurers generally form contractual agreements with in-network providers that prohibit balance billing. However, if out-of-network providers use

¹⁴ There are two ways that estimated Medicare FFS prices in this study reflect service intensity. First, the base RVU of a service is higher when Medicare views a service as requiring more inputs or greater skill. Second, we adjusted RVUs according to specific Medicare pricing rules, such as those that reduce physicians’ fees when they provide only pre- or postoperative surgical care. The appendix describes payment rules reflected in our analysis.

¹⁵ Although Zuvekas and Cohen (2016) found that fewer than 5 percent of all physician office visits were paid using capitation, other evidence suggests that the percentage of services that are capitated may be higher among the three insurers included in our data (see Curto and others 2017).

balance billing frequently, then our analysis may underestimate out-of-network commercial prices.

Another limitation of our approach is that Medicare FFS prices may not accurately reflect all variation in input costs or service intensity across observations. For instance, many experts note that primary care physicians are less well compensated for their time than specialists are (for instance, see Berenson 2016), and others have criticized the accuracy of Medicare’s geographic adjustments (Government Accountability Office 2007). We are agnostic on whether Medicare’s prices are correct—and most results do not hinge on whether Medicare accurately reflects costs. However, we might overstate the degree of variation in private prices if dividing private prices by Medicare FFS prices increased that variation. In supplementary analysis, we tested whether dividing private prices by Medicare FFS prices increased variation by comparing the coefficients of variation for prices and price ratios. In general, we find that dividing by Medicare FFS prices decreases variation—sometimes by more than 30 percent. However, for two services in the commercial population (gall bladder surgery and stent placement) and one in the Medicare Advantage population (subsequent hospital care), dividing private prices by Medicare FFS prices increased variation by small amounts, between 2 percent and 5 percent (see the appendix).

4. Findings About Physicians’ Prices

We described private prices for physicians’ services by summarizing commercial and Medicare Advantage prices for 20 services and comparing average private prices with Medicare FFS prices for the same service. We then aggregated prices to the MSA or provider level and described how prices varied across areas, across providers within areas, and tested whether prices were correlated with certain key variables, such as the share of beneficiaries enrolled in Medicare Advantage and Medicare Advantage benchmark payment rates. Finally, we compared average prices for services received inside and outside insurers’ networks.

Comparison of Private and Medicare FFS Prices

Average commercial prices for all 20 services we examined were higher than Medicare FFS prices, sometimes substantially so. Average prices in commercial plans ranged from 11 percent more than Medicare FFS prices for an office visit for an established patient to more than twice as high as Medicare FFS for an MRI (see Figure 1). In contrast, Medicare Advantage prices were substantially lower than commercial prices and quite close to Medicare FFS prices (see Figure 2). Average prices in Medicare Advantage plans for the 20 selected services ranged from 8 percent less expensive than Medicare FFS (for stent placement accompanying angioplasty) to 8 percent more expensive than Medicare prices (for knee arthroscopy). Median prices for Medicare Advantage services were almost precisely the same as Medicare FFS prices for all 20 services.

Nationwide Variation in Prices for a Specific Service

Medicare Advantage prices were tightly clustered around the Medicare FFS price, whereas commercial prices were widely dispersed. Depending on the service, between 42 percent and

63 percent of all claim-line observations in the Medicare Advantage sample were priced within one percentage point of the Medicare FFS price. In contrast, fewer than 3 percent of commercial observations were within a percentage point of the Medicare FFS price, and fewer than 3 percent of commercial observations were within a percentage point of the median commercial price for each service. Those patterns suggest that Medicare Advantage prices are benchmarked to Medicare FFS prices, whereas commercial prices are not.

The range of commercial prices also was much larger than the range of Medicare Advantage prices for all services. For instance, prices for colonoscopies at the 10th percentile of commercial price ratios were 8 percent below the Medicare FFS price and colonoscopies at the 90th percentile were three times higher. In contrast, prices for colonoscopies in the 10th percentile of Medicare Advantage price ratios were 10 percent less than Medicare FFS and those at the 90th percentile were 6 percent higher than Medicare FFS. As a result, there was only an 18 percent difference between the 90th and 10th percentiles in the Medicare Advantage sample, compared with a threefold difference between the 90th and 10th percentiles in the commercial sample (see Figure 3). Similar patterns were seen for all 20 services studied. In the commercial population, price ratios at the 90th percentile were more than twice those at 10th percentile for all services. For 7 of the 20 services, they were three times more expensive. In contrast, observations at the 90th percentile of Medicare Advantage price ratios were, at most, 54 percent more expensive than those at the 10th percentile (see Figure 1 and Figure 2).

In some cases, price variation in commercial plans could be the result of differences in the way that insurers structure payments. We observed some of the largest variation in commercial pricing for MRIs and other services that can be provided in a range of clinical settings. We also observed substantial variation for services such as knee arthroscopy, for which there are complicated rules for paying physicians who provide more than one service to a given patient on a single day. However, there also was substantial dispersion for relatively uncomplicated services, such as physician office visits or EKGs. The degree of variation in commercial prices is especially noteworthy, given the limited variation in prices in Medicare Advantage plans.

Variation in Prices Across and Within MSAs

To describe price variation across MSAs for each service, we calculated the average ratio of private to Medicare FFS prices for each service in each MSA in the commercial and Medicare Advantage populations.¹⁶ To describe price variation across providers within an MSA, we calculated the median commercial and Medicare Advantage price ratio for each service and each

¹⁶ To ensure that averages were not influenced by a small number of observations, for this portion of analysis, we included only MSAs for which there were more than 25 observations from at least five providers.

provider within an area.¹⁷ (We used the median price to summarize provider-level prices because the number of services provided by many doctors in our sample is small, and averages could be sensitive to outliers.) We then characterized variation in average prices across MSAs and median prices across providers within MSAs.

Variation in Average Prices Across MSAs. The average ratios of commercial to Medicare FFS prices varied substantially from one MSA to another; the average ratios of Medicare Advantage to Medicare FFS prices varied much less. For example, the average commercial price for hip replacements for the MSA at the 10th percentile of price ratios was only 24 percent higher than Medicare FFS prices, whereas the average price for the MSA at the 90th percentile was 2.7 times higher than Medicare FFS. As a result, the average hip replacement at the 90th percentile of MSAs was more than twice as expensive as the average hip replacement at the 10th percentile (see Figure 4). We observed similar variation for all 20 services in the commercial population. Average price ratios at the 90th percentile MSA were 70 percent higher than the average ratios at the 10th percentile MSA for all services and twice as high for 10 of the 20 services.

In contrast, the average ratios of Medicare Advantage prices to Medicare FFS prices varied much less across MSAs. For example, the average Medicare Advantage price for hip replacements in the MSA at the 10th percentile was 3 percent lower than the FFS Medicare price, and the average hip replacement in the MSA at the 90th percentile cost 6 percent more than Medicare FFS. Thus, there was only a 9 percent difference between the most and least expensive areas in Medicare Advantage prices for hip replacements, compared with the nearly threefold difference in commercial prices. For all services, the average ratio of Medicare Advantage to Medicare FFS prices in the MSA at the 90th percentile was at most 24 percent higher than the price ratio in the MSA at the 10th percentile.

Prices may vary from area to area for several reasons. Prices vary because of the costs of the inputs: Local costs for goods and services vary considerably. All prices in this analysis were compared with Medicare FFS prices, which are at least partially adjusted for geographic differences in input costs. Although that adjustment should considerably reduce variation across areas, Medicare's geographic adjustments may not accurately reflect all differences in input costs for all areas. Additionally, commercial prices could vary geographically because of the relative market power of physicians and insurers: In areas where physician groups' market power exceeds that of insurers, prices may be higher.

Variation in Prices Across Providers Within MSAs. We next examined variation in private prices for providers within MSAs by calculating the median ratio of private to Medicare FFS

¹⁷ To reduce the likelihood that price variation was driven by outliers, we restricted the sample for the within-MSA analysis to physicians who provided at least five claim-lines in an MSA for each population and each service. We then restricted the analysis to MSAs and services with at least five providers and 50 claim-lines.

prices for each service and each physician in both the commercial and the Medicare Advantage samples. We then summarized the variation in prices across providers within MSAs.

There was substantial variation in the ratios of commercial prices among providers within individual MSAs. For instance, in Chicago, the provider in the 10th percentile of price ratios for brain MRIs was paid 25 percent more than the Medicare FFS price, whereas the provider at the 90th percentile was paid more than four times the Medicare FFS price. As a result, the 90th-percentile MRI provider in Chicago was paid more than three times as much as the 10th-percentile provider (see Figure 5).

Medicare Advantage prices for the same services in the same cities showed much less variation among providers than commercial prices did. For instance, in Chicago, the provider at the 10th percentile of price ratios for brain MRIs was paid 9 percent less than the Medicare FFS price, whereas the provider at the 90th percentile was paid the Medicare FFS price exactly. Thus, there was only roughly a 10 percent difference between the 90th- and 10th-percentile providers in Chicago in Medicare Advantage, compared with a threefold difference among commercial providers.

To systematically characterize variation in prices across providers within MSAs, we calculated the percentage of MSAs in which the median price ratio for the 90th-percentile provider was at least 50 percent higher than the median price ratio for the 10th-percentile provider. For each of the 20 services in the commercial market, at least half of all MSAs showed this much variation (see Figure 6). For cataract surgery—the service that varied the least across providers—the 90th-percentile provider was 50 percent more expensive than the 10th-percentile provider in 53 percent of MSAs. For brain MRIs—the service that varied the most—providers in the 90th percentile were at least 50 percent more expensive than those in the 10th percentile in 87 percent of MSAs.

By contrast, fewer than half of all MSAs showed such variation for any of the 20 services we examined. The service with the most variation across providers was breast biopsy: The 90th-percentile provider was at least 50 percent more expensive than the 10th-percentile provider in 45 percent of MSAs. For all other services, providers in the 90th percentile were 50 percent more expensive than providers in the 10th percentile in less than a third of MSAs. (Knee arthroscopy and hysteroscopy were omitted from this portion of the analysis for Medicare Advantage because fewer than 5 MSAs met our sample restrictions.)

Prices may vary among providers within an MSA for a variety of reasons. Even for narrowly defined services, prices can differ based on a range of characteristics, such as whether a service is provided in an office or facility or whether the physician was the primary or an assistant surgeon. We sought to reduce variation arising from those factors by using Medicare FFS prices as the benchmark for comparison. However, as discussed above, Medicare price adjustments may not fully adjust for cost differences between services or settings. For instance, if Medicare

underestimates the difference in the cost of providing a service in an office compared with a hospital outpatient department, then we may observe additional price variation. Also, as above, price differences could reflect differences in provider quality and variation in market power among providers.¹⁸ Full analysis of such factors was beyond the scope of this study.

Correlations in Prices

To better characterize price variation, we tested whether commercial, Medicare Advantage, and Medicare FFS prices were correlated across areas or providers. To better inform CBO's models, we also tested whether Medicare Advantage prices were correlated with the percentage of Medicare beneficiaries enrolled in the Medicare Advantage market (referred to as Medicare Advantage penetration) and payment rates for Medicare Advantage plans.

Correlations in Average Prices for a Given Service Between Areas. We tested whether average Medicare FFS prices, Medicare Advantage prices, and commercial prices for a service were correlated with each other across MSAs.¹⁹ We found that, across areas, average Medicare Advantage prices were closely correlated with average Medicare FFS prices for all services and that all correlations were significant and strong (see Figure 7). For all services, the correlation coefficients were greater than .6, and for 8 of the 20 services, correlation coefficients were greater than .9.

In contrast, commercial prices were correlated with Medicare FFS prices at $p < .05$ for only 13 of 20 services, and correlation coefficients were less than .5 for all but 4 services. Those patterns suggest that Medicare FFS prices exert a stronger influence on Medicare Advantage prices than on commercial prices.

Correlation in the Ratio of Private to Medicare FFS Prices Among Providers for a Given Service. We also tested whether the same providers were paid higher prices in both the commercial and the Medicare Advantage samples. To do this, we calculated the median ratio of private prices to Medicare FFS prices for each provider, for each service, in each population. We

¹⁸ Although research has shown a link between provider market power and prices, there is little evidence suggesting that higher-priced practices offer higher-quality care. To our knowledge, the only paper that has tested for a such a relationship found that higher-priced practices scored higher on some but not most measures of quality of care—suggesting a weak relationship between quality and prices (see Roberts and others 2017).

¹⁹ MSAs were included in this portion of analysis if they had at least 25 claim-lines and at least five distinct NPIs in *both* populations. Because different MSAs met those criteria for each population, we analyzed a slightly smaller set of MSAs in this section than in the previous section.

then tested whether commercial and Medicare Advantage price ratios were correlated across providers.²⁰

In general, providers who charged higher prices (relative to Medicare FFS) in the commercial population also charged higher prices in the Medicare Advantage population; however, correlation coefficients were generally small (see Figure 8). Prices were correlated across providers for 15 of the 20 services, and correlation coefficients ranged from .1 (for abdominal MRI) to .5 (for a new-patient office visit).

Relationship Between Medicare Advantage Penetration and the Ratios of Medicare Advantage to Medicare FFS Prices. One question of particular interest to CBO is how the prices that Medicare Advantage insurers pay physicians vary with Medicare Advantage penetration. An assessment of that relationship will inform CBO’s modeling of the effects of converting Medicare to a premium support system because it will provide an indication of the extent to which prices might change if private plans enrolled a larger share of the Medicare market.²¹

To test that relationship, we calculated the median Medicare Advantage price ratio for each service in each MSA and then tested whether median price ratios were correlated with Medicare Advantage penetration.²² Figure 9 illustrates that relationship for two services (micrographic surgery and intermediate office visits); and Table 2 (second column) lists the correlation coefficients for all services. Medicare Advantage penetration in the sample ranges from less than 1 percent to about 61 percent.

Within that range of market penetration, we found little evidence that Medicare Advantage price ratios varied with Medicare Advantage penetration. Correlation coefficients were negative for many services, suggesting that price ratios in Medicare Advantage plans declined slightly as the market share of Medicare Advantage plans grew. However, correlation coefficients were

²⁰ As above, providers were identified using NPIs. To be included in this analysis, a provider must have provided at least five claim-lines for a given service both in the Medicare Advantage population and in the commercial population.

²¹ Recent research shows that Medicare Advantage penetration is not significantly correlated with hospital prices (Baker and others 2016; Maeda and Nelson 2017).

²² We calculated Medicare Advantage penetration by adding total enrollment in health maintenance organizations and local and regional preferred provider organizations. We then divided that sum by the total number of people eligible for Medicare in a market. Data on plan enrollment are available from the Centers for Medicare & Medicaid Services, “Monthly MA Enrollment by State/County/Contract” (accessed May 19, 2017), <https://go.usa.gov/xNW43>. Data on the number of people eligible for Medicare are available from Centers for Medicare & Medicaid Services, “MA State/County Penetration” (accessed May 19, 2017), <https://go.usa.gov/xNWjm>.

significant at $p < .05$ for just four services, and those correlation coefficients were small, ranging from $-.11$ to $-.27$.

Relationship Between Medicare Advantage Benchmarks and Medicare Advantage Prices.

We also tested whether Medicare Advantage prices systematically varied with the Medicare Advantage benchmarks.²³ We used median MSA-level Medicare Advantage prices in this portion of the analysis rather than the ratios of Medicare Advantage prices to Medicare FFS prices because Medicare Advantage benchmarks are linked to Medicare FFS spending per capita. Thus, the denominator of Medicare Advantage to Medicare FFS price ratios might be mechanically correlated with benchmarks.

Our hypothesis—that prices might be higher in areas with higher benchmarks—was developed based on the interviews Berenson and colleagues (2015) conducted with insurers and hospital administrators. In those interviews, respondents claimed that the benchmarks limited the maximum price that Medicare Advantage insurers could pay providers.

In our sample of services, we found only limited evidence supporting that hypothesis (see Table 2, column 3). Average Medicare Advantage prices were significantly and positively correlated with Medicare Advantage benchmarks for 8 of 20 services. That is, Medicare Advantage physician prices are higher in areas with higher benchmarks. However, those significant correlation coefficients were generally small—between $.1$ and $.3$. Those weak correlations are unsurprising, given the limited geographic variation in Medicare Advantage prices in the data, but they also indicate a limited relationship between maximum prices and Medicare Advantage benchmarks.

Comparison of In-Network and Out-of-Network Prices

Finally, we compared prices and patient cost sharing for observations provided in and out of network.²⁴ For this portion of the analysis, we included the 20 services analyzed above and 4 additional services: three CPT codes for patient E&M in hospital emergency rooms and one code for inpatient critical care. All four services often are provided in emergencies, and thus patients are more likely to visit out-of-network physicians when receiving them. For those services, we included observations provided in emergency rooms in addition to those provided in physicians' offices, hospital inpatient and outpatient departments, and ambulatory surgical centers.

²³ Payments to plans vary based on the plans' quality scores, so we constructed an enrollment-weighted average of Medicare Advantage plans' quality-adjusted benchmarks.

²⁴ The indicator for whether services were in or out of network is missing for, at most, 2 percent of claim-lines for any one service. For this analysis, we classified those observations as being out of network.

As above, we calculated private prices for each service by summing the insurer payments and patient cost sharing for each observation. If out-of-network providers use balance billing, the charges do not appear in claims data, and therefore will not be reflected in the calculation of price.²⁵ Balance billing is not a concern in the Medicare Advantage sample because providers are allowed to balance bill Medicare Advantage patients only in private fee-for-service plans, which were excluded from this analysis. Balance billing also is unlikely to be a concern for commercial services received in network because insurers generally form contractual agreements with in-network providers that prohibit balance billing. However, we will underestimate out-of-network commercial prices if out-of-network providers frequently balance bill patients.²⁶

Percentage of Observations Provided Out of Network. For commercial patients, most observations were provided by in-network physicians. For the 20 services included in main analysis, the vast majority of claim-line observations—at least 93 percent for all services—were provided in network in commercial plans (see Figure 10). For the four emergency services that were added for this portion of analysis, a smaller but still substantial percentage—between 66 percent and 85 percent of services—also were provided in network.

In contrast, a lower proportion of Medicare Advantage observations were provided in network (see Figure 11). For the 20 services included in main analysis, between 78 percent (for subsequent hospital care) and 92 percent of observations (for intensity-modulated radiation therapy) were provided in network. Even for relatively routine and predictable services such as office visits, 10 percent to 15 percent of observations were received out of network. For the four emergency services added to the analysis, the percentage of claim-lines provided in network was even lower, ranging from 49 percent for the most intensive emergency room E&M visits to 67 percent for inpatient critical care.

Prices for Services Provided Out of Network. In the commercial sample, the prices we observed for out-of-network services were significantly higher than prices for in-network services (see Figure 10). For instance, the average price for the 97 percent of brain MRIs

²⁵ Many insurers protect patients from balance billing, and slightly less than half of all states have laws that either prohibit certain providers from balance billing or require insurers to cover balance-billing charges in certain situations. Such laws rarely provide complete protection against balance billing, however, and self-insured plans are exempt from such restrictions (see Lucia and others 2017).

²⁶ Although some researchers have estimated the percentage of care provided outside of networks, the extent to which providers balance bill patients is not known (see America’s Health Insurance Plans 2015; Cooper, Morton, and Shekita 2017; Garmon and Chartrock 2016). Older evidence from the implementation of balance-billing restrictions in Medicare suggests that beneficiaries’ total out-of-pocket medical spending fell by 9 percent once balance billing was restricted (McKnight 2007), suggesting that balance billing was common. However, balance billing may have occurred more frequently in Medicare than in the commercial market because payments to providers are lower and many patients have supplemental insurance.

received in network was 2.4 times higher than Medicare FFS, whereas the average observed price for the 3 percent of brain MRIs that were provided out of network was 3.4 times higher than Medicare FFS. Prices for the four emergency services were particularly high. For example, the average commercial price for the most intensive emergency department E&M visit was 4.6 times the Medicare FFS price out of network and 2.6 times the Medicare FFS price in network.

In contrast, Medicare Advantage prices were similar for in- and out-of-network services. Average price ratios for out-of-network services were at most 20 percent higher than price ratios for in-network services. For 8 of 24 services examined in this portion of analysis, the average ratios of Medicare Advantage prices to Medicare FFS prices were actually lower out of network than in network (see Figure 11).

Patient Cost Sharing In and Out of Network. To compare patient cost sharing in and out of network, we calculated the percentage of the price on a claim that the patient paid through copayments, deductibles, and coinsurance. (Again, any balance-billing amounts will not be observed in claims data.) For 19 of the 20 services examined in the main analysis in the commercial sample, patients paid a greater share of the total price out of network than in network. For example, on average, patients paid 50 percent of the total observed price for cataract surgery out of network and 27 percent of the total price for cataract surgery in network. For relatively less expensive services, such as an EKG or new-patient office visit, the patient sometimes paid more than 50 percent of the total price for an out-of-network service (see Figure 12).

In Medicare Advantage, the differences between in- and out-of-network cost sharing were much smaller (see Figure 13). For instance, for cataract surgery, patients paid only 7 percent of the total in-network price, on average, and 17 percent of the total out-of-network price. Across the 20 services included in the main analysis, the largest average difference between the share of the price paid by patients out of network versus in network was 13 percentage points for Medicare Advantage patients and more than 40 percentage points for commercial patients. (In each case, the largest difference was for an EKG; see Figure 12 and Figure 13.)

For the four emergency and critical care services added to this portion of analysis, the percentage of the total price paid by the patient was almost identical in and out of network for both the Medicare Advantage and commercial populations, perhaps because most insurance policies allow patients to visit any provider in an emergency.²⁷ In the commercial population, however,

²⁷ Under the Affordable Care Act, all nongrandfathered plans must cover out-of-network emergency services at the same level of cost sharing as in-network emergency services (see Pollitz 2016).

the actual dollar amounts for which patients were responsible were much higher out of network than in network because the prices paid to out-of-network providers were so much higher.

Medicare Advantage enrollees also generally paid a smaller portion of the total price than enrollees in commercial plans did, for in- and out-of-network services alike. For 13 of the 24 services analyzed here, patients in commercial plans were responsible for 20 percent or more of the total in-network cost of care on average. In Medicare Advantage, that was true only for 3 services (all of which were physicians' office visits). Additionally, for all but 3 services (colonoscopy, intensity-modulated radiation therapy, and EKG), Medicare Advantage enrollees paid a lower average share of the total price for out-of-network services than commercial enrollees paid for in-network services.

5. Discussion

This analysis supports three distinct conclusions. First, commercial prices for physicians' services are higher than Medicare FFS prices, whereas prices in Medicare Advantage and Medicare FFS are similar. Specifically, we analyzed the prices three major insurers paid for 20 services and found that those insurers paid average commercial prices that were between 11 percent and 139 percent higher than Medicare FFS prices. In contrast, the same three insurers paid average prices that were at most 8 percent more than Medicare FFS prices in their Medicare Advantage plans, and the majority of Medicare Advantage observations were priced within a percentage point of the Medicare FFS price. Those patterns suggest that insurers can benchmark to Medicare FFS in setting Medicare Advantage prices, but cannot do so in their commercial plans.

The ratios of commercial prices to Medicare FFS prices also varied substantially across and within metropolitan statistical areas; Medicare Advantage price ratios did not. For half of the 20 services we studied, there was at least a twofold difference in the average ratios of commercial to Medicare FFS prices across MSAs. In contrast, average Medicare Advantage price ratios in more expensive MSAs were at most 24 percent higher than those in less expensive MSAs. Commercial prices also varied substantially among providers within MSAs, whereas Medicare Advantage prices varied much less. For all 20 services, commercial price ratios for the most expensive providers were at least 50 percent higher than price ratios for the least expensive providers in at least half of all MSAs. In contrast, for most services in Medicare Advantage, such variation among providers was observed in less than a third of all MSAs.

Finally, we found that prices were substantially higher when commercial patients visited out-of-network providers, whereas in Medicare Advantage, in- and out-of-network prices were very similar. Specifically, average commercial prices were as much as three times higher out of network than in network. In Medicare Advantage plans, average out-of-network prices were, at most, 20 percent higher than in-network prices. Those results are consistent with statutory regulations that limit the amount that providers can charge for out-of-network services in

Medicare Advantage plans. They also may suggest that such regulations are the reason that insurers secure lower prices in their Medicare Advantage plans.

Our findings on commercial prices are qualitatively consistent with past research in that we found that commercial prices were generally higher than Medicare FFS prices and that the difference between commercial and Medicare FFS prices was larger for specialty services. Our estimates of commercial price variation also are roughly consistent with the results of other studies that used different data and methodologies.²⁸ Although research on out-of-network commercial prices has thus far been limited, the findings here are consistent with research suggesting that out-of-network prices are higher.

Our findings on Medicare Advantage prices generally support those of Trish and colleagues (2017), although our estimates are slightly different. We found that Medicare Advantage insurers pay almost exactly Medicare FFS prices, whereas, for some services, Trish and colleagues found that Medicare Advantage insurers tend to pay less than Medicare FFS prices. The differences in findings could arise because Trish and colleagues calculated average Medicare FFS prices using Medicare FFS claims data, whereas we calculated those prices from the Medicare fee schedule. As a result, Trish and colleagues' estimates probably include adjustments that increased effective Medicare FFS prices (for example, bonuses in Health Professional Shortage Areas or for meaningful use of electronic health records), whereas ours did not. Together, the two studies suggest that insurers negotiate prices using the Medicare fee schedule and that the fee schedule's prices are lower than the effective prices in Medicare FFS, after the application a variety of policies. (The data used in the two studies also included different insurers, and thus, differences in our estimates might reflect pricing variation across insurers.)

Our findings on out-of-network prices are, to our knowledge, unique in the literature, and they support the hypothesis proposed by Berenson and colleagues (2015) that limits on out-of-network prices in Medicare Advantage plans limit the prices that insurers can negotiate in network. However, our findings examined a relatively narrow set of services provided by some of the largest insurers in Medicare Advantage. To elucidate whether all Medicare Advantage insurers pay similar prices for services, further research is needed.

Our study has several limitations worth noting. First, we compared all private prices with Medicare FFS prices. Because Medicare FFS prices are constructed to reflect variation in input costs across services, clinical settings, and geographic areas, that approach reduces variation in prices attributable to those differences. However, Medicare FFS prices may not fully or correctly account for all variation in input costs of physicians' services. If private insurers adjust prices

²⁸ See Austin and Baker (2015); Baker, Bundorf, and Royalty (2013); and Newman and colleagues (2016).

differently than Medicare FFS does—particularly in commercial plans—then we will observe additional variation that is driven by differences in input costs across claims.

Second, our study relies on claims data to estimate prices, and claims data do not capture additional payments that insurers or patients may make to physicians, such as quality bonuses, additional fees for accepting patients, or balance billing of patients by physicians. Our claims data exclude providers who receive fully capitated payments, and balance billing is not permitted in the Medicare Advantage plans included in our sample. Both of those conditions reduce the potential bias of our approach. However, if insurers make additional payments to physicians in fee-for-service contracts or if physicians frequently balance bill commercial patients, then such payments are not captured in estimates of average prices.

A third limitation of our research is that the HCCI data included claims only from three insurers, and we examined only a limited set of services covered by those insurers. Although those insurers covered a substantial portion of both the commercial and the Medicare Advantage populations, our results might not generalize to all insurers. Similarly, although the services we studied are common and account for a significant portion of spending on physicians' services in our sample, our conclusions may not generalize to all services.

Finally, many factors that we did not analyze could cause prices to vary. Our analysis relies on comparison of private prices to Medicare FFS prices, which vary with geographic location, site of service, certain clinical characteristics of the service, and the relative value of the inputs to a service. However, prices may vary for a range of reasons that are not reflected in the Medicare FFS prices, including physician quality, practice structure, or competition among insurers or physicians. Assessing the effects of those factors on prices is an area for future research.

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Tables and Figures

Abbreviations Used in the Tables and Figures

ASC = ambulatory surgery center

CT = computed tomography

EKG = electrocardiogram

E&M = evaluation and management

FFS = fee for service

IMRT = intensity-modulated radiation therapy

MRI = magnetic resonance imaging

MSA = metropolitan statistical area

N = number

NPI = national provider identifier

PET = positron emission tomography

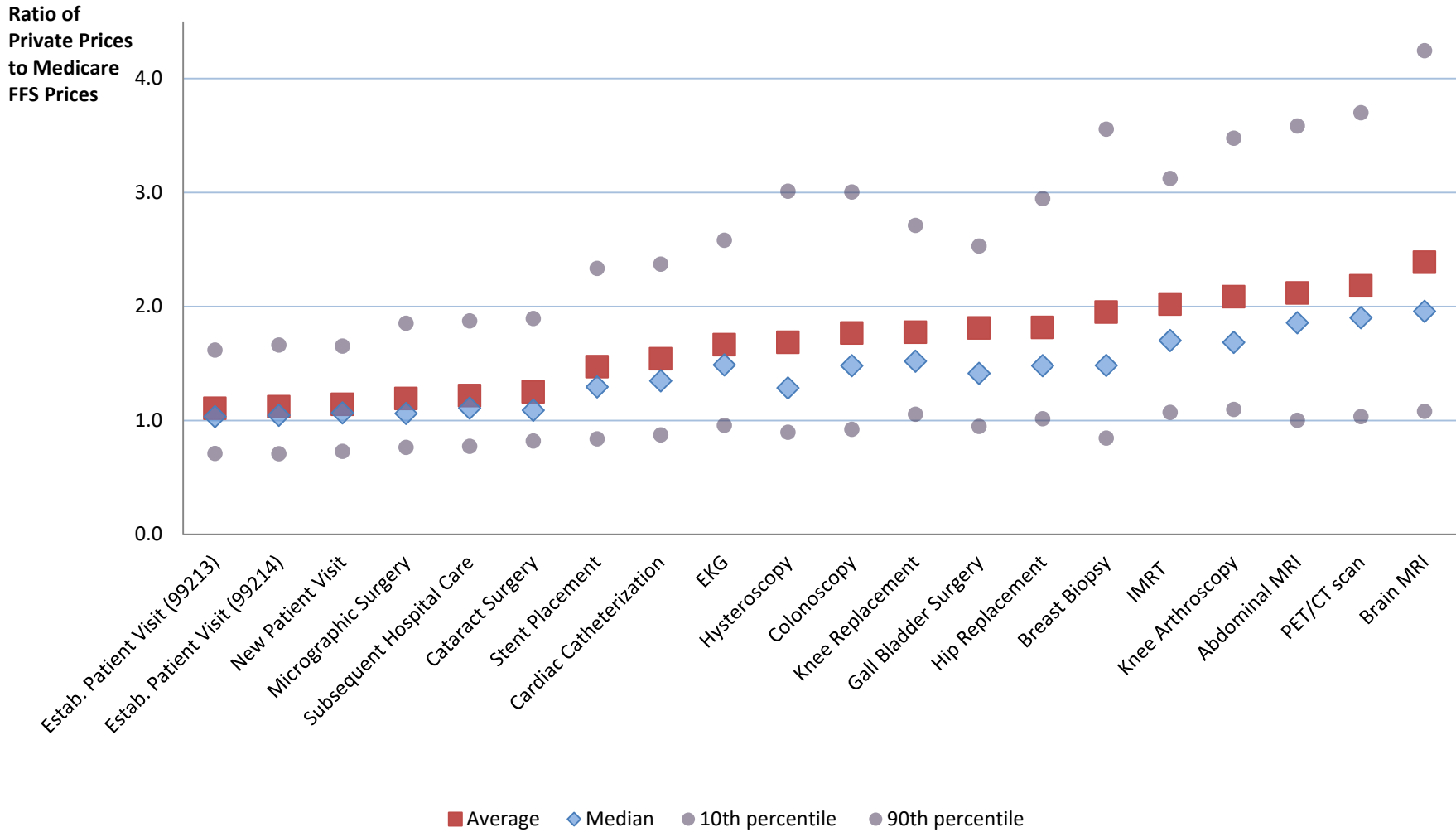
Table 1. Physicians’ Services Included in Analysis and Descriptive Statistics

Procedure Code	Service	Most Common Provider Specialty	Most Common Setting
Surgical Services			
17311	Mohs micrographic surgery	Dermatology	Physician office
19083	Image-guided breast biopsy	Radiology	Hospital outpatient dept. or ASC
27447	Total knee arthroplasty (knee replacement)	Orthopedics	Hospital inpatient dept.
27130	Total hip arthroplasty (hip replacement)	Orthopedics	Hospital inpatient dept.
29881	Knee arthroscopy and surgery	Orthopedics	Hospital outpatient dept. or ASC
45385	Colonoscopy with tumor or lesion removal	Gastroenterology	Hospital outpatient dept. or ASC
47562	Laparoscopic cholecystectomy (gallbladder surgery)	General surgery	Hospital outpatient dept. or ASC
58558	Surgical hysteroscopy with biopsy or polypectomy	Obstetrics and gynecology	Hospital outpatient dept. or ASC
66984	Cataract removal with intraocular lens insertion	Ophthalmology	Hospital outpatient dept. or ASC
Radiologic Services			
70553	Brain MRI, with and without contrast	Radiology	Hospital outpatient dept. or ASC
74183	Abdominal MRI, with and without contrast	Radiology	Hospital outpatient dept. or ASC
77418	IMRT	Therapeutic radiology	Physician office
78815	Tumor imaging, PET with concurrently acquired CT*	Radiology	Hospital outpatient dept. or ASC
Medical Services			
92928	Percutaneous transcatheter placement of intracoronary stent(s), with coronary angioplasty when performed (stent placement)	Cardiology	Hospital outpatient dept. or ASC (commercial), hospital inpatient department (Medicare Advantage)
93000	EKG, 12 leads, interpretation and report, office-based	Internal medicine (commercial), cardiology (Medicare Advantage)	Physician office
93458	Catheter placement for coronary artery(s) for coronary angiography, with left heart catheterization	Cardiology	Hospital outpatient dept. or ASC
99203	New patient office visit, low to moderate complexity	Family practice (commercial), orthopedics (Medicare Advantage)	Physician office
99213	Established patient office visit, low to moderate complexity	Family practice	Physician office
99214	Established patient office visit, moderate to high complexity	Family practice	Physician office
99232	Subsequent hospital care, intermediate intensity	Internal medicine	Hospital inpatient dept.

The table summarizes the services included in the analysis, the top specialty providing each service, and the most common setting for each service. Unless otherwise noted, the most common provider specialty and most common setting are the same for the commercial and Medicare Advantage sample.

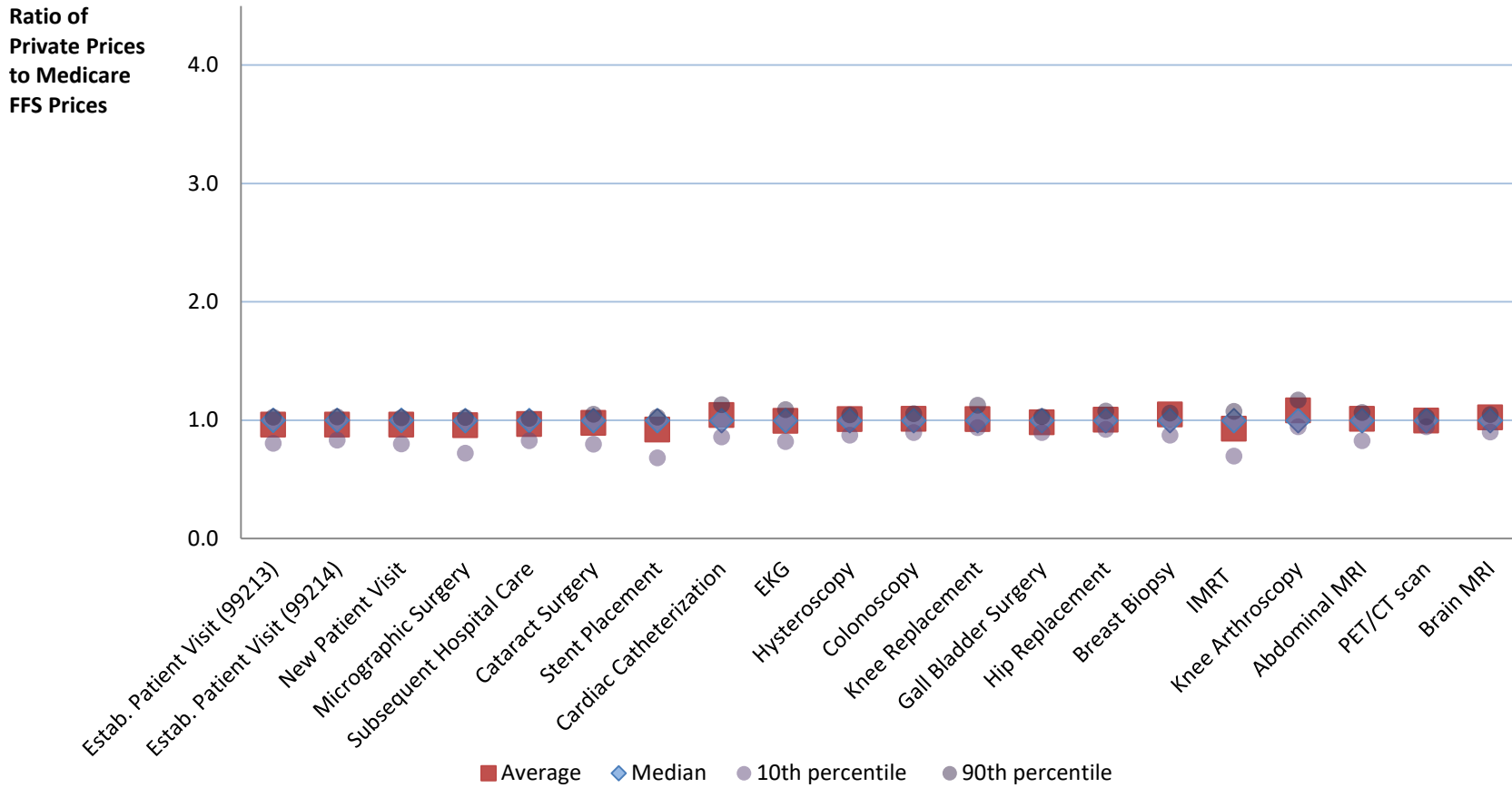
* PET/CT scans include only the professional component in this study, because the technical component is priced by individual carriers in Medicare FFS.

Figure 1. Commercial Prices for Selected Physicians' Services, 2014



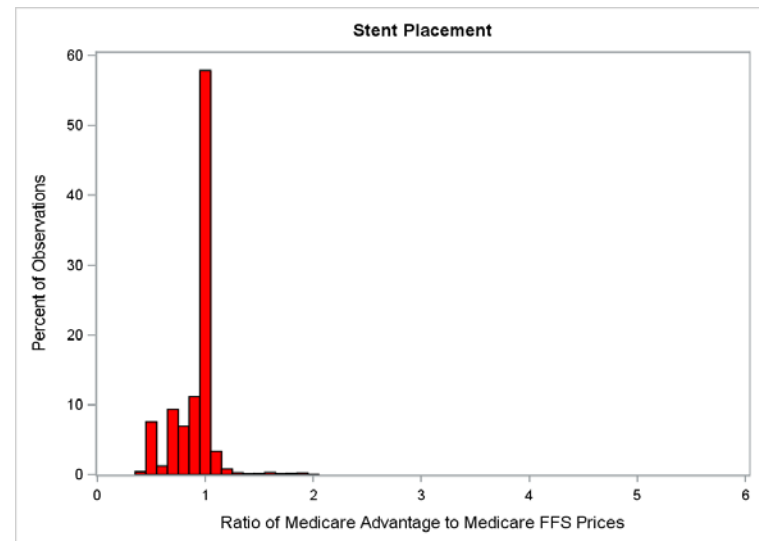
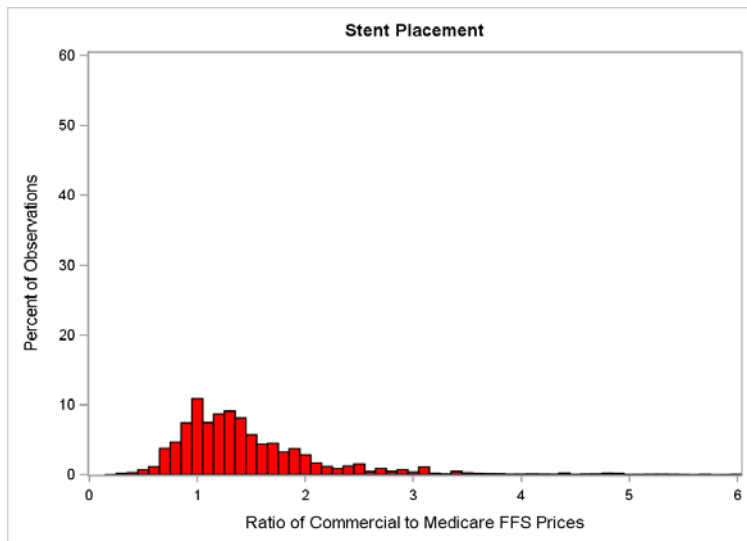
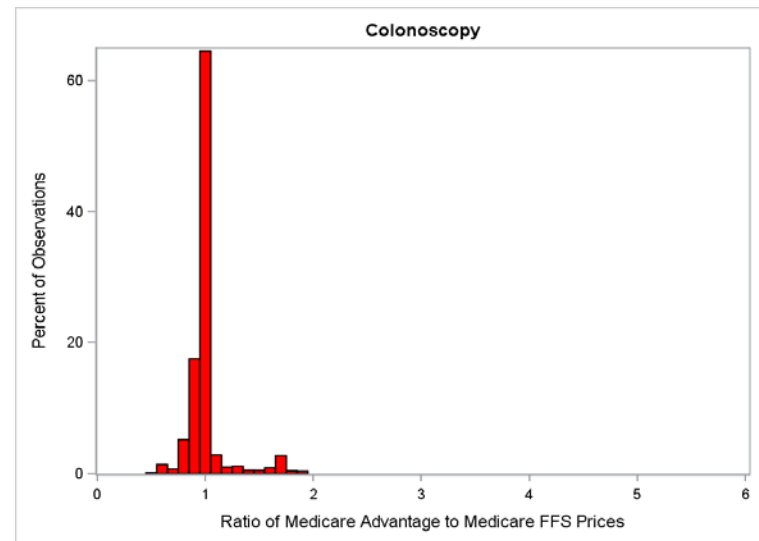
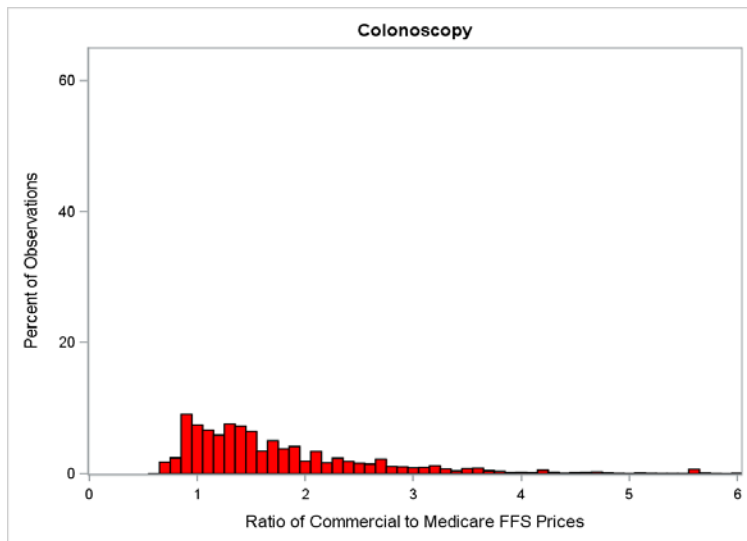
Observations are at the claim-line level.

Figure 2. Medicare Advantage Prices for Selected Physicians' Services, 2014



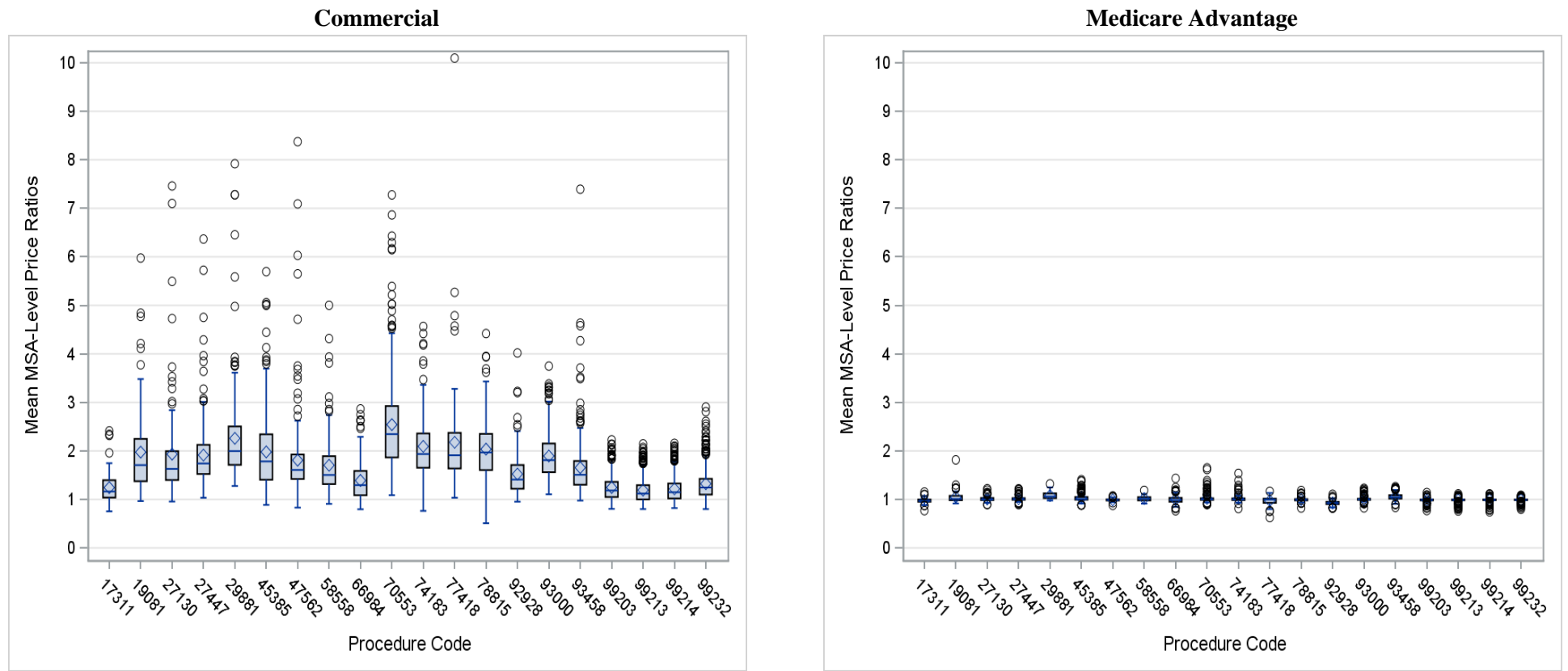
Observations are at the claim-line level.

Figure 3. Ratio of Private Payments to Estimated Medicare FFS Payments for Two Services



Observations are at the claim-line level.

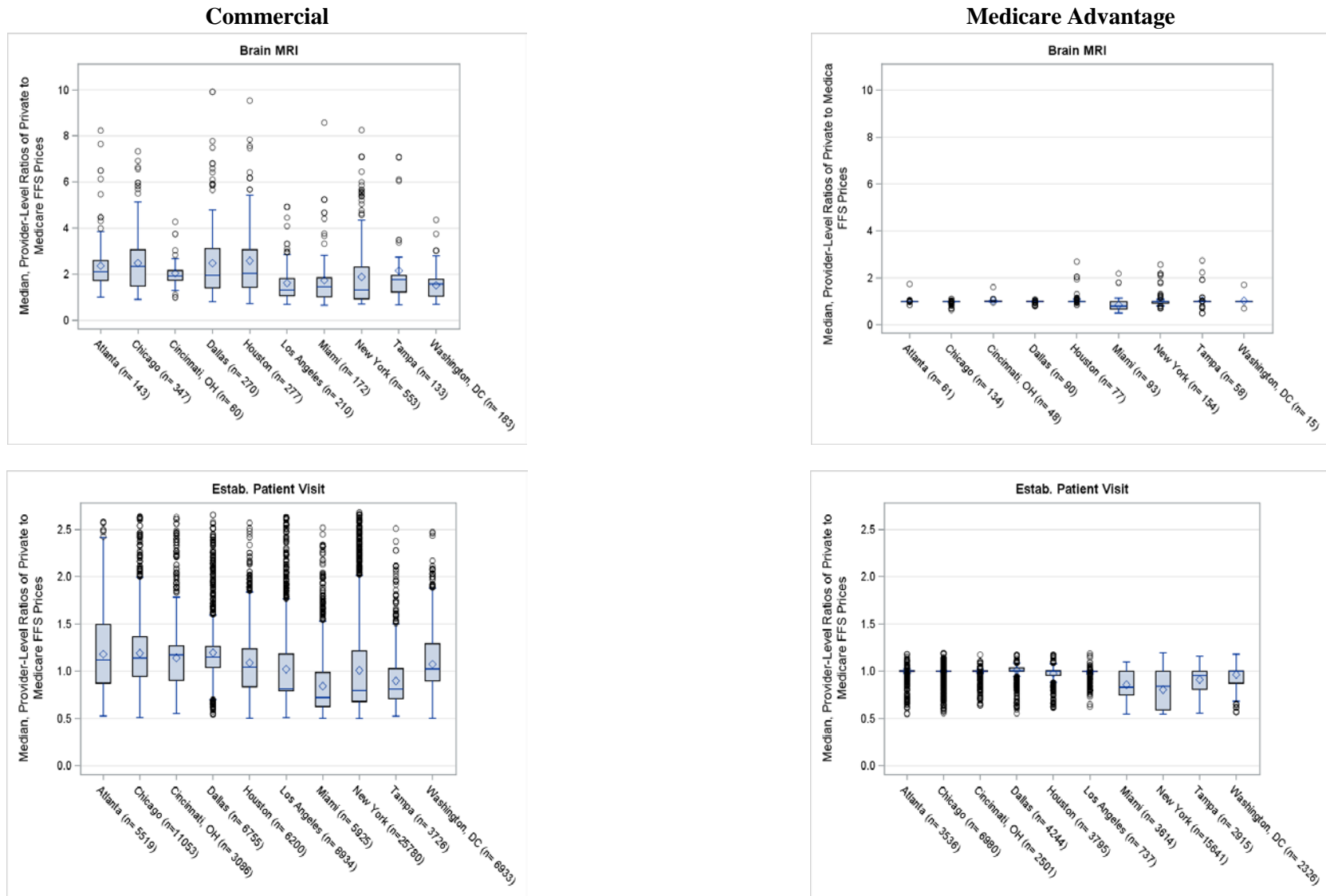
Figure 4. Variation Across MSAs in the Average Ratios of Private Prices to Medicare FFS Prices



Procedure codes			
17311 = Micrographic Surgery	45385 = Colonoscopy	74183 = Abdominal MRI	93458 = Cardiac Catheterization
19081 = Breast Biopsy	47562 = Gall Bladder Surgery	77418 = IMRT	99203 = New Patient Office Visit
27130 = Hip Replacement	58558 = Hysteroscopy	78815 = PET/CT scan	99213 = Estab. Patient Office Visit
27447 = Knee Replacement	66984 = Cataract Surgery	92928 = Stent Placement	99214 = Estab. Patient Office Visit
29881 = Knee Arthroscopy	70553 = Brain MRI	93000 = EKG	99232 = Subsequent Hospital Care

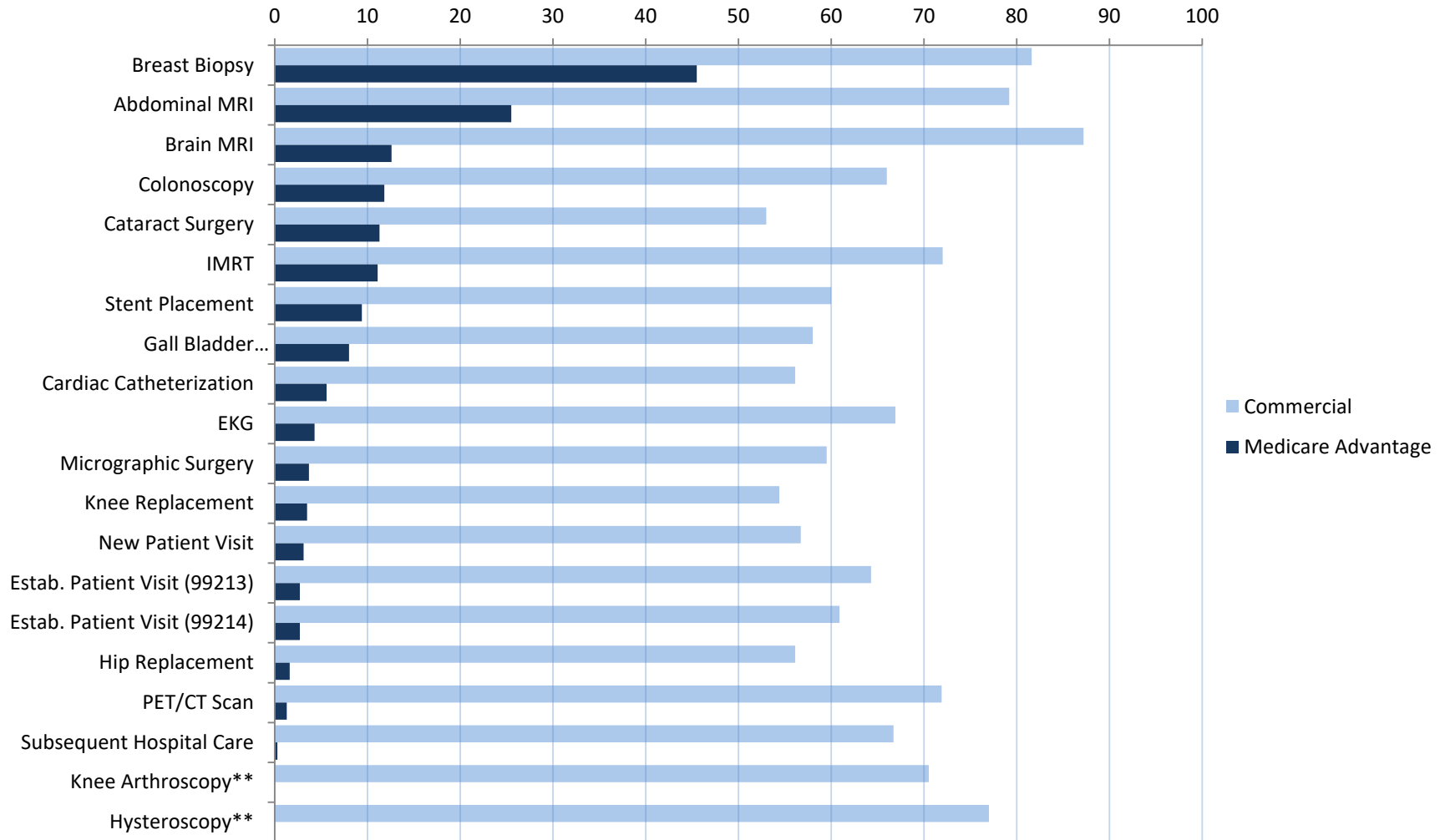
Data were limited to all MSAs with at least 25 claim-lines and at least five distinct providers for each service in each population. The edges of each box are the 25th and 75th percentiles, respectively; the middle line is the median MSA; the mean is marked by a diamond. The upper and lower fences end at 1.5 times the interquartile range above and below the 25th and 75th percentiles. Outliers outside those ranges are indicated by dots.

Figure 5. Variation in the Median Ratios of Private to Medicare FFS Prices Across Providers for Two Selected Services



Excludes providers with fewer than 5 claim-lines for a given service and includes only MSAs with at least 100 claim-lines and at least five distinct providers for each service in each population. Los Angeles is excluded from the panel for brain MRIs in Medicare Advantage because the sample size in the MSA was insufficient for disclosure, after all restrictions were applied. N is the number of providers in each MSA, where providers are identified by NPI.

Figure 6. Percentage of MSAs in Which the Median Ratio of Private to Medicare FFS Prices is at Least 50 Percent Greater for the 90th-Percentile Provider Than for the 10th-Percentile Provider



Analysis excludes providers with fewer than five claims and includes only MSAs with at least 50 claim-lines and at least five distinct providers for each service in each population.

**Knee arthroscopy and hysteroscopy were omitted from this portion of analysis for Medicare Advantage because there were fewer than five MSAs that met the sample restrictions in Medicare Advantage.

Figure 7. Correlations in Private and Medicare FFS Prices Across MSAs

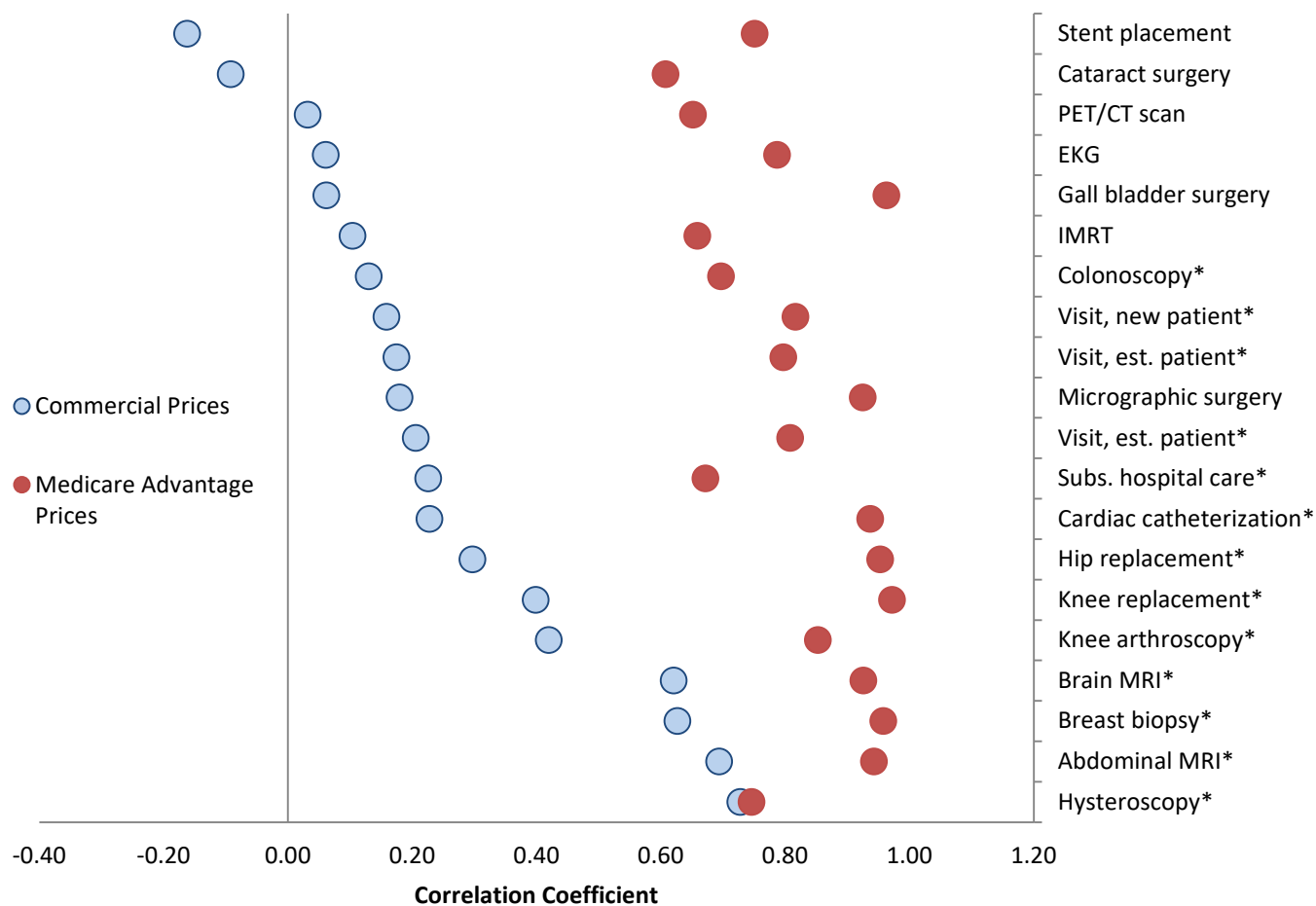


Figure summarizes correlation coefficients between average, MSA-level private prices and Medicare FFS prices for MSAs with at least 25 claims and at least five distinct providers for each service in both the Medicare Advantage and the commercial populations.

* Indicates commercial correlation coefficients that were significant at $p < .05$. All MA correlation coefficients were significant at $p < .05$.

Figure 8. Correlations in Commercial and Medicare Advantage Price Ratios Across Providers

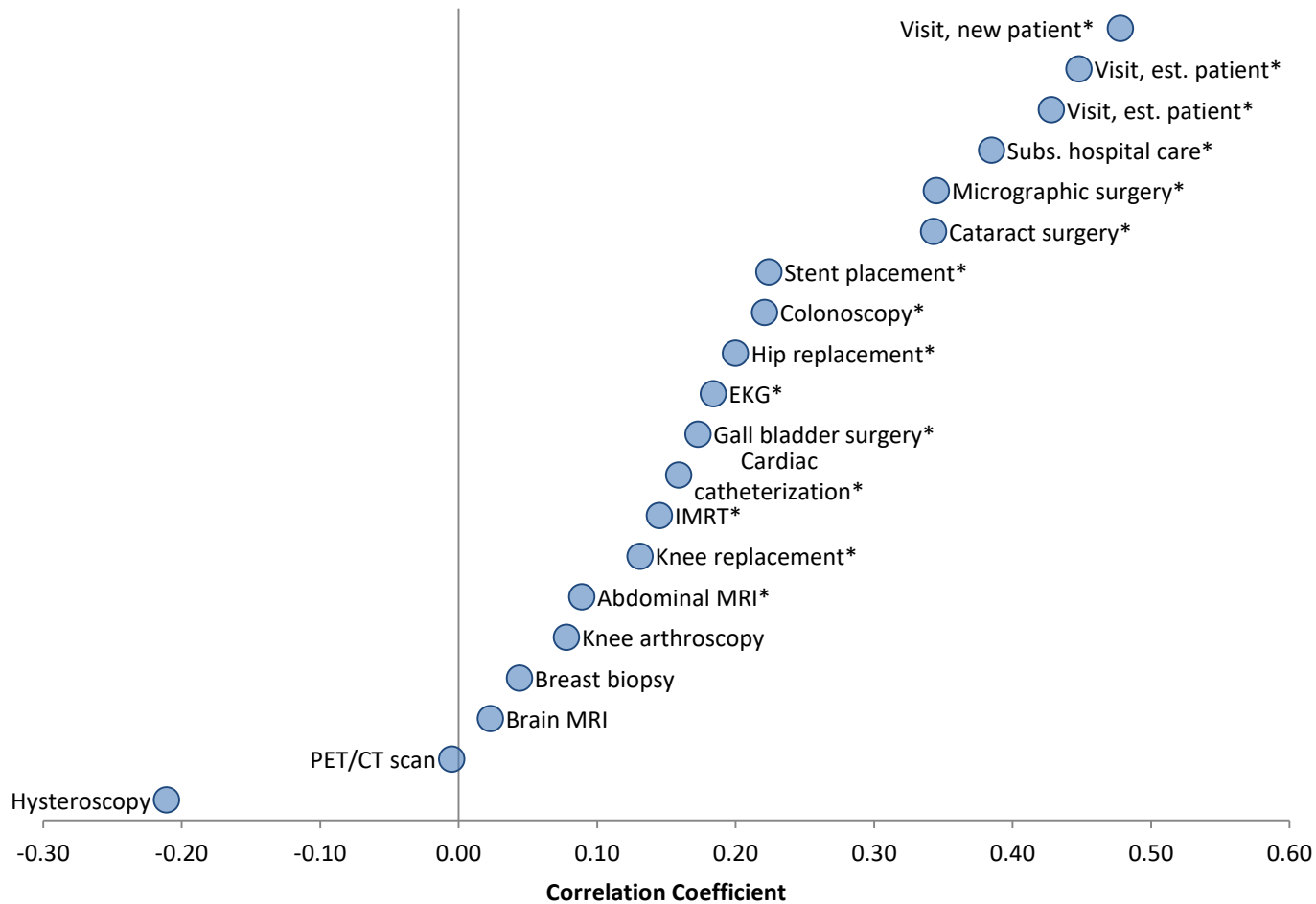
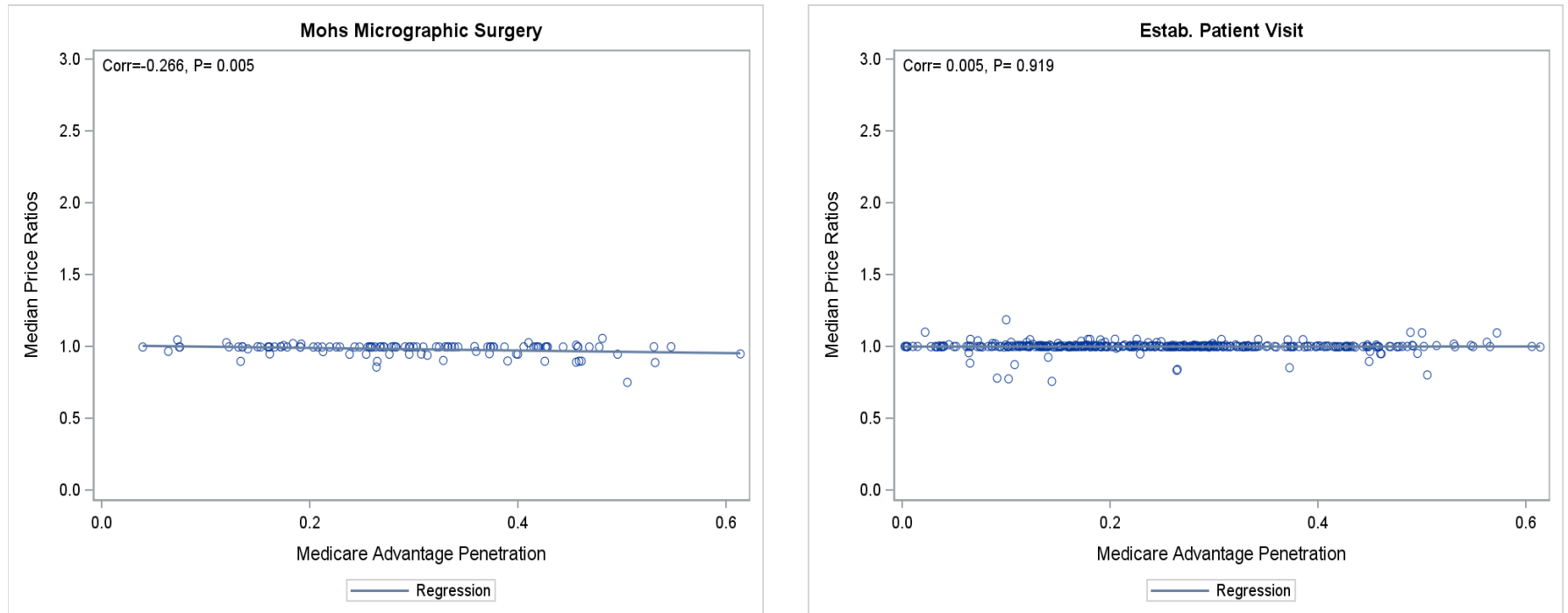


Figure summarizes correlation coefficients between median, provider-level price ratios for the same service in commercial and Medicare Advantage plans. Excludes NPIs with fewer than five claims and includes only MSAs with at least 50 claim-lines and at least five distinct NPIs for each service in the Medicare Advantage and the commercial populations.

* Indicates commercial correlation coefficients that were significant at $p < .05$.

Figure 9. Relationship Between Medicare Advantage Penetration and the Average Ratio of Medicare Advantage to Medicare FFS Prices for Two Services



MSAs are included if they have at least five NPIs and 25 claim-lines for each service in the MA population. Medicare Advantage penetration denotes the percentage of all Medicare beneficiaries in Medicare Advantage plans in an MSA in 2014.

Table 2. Correlations Between Prices, Market Penetration, and Medicare Payments to Medicare Advantage Plans

Services	Correlation Between Medicare Advantage Price Ratios and Medicare Advantage Penetration		Correlation Between Medicare Advantage Prices and Medicare Advantage Benchmarks	
Mohs micrographic surgery	-0.27*		0.02	
Breast biopsy	-0.13		0.06	
Hip replacement	-0.19*		0.17*	
Knee replacement	-0.06		0.13	
Knee arthroscopy	-0.01		-0.02	
Colonoscopy	-0.01		0.02	
Gall bladder surgery	-0.13		0.15	
Hysteroscopy	-0.30		0.27	
Cataract surgery	-0.11		0.13*	
Brain MRI	0.08		0.07	
Abdominal MRI	0.01		0.19*	
IMRT	-0.13		-0.07	
PET/CT scan	0.11		0.23*	
Stent placement	-0.20*		-0.01	
EKG	-0.11*		0.18*	
Cardiac catheterization	-0.12		0.08	
Visit, new patient	-0.03		0.07	
Visit, est. patient	0.01		0.11*	
Visit, est. patient	0.04		0.13*	
Subs. hospital care	0.03		0.12*	

Column 2 shows correlation coefficients between Medicare Advantage price ratios and Medicare Advantage penetration (the percentage of all Medicare beneficiaries in Medicare Advantage plans in an MSA in 2014). Column 3 shows correlation coefficients between Medicare Advantage prices and benchmark payments, where benchmark payments are adjusted by the quality score of all plans operating in an MSA. MSAs are included if they had at least five physicians and 25 claim-lines for each service in the Medicare Advantage population.

* Correlation coefficients are significant at $p < .05$.

Figure 10. Percentage of Commercial Observations Provided In Network and Average Ratios of Commercial Prices to Medicare FFS Prices for In- and Out-of-Network Observations

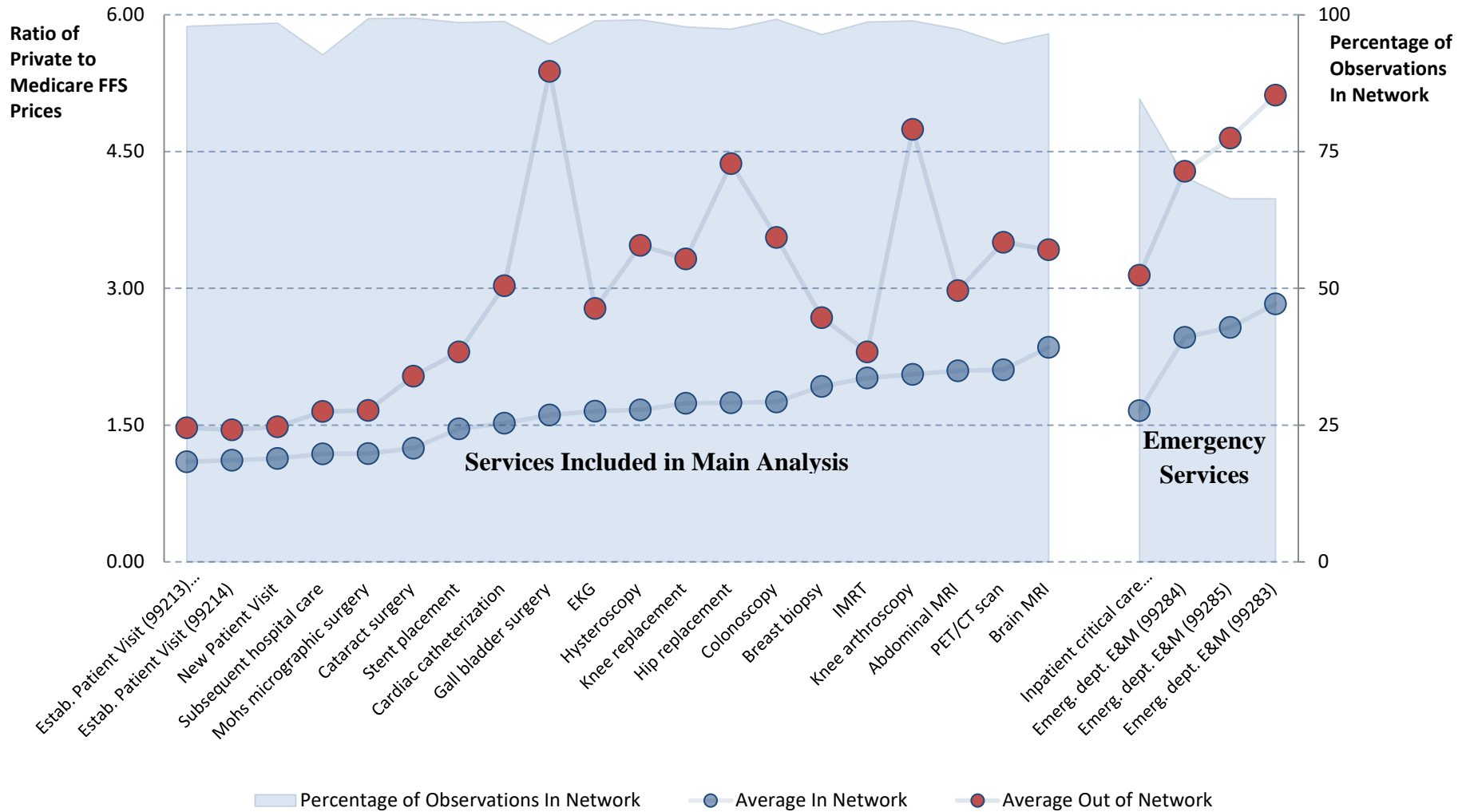


Figure summarizes commercial prices for observations received in and out of network and summarizes the percentage of commercial observations that were provided by in-network physicians. Average prices reflect the price on a claim, but do not reflect any balance billing by providers. The left side summarizes data for the 20 services included in the main analysis; the right side shows 4 additional services provided primarily in emergency departments. Claims without network codes were classified as out of network; less than 2 percent of claims for any service in any population were missing a network indicator.

Figure 11. Percentage of Medicare Advantage Observations Provided In Network and Average Ratios of Medicare Advantage Prices to Medicare FFS Prices for In- and Out-of-Network Observations

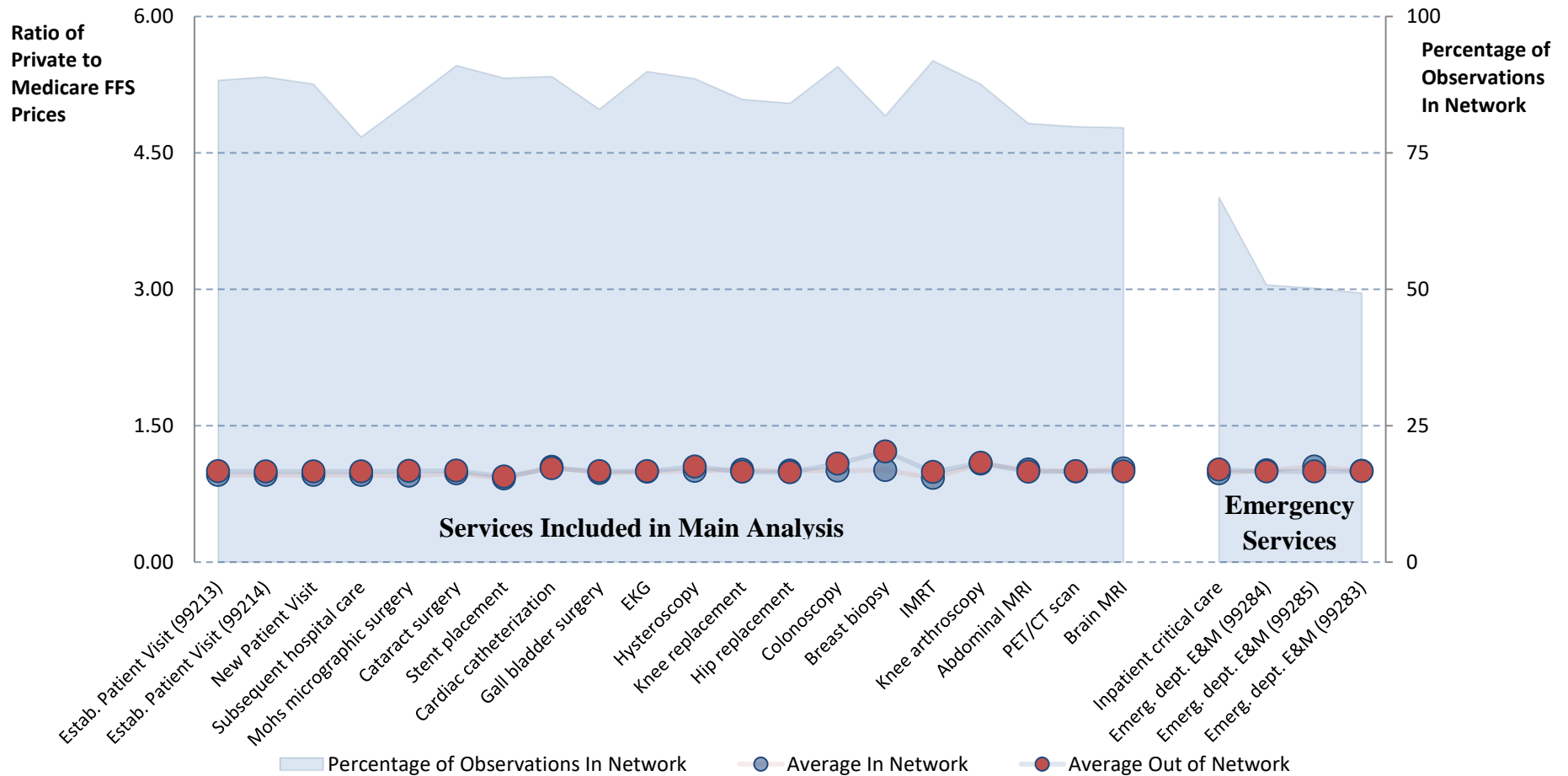


Figure summarizes Medicare Advantage prices for observations received in and out of network, and summarizes the percentage of Medicare Advantage observations that were provided by in-network physicians. Average prices reflect the price on a claim, but do not reflect any balance billing by providers. The left side summarizes data for the 20 services included in the main analysis; the right side shows 4 additional services provided primarily in emergency departments. Claims without network codes were classified as out of network; less than 2 percent of claims for any service in any population were missing a network indicator.

Figure 12. Average Cost Sharing Paid by the Patient In and Out of Network in Commercial Plans

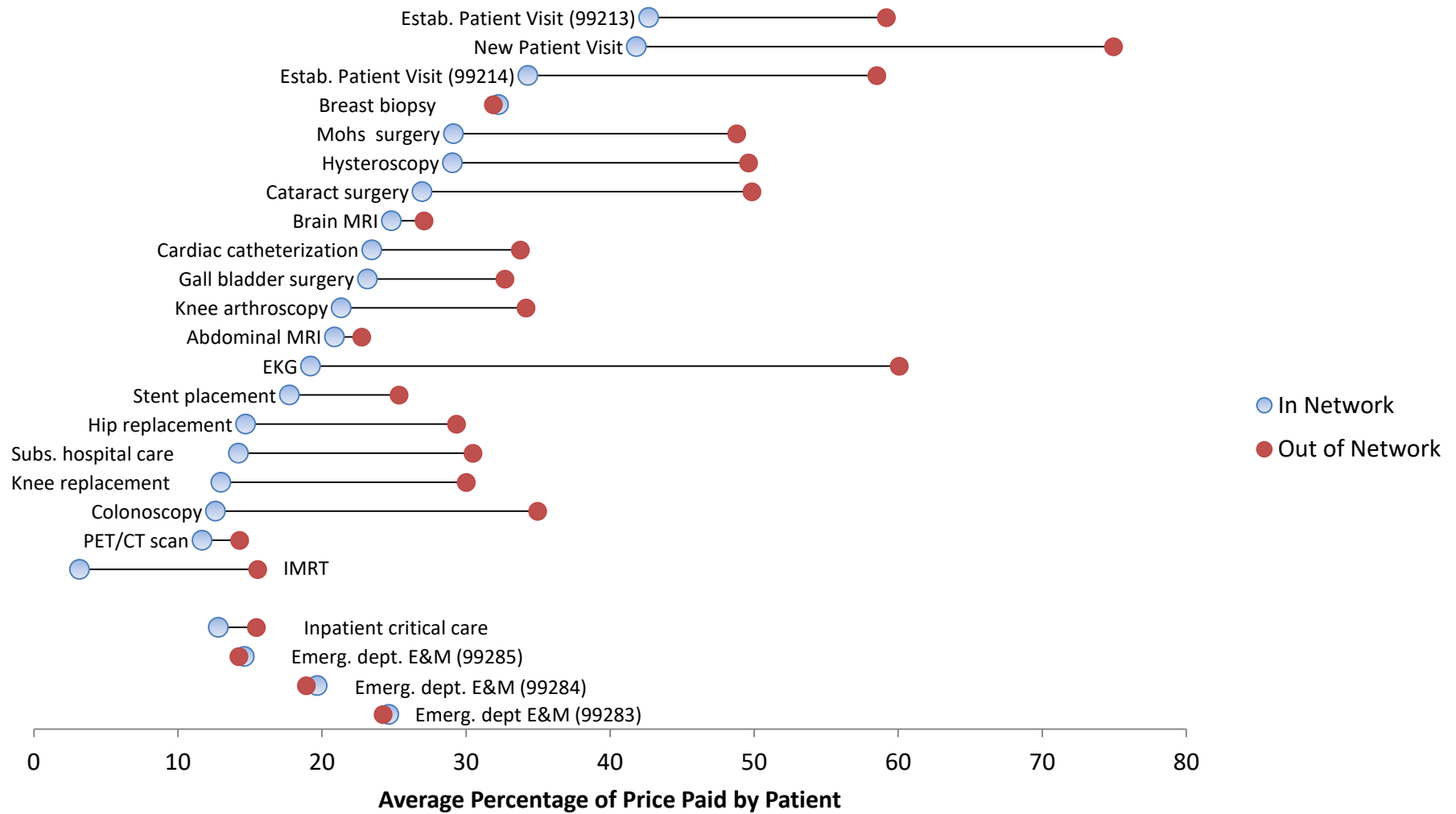


Figure shows the average percentage of the price on each claim-line paid by the patient in the form of copayments, deductibles, and coinsurance, in and out of network. Our estimates do not include any amounts “balance billed” by the physician—that is, any additional amount collected by out-of-network physicians whose charges exceed the insurer’s payment rate. Claims without network codes were classified as out of network; less than 2 percent of claims for any service were missing a network indicator.

Figure 13. Average Cost Sharing Paid by the Patient In and Out of Network in Medicare Advantage Plans

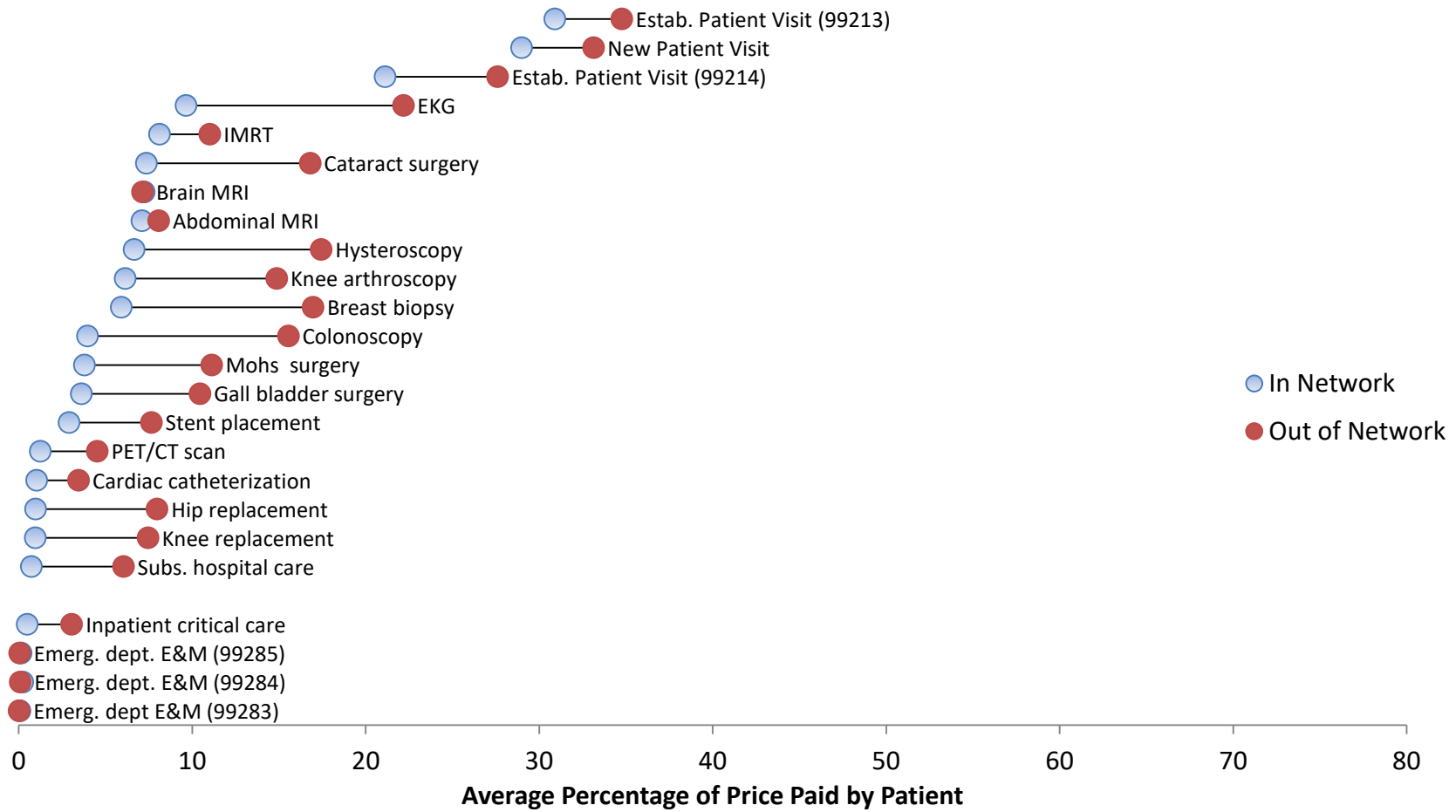


Figure shows the average percentage of the price on each claim-line paid by the patient in the form of copayments, deductibles, and coinsurance, in and out of network. Claims without network codes were classified as out of network; less than 2 percent of claims for any service were missing a network indicator.