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Value-Based Pricing for Hospital Outpatient Services: A Demonstration That Merges Cost-Effectiveness Analysis with Real-World Cost Data

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AT A GLANCE

Employers have been trying to manage the cost of providing health coverage for decades. Attempted cost control measures include a combination of plan design and cost-sharing changes that affect how much enrollees pay out-of-pocket for health care services and other structural changes to the delivery of health care more generally. Yet, in most years since 1988, the cost of providing health benefits to employees and their dependents has increased more than overall inflation.

One tool that can be used to inform the value of money for health care is "value assessment," which is a form of economic evaluation that compares estimates of an intervention's costs with its projected health benefits. However, value assessments tend to be focused on prescription drugs rather than other outpatient health care services. This is true even though prescription drug spending accounted for between 9 percent and 15 percent of U.S. health spending in 2022, while inpatient and outpatient services accounted for between 50 percent and 70 percent of health spending. More generation of evidence on the clinical effects of inpatient and outpatient services — particularly those representing a large share of employer spending — could be of value to employers.

The purpose of this *Issue Brief* is to offer a demonstration of how employers can use value assessments to compare prices paid for value of hospital outpatient department (HOPD)-provided services relative to the cost paid by comparing published cost-effectiveness analysis (CEA) estimates with real-world cost data. We use the quality-adjusted life year (QALY) and the incremental cost-effectiveness ratio (ICER) in our analysis. The QALY is a measure that integrates the quantity of life in years with the quality of that time in terms of health status. The ICER measures the QALYs gained from the additional costs incurred using the treatment compared with "treatment as usual" (or an alternative intervention). Finally, in CEA, the ICER is routinely assessed according to society's willingness to pay for a QALY. Value-based prices can be derived using these metrics.

Key Findings:

- If spending on a health care service is below a value-based price, then one might consider that price to be worthwhile (or "a good deal") given society's willingness to pay for a QALY. If spending is above the value-based price, then one would conclude that the payer is overpaying for the service. It can be argued that a single number cannot adequately capture a society's willingness to pay for a QALY due to variations in values, assumptions, inferences, and contexts. Despite this challenge, we present our results with respect to a value-based price at the $100,000-per-QALY threshold, since researchers have been gravitating toward this level. We also compare the value-based price with median spending. Our findings are mixed as to whether the value-based price is above or below median spending. Readers interested in the distribution of health care spending and other value-based prices are encouraged to examine the appendix.

- In all three carotid artery stenosis screenings, the service was worthwhile at the median allowed amount, as the value-based price was above it.
- For both arthroscopic partial meniscectomy services, the value-based price was below the median allowed amount. As a result, payers may have overpaid for these procedures.
- For low-back-pain imaging, we combined CT scans and MRIs. Median spending was determined to be below the value-based price, suggesting that payers may not have overpaid for these services.
- Median spending for septoplasty for a deviated septum was considerably higher than the value-based price.
- Regarding sleep studies, we examined full-night and split-night studies. We found that median spending was below the value-based price, suggesting that payers may not have overpaid for these diagnostic tests.

Findings from this study, and from the field of value assessments more broadly, should be of importance to both sponsors of health benefits and policymakers. While plan sponsors prefer to offer generous health insurance to recruit and retain workers, they have limited resources and must manage costs accordingly. Greater generation of evidence on the clinical and cost effectiveness of health services that represent the largest share of spending can improve plan coverage decision making. Today, evidence on value assessments of most services representing significant costs to employers is lacking. The current evidence that is available suggests that many employers may be overpaying for services relative to the "cost effective" price.

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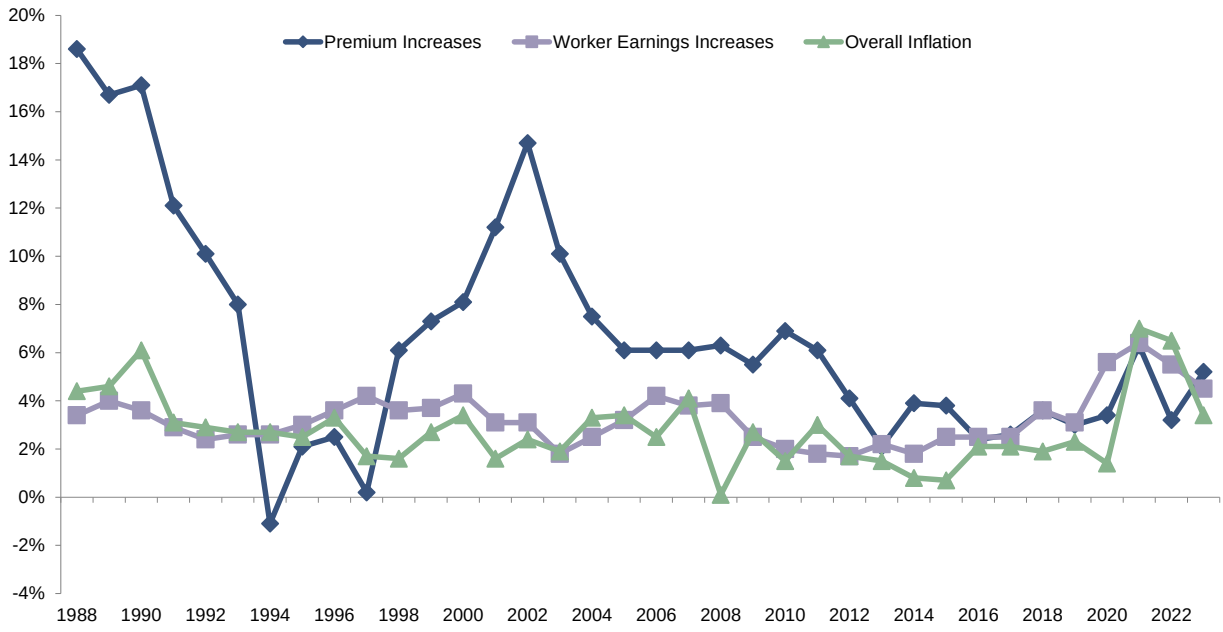
Introduction

In the seminal paper "It's The Prices, Stupid: Why The United States Is So Different From Other Countries," Uwe E. Reinhardt and his coauthors concluded, "The United States spent considerably more on health care than any other country, whether measured per capita or as a percentage of GDP. At the same time, most measures of aggregate utilization such as physician visits per capita and hospital days per capita were below the OECD median…U.S. policymakers need to reflect on what Americans are getting for their greater health spending. They could conclude: It's the prices, stupid." (Anderson, Reinhardt, Hussey, and Petrosyan, 2003).

More recent research reinforces this point of view. Between 2018 and 2022, spending on health care services increased a cumulative 18.7 percent among the population with employment-based health coverage (Health Care Cost Institute, 2024). Yet, price increases accounted for much of this increase: Prices increased 13.9 percent, while use of health care services increased only 4.4 percent.

Employers have been trying to manage the cost of providing health care coverage for decades. Attempted cost-control measures include a combination of plan design/cost-sharing changes that affect how much enrollees pay out of pocket for health services and other structural changes to the delivery of health care. Yet, in most years since 1988, the cost of providing health benefits to employees and their dependents has increased more than overall inflation (Figure 1). Today, premiums for employee-only coverage and family coverage average $8,951 and $25,572, compared with $4,704 and $12,680 (respectively) in 2008.[1] Despite the efforts to manage spending, employers continue to face challenges controlling their spending on health coverage and health care services.

Figure 1
Premium Increases Among Employers With 10 or More Employees, Worker Earnings, and Inflation, 1988–2023



Source: Mercer, National Survey of Employer-Sponsored Health Plans, and Bureau of Labor Statistics.

Employers have mostly shied away from integrating into health plan design comparative clinical effectiveness and cost-effectiveness analysis (CEA), together known as "value assessment." Comparative clinical effectiveness involves weighing the benefits against the harms for one treatment option vs. another (Institute for Clinical and Economic Review, 2023). CEA is one of several economic evaluation approaches that assess the economic cost incurred for a specific outcome such as reduced inpatient hospitalization. A special form of CEA, cost-utility analysis, uses the quality-adjusted life year (QALY) as the outcome of interest (Drummond, Sculpher, Claxton, Stoddart, and Torrance, 2015). The QALY is a measure that integrates life expectancy with the quality of life in terms of health status. A year lived in perfect health equals 1 QALY, whereas a year lived with any morbidity is adjusted to equal some proportion of 1 QALY (e.g., QALY=0 represents death).[2]

The incremental cost-effectiveness ratio (ICER) is used in CEA to compare one treatment with another or "treatment as usual." The ICER equals the difference in costs between the treatment and its comparator divided by the difference in QALYs resulting from the treatment and its comparator. It is measured over a selected time horizon (often lifetime). Put simply, the ICER measures the expected QALYs gained from the additional costs incurred using the treatment.

$$ICER = \frac{Cost\ of\ Treatment\ -\ Cost\ of\ Treatment\ as\ Usual}{QALYs\ From\ Treatment\ -\ QALYs\ From\ Treatment\ as\ Usual}$$

There are generally accepted thresholds that are often referred to when classifying health services. Historically, $50,000 per QALY has been the preferred level above which interventions are often considered "not worth it." However, ranges of $20,000 to $150,000 have been proposed, and in recent years, researchers have been gravitating toward $100,000. It is worth noting that some scholars (Neumann, Cohen, and Weinstein, 2014) argue that a single threshold could never represent society's willingness to pay for a QALY due to variations in values, assumptions, inferences, and contexts; instead, they argue, multiple thresholds should be utilized.

Value assessments are predominantly focused on prescription drugs rather than other outpatient health care services (Neumann, Li, Phillips, and Cohen, 2024). This is true despite the fact that prescription drug spending accounted for between 9 percent and 15 percent of national health spending in 2022.[3] In contrast, inpatient and outpatient services accounted for between 50 percent and 70 percent of health spending in the United States. As argued by Neumann, Li, Phillips, and Cohen (2024), "the lack of attention to services and procedures [in value assessment] neglects opportunities to achieve broader systemwide efficiency and affordability, and may distract focus from the largest categories driving health costs." And a key reason for this lack of focus is the lack of readily available data on the effectiveness of the services on health outcomes. But this is a barrier that is easily overcome if we can prioritize and incentivize health outcomes research that targets procedures and services.

The purpose of this *Issue Brief* is to offer a demonstration of how value assessments can be used for hospital outpatient department (HOPD)-provided health services by combining published CEA estimates with real-world cost data.

Findings from this study should be of interest to both sponsors of health benefits and policymakers. Plan sponsors prefer to offer generous health insurance to recruit and retain workers, but they have limited resources and must manage costs accordingly. While value assessments can help employers understand how the prices they pay relate to whether services are estimated to be low or high value, the current evidence base is limited. Broader-based value assessments can also help policymakers at the federal and state levels as they wrestle with budget constraints in the context of setting spending priorities for programs, such as Medicare and Medicaid. But to realize the savings, more generation of evidence on clinical effectiveness of services and procedures is needed.

Data and Methods

Selection of HOPD Services

We searched the peer-reviewed literature for CEAs of outpatient medical services, using relevant search terms such as "cost-effectiveness analysis" and "CEA" combined with names of services routinely performed in the HOPD setting. To guide our search, we looked for items included on the Centers for Medicare and Medicaid Services' (CMS') list of 300 "shoppable services"[4] as well as those designated as "low value" by the U.S. Preventive Services Task Force (USPSTF).[5] We searched PubMed, Google Scholar, and Tuft University's CEA Registry.[6]

For our analysis, we had several inclusion criteria. First, one or more (preferably recent) CEA studies specific to the HOPD service were required. Second, those studies had to include sufficient detail regarding the ICER calculations. Third, we opted for CEA studies wherein the comparators were "treatment as usual" to allow for the general alignment with real-world cost data in our subsequent calculations. Fourth, we preferred studies that adopted a lifetime evaluation horizon. Finally, we also sought to present some diversification in the type of service examined, such as imaging, surgical, and diagnostic. Based on these parameters, we selected the following nine treatment services for analysis:

Carotid Artery Stenosis Screening

1. Computed Tomographic Angiography of Neck (with contrast)
2. Magnetic Resonance Angiography of Neck (with or without contrast)
3. Duplex Scan of Extracranial Arteries

Arthroscopic Partial Meniscectomy of the Knee

4. Arthroscopic Partial Meniscectomy, Medial and/or Lateral (without osteoarthritis)
5. Arthroscopic Partial Meniscectomy, Medial and/or Lateral (with osteoarthritis)

Imaging for Low Back Pain

6. Computed Tomography and Magnetic Resonance Imaging of Spine (with or without contrast)

Septoplasty for Deviated Septum

7. Septoplasty or Submucous Resection

Sleep Studies

8. Full-Night Polysomnography (attended by a technologist) in Hospital Outpatient Department
9. Split-Night Polysomnography (attended by a technologist) With Continuous Positive Airway Pressure Therapy in Hospital Outpatient Department

For each service, we attempted to identify and utilize the best literature-based estimate of the expected number of QALYs gained from receiving the service compared with "treatment as usual," which was **not receiving the service** in seven of the nine. For the two sleep studies, the comparator was a home sleep study. Citations for the CEA studies used are provided in the results figures below.

Use of Real-World Cost Data

We made use of 2022 MarketScan® outpatient medical claims data as follows. Using procedure (and in some cases also diagnosis) codes, we extracted all claims for each service delivered in the HOPD setting (using place of service codes) and paid on a non-capitated basis for all plan enrollees ages 18–64. We also extracted claims for contrast agents for carotid artery stenosis screening and imaging for low-back pain. And, where we could reliably associate them with the service, we also included facility fee claims. Finally, for arthroscopic partial meniscectomy of the knee and septoplasty for deviated septum, we included all claims occurring on the same day in the HOPD setting, assuming that they were linked to the surgery.

Using these extracted claims, we calculated the average cost for each of the nine treatment services (and the home sleep study for use as a comparator) based on allowed amounts. We divided the real-world, data-derived cost (i.e., the incremental cost) by the expected number of QALYs gained to yield the cost per QALY (i.e., the ICER) observed in 2022 for each of the nine services.

$$\boldsymbol{Cost\ per\ QALY\ (i.e., ICER) = \frac{Real\ World\ Cost}{Expected\ QALYs\ Gained}}$$

The observed cost per QALY can be examined with various willingness-to-pay thresholds in mind to assess value, particularly when comparing medical and pharmacy treatment services that are competing for scarce health care resource dollars. We also multiplied the expected QALY gains for each service times $50,000, $100,000, and $150,000 to derive the value-based price that would prevail at each of these thresholds.

$$\boldsymbol{Value\text{–}Based\ Price = Expected\ QALYs\ Gained * Willingness\text{–}to\text{–}Pay\ Threshold}$$

Results

In theory, if spending on a health care service is below the estimated value-based price, then one might consider that price to be worthwhile (or "a good deal") given society's willingness to pay at that threshold. However, if spending is above the value-based price, then one would conclude that the payer is overpaying for the service. Neumann, Cohen, and Weinstein (2014) argue that a single threshold could never represent society's willingness to pay for a QALY due to variations in values, assumptions, inferences, and contexts; instead, they argue, multiple thresholds should be utilized. Similarly, there are several reasons that the ICER isn't adequately representing the interventions' clinical benefits. In the figures below, we present the value-based price at the $100,000 threshold. Despite the Neumann, Cohen, and Weinstein (2014) argument, researchers have been gravitating toward $100,000. As you will see below in our findings, for some services, median spending is below all the value-based prices, while for other services, it is above all value-based prices.

The appendix includes the following detailed results: real-world costs at the mean, 25th percentile, median, and 75th percentile; expected QALYs gained; cost per QALY at the mean, 25th percentile, median, and 75th percentile; and value-based prices at the $50,000-, $100,000-, and $150,000-per-QALY thresholds.

Figure 2 shows our findings. We examined three types of carotid artery stenosis screenings. A computed tomographic angiography of the neck is a type of CT scan, while a magnetic resonance angiography of the neck is like an MRI. A duplex scan of extracranial arteries is an ultrasound. In all three variants, the service was worthwhile at the median allowed amount, as the value-based price was above it.

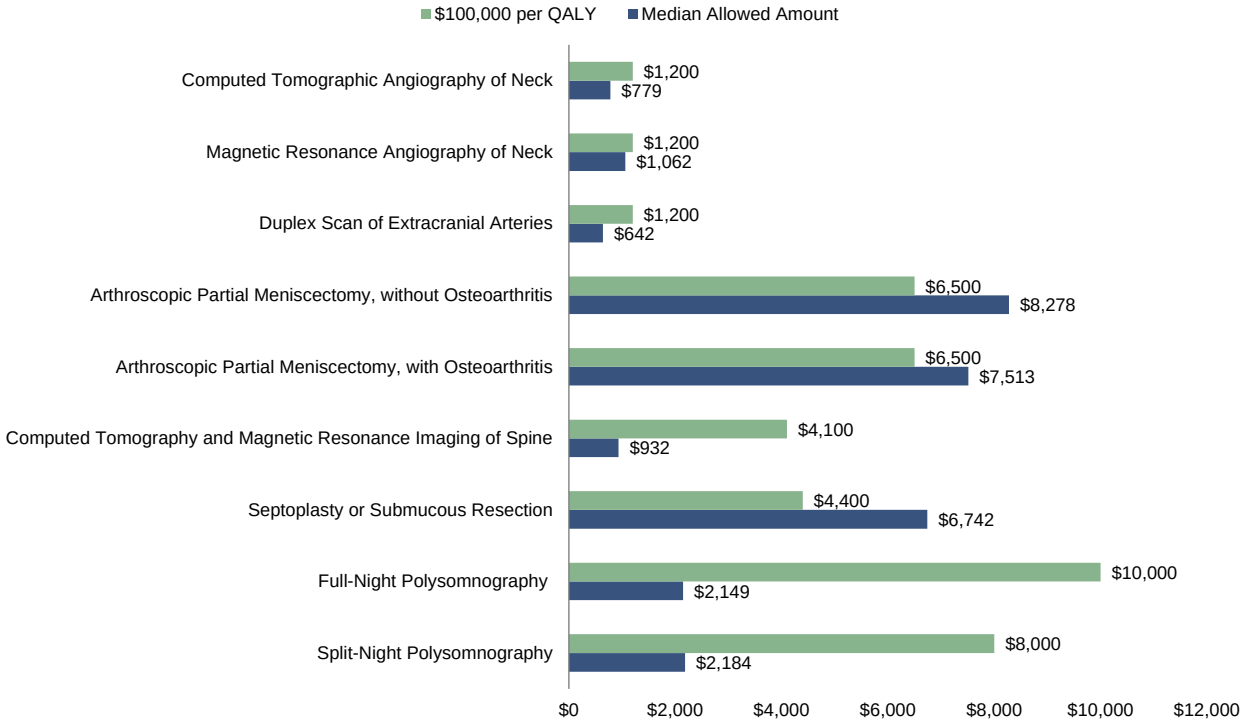
Next, we examined two types of arthroscopic partial meniscectomy (APM). An APM is a surgical procedure that removes a damaged portion of the knee joint to relieve symptoms of a meniscal tear. We examined the service separately for enrollees with and without osteoarthritis. In both cases, the value-based price was below the median allowed amount. As a result, one would conclude that payers may have overpaid for these surgeries.

In our findings for imaging for low-back pain, we analyzed claims data for CT scans and MRIs. Median spending was below the value-based price, suggesting that payers may not have overpaid for these services. These findings will be discussed in more detail below.

With respect to septoplasty for a deviated septum, one would conclude that payers overpaid for this service because the value-based price was below median cost.

Regarding sleep studies, we examined full-night and split-night sonography. Unlike the other services examined in this paper, where the comparator was not receiving the health care service, these two diagnostic tests were compared with a home-based sleep study. We found that median spending was below the value-based price, suggesting that payers were not overpaying for these services.

Figure 2
Median Allowed Amounts Compared With Value-Based Prices



Note: QALY = quality-adjusted life year.
Source: Employee Benefit Research Institute estimates based on administrative enrollment and claims data; Gilbert et al. (2004); NIHR (2004); Deutsch et al. (2006); Schwartz et al. (2014); and Williams et al. (2022).

Discussion

This demonstration shows how value assessment for the common and costly shoppable services can be easily used by employers and plan sponsors to learn how the prices they are paying align with "value-based prices" to determine whether they are overpaying for select services.

The results presented above focus on median costs for select services with existing CEA data, compared with value-based prices that were derived with the assumption of society's willingness to pay $100,000 per QALY. Whether a health care service is considered "a good deal" or overpriced will depend on the specific price from a specific health care provider. Indeed, for some services, the 25th and 75th cost percentiles straddle the value-based price (see the appendix). Moreover, the relative appropriateness of the real-world costs is highly sensitive to the chosen willingness-to-pay threshold (see the appendix).

Employers should consider several issues as they weigh the utility of value assessments for services. First, how do employers use value-based pricing to negotiate with providers of health care services? Employers may be able to use value-based pricing to negotiate lower reimbursement rates among high-priced providers. However, low-priced providers may be able to use value-based pricing to negotiate higher reimbursement rates. Employers' use of value-based pricing may also trigger consolidation among providers, which would increase negotiating power among

providers, a trend that has already been occurring (Fronstin and Roebuck, 2021). Employers will also need to consider whether value-based prices are set locally, regionally, or nationally.

Employers could also use value assessments to create tiered cost-sharing levels. This is one way to use transparency around pricing to engage health plan enrollees. Communication with plan members is key to an effective implementation of value-based pricing. Individuals will need comparable information on prices and quality to make informed decisions regarding provider selection. Lists of doctors and hospitals, either in preferred networks or with prices at or below the value-based price, can be more easily disseminated today than in the past through the use of mobile apps and websites.

However, this concept may be difficult to implement in practice. Enrollees who value high-priced providers may choose to pay the higher cost sharing. And communicating a value-based price for select health care services while other services are not subject to a value-based price may be challenging and confusing to plan participants.

Employers have considered similar issues as they have wrestled with reference pricing strategies, and there may be lessons to be learned from it (Fronstin and Roebuck, 2014). Reference pricing may not necessarily have desirable effects on provider prices. High-cost providers may be reluctant to reduce prices unless they expect offsetting gains in volume, and those with sufficient market power and/or strong patient relationships may be successful in standing their pricing ground. Providers may move to increase prices of non-reference-priced services. And providers below the reference price may be prompted to increase prices to a "shadow price" at or near the reference price. These issues may explain why only 13 percent of large employers had introduced reference pricing as of 2016.[7]

Employers may want to use value-based pricing but may need to take a nuanced approach. Imaging for low-back pain is a case in point. Our findings suggest that median spending on imaging for low-back pain is below the value-based price, suggesting that payers are not overpaying for these services. The North American Spine Society recommends against the use of imaging of the spine within the first six weeks of an acute episode of low-back pain in the absence of red flags.[8] Advanced imaging in this situation has not been found to improve outcomes. Navigating such care recommendations can be quite challenging for employers.

Even though there is much more research on value-based pricing related to prescription drugs than on outpatient services, for the most part, employers have not moved toward value-based purchasing in any meaningful way. This may in part be due to the dearth of usable CEA studies for medical services. Ultimately, like reference pricing, if implementing value-based pricing were easy to do, more employers would likely already be doing so.

This study shows that value assessments can be useful for employers and plan sponsors to benchmark the prices they pay. But it also highlights the dearth of evidence on the value of services that would enable this benchmarking. More generation of evidence on the clinical effects of inpatient and outpatient services — particularly those representing a large share of employer spending — is needed.

Limitations

Our study is intended to illustrate how CEA might be applied to HOPD services to derive value-based prices. Several limitations are worth noting. First, while we implemented important selection criteria, our nine HOPD services are largely a convenience sample and are not representative of all HOPD services. Second, the CEA publications we referenced vary in terms of quality, methodology, discount rate, time horizon, and economic perspective. Consequently, a lack of comparability among the incremental QALY estimates may lead to misalignment when marrying them with our real-world cost data, potentially impacting the accuracy of our value-based pricing assessments. Third, given that the cited CEAs were conducted some time ago, potential changes in clinical practice or technology may limit the relevance and applicability of our findings. The expected QALY gains drawn from these earlier studies may no longer align with the current effectiveness of the HOPD services analyzed or the comparators due to advances in medical procedures, treatment delivery, updated clinical guidelines, or shifts in standard care practices. Finally, we have not attempted to quantify the inherent uncertainty in our analysis.

Conclusion

The rising costs of health care continue to challenge employers, compelling them to seek innovative strategies for managing spending while providing effective coverage. This *Issue Brief* underscores the practicality of using value assessments to benchmark prices paid for inpatient and outpatient services, which represent the largest share of employer spending. More generation of comparative clinical-effectiveness and cost-effectiveness analyses can guide employers in optimizing their spending on health services. Our findings indicate that while certain services may be priced closely to the estimated value, others reveal significant overpayments that warrant reconsideration of current pricing structures. However, our analysis also highlights the limited availability of cost-effectiveness data for many medical services, emphasizing a need for more comprehensive economic evaluations to better inform employers' coverage and spending decisions.

Our findings underscore the necessity for employers and policymakers to adopt a more nuanced understanding of value assessments beyond prescription drugs. As demonstrated, there are varying implications for different health services, and a one-size-fits-all approach may not suffice. CEA provides a useful benchmark rather than a prescriptive solution for benefit design, and employers' use of it may be limited until more evidence is generated. Employers may want to consider innovative strategies, such as tiered cost sharing and enhanced transparency, to facilitate consumer engagement to guide enrollees toward higher-value care, as well as to address provider pricing. However, they may face implementation challenges related to provider pricing and enrollee behavior. Ultimately, adopting value-based pricing frameworks could serve as a pivotal step in transforming health care purchasing, thereby supporting the dual objectives of cost containment and improved health outcomes for employees and their families. Expanding the evidence base will be critical to fully realizing the potential of value-based pricing for outpatient services. However, if implementing value-based pricing were easy to do, more employers would already be doing so.

Appendix

Appendix Figure 1
Full Results

	Sample Size	Allowed Amounts				Effectiveness	Cost per QALY				Value-Based Price		
Treatment Service	**N**	**Mean**	**25th Percentile**	**Median**	**75th Percentile**	**Expected QALYs Gained**	**Mean**	**25th Percentile**	**Median**	**75th Percentile**	**$50,000 per QALY**	**$100,000 per QALY**	**$150,000 per QALY**
Computed Tomographic Angiography of Neck (with contrast)	14,591	$1,111	$382	$779	$1,480	0.012	$92,542	$31,825	$64,928	$123,338	$600	$1,200	$1,800
Magnetic Resonance Angiography of Neck (with or without contrast)	2,641	$1,380	$499	$1,062	$1,995	0.012	$114,967	$41,558	$88,484	$166,217	$600	$1,200	$1,800
Duplex Scan (i.e., Ultrasound) of Extracranial Arteries	8,757	$686	$321	$642	$959	0.012	$57,184	$26,723	$53,488	$79,948	$600	$1,200	$1,800
Arthroscopic Partial Meniscectomy, Medial and/or Lateral (without osteoarthritis)	10,114	$10,677	$5,224	$8,278	$12,913	0.065	$164,257	$80,372	$127,358	$198,661	$3,250	$6,500	$9,750
Arthroscopic Partial Meniscectomy, Medial and/or Lateral (with osteoarthritis)	5,843	$9,063	$4,924	$7,513	$11,118	0.065	$139,429	$75,760	$115,577	$171,048	$3,250	$6,500	$9,750
Computed Tomography and Magnetic Resonance Imaging of Spine (with or without contrast)	29,672	$1,253	$527	$932	$1,682	0.041	$30,559	$12,853	$22,741	$41,013	$2,050	$4,100	$6,150
Septoplasty or Submucous Resection	6,796	$8,736	$2,679	$6,742	$12,110	0.044	$198,554	$60,892	$153,236	$275,226	$2,200	$4,400	$6,600
Full-Night Polysomnography (attended by a technologist) in Hospital Outpatient Department	24,149	$2,216	$1,140	$2,149	$3,060	0.10	$15,302	$8,867	$4,535	$14,627	$5,000	$10,000	$15,000
Split-Night Polysomnography (attended by a technologist) with Continuous Positive Airway Pressure Therapy in Hospital Outpatient Department	20,028	$2,291	$1,074	$2,184	$3,207	0.08	$20,060	$12,432	$4,850	$18,719	$4,000	$8,000	$12,000

Note: QALY = quality-adjusted life year.
Source: Employee Benefit Research Institute estimates based on administrative enrollment and claims data; Gilbert et al. (2004); NIHR (2004); Deutsch et al. (2006); Schwartz et al. (2014); and Williams et al. (2022).

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Endnotes

[1] See Figures 6.4 and 6.5 in https://www.kff.org/report-section/ehbs-2024-section-6-worker-and-employer-contributions-for-premiums/.

[2] The QALY metric has been criticized for discriminating against certain populations and is banned from being used in many government programs but has been commonly used in health outcomes literature.

[3] See https://www.cms.gov/files/document/nations-health-dollar-where-it-came-where-it-went.pdf and https://www.ispor.org/docs/default-source/intl2023/bvi-empirical-research-poster-final-pdf. Note that the Centers for Medicare & Medicaid Services (CMS) counts only retail pharmacy spending in its prescription drug estimate. Specialty medications not dispensed through a retail pharmacy, such as physician-administered outpatient drugs that are largely paid for via the medical benefits, are not included in the CMS estimate. Thus, while the 15 percent estimate may be more accurate, it is still a small number relative to other sources of health spending.

[4] See www.cms.gov/files/document/steps-making-public-standard-charges-shoppable-services.pdf for a list of 70 CMS-specific shoppable services.

[5] See https://www.uspreventiveservicestaskforce.org/uspstf/topic_search_results?topic_status=P.

[6] See https://cear.tuftsmedicalcenter.org/.

[7] See https://www.mercer.com/en-us/insights/us-health-news/some-good-news-about-reference-based-pricing/ for the most recent data that we could find on reference pricing.

[8] See https://www.aafp.org/pubs/afp/collections/choosing-wisely/127.html.