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Issue BRIEF

Reference Pricing for Health Care Services: A New Twist on the Defined Contribution Concept in Employment-Based Health Benefits

By Paul Fronstin, Ph.D., Employee Benefit Research Institute; and M. Christopher Roebuck, Ph.D., RxEconomics

AT A GLANCE

- This analysis examines reference pricing, a form of defined contribution health benefits, where plan sponsors pay a fixed amount or limit their contributions toward the cost of a specific health care service, and health plan members must pay the difference in price if a more costly health care provider or service is selected.
- Reference pricing for hip and knee replacement, colonoscopy, magnetic resonance imaging (MRI) of the spine, computerized tomography (CT) scan of the head or brain, nuclear stress test of the heart, and echocardiogram were examined because these services have fairly uniform protocols, and they are less likely to experience variation in quality, both of which make price comparisons easier for patients.
- Potential aggregate savings could reach $9.4 billion if all employers adopted reference pricing for the health care services examined in this paper. The $9.4 billion represents 1.6 percent of all spending on health care services among the 156 million people under age 65 with employment-based health benefits in 2010.
- Savings from reference pricing materializes through the combination of 1) patients choosing providers at the reference price, 2) patients paying the difference between the reference price and the allowed charge through cost sharing, and 3) providers reducing their prices to the reference price. Any increase in prices among providers below the reference price would reduce the potential for savings.
- Reference pricing for knee and hip replacements would result in savings averaging $10,367 per knee or hip replacement among the cases that were above the reference price, and would account for about 40 percent of the aggregate savings. While the incidence rate of hip and knee replacements in the population of people with employment-based coverage is relatively low, the costs are relatively high. In contrast, stress tests of the heart accounted for only 2 percent of the aggregate potential savings. While incidence rates ranged from 14 to 20 percent between 2008 and 2010, only $87 per case would be saved from reference pricing. Colonoscopies, CT scans of the head or brain, and echocardiograms each accounted for between 15–20 percent of aggregate potential savings, while MRIs of the spine accounted for about 10 percent of the potential savings.
- Plan sponsors should consider a number of issues as they weigh adopting reference pricing, including how the reference price is determined and how providers may react. Communication to plan members is also key to effective use of reference pricing.

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Introduction

Between the late 1970s and 2010, the percentage of workers with only a defined contribution retirement plan increased from 16 percent to 69 percent (Fronstin, 2012). While many employers did not set out to shift the cost of retirement planning onto workers, defined contribution plans allowed employers to exercise more control and predictability over most or all of the costs associated with providing retirement benefits to employees (Nichols, 2002). As a result of those experiences, employers have been talking about using a defined contribution approach in their health benefits for a few decades now (Fronstin, 2001).

Employers have been interested in and have tried to implement the "defined contribution" concept for health benefits in a number of different ways. Those that provided health coverage with a health reimbursement arrangement (HRA) (starting in 2001) or a health savings account (HSA) (starting in 2004) contributed money to an account that workers and their dependents could use to pay for health care services. These account-based health plans are forms of defined contribution (Fronstin, 2004). More recently, there appears to be a trend toward private health insurance exchanges, where employers provide a fixed amount of money for workers to use toward the cost of health coverage (Fronstin, 2012). This funding of benefits through private health insurance exchanges can also be considered a form of defined contribution health plan.

By providing a defined funding amount, account-based health plans and private health insurance exchanges attempt to create more engaged shoppers of health care services and coverage. Another defined contribution approach is reference pricing (RP). Under RP, plan sponsors either pay a fixed amount or limit their contributions toward the cost of a specific health care service. If a plan member chooses a health care provider or service that costs more, he or she must pay the difference in price. In 2012, 11 percent of employers with 500 or more workers were using some type of RP, and another 16 percent were considering it.[1] Well-known examples of RP implementations include the California Public Employees' Retirement System (CalPERS) knee- and hip-replacement program (Robinson and Brown, 2013) and Safeway's colonoscopy and lab programs (Robinson and MacPherson, 2012).

This paper examines the theory and expectations behind RP, as well as the potential savings, both in the study sample and nationally, from an RP design for the following health services: hip and knee replacement, colonoscopy, magnetic resonance imaging (MRI) of the spine, computerized tomography (CT) scan of the head or brain, nuclear stress test of the heart, and echocardiogram. These services were chosen because they have fairly uniform protocols, which make price comparisons easier for patients.

Theory and Expectations

When health plan enrollees use traditional health care services, patient cost sharing is typically in the form of copayments or co-insurance, once any deductibles have been met. Copayments are fixed payments that, once set, do not vary with the price of the health care service being used. Conversely, co-insurance is a percentage of the health-service cost. In 2013, 74 percent of workers had copayments for primary care and 72 percent had copayments for specialist office visits, while one-fifth of workers had co-insurance for office visits (Figure 1). Co-insurance is much more common for hospital admissions: About 60 percent of workers had co-insurance for hospital admissions in 2013.[2] Co-insurance is typically subject to an out-of-pocket maximum, whereas copayments are not.

Reference pricing represents a different type of cost-sharing arrangement than that to which most workers and their dependents are accustomed. Rather than fixing the patient's out-of-pocket (OOP) cost through a copayment, RP caps the plan sponsor's or health plan's payment for a specific health care service or provider. And, in contrast to what is typical with co-insurance—under which a patient's cost sharing is limited by any OOP maximum—patient cost sharing is not capped for services subject to RP. If a patient selects a health service or provider with a cost that is greater than the reference price, then he or she is responsible for paying the entire difference. Robinson and MacPherson (2012) refer to RP as a "reverse deductible," where the plan sponsor pays the first part of the allowed charge and the patient pays the remainder.

RP is not an all-encompassing substitute for copayments or co-insurance. It can be used alongside traditional cost-sharing arrangements within a health plan for different health services or providers. When utilized, RP typically is applied to very specific types of services—those with substantial variation in price, but with very little difference in quality or else fairly uniform care-delivery protocols.

The goal of RP is to reduce, or at least limit, health care spending by the employer, while at the same time creating a more engaged health care consumer. Copayments limit patients' financial exposure to the cost of treatment because there is usually no connection between the total cost of a health service and its copayment. Similarly, co-insurance shields patients from health care costs because once a patient reaches his or her OOP maximum, they incur no additional costs. Moreover, although liable for a deductible, patients are still insulated from cost sharing for health services that exceed the deductible. The lower the level of patient cost sharing, the greater the likelihood that insured individuals will make inefficient health care consumption choices—a concept known as "moral hazard" (Pauly, 1968). RP seeks to address this issue by sensitizing patients to the overall cost of health care.

One of the benefits of RP relates to patient choice of provider or health care service. Members may apply their employers' contributions toward payment for any providers or health care services. This helps plan sponsors avoid restricting costs by reducing choices in moving to preferred or narrow networks. RP could, of course, also be coupled with narrow networks, which might then be used to negotiate lower charges with providers.

RP might also serve to drive down overall health care costs if higher-priced providers respond by reducing prices. Robinson and Brown (2013) found that the introduction of RP for knee and hip replacement in CalPERS resulted in a shift from high-priced to low-priced facilities and a 34.3 percent decline in prices charged to CalPERS members at high-priced facilities. They also found that low-priced providers reduced prices by 5.6 percent, and that RP was responsible for a 20.2 percent decrease in hospital prices for knee and hip replacement. After the RP was introduced, some hospitals renegotiated contracted rates in the broader market (Lechner, Gourevitch and Ginsburg, 2013). Li, et al. (2013) also examined RP for knee and hip replacement and found that after implementation, average costs declined 13 percent for hip replacements, 20 percent for knee replacements, and 23 percent for non-RP providers of hip replacements. Importantly, quality was deemed to be better or equivalent—as measured by post-surgery complications, infection rates, and hospital readmission rates.[3]

Additionally, RP may spur more providers to learn more about the cost of the health care services. Recent research has found that only about one-fifth of doctors correctly estimated the cost of an implantable device (Okike, et al. 2014). Physicians generally do not have an incentive to learn the prices of the services they recommend to their patients. In fact, contractual agreements may even prevent them from obtaining such information. However, if an increasing number of patients are presented with an RP plan design, providers and their administrators may move to alter their contracts to allow for a broader communication of prices in order to be more competitive. RP will work only if consumers have accurate information about provider prices.

RP may not necessarily have desirable effects on provider prices, however.

First, high-cost health care 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-RP health services in order to fill the revenue hole resulting from the pricing impact of RP practices.

Second, the notion that reduced prices will emerge from RP assumes that the prices of high-cost providers are well above the cost of care—an empirical question in need of analysis. This also of course raises the question of whether or not the high-cost providers' services are indeed of higher quality.

Third, the implementation of RP may prompt providers currently below the reference point to increase prices to a "shadow-price" at or near the reference price, particularly if patients are insensitive to variations in prices at or below the reference price, and if prices are set exogenously (Brekke, Holmas, and Straume, 2011). However, lower-priced providers may continue to charge lower prices to be competitive, especially if patients have co-insurance below the reference price.

Fourth, patients that value high-priced providers may choose to pay the higher cost sharing.

The effectiveness of RP could also be limited in geographic regions where there are few providers (or just one) with significant market power. Plan sponsors may also be hesitant to use RP in geographic regions where there are few providers if they are concerned about changing plan design in such a way that affects worker recruitment and retention. RP could, however, be used to encourage patients to travel to lower-priced providers when facing high-cost, non-emergency local services.

Plan sponsors are interested in RP because there may be substantial variation in prices that are not explained by differences in quality or outcomes. A recent study found that high-priced hospitals performed worse than low-priced hospitals on measures of re-admissions and patient safety, such as postsurgical death rates and blood clots (White, Reschovsky, and Bond, 2014). The investigators also found that high-priced hospitals performed the same as low-priced hospitals on 30-day mortality rates for heart attacks and pneumonia. The 30-day mortality rate for heart failure was the only quality measure for which high-priced hospitals performed better than low-priced hospitals. These findings are consistent with those on variation in hospital pricing in Massachusetts (Office of Attorney General Martha Coakley, 2013). Moreover, a recent white paper concluded that spending among the population with employment-based health benefits would fall by 3.5 percent—or $36 billion—if prices for 300 "shoppable" procedures were reduced to their median price (Coluni, 2012). Price variation motivated Safeway to adopt RP for colonoscopies (Robinson and MacPherson, 2012).

Data and Methods

Data for this study were derived from Truven Health Analytics' *MarketScan*® Commercial Database (copyright © 2008–2010 Truven Health Analytics, all rights reserved), which includes employer health plans. The *MarketScan* database contains claims-level information on health care services utilization—such as inpatient and outpatient care and prescription drugs—as well as the associated billed, allowed, plan-sponsor-paid, and member-share amounts. Policy holders and their dependents less than 65 years of age were examined using data from January 2008 through December 2010. Overall, the analytical dataset included 3.2 million individuals in 2008, 3 million in 2009, and 2.8 million in 2010. In each of the three years, spending on the following six health services were studied: 1) hip (partial or total) and knee (total) replacement, 2) colonoscopy, 3) MRI of the (lumbar-sacral) spine (without contrast), 4) CT scan of the head or brain (without contrast), 5) stress test of the heart (including test, supervision, and interpretation), and 6) echocardiogram (transthoracic without spectral or color Doppler). These services were chosen because they have fairly uniform delivery protocols, and they are less likely to experience variation in quality, both of which make price comparisons easier for patients.

To derive reference prices for each health service examined, the sample was divided into 306 hospital referral regions (HRRs). HRRs were defined by the Dartmouth Atlas Group and represented regional health care markets, which generally require the services of a major referral center.[4] Within each HRR is at least one city where both major cardiovascular surgical procedures and neurosurgery are performed. HRRs sometimes cross state boundaries. For this study, individuals were assigned to an HRR based upon their three-digit ZIP code (ZIP3) of residence using the ZIP-code-to-HRR crosswalk provided by the Dartmouth Atlas Group. ZIP3 was the finest level of geographic information

available in the dataset, and in some cases more than one HRR mapped to a single ZIP3. In those instances, one HRR was selected and applied consistently throughout.

Reference prices in this study were set within each HRR at the 67th percentile of the distribution of total allowed amounts for all claims processed for each of the health services under study. This approach allowed for regional variation in reference prices, but also meant that reference prices were higher when higher-priced providers accounted for a disproportionate share of services provided within an HRR and lower when lower-priced providers did. This approach was similar to that established by CalPERS, which also set the reference price at the 67th percentile (Robinson and Brown, 2013). However, CalPERS set a single reference price across all geographic regions in California.

Sample

Shown in Figure 2 are the total numbers and incidences of health services provided to patients in the study from 2008 through 2010. The dataset contained 5,000–6,300 hip and knee replacements; 35,000–38,000 colonoscopies; 34,000–36,000 MRIs of the spine; 49,000–53,000 CT scans of the head or brain; 39,000–64,000 stress tests of the heart; and 77,000–83,000 echocardiograms. Incidence rates per 1,000 individuals in 2010 were 2.25 for hip and knee replacements; 13.07 for colonoscopies; 11.89 for MRIs of the spine; 17.26 for CT scans of the head or brain; 13.90 for stress tests of the heart; and 27.35 for echocardiograms.

Basic demographics for the study sample are shown in Figure 3 and are compared to demographics in the population with employment-based health benefits in 2010 from the Current Population Survey (CPS). The study sample under-represented individuals ages 25–34 and over-represented individuals ages 45–54. The study sample also under-represented individuals in the Midwest and South, while it over-represented individuals in the West.

Results

Price Variation

Figures 4–9 display the variation in pricing for the six health care services examined in this paper. For presentation in these graphs, 230 (of the 306) HRRs were selected because they contained at least 1,000 individuals in 2010. In each figure, the median price is depicted as a solid black line and the variation in pricing between the 33rd and 67th percentile is represented by the shaded blue area. The top of the blue band, therefore, reflects the reference price set in each HRR according to the study scenario.

Each service experienced wide variation in pricing within and across HRRs, with the exception of stress tests of the heart, which may be explained by the relatively low prices charged by most providers. Mean reference prices are shown in Figure 10 by type of health service.

Potential Savings in Study Sample

The potential savings from adopting RP is show in Figure 11 by type of service for 2010 for the 2.8 million people in the study sample. As mentioned above, the reference price was set at the 67th percentile by HRR.

If RP was adopted for knee and hip replacements, savings would average $10,367 per knee or hip replacement among the 33 percent of the cases that were above the reference price. This savings would materialize through the combination of:

- Patients choosing providers at the reference price,
- Patients paying the difference between the reference price and the allowed charge through cost sharing, and
- Providers reducing their prices to the reference price.

Among the 67 percent of cases below the reference price, if providers were to increase their prices to the reference price, an average of $8,056 more would be paid per case. In aggregate, spending would be $21.7 million lower among

Figure 1

Percentage of Covered Workers With the Following Types of Cost Sharing for In-Network, Physician-Office Visits (In Addition to Any General, Annual-Plan Deductible), by Plan Type, 2013

	Copay Only	Co-insurance Only	No Cost Sharing	Other Type of Cost Sharing
Primary Care				
HMO[a]	96%	3%	1%	1%
PPO[b]	82	15	2	1
POS[c]	89	4	4	3
HDHP/SO[d]	22	55	22	0
ALL PLANS	**74%**	**20%**	**6%**	**1%**
Specialty				
HMO[a]	94%	4%	0%	2%
PPO[b]	80	15	2	2
POS[c]	90	5	3	2
HDHP/SO[d]	18	56	22	5
ALL PLANS	**72%**	**20%**	**6%**	**2%**

Source: Kaiser/HRET Survey of Employer-Sponsored Health Benefits, 2013.
[a] Health maintenance organization.
[b] Preferred provider organization.
[c] Point of service.
[d] High-deductible health plan with savings option.

Figure 2

Number and Incidence of Health Services by Year

	2008		2009		2010	
	Lives = 3,213,139		Lives = 3,004,053		Lives = 2,818,672	
Health Service	Number of Cases	Incidence Rate (per 1,000)	Number of Cases	Incidence Rate (per 1,000)	Number of Cases	Incidence Rate (per 1,000)
Hip and knee replacement	5,029	1.57	5,744	1.91	6,343	2.25
Colonoscopy	35,265	10.98	37,672	12.54	36,853	13.07
MRI of the spine	35,680	11.10	34,747	11.57	33,528	11.89
CT scan of the head or brain	49,661	15.46	53,173	17.70	48,656	17.26
Stress test of the heart	64,023	19.93	47,489	15.81	39,176	13.90
Echocardiogram	83,077	25.86	81,539	27.14	77,092	27.35

Source: EBRI estimates derived from Truven Health Analytics MarketScan® Commercial Database (copyright © 2008–2010 Truven Health Analytics, all rights reserved).

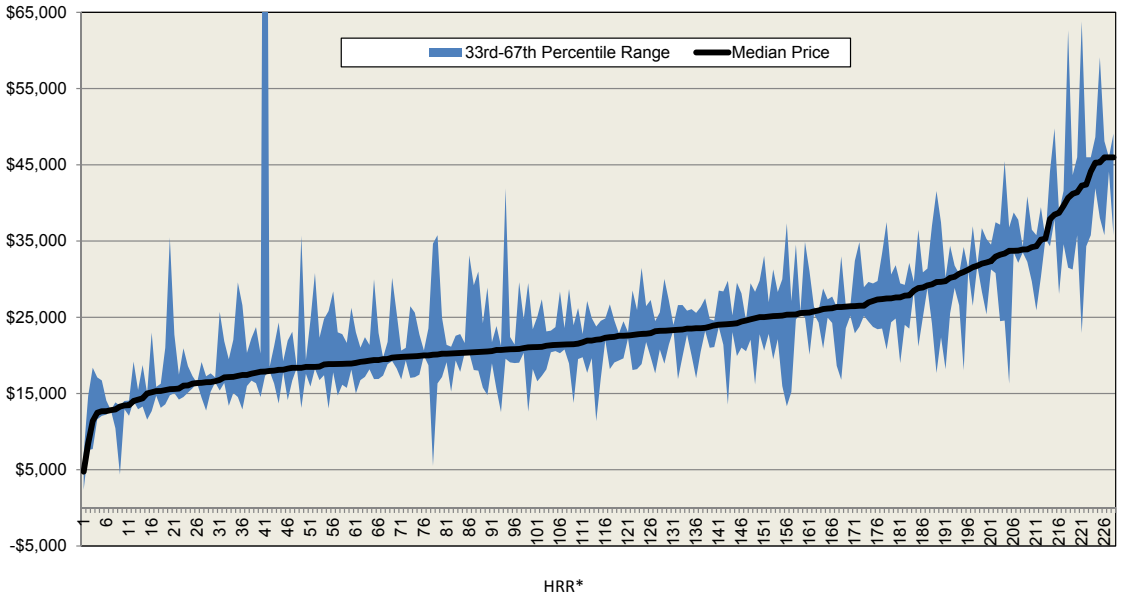
Figure 3

Study Sample Characteristics, 2010

	Study Sample Means	Current Population Survey
n =	2,818,672	109,527
Gender		
Male	48%	50%
Female	52%	50%
Age		
Under 18	26%	26%
18–24	8%	9%
25–34	8%	15%
35–44	17%	16%
45–54	23%	19%
55–64	17%	15%
Region		
Northeast	22%	20%
Midwest	15%	23%
South	29%	35%
West	34%	22%

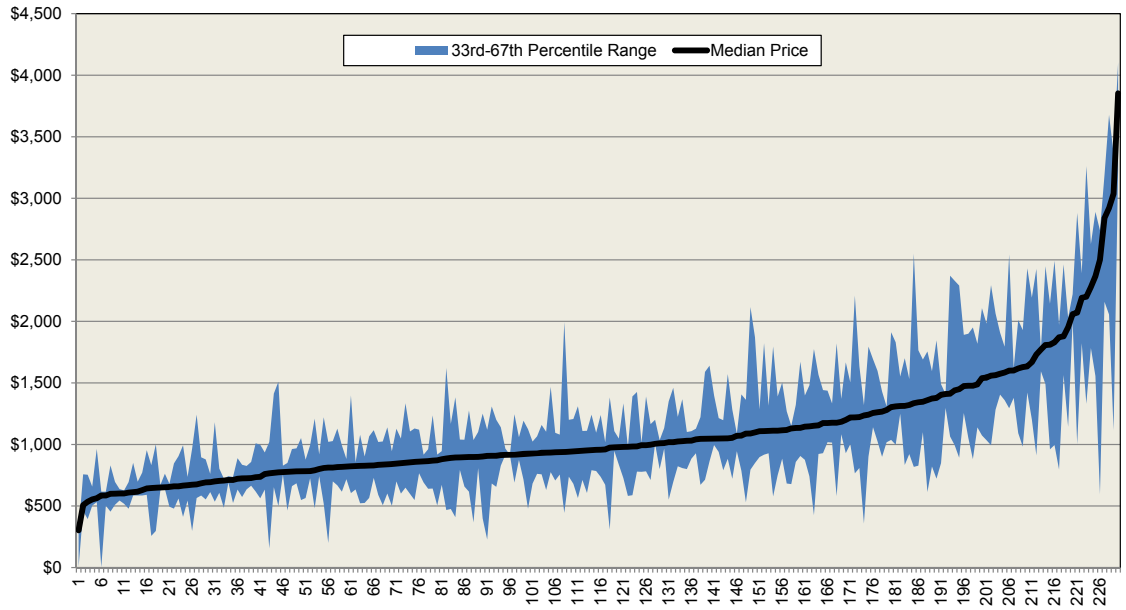
Source: EBRI estimates derived from Truven Health Analytics MarketScan® Commercial Database (copyright © 2010 Truven Health Analytics, all rights reserved), and Current Population Survey, March 2011Supplement.

Figure 4
Hip and Knee Replacement:
Median Prices and 33rd to 67th Percentile Ranges, by HRR,* 2010



Source: EBRI estimates derived from Truven Health Analytics MarketScan® Commercial Database (copyright © 2010 Truven Health Analytics, all rights reserved).
* Hospital referral regions.

Figure 5
Colonoscopy:
Median Prices and 33rd to 67th Percentile Ranges, by HRR,* 2010



Source: EBRI estimates derived from Truven Health Analytics MarketScan® Commercial Database (copyright © 2010 Truven Health Analytics, all rights reserved).
* Hospital referral regions.

patients in the study sample who used providers above the reference price. Because 67 percent of the cases were below the reference price, in aggregate, spending would be $34.2 million higher among patients in the study sample if providers below the reference price raised their prices. Clearly, the net effect is that reference pricing would result in higher spending, but that assumes all providers below the reference price would raise prices to the reference price. As mentioned above, Robinson and Brown, 2013, saw no evidence of such provider behavior in California after CalPERS adopted reference pricing for knee and hip replacements. Also, shadow pricing may not be able to occur immediately as providers would have to renegotiate contracts.

The potential savings per case is much lower for the other health services because the cost of those services is much lower than that of knee and hip replacements. However, aggregate savings are still substantial because incidence rates range from 10–27 percent, rather than the 1–2 percent for knee and hip replacements.

In all cases, the average savings per case outweighs the overall loss per case that would occur if providers below the reference price increased prices to the reference price. However, because 33 percent of the cases were by definition above the reference price and 67 percent of the cases were below the reference price, aggregate savings would be negative (i.e., overall costs would be higher) in the study sample if RP was adopted for colonoscopy, and MRI of the spine, if providers below the reference price raised prices to the reference price.

In the case of CT scan of the head or brain, stress test of the heart, and echocardiogram, aggregate savings would still be positive in the study sample even if providers below the reference price raised prices to the reference price.

Potential Aggregate Savings

Based on the incidence rates in Figure 2 and the savings per case in Figure 11, potential aggregate savings could reach $9.4 billion, if all employers adopted RP for the health care services examined in this paper (Figure 12). This assumes that all health care providers whose prices are currently below the reference price would remain below the reference price. The $9.4 billion represents 1.6 percent of all spending on health care services among the 156 million people with employment-based health benefits in 2010.[5]

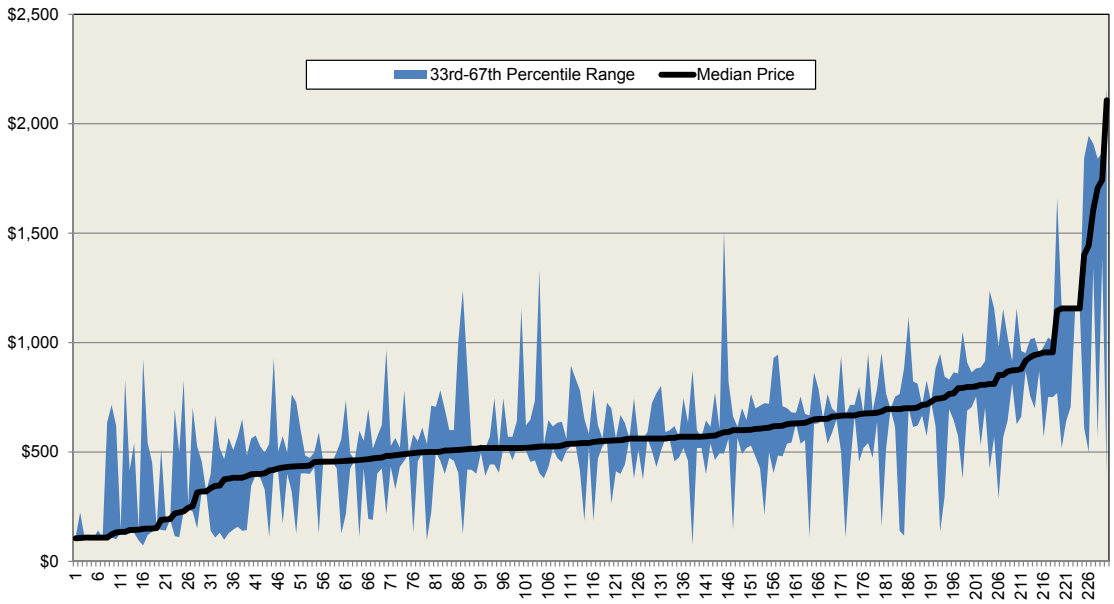
Hip and knee replacements account for about 40 percent of the savings. While the incidence rate of hip and knee replacements in the population of people with employment-based coverage is relatively low, the costs are relatively high. In contrast, stress tests of the heart accounted for only 2 percent of the aggregate potential savings. While incidence rates ranged from 14 to 20 percent between 2008 and 2010, only $87 per case would be saved from RP (again assuming that providers below the reference price did not increase prices). Colonoscopies, CT scans of the head or brain, and echocardiograms each accounted for between 15–20 percent of aggregate potential savings, while MRIs of the spine accounted for about 10 percent of the potential savings.

Issues to Consider

Plan sponsors should consider a number of issues as they weigh adopting reference pricing.

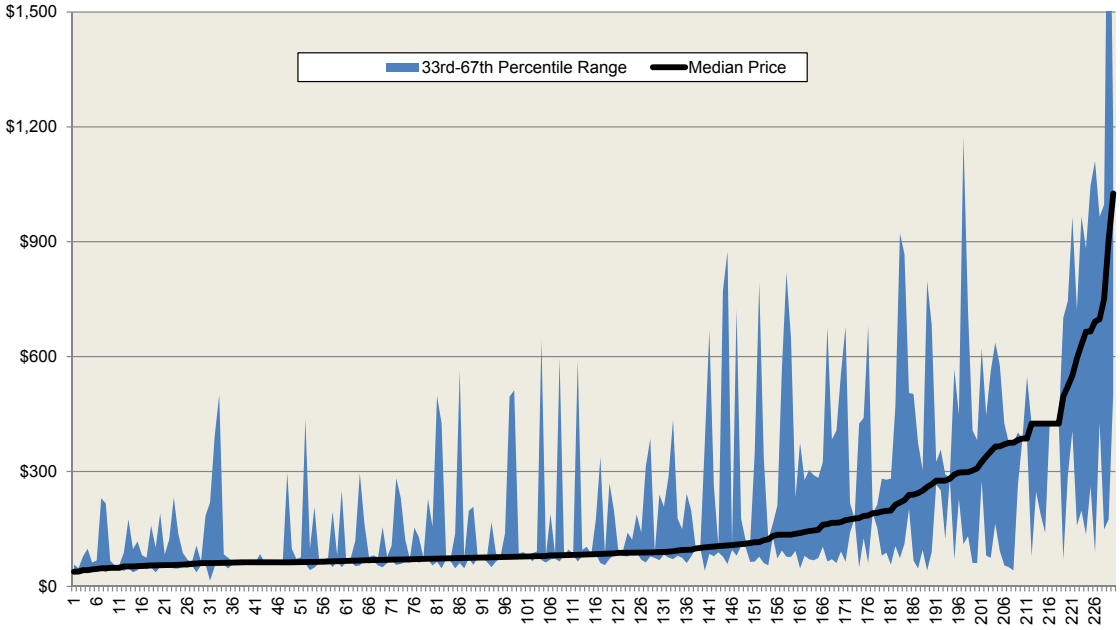
First, how is the reference price determined? CalPERS set the reference price for knee and hip replacement at $30,000, which was higher than the prices charged by about two-thirds of the hospitals in the preferred provider organization (PPO) network. The ramifications of this decision are complex: If reference prices are set high, patients will have many providers to choose from that are below the RP, the potential for savings will be minimized, and fewer providers will have an incentive to lower prices. If reference prices are set low, patients will have fewer providers to choose from that are at or below the RP, unless provider prices fall. Artificially low reference prices may also trigger consolidation among providers, which would increase negotiating power among providers. If providers are unable to reduce the cost of services subject to RP, they may increase prices of other services. Plan sponsors will also need to consider whether reference prices are set locally, regionally, or nationally. A national or global reference price is easier to communicate, but will not allow for variations in pricing across regions that are independent of either practice patterns or quality. More research is needed to better understand the implication of varying reference prices.

Figure 6
MRI* of the Spine:
Median Prices and 33rd to 67th Percentile Ranges, by HRR, 2010**



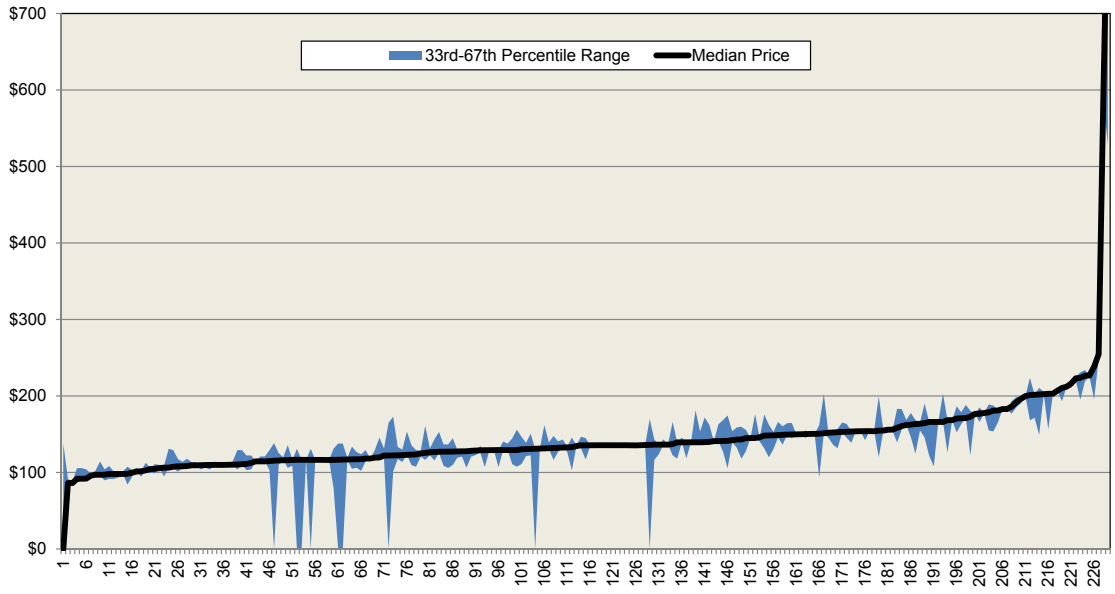
Source: EBRI estimates derived from Truven Health Analytics MarketScan® Commercial Database (copyright © 2010 Truven Health Analytics, all rights reserved).
* Magnetic resonance image.
** Hospital referral regions.

Figure 7
CT Scan of the Head or Brain:
Median Prices and 33rd to 67th Percentile Ranges, by HRR,* 2010



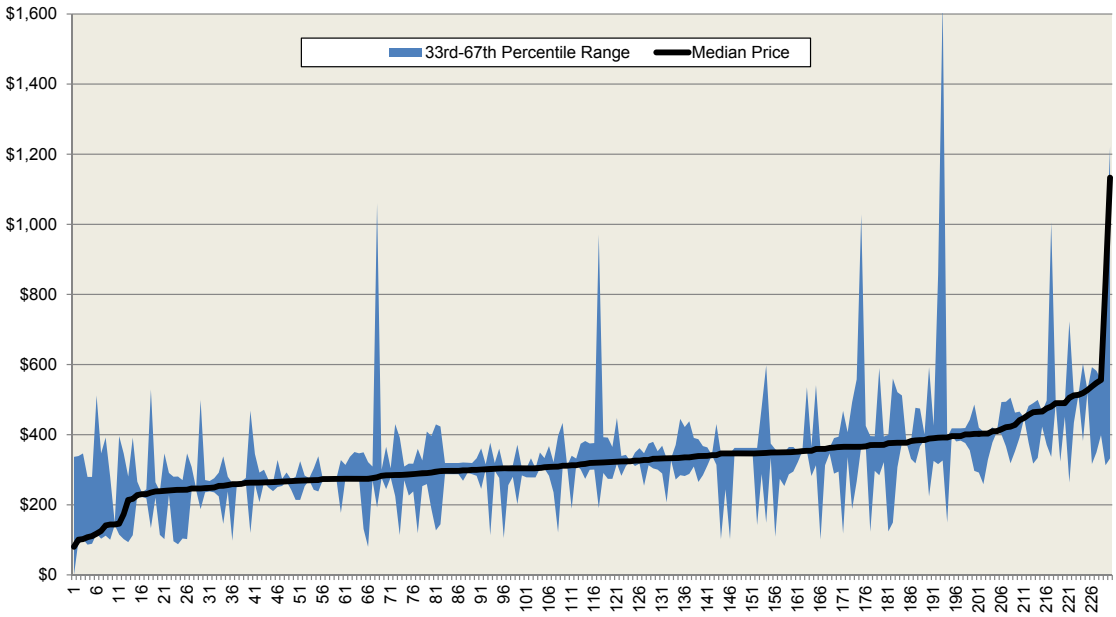
Source: EBRI estimates derived from Truven Health Analytics MarketScan® Commercial Database (copyright © 2010 Truven Health Analytics, all rights reserved).
* Hospital referral regions.

Figure 8
Stress Test of the Heart:
Median Prices and 33rd to 67th Percentile Ranges, by HRR,* 2010



Source: EBRI estimates derived from Truven Health Analytics MarketScan® Commercial Database (copyright © 2010 Truven Health Analytics, all rights reserved).
* Hospital referral regions.

Figure 9
Echocardiogram:
Median Prices and 33rd to 67th Percentile Ranges, by HRR,* 2010



Source: EBRI estimates derived from Truven Health Analytics MarketScan® Commercial Database (copyright © 2010 Truven Health Analytics, all rights reserved).
* Hospital referral regions.

If plan sponsors adopt RP, will providers charging prices currently below the reference price increase their prices to the reference price or near it? Ultimately, this may depend on how plan sponsors structure cost sharing in conjunction with reference pricing. Under RP, employers could pay the full cost below the reference price. Alternatively, some form of cost sharing could be imposed below the RP. For example, patients could be required to pay co-insurance of 10 percent or 20 percent up to the reference price and then the difference between allowed charges and the reference price, were they to use a provider charging prices above the reference price. CalPERS imposed both a deductible and 20 percent co-insurance up to a $3,000 out-of-pocket maximum even when providers below the RP were used. To the degree that patients are required to pay co-insurance, they will likely be more engaged, and providers will be less likely to raise prices closer to the reference price. If low-priced providers increase prices to the reference price or near it, potential savings will not materialize.

Of course, communication to plan members is key to an effective implementation of RP. Individuals will need comparable information on prices and quality in order to make informed decisions regarding provider selection. Lists of doctors and hospitals, either in preferred networks, or with prices at or below the RP, can today be more easily disseminated than in the past through mobile apps and websites.

Conclusion

Reference pricing is receiving more attention and consideration today because of growing plan sponsor interest in managing health care costs. This paper has shown that if RP was adopted for all individuals with employment-based health benefits for the six health care services analyzed in the paper, employer spending could fall about 1.6 percent ($9.4 billion in 2010). However, those savings would likely not materialize if providers currently charging below the reference price increased their prices to the reference price or near it.

References

Brekke, Kurt R., Tor Helge Holmas, and Odd Rune Straume. "Reference Pricing, Competition, and Pharmaceutical Expenditures: Theory and Evidence From a Natural Experiment." *Journal of Public Economics* 95, no. 7 (2011): 624-638.

Coluni, Bobbi. *Save $36 Billion in U.S. Healthcare Spending Through Price Transparency.* Thomson Reuters, 2012. Ann Arbor, MI.

Fronstin, Paul. "Defined Contribution Health Benefits." *EBRI Issue Brief,* no. 231 (Employee Benefit Research Institute, March 2001).

Fronstin, Paul. "Health Savings Accounts and Other Account-Based Health Plans." *EBRI Issue Brief,* no. 273 (Employee Benefit Research Institute, September 2004).

Fronstin, Paul. "Private Health Insurance Exchanges and Defined Contribution Health Plans: Is it Déjà Vu All Over Again?" *EBRI Issue Brief,* no. 373 (Employee Benefit Research Institute, July 2012).

Kanavos, Panos, and Uwe Reinhardt. "Reference Pricing For Drugs: Is It Compatible With U.S. Health Care?" *Health Affairs* 22, no. 3 (May 2003): 16-30.

Lechner, Amanda E., Rebecca Gourevitch, and Paul B. Ginsburg. "The Potential of Reference Pricing to Generate Health Care Savings: Lessons from a California Pioneer." *HSC Research Brief No. 30* (Center for Studying Health System Change), December 2013.

Li, Chia-hsuan et al. "Effects of a Reference-Based Purchasing Design on Healthcare Utilization and Outcomes of Knee and Hip Replacement Surgeries." Paper presented at the Academy Health 2013 Annual Research Meeting, Seattle, WA. 2013.

Nichols, Len M. "Can Defined Contribution Health Insurance Reduce Cost Growth?" *EBRI Issue Brief,* no. 246 (Employee Benefit Research Institute, June 2002).

Office of Attorney General Martha Coakley. "Examination of Health Care Cost Trends and Cost Drivers: Pursuant to G.L. c. 6D, &8." Boston, MA, 2013.

Okike, Kanu, et al. "Survey Finds Few Orthopedic Surgeons Know The Costs Of The Devices They Implant." *Health Affairs* 33, no. 1 (January 2014): 103-109.

Pauly, Mark V. "The Economics of Moral Hazard: Comment." *American Economic Review* 58, no. 3 (June 1968): 531-537.

Robinson, James C., and Kimberly MacPherson. "Payers Test Reference Pricing And Centers Of Excellence To Steer Patients To Low-Price And High-Quality Providers." *Health Affairs* 31, no. 9 (September 2012): 2028-2036.

Robinson, James C., and Timothy T. Brown. "Increases In Consumer Cost Sharing Redirect Patient Volumes And Reduce Hospital Prices For Orthopedic Surgery." *Health Affairs* 32, no. 8 (August 2013): 1392-1397.

White, Chapin, James D. Reschovsky, and Amelia M. Bond. "Understanding Differences Between High- And Low-Price Hospitals: Implications For Efforts To Rein In Costs." *Health Affairs* 33, no. 2 (February 2014): 324-331.

Endnotes

[1] See Slide 26 in http://benefitcommunications.com/upload/downloads/Mercer_Survey_2013.pdf

[2] See Exhibit 7.22 in http://kaiserfamilyfoundation.files.wordpress.com/2013/08/8465-employer-health-benefits-20132.pdf

[3] See http://academyhealth.org/files/2013/sunday/li.pdf

[4] More information about HRRs can be found at http://www.dartmouthatlas.org/data/region/

[5] Aggregate spending on employment-based health insurance premiums (a proxy for spending on health care services) was $576 billion in 2010 according to data in Table 16 in http://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/NationalHealthExpendData/Downloads/Proj2011PDF.pdf

Figure 10

Mean Reference Price, by Type of Health Service, 2010

Health Service	Mean Reference Price
Hip and knee replacement	$28,227
Colonoscopy	1,463
MRI of the spine	723
CT scan of the head or brain	297
Stress test of the heart	171
Echocardiogram	433

Source: EBRI estimates derived from Truven Health Analytics MarketScan® Commercial Database (copyright © 2010 Truven Health Analytics, all rights reserved).

Figure 11

Potential Gains and Losses in Study Sample from Reference Pricing, 2010

Health Service	Total Number of Cases	Average Potential Gain	Aggregate Potential Gain ($ millions)	Average Potential Loss	Aggregate Potential Loss ($ millions)
Hip and knee replacement	6,343	$10,367	$21.7	-$8,056	$34.2
Colonoscopy	36,853	772	9.4	-678	16.7
MRI of the spine	33,528	433	4.8	-343	7.7
CT scan of the head or brain	48,656	617	9.9	-184	6.0
Stress test of the heart	39,176	87	1.1	-35	0.9
Echocardiogram	77,092	362	9.2	-139	7.2
Total Aggregate Potential Gain, Loss			*$56.1*		*$72.8*
Total Number of Lives	*2,818,672*				
Per Member Per Year (PMPY)			*$19.91*		-$25.82

Source: EBRI estimates derived from Truven Health Analytics MarketScan® Commercial Database (copyright © 2010 Truven Health Analytics, all rights reserved).

Figure 12

Aggregate Potential Savings from Reference Pricing, by Select Health Service, 2010

Health Service	Total Number of Cases Within Employment-Based Health Coverage Population (millions)	Total Potential Savings ($ billions)	Percentage of Savings
Hip and knee replacement	0.4	$3.6	39%
Colonoscopy	2.0	1.6	17
MRI of the spine	1.9	0.8	9
CT scan of the head or brain	2.7	1.7	18
Stress test of the heart	2.2	0.2	2
Echocardiogram	4.3	1.5	16
Total Aggregate Potential Savings		$9.4	100%

Source: EBRI estimates derived from Truven Health Analytics MarketScan® Commercial Database (copyright © 2010 Truven Health Analytics, all rights reserved).

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