



Using Data to Lower Costs

California's Reference-Based Payment Experience and Implications for Other States

INTRODUCTION

In response to rising health care costs, many employers and insurers have implemented programs that aim to change how consumers select health care providers. Underlying these programs is the wide degree of price variation for the commercially insured population, which was highlighted in a recent study. These programs use financial incentives to steer patients away from high-priced providers and to low-priced providers.^{1,2} Of particular note is the reference based payments program (RBP) implemented by the California Public Employees' Retirement System (CalPERS) for outpatient surgical services in 2012.

In previous work, we have documented that this program leads to substantial changes in consumer behavior and delivers financial savings to CalPERS. In this brief, we estimate the potential savings if an analogous program were to be implemented in other geographic markets. To do so, we use several sources of data to determine what drives RBP savings and how RBP might work in markets outside of California. For colonoscopies, we estimate that RBP programs can lead to an approximately 8.5% savings per procedure. Moreover, we identify the regions in which RBP may have the strongest effect and the regions in which RBP programs may be less effective. Finally, we look at how a nationwide RBP program modeled after the CalPERS program might impact clinical quality by reducing procedural complications. We find that the types of providers to which CalPERS RBP program

steers patients do not have lower clinical quality than higher-priced alternatives.

BACKGROUND: CALPERS AND REFERENCE-BASED PAYMENTS

The California Public Employees' Retirement System (CalPERS) is the third largest purchaser of health services in U.S. CalPERS provides health care coverage to over 1.6 million public employees, retirees, and their dependents throughout the state. Facing unsustainable health care cost increases during the great recession, CalPERS sought to curb program spending on health care without substantially increasing costs to its enrollees or reducing care quality. While high-deductible health plans (HDHPs) have proven effective at reducing consumer health care spending,³ there is also evidence that consumers indiscriminately reduce consumption of necessary, as well as unnecessary, services in response to this form of cost sharing.4-11

As an alternative, CalPERS chose to implement a Reference-Based Payment (RBP) program. With the RBP program, CalPERS sets a maximum reimbursable amount (the "Reference Price") for a given service. If an enrollee receives care from a provider with a price above the reference price, the patient is responsible for the difference between the provider's price and the reference price. RBP programs are also commonly referred to as reference pricing, reference-based pricing, and reference-based benefits programs. We

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We acknowledge funding support from the Laura and John Arnold Foundation. The Health Care Cost Institute through the University of Chicago NORC provided access to the data used in this study. Courtnee Hamity and Mathew Jones provided exceptional research assistance. use reference-based payments to reinforce the key mechanism that the payer cannot directly change prices but rather the amount it chooses to pay for certain services.

In contrast to HDHPs, in which consumers are shielded from the cost of their care after spending above their deductible amount, the RBP program is designed to make consumers sensitive to price variation for selected services regardless of the amount of care they previously consumed. Unlike deductible plans, the targeted nature of RBP provides patients with incentives to receive care from less expensive providers rather than reduce the use of services. In addition, once the deductible is reached, most deductible-based plans have coinsurance, which exposes consumers to only 20% of the provider's price. Thus, for expensive procedures that cost much more than the deductible, there is little incentive for patients to price-shop.

For this analysis, we focus on colonoscopies because it is the most common service for which RBP was has been applied. Colonoscopies were identified as an ideal target for the RBP program due to the wide range of prices for colonoscopy procedures in California. As shown in Figure 1, the price for colonoscopies in 2011, the year before the implementation of the RBP program, varied substantially. Prices for colonoscopies conducted in hospital outpatient departments (HOPDs) in California ranged from \$552 to \$8,883, with a median price of \$2,273. In contrast, ambulatory surgery center (ASC) prices ranged from \$500 to \$6,003, with a median price of \$878. Because of the already lower-than-hospital prices for services rendered in ASCs, the RBP program only applied to outpatient procedures conducted in HOPDs, and did not apply to procedures performed at ASCs.

The intent of only applying RBP to HOPDs was to encourage patients to shift to ASCs and over the longer term, to spur HOPDs to reduce prices to ASC levels. Given the distribution of colonoscopy prices in the state, CalPERS set the reference price for the procedure at \$1,500. At this reimbursement level, CalPERS sought to ensure that its enrollees' would still have fully-reimbursed access to an adequate number of colonoscopy providers at the outset of the program. As an example of how the RBP program for colonoscopies works, if a patient receives a colonoscopy from either an HOPD with a price of \$1,500 or less or an ASC with any price, the patient is only responsible for standard cost-sharing (e.g. deductibles, copays, and coinsurance). However, if the patient receives care from an HOPD with a price above \$1,500, then the patient is responsible for standard cost-sharing up to \$1,500 *plus* the entirety of the difference between the provider's price and \$1,500.

To ensure the program did not harm access for at-risk patients, CalPERS established several exemptions to the program. Patients without an ASC within 30 miles of their home zip code were exempted from the RBP program. Patients were also exempted from

FIGURE 1

Range in Colonoscopy Prices Across California HOPDs and ASCs in 2011

Source: Reprinted from Robinson, et al. 2015. "Reference-Based Benefits for Preventive Screening: Association with Consumer Choices, Insurer Payments, and Procedural Complications." JAMA Internal Medicine.



the RBP program if their physician recommended receiving care at an HOPD. The program was paired with a pre-authorization program and patients were informed about the program and provider prices when selecting providers during pre-authorization.

Effect of CalPERS RBP Program

In the years following the implementation of the RBP program, CalPERS' payments for colonoscopy procedures declined significantly.¹² Figure 2 shows the trends in CalP-ERS colonoscopy payment rates before and after implementation of the RBP program. In 2013, two years after the start of the RBP program, CalPERS spending on colonoscopies was significantly lower, compared to spending if choices and prices for CalPERS had followed the trends experienced by a comparison group whose members were not subject to reference pricing. Our previous work has shown that the RBP program for colonoscopies reduced CalPERS' spending by \$7 million over two years.¹² we have found similar savings for other services to which RBP was applied.¹³⁻¹⁵ The financial savings from the RBP program occur primarily as patients shift demand from HOPDs to ASCs, but evidence also exists that the program leads high-priced HOPDs to lower prices.^{16,17}

Research Question: Can RBP Work in Other Markets?

Based on the success of the CalPERS program, we wanted to know about the potential savings if purchasers and insurers in other markets implemented the same type of program. While the CalPERS program was designed for California, the price variation exists in all geographic markets. Figure 3 shows variation in provider prices across the U.S. recent work that uses the same nationwide data has detailed the enormous degree of price variation for health care services in the United States.²

FIGURE 2

Payment per Procedure for Colonoscopy Before and After Implementation of Reference-Based Payments by CaIPERS

Source: Reprinted from Robinson, et al. 2015. "Reference-Based Benefits for Preventive Screening: Association with Consumer Choices, Insurer Payments, and Procedural Complications." JAMA Internal Medicine.

FIGURE 3

Nationwide Variation in Provider Prices for Colonoscopies

Source: Calculations using HCCI data.





FIGURE 4

Per-Colonoscopy Procedure Savings for RBP Program by Market

Source: C Whaley, TT Brown, JC Robinson. Berkeley Center for Health Technology, University of California, Berkeley, calculations using CalPERS medical claims data.



POTENTIAL SAVINGS FROM RBP IN NON-CALIFORNIA MARKETS

To estimate the savings of RBP strategies in markets outside of California, the first step is to identify the market-level variation in the effectiveness of the CalPERS RBP program. As shown in Figure 4, the program does not work equally well in all markets. For some markets, such as Palm Springs, where we see a \$445 reduction in spending per colonoscopy, the program works very well. However, in some markets, such as Santa Barbara, where we see a \$95 increase in per-colonoscopy costs, the program does not work as well.

A key piece of our analysis is to estimate the market characteristics that drive the differences in the effectiveness of the program. To do so, we use multiple sources of data. The most important is the market-level price characteristic data computed from a large and nationwide database of medical claims. The Health Care Cost Institute (HCCI), along with companies providing data to it—Aetna, Humana, and UnitedHealthcare —provided the claims data that were used in this analysis. Medical claims from approximately 50 million individuals are included in the HCCI database, making it one of the largest sources of commercial claims available for research purposes. We augment this data with external data on demographics, market characteristics, provider concentration, and insurance marketplaces.

From the HCCI data, we identified patients with a colonoscopy in 2009-2013.* Patients with a colonoscopy performed in inpatient and emergency department settings were excluded. The population was restricted to patients between the ages of 19 and 65 who were included in the HCCI data in the year prior to their colonoscopy. The prior year exclusion allows for computation of precolonoscopy risk measures. From this population, we calculated each market's average price and distribution of prices.

To predict the drivers of market-level savings, we developed a machine-learning algorithm. This algorithm allows us to test the importance of more market-characteristics than we have markets. For our primary analysis, we use hospital referral regions (HRRs) as our market definition but we also examined the more granular Hospital Service Areas (HSAs) and counties. Our model identifies the most important drivers of the effectiveness of RBP as provider market concentration, price variation, and the availability of low-priced provides.

Figure 5 presents the potential savings percolonoscopy if the CalPERS RBP program was implemented in each market. To make these results more interpretable, we have also developed a set of interactive maps at http:// berkeleyhealthtech.org/HHRMap%20D3/ index_maps.php. These maps allow employers and insurers to investigate the effectiveness

* Colonoscopy services were identified according to Current Procedure Terminology (CPT) and International Classification of Disease (ICD-9) codes (CPT codes 44388-44394 and 45378-45385 and ICD-9 codes 45.22, 45.23, 45.25, 45.41, and 45.42) at either an ASC or HOPD.

FIGURE 5

Potential Per-Procedure Savings by Market if Reference-Based Payment Program Were Implemented for Colonoscopy Services

This figure plots the average savings per colonoscopy by market if the CaIPERS Reference Based Pricing Program for Colonoscopies was implemented in all U.S. markets. Markets are defined at the Hospital Referral Region (HRR) level. Choices, Insurer Payments, and Procedural Complications." JAMA Internal Medicine.



of the program in each local market. Overall, we estimate the same RPB program implemented by CalPERS has the potential to lead to meaningful savings in nearly all geographic markets. The markets where the CalPERS program may not work best are markets that already have low prices or markets that only have high-priced providers. We estimate that total medical spending would decrease by approximately \$95 million per year if the program were applied to all three payers in the HCCI database.

POTENTIAL EFFECT OF RBP ON RATES OF PROCEDURAL COMPLICATIONS

The CalPERS RBP program shifts demand from high-priced HOPDs to low-priced ASCs. One natural question is if this shift has the potential to harm the quality of patient care. While our earlier studies have shown that the CalPERS program did not influence procedural complications, we also use the HCCI data to explore the potential effects of an expanded RBP program on patient safety. We examined the relationship between clinical complications for colonoscopy and

- 1. Receiving a colonoscopy at a high vs. low-priced provider.
- Receiving a colonoscopy at an ASC vs. HOPD.

For each comparison group, we examined rates of cardiovascular, serious gastrointestinal, and non-serious gastrointestinal complications.¹² While these do not cover the full scope of clinical quality, they do allow for an initial look at care differences across providers. In addition, we do not examine the decision to receive care. Unlike HDHPs, RBP does not have the same incentives to reduce care utilization as other forms of cost-sharing.

One inherent difficulty with this analysis is the potential that individuals who choose to receive colonoscopies from either lowpriced providers or ASCs may be healthier or less prone to procedural complications. To address this concern, we include a variety of controls for patient health status, including comorbidities, demographics, and medical spending in the year prior to the colonoscopy. To assess differences in provider quality, for each complication, we created risk-adjusted provider "scores" that show how each provider's complication rate compares to other providers in the same region. A provider with a score of "0" has a complication rate equal to the average of all providers in that region. A positive risk-score indicates that the provider has a higher complication rate than the market average while a negative score indicates a lower complication rate.



FIGURE 6

Relationship Between Provider Price and Colonoscopy Complications (Any Procedural Complication)

Observations weighted by HRRspecific market share

This figure plots provider-specific risk scores for any complication related to colonoscopy (e.g. cardiovascular, serious gastrointestinal, and non-serious gastrointestinal) and prices. Risk scores are defined using the z-score at the Hospital Referral Region (HRR) level. A positive risk score indicates a higher-than average complication rate while a negative risk score indicates lower than average complication rates.

* To test the relationship between procedural complications and receiving care at an ASC, we use an instrumental variables approach that uses state certificate of need laws as a source of exogenous variation. 27 states have laws in place that make it more difficult for ASCs to form. In the HCCI data, patients in these states are 21% percent less likely to receive a colonoscopy from an ASC than states without a certificate of need law. Using the differences in states with certificate of need laws as and states where patients are more likely to receive a colonoscopy at an ASC, we estimate a similar relationship between ASCs and clinical quality.

As shown in Figure 6, we a small but clinically insignificant relationship between higher provider prices and increased rates of procedural complications. This finding is supported by more detailed statistical analyses. In addition, we also do not find any relationship between procedural complications and receiving care at an ASC* If anything, patients who receive care at an ASC are *less* likely to have a complication related to their colonoscopy procedure.

CONCLUSION

In recent years, price variation of health care services has gained substantial attention. For purchasers of health care services, employers and insurers, price variation is a meaningful problem. Without the right set of targeted incentives to receive care from low-priced providers, patients have little reason to price shop for health care services. The costs of the lack of the appropriate incentives is borne by purchasers but is then passed back to consumers in the form of higher premiums and lower wages. While many policy-makers believed HDHPs would encourage patients to shop, the results have been disappointing. However, a more innovative solution to health care price variation is to limit the amount that an employer or insurer will reimburse consumers for receiving certain types of "shoppable" procedures. In this issue brief, we estimate that the same program that CalPERS implemented would be successful in lowering health care spending in nearly all markets in the United States. Moreover, we do not expect that expanded RBP programs will harm patient care.

We do caution that the appropriate implementation of RBP programs is essential. An exemption process similar to the one CalP-ERS put in place is important. Before implementing and during the program, CalPERS made sure to inform consumers about the new changes. In addition, to prevent consumers from being blindsided from surprise medical bills, transparent pricing is vital for any type of RBP program to be successful. However, by changing the basic incentives facing consumers, RBP changes how consumers make health care decisions and encourages them to be active shoppers for care. Our hope is that as these types of programs expand, a culture of price and quality shopping will emerge.

This research product, using HCCI data, was independently initiated by the researchers and is part of the State Health Policy Grant Program funded by the Laura and John Arnold Foundation.

REFERENCES

- Quealy, K. & Sanger-katz, M. The Experts Were Wrong About the Best Places for Better and Cheaper Health Care. *The New York Times* (2015). at <http:// www.nytimes.com/interactive/2015/12/15/ upshot/the-best-places-for-better-cheaper-healthcare-arent-what-experts-thought.html>
- Cooper, Z., Craig, S., Gaynor, M. & Van Reenen, J. The Price Aint Right? Hospital Prices and Health Spending on the Privately Insured. *Work. Pap.* (2015).
- Lo Sasso, A. T., Helmchen, L. A. & Kaestner, R. The Effects of Consumer-Directed Health Plans on Health Care Spending. *J. Risk Insur.* 77, 85–103 (2010).
- Brot-Goldberg, Z., Handel, B., Chandra, A. & Kolstad, J. What Does a Deductible Do? The Impact of Cost-Sharing on Health Care Prices, Quantities, and Spending Dynamics. *Work. Pap.* (2015).
- Beeuwkes Buntin, M., Haviland, A. M., McDevitt, R. & Sood, N. Healthcare spending and preventive care in high-deductible and consumer-directed health plans. *Am. J. Manag. Care* 17, 222–230 (2011).
- Borah, B. J., Burns, M. E. & Shah, N. D. Assessing the impact of high deductible health plans on healthcare utilization and cost: a changes-in-changes approach. *Health Econ.* 20, 1025–1042 (2011).
- Huckfeldt, P. J., Haviland, A., Mehrotra, A., Wagner, Z. & Sood, N. Patient Responses to Incentives in Consumer-directed Health Plans: Evidence from Pharmaceuticals. (National Bureau of Economic Research, 2015). at <http://www.nber.org/papers/w20927>
- Meeker, D. et al. Coverage and Preventive Screening. Health Serv. Res. 46, 173–184 (2011).

- Reed, M. et al. High-Deductible Health Insurance Plans: Efforts To Sharpen A Blunt Instrument. Health Aff. (Millwood) 28, 1145–1154 (2009).
- 10. Reiss, S. K. *et al.* Effect of Switching to a High-Deductible Health Plan on Use of Chronic Medications. *Health Serv. Res.* **46**, 1382–1401 (2011).
- 11. Wharam, L. Emergency department use and subsequent hospitalizations among members of a high-deductible health plan. *JAMA* **297**, 1093–1102 (2007).
- Robinson, J. C., Brown, T. T., Whaley, C. & Finlayson, E. Association of Reference Payment for Colonoscopy With Consumer Choices, Insurer Spending, and Procedural Complications. *JAMA Intern. Med.* 1–7 (2015). doi:10.1001/jamainternmed.2015.4588
- Robinson, J. C. & Brown, T. T. Increases In Consumer Cost Sharing Redirect Patient Volumes And Reduce Hospital Prices For Orthopedic Surgery. *Health Aff.* (*Millwood*) 32, 1392–1397 (2013).
- Robinson, J., Brown, T. & Whaley, C. Reference-Based Benefit Design Changes Consumers' Choices And Employers' Payments For Ambulatory Surgery. *Health Aff. (Millwood)* 34, (2015).
- Robinson, J. C., Brown, T. T., Whaley, C. & Bozic, K. J. Consumer Choice Between Hospital-Based and Freestanding Facilities for Arthroscopy. J Bone Jt. Surg Am 97, 1473–1481 (2015).
- Brown, T. T. & Robinson, J. C. Reference Pricing with Endogenous or Exogenous Payment Limits: Impacts on Insurer and Consumer Spending. *Health Econ.* (2015). doi:10.1002/hec.3181
- Whaley, C. & Brown, T. Firm Responses to Targeted Consumer Incentives: Evidence from Reference Pricing. *Work. Pap.* (2015).