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# Price Transparency For MRIs Increased Use Of Less Costly Providers And Triggered Provider Competition

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**ABSTRACT** To encourage patients to select high-value providers, an insurer-initiated price transparency program that focused on elective advanced imaging procedures was implemented. Patients having at least one outpatient magnetic resonance imaging (MRI) scan in 2010 or 2012 were divided according to their membership in commercial health plans participating in the program (the intervention group) or in nonparticipating commercial health plans (the reference group) in similar US geographic regions. Patients in the intervention group were informed of price differences among available MRI facilities and given the option of selecting different providers. For those patients, the program resulted in a \$220 cost reduction (18.7 percent) per test and a decrease in use of hospital-based facilities from 53 percent in 2010 to 45 percent in 2012. Price variation between hospital and nonhospital facilities for the intervention group was reduced by 30 percent after implementation. Nonparticipating members residing in intervention areas also observed price reductions, which indicates increased price competition among providers. The program significantly reduced imaging costs. This suggests that patients select lower-price facilities when informed about available alternatives.

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**D**uring the past several years, increasing attention has been paid to the variation in pricing for health care services.<sup>1-6</sup> The variation is found throughout health care, but price variation for imaging scans has been more widely documented.<sup>1-4</sup> For instance, the same magnetic resonance imaging (MRI) scan can range from \$300 to \$3,000 within a given geographic area, with no demonstrated difference in quality.<sup>7</sup>

A number of factors contribute to price variation, including the type of facility that performs the scan. Hospital-based outpatient departments typically charge higher rates than freestanding imaging centers or physician offices because of costs related to hospitals' emergency care capa-

bilities and stringent accreditation and regulatory requirements.<sup>1</sup> According to a 2009 Medicare Payment Advisory Commission report to Congress, hospitals can charge more for imaging than other providers can, because hospitals use their market power to negotiate higher payments from private insurers.<sup>8</sup>

Among hospital-based facilities, prices may vary further—by academic status, with teaching hospitals usually charging higher prices;<sup>9</sup> by mix of services provided; or by mix of population served, because of the need to cross-subsidize across payers and services. Even within a single commercial payer, cost sharing will vary by plan benefit designs. As a result, patients generally are unaware of or unable to estimate the extent to which medical costs vary.<sup>7,10</sup>

## Background

**PRICE TRANSPARENCY IN HEALTH CARE** In contrast to other competitive markets, it is often difficult for patients to obtain prices for health services and procedures from providers before receiving a service.<sup>11,12</sup> Health care prices typically reflect negotiations between providers and payers. A provider may contract with numerous health plans at different prices, which makes the disclosure of costs for specific procedures challenging in several ways.

First, health care providers are accustomed to negotiating prices. It is in providers' interest to keep these prices confidential or to publish only partial costs, such as facility fees but not professional fees for a particular procedure.<sup>12,13</sup>

Second, it is logistically challenging for providers to supply useful insurer-specific price data to patients without information about the patient's benefit design.

Third, not all patients possess sufficient medical literacy to accurately compare all cost components for different types of services or to predict their cost-sharing responsibility.<sup>12</sup> Even if consumers are aware of actual medical costs, they might apply standard market principles and misinterpret a higher price as an indication of higher quality.<sup>14</sup> This misinterpretation often serves as a disincentive to shop for lower-cost services.

Finally, patients have historically been responsible for only a small portion of a procedure's true cost.<sup>15-19</sup> Thus, there is neither a strong tendency nor an established practice for patients to verify prices before receiving a service.

**CHALLENGES OF PRICE TRANSPARENCY INITIATIVES** In an attempt to redress this situation, federal and state governments have implemented policies to increase transparency across a broad range of providers and services. In some cases, governments have engaged in efforts to publish health care prices in public reports or online.

In early 2007 New Hampshire became one of the first states to launch a price transparency program.<sup>20</sup> Costs of health care procedures—including preventive services; emergency visits; and radiological, surgical, and maternity procedures—were posted on the web-based New Hampshire Comprehensive Health Care Information System.<sup>21</sup> In 2013 the Centers for Medicare and Medicaid Services published an online database containing the costs charged by individual hospitals for the most common inpatient and outpatient services.<sup>22</sup> In April 2014 Medicare payments to individual physicians for fee-for-service beneficiaries were posted on the same website.

Presumably, such price transparency initia-

tives would enable patients to make informed choices and select lower-cost facilities, thus reducing overall medical costs. However, research conducted by the New Hampshire Insurance Department several years after the state's price transparency initiative began found no such decrease. That is, the existence of New Hampshire's price transparency website had no impact on reducing price variations among providers.<sup>20</sup>

There are both patient- and provider-related challenges to the success of price transparency initiatives. It is difficult to engage patients when costs remain largely hidden behind insurance deductibles and copayments,<sup>7,20</sup> costs of only selected procedures or services are published,<sup>13</sup> or portions of the total costs are not disclosed.<sup>13</sup> If data are limited and obscured, patients remain uninformed about how much they will have to pay for health care, and they have little incentive or opportunity to seek the lowest prices.

Insurance providers may be engaged in price negotiations, but such efforts are weakened by a lack of competition among hospital-based facilities in many geographic areas. The simple proximity of neighboring facilities does not guarantee competition. Aggressive negotiating practices, limited capacity of potential competitors, prestigious reputations, and affluence in the surrounding community all hinder competitive pricing.<sup>20</sup>

Fortunately, promising signs for price transparency have begun to emerge. A study on a reference-based purchasing benefit design for Anthem Blue Cross in California and the California Public Employees' Retirement System (CalPERS) reported that combining reference-based pricing with member outreach on cost information enabled members to select lower-cost facilities for elective surgery.<sup>23,24</sup> In a separate study of 1,421 consumers presented with multiple scenarios, 80 percent selected the health care provider that had the highest value when they were given access to well-designed reports on price and quality—for example, about avoidable complications.<sup>14</sup> These findings indicate that when patients are engaged in the decision process, they are able to select facilities for non-urgent care that provide high-quality service in relation to the cost of care.<sup>14,20</sup>

## Informed Choice: Making It Simple For The Consumer

In late 2010 one of the largest specialty benefit management<sup>25</sup> companies in the United States, AIM Specialty Health, implemented a price transparency initiative that was focused on elective advanced imaging procedures in parts of the Northeast, Midwest, and Southeast.

# The benefits of the program extended beyond the members targeted for intervention.

Advanced imaging was selected because it is one of the most common elective procedures: In 2010, 65 MRI scans and 149 computed tomography (CT) scans were performed per 1,000 patients.<sup>26</sup> In addition, the availability of multiple imaging service providers in a given geographic area made it feasible for price competition.

Information on the quality of imaging services was also available, based on an imaging facility's capabilities. This enabled a quantifiable and defensible estimation of value for each test. The capability score for an imaging facility was based on staff qualifications, accreditation, quality programs, equipment, and overall service levels.

The price transparency program was also supported by the availability of timely imaging preauthorization data for insurance plan members in the program. The prior authorization process enabled the radiology benefit management staff to compare pricing information about the referred imaging provider with information about other providers in the same geographic area.

If there was a significant difference in price (at least \$400 per imaging study), quality, or both, a customer service agent telephoned the member and suggested alternative facilities. If the member accepted the recommendation to use a higher-value facility, the agent helped schedule a new appointment. There was no effect on benefits if the member did not accept the recommendation.

This price transparency initiative was unique in that it engaged members through phone calls when a high-value imaging facility was a practical choice instead of referring members to static information on a website. The program used real-time member profiles and provider referral information to identify cases scheduled at low-value facilities. Finally, because there was approximately a five-day window between a preauthorization request and the imaging test, there was sufficient time for customer service agents to discuss other options with members.

The objective of the study we report on here was to evaluate consumers' responses to the in-

surer-initiated price transparency program and determine whether the intervention prompted members to select high-value imaging providers, resulting in a lower per image price than in the year before the intervention. This study is the first evaluation of a large-scale private-sector effort in price transparency and of its impact on consumer response.

## Study Data And Methods

**DATA SOURCE AND STUDY POPULATION** This retrospective cross-sectional study used administrative claims data from commercial Blue Cross and Blue Shield health plans in the Northeast, Midwest, and Southeast regions of the United States. Patients had at least one outpatient diagnostic MRI scan during either the pre-implementation (2010) or post-implementation (2012) year. Inpatient and emergency department MRI tests were excluded because they were not subject to the preauthorization and price transparency program. All patients were age eighteen or older, continuously enrolled in the health plan during the year of the MRI scan, and enrolled in either a preferred provider organization (PPO) or a consumer-directed health plan insurance product.

The intervention cohort was composed of members whose employers participated in the price transparency program. These members resided in the metropolitan hospital service areas of Atlanta, GA; Cincinnati, OH; Cleveland, OH; Indianapolis, IN; and St. Louis, MO. The reference cohort consisted of patients residing in areas in the same census regions as the intervention group (Albany, NY; Chicago, IL; Hartford, CT; Kansas City, MO; Lexington, KY; Louisville, KY; New Haven, CT; Richmond, VA; and Rochester, NY) where no price transparency program was implemented. (for a map that shows the locations of the intervention and reference groups, see online Appendix Exhibit 1).<sup>27</sup> The areas in the two groups were similar in terms of significant Anthem or Empire Blue Cross and Blue Shield market penetration and provider network characteristics such as the availability and quality of imaging services.

The primary outcome measure was the change in average cost per image from 2010 to 2012 among members offered the price transparency program (the intervention cohort), compared to the change among members in metropolitan areas where no program was implemented (the reference cohort).<sup>28</sup> The imaging costs analyzed were based on total costs per test—the amounts paid by the health plan and those paid by the member.

**STATISTICAL ANALYSIS** Unadjusted analyses

are reported using summary statistics. We used difference-in-differences regression to evaluate the impact of the price transparency program on unit cost. The impact was net of preprogram price differences between the intervention group and the reference group, common imaging cost trends, and other covariates relevant to imaging. Those covariates included type of imaging test (such as imaging of the head, chest, abdomen, or spine) and the Medicare geographic adjustment factor, which measures operating expenses for health care facilities across regions. The geographic adjustment factor was introduced into the regression to minimize possible variations in costs among metropolitan areas.

**LIMITATIONS** This study had several limitations. We assumed that the pricing trend derived from the reference group was linearly applicable to the price transparency program. We also assumed that the variation in baseline imaging costs among different cities would be reduced through risk adjustment with the geographic adjustment factor. However, we cannot confirm that the risk adjustment eliminated all baseline differences.

The study did not include other socioeconomic or provider-level factors that could have affected imaging costs in each of the cities included in the study. However, these effects, if any, would likely be homogeneously distributed among both the intervention and reference cohorts. Both cohorts consisted of a limited number of metropolitan areas, and the results might not be generalizable to other regions.

Lastly, about one-third of the patients in the study had no cost sharing for the imaging test. In some cases, this was because they had no deductible. In other cases, it was because they had reached their out-of-pocket maximum, which might limit their responsiveness to the

program. One enhancement currently under consideration would identify the actual out-of-pocket savings and prioritize for outreach those members with the greatest potential savings. Future research could evaluate the impact of this or similar initiatives when patient cost sharing is a more explicit component of the outreach effort.

## Study Results

**PATIENT DEMOGRAPHICS** There were 61,271 patients in the intervention cohort and 44,366 patients in the reference cohort, for a total of 105,637 patients who had at least one MRI scan. Age and sex distributions were comparable in the two groups (see Appendix Exhibit 2).<sup>27</sup>

Fifteen percent of the patients were enrolled in high-deductible health plans. The minimum annual deductible defined by the federal government for these plans was \$1,200 for individual coverage and \$2,400 for family coverage. The remaining patients were enrolled in PPO plans, and the majority of them had an annual deductible of less than \$1,000 for an individual. The distribution of high-deductible health plans and PPOs was also comparable in the intervention and reference groups.

**IMPACT ON IMAGING COST** From 2010 to 2012 the unadjusted average cost of an MRI decreased by \$99 (9.4 percent) in the intervention cohort (Exhibit 1). In contrast, the cost increased by \$97 (10.5 percent) in the reference cohort—a change that is in line with published data from the Bureau of Labor Statistics on price inflation for medical care services.<sup>29</sup>

The results were consistent after we adjusted the imaging cost with the difference-in-differences regression model (Exhibit 1). We observed an adjusted cost per test decrease of \$95 (9.0 percent) for the intervention cohort from 2010 to 2012 and an increase of \$124 (14.3 percent) for the reference cohort.

We compared the regression-adjusted change from 2010 to 2012 in the intervention and reference groups (Exhibit 2). The result of the price transparency intervention was an adjusted \$220 reduction (18.7 percent;  $p < 0.001$ ) in the cost of an MRI scan.

**PATIENTS SHIFTED AWAY FROM HOSPITAL-BASED FACILITIES** One factor driving the cost reduction was that a notable percentage of members in the intervention cohort shifted from hospital-based outpatient facilities to freestanding or office facilities. The proportion of MRI imaging that occurred at hospital-based facilities decreased from 53 percent in 2010 to 45 percent in 2012 in the intervention cohort (Exhibit 3). In contrast, the rate was essentially unchanged in the reference cohort (51 percent in 2010 and

### EXHIBIT 1

Volume And Cost Of Magnetic Resonance Imaging (MRI) Scans In Intervention And Reference Groups, 2010 And 2012

	Intervention group		Reference group	
	2010	2012	2010	2012
Number				
Patients	33,349	27,922 <sup>a</sup>	21,861	22,505
MRI scans	44,050	36,213 <sup>a</sup>	28,534	28,988
Average MRI scans per patient	1.32	1.30	1.31	1.29
Average cost per MRI (\$)				
Unadjusted	1,055	956	928	1,025
Adjusted <sup>b</sup>	1,053	958	868	992

**SOURCE** Authors' analysis. <sup>a</sup>Not all employer groups in the intervention area signed up for the price transparency program. <sup>b</sup>Adjusted for type of imaging test (such as imaging of the head, chest, abdomen, or spine) and the Medicare geographic adjustment factor.

50 percent in 2012). This change in the intervention cohort indicated a shift by patients to facilities with lower average costs.

**HOSPITAL-BASED FACILITIES REDUCED PRICE**

Prompting provider competition is a desirable impact of price transparency.<sup>20</sup> We found that the unit MRI price for the intervention group decreased, on average, from \$1,488 to \$1,313 in hospital-based facilities after the intervention (Exhibit 4), while the price increased in non-hospital facilities. (The price increase in non-hospital facilities was also observed in areas without the program.) This 30 percent reduction in price variation between imaging locations in the intervention group is consistent with the findings of James Robinson and Timothy Brown, who observed that high-price hospitals reduced their prices after the implementation of a reference-based pricing benefit design.<sup>24</sup>

**Discussion**

In this real-world analysis of a health care price transparency program, we found that when similar-quality but lower-price alternatives were presented to health plan members by outreach, members were willing to select lower-price facilities. As a result, the price transparency program greatly reduced the average price level, shifted patients away from hospital-based facilities, and reduced the price variation between hospital and nonhospital facilities in the intervention group. These positive findings were attributed to responsiveness not only among members in the intervention group but also among providers.

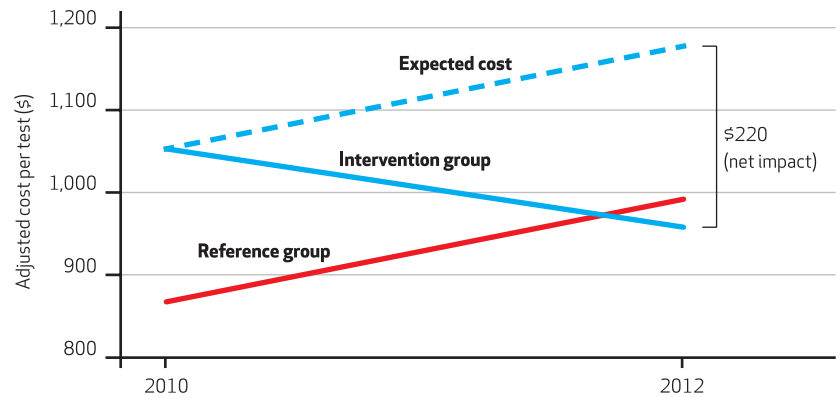
**EVIDENCE OF PRICE COMPETITION BY PROVIDERS**

It appears that the benefits of the program extended beyond the members targeted for intervention to health plan members whose employers had not participated. A subanalysis of 39,755 MRI patients residing in the same metropolitan areas who were included in the study but were not part of the price transparency program also showed a reduction in average cost per test, although to a lesser extent than patients participating in the program. The nonparticipating employer groups experienced an average decrease of \$57 per test, compared with a \$99 decrease in the employer groups participating in the intervention (and a \$97 cost increase in the reference group residing outside the regions of the intervention program).

The cost reduction in the nonparticipating employer groups provides evidence of universal provider competition that was influenced by the intervention. In fact, after the implementation of the price transparency program, more than thirty hospital-based imaging providers reportedly negotiated to lower prices, to stay competitive.

**EXHIBIT 2**

**Adjusted Cost Per Magnetic Resonance Imaging (MRI) Scan In Intervention And Reference Groups, 2010 And 2012**



**SOURCE** Authors' analysis. **NOTES** The expected cost is the expected trend for the intervention group, based on the trend in the reference group. It represents the projected per image cost in the intervention group had there been no price transparency program for that group.

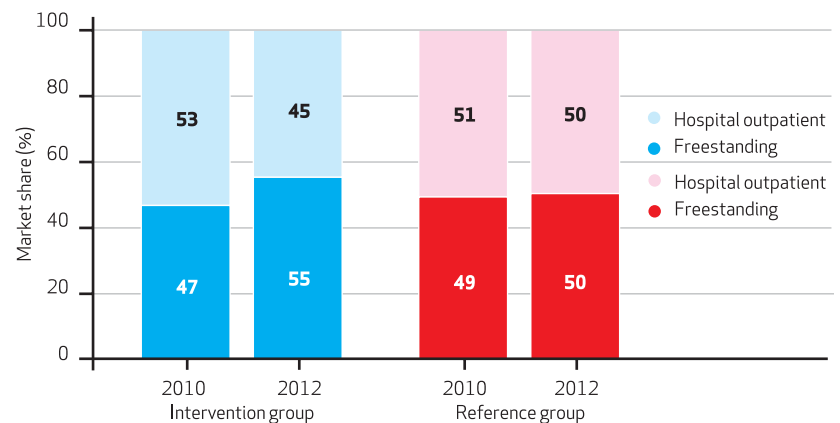
This study demonstrated that a price transparency program can effectively trigger provider competition that goes beyond the participating members. Such an effect was also observed recently in a study on elective joint replacement after patients shifted to less expensive facilities and benefited from significant cost reductions.<sup>10</sup>

**SENSITIVITY ANALYSIS USING COMPUTED**

**TOMOGRAPHY** We repeated these analyses on diagnostic CT scans in the same geographic areas as a sensitivity test for the effect of the price transparency intervention on different imaging procedures. A coding change for CT scans in 2011 that integrated two separate CT procedures into one common *Current Procedural Terminology*

**EXHIBIT 3**

**Market Share Of Magnetic Resonance Imaging In Freestanding Or Office Facilities And In Hospital Outpatient Facilities In Intervention And Reference Groups, 2010 And 2012**



**SOURCE** Authors' analysis.

## EXHIBIT 4

**Magnetic Resonance Imaging Costs At Freestanding Or Office Facilities And At Hospital-Based Outpatient Facilities In Intervention And Reference Groups, 2010 And 2012**

	Intervention group		Reference group	
	2010	2012	2010	2012
Freestanding or office facilities	\$ 563	\$ 668	\$ 652	\$ 672
Hospital-based outpatient facilities	1,488	1,313	1,198	1,383
Difference	925	645	546	711

**SOURCE** Authors' analysis. **NOTES** Between 2010 and 2012 the difference in the intervention group fell 30 percent. In the reference group it rose 30 percent.

(CPT) code resulted in a reduction in CT unit costs for both the intervention and reference groups. Despite the coding change, we observed that the net program impact on average unit cost was directionally the same as for MRI scans—an adjusted net reduction of \$102 in the intervention cohort.

**ROAD MAP TO A SUCCESSFUL PRICE TRANSPARENCY PROGRAM** The price transparency initiative has the potential to be effective for nonurgent procedures, when there are at least several days between a patient's decision to select the provider and the time when the procedure takes place. Procedures that could offer the greatest benefits from member outreach would generally have a preauthorization or prenotification component. These could include echocardiography or other high-tech imaging, such as positron emission tomography (PET) scans and nuclear cardiology; sleep studies; preventive colonoscopy; arthroscopy; and elective joint replacement surgeries.

In contrast to the more commonly employed passive websites, this intervention program included outreach to members when they were scheduling an imaging procedure. The intervention also included several elements that are key to making a price transparency program successful.

►**RELEVANT TO CONSUMERS:** This intervention did not use a static price transparency website that exposed members to a plethora of general information. Instead, the intervention reached out to members with information specific to their procedure types. It did not provide members with the amount charged by facilities, which is usually of limited interest to consumers, but with the cost of the “negotiated” amount (insurer-specific and provider-specific costs). Moreover, members were redirected to comparable facilities close to the original referred facilities or their home. Providing customized information empowered members to respond more effectively to the recommendation during the outreach.

►**QUALITY EMPHASIZED ALONG WITH PRICE:** Consumers are interested in the quality of health care along with its cost. Without additional contextual information on health care quality, some consumers believe the adage, “You get what you pay for.”<sup>14</sup> A successful price transparency program provides understandable quality information to members in addition to cost data.

►**UP-TO-DATE, ACCURATE DATA:** Up-to-date and accurate member data and cost and quality information are essential for successful consumer-engaged price transparency programs. For this intervention, patients' phone numbers entered during an office visit were uploaded into a preauthorization database, enabling effective member outreach with a high contact rate. Quality scores were derived from provider-reported capability data, and cost information about imaging facilities was populated with average imaging cost based on medical claims. All data were updated periodically to provide the most current data to members.

►**TIMING:** To influence a decision, health care decision support needs to be provided to patients at the time that decision is made.<sup>30,31</sup> In clinical decision support systems, which have been implemented throughout the health care field to promote better clinical decisions,<sup>32-39</sup> the provision of well-timed support, in addition to access to up-to-date information, is seen as a critical factor.<sup>33</sup> Providing personalized cost and quality information on the care process before the member enters it, at a time when his or her choice of providers could be changed, makes the information instantly relevant.

►**INTEGRATED DECISION SUPPORT INFORMATION SYSTEM:** Lastly, health decision support needs to integrate quality and cost data on relevant services and provider characteristics such as location, contact information, and the availability of appropriate equipment into one system to offer seamless, effective decision support.

## Conclusion

The price transparency program we studied provided timely and relevant information on cost and quality to assist health plan members in selecting high-value facilities for advanced imaging procedures. Patients responded to price transparency with increased use of less costly facilities, which were often not hospital based. This program prompted higher-cost facilities to respond and resulted in a 30 percent reduction in price variation between hospital and nonhospital facilities in the intervention group. The effect of price transparency extended beyond the intervention cohort and triggered large-scale provider competition and cost reduction for non-

participating plan members residing in the same region.

The price transparency program resulted in a significant price reduction of 18.7 percent per

MRI test. This suggests that a price transparency initiative involving direct member outreach with integrated quality information can successfully reduce health care costs. ■

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- 27** To access the Appendix, click on the Appendix link in the box to the right of the article online.
- 28** Because the intervention was implemented throughout 2011, with actual start dates varying by metropolitan area, claims from that transitional year were not included in the analysis (to allow for the program to be fully implemented).
- 29** Bureau of Labor Statistics. Databases, tables, and calculators by subject: Consumer Price Index—All Urban Consumers [Internet]. Washington (DC): Department of Labor; [cited 2014 Jun 6]. Available from: [http://data.bls.gov/timeseries/CUSR0000SAM2?output\\_view=pct\\_3mths](http://data.bls.gov/timeseries/CUSR0000SAM2?output_view=pct_3mths)
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