Distribution Agreement

In presenting this thesis as a partial fulfillment of the requirements for a degree from Emory University, I hereby grant to Emory University and its agents the non-exclusive license to archive, make accessible, and display my thesis in whole or in part in all forms of media, now or hereafter now, including display on the World Wide Web. I understand that I may select some access restrictions as part of the online submission of this thesis. I retain all ownership rights to the copyright of the thesis. I also retain the right to use in future works (such as articles or books) all or part of this thesis.

Ritika Manik   April 1, 2021

Public Preferences: Cost of Care Discussions and Out-of-Pocket Imaging Costs

by

Ritika Manik

Gelareh Sadigh, MD
Adviser

Biology Department

Gelareh Sadigh, MD

Advisor

Marshall Duke, PhD

Committee Member

Arri Eisen, PhD

Committee Member

2021

Public Preferences: Cost of Care Discussions and Out-of-Pocket Imaging Costs

By

Ritika Manik

Gelareh Sadigh, MD

Adviser

An abstract of
a thesis submitted to the Faculty of Emory College of Arts and Sciences
of Emory University in partial fulfillment
of the requirements of the degree of
Bachelor of Science with Honors

Biology Department

2021

Abstract

Public Preferences: Cost of Care Discussions and Out-of-Pocket Imaging Costs

By Ritika Manik

Introduction: Higher insurance deductibles and rising out-of-pocket (OOP) healthcare costs can lead to adverse financial outcomes and treatment non-adherence. Encouraging OOP cost discussions with healthcare providers and increasing the availability of price transparency tools are solutions that have been proposed to ameliorate the financial burden of healthcare. We investigated public preferences regarding OOP cost discussions and price transparency tools.

Method: We recruited 1,025 volunteers using Amazon Mechanical MTurk. Participants completed a 30-question survey that assessed their preferences about OOP cost discussions, OOP cost delivery, and how they weigh cost versus quality (accuracy, doctor recommendation, and online ratings) when choosing an imaging center for a back MRI in two different clinical scenarios. Data was analyzed using average ranks and ordered logistic regressions of fractional factorial models.

Results: A majority of participants wanted to know about OOP costs of imaging tests before their receipt. Most wanted to have OOP cost discussions when scheduling imaging tests or during the doctor visit when the test is recommended, and most preferred to have these discussions with the doctor or provider ordering the test. For mild back pain, low-cost imaging was prioritized by patients in all models when the effects of OOP costs and center quality were separated, but when cost and quality data were presented together, high-quality, high-cost imaging was preferred over low-cost, low-quality imaging. For severe back pain, high-quality imaging was prioritized by patients in all models when the effects of OOP costs and center quality were separated, and this trend remained consistent when cost and quality data were presented together. When given data for cost and quality, the least preferred options were not knowing the cost of imaging or not obtaining imaging tests, regardless of the severity of the back pain.

Conclusions: Quality metrics impact patients' healthcare decisions. With the recent push towards price transparency, price transparency tools should incorporate quality metrics to enable healthcare consumers to make value-based decisions. Overall, transparency in medical care can be promoted by providers (via OOP cost discussions) and institutions (via quality-based price transparency tools), leading to decreased financial burden on healthcare consumers.

Public Preferences: Cost of Care Discussions and Out-of-Pocket Imaging Costs

By

Ritika Manik

Gelareh Sadigh, MD

Adviser

A thesis submitted to the Faculty of Emory College of Arts and Sciences
of Emory University in partial fulfillment
of the requirements of the degree of
Bachelor of Science with Honors

Biology Department

2021

Acknowledgements

First and foremost, I would like to express my gratitude to my advisor, Dr. Gelareh Sadigh. She has supported me in all of my academic pursuits, provided extensive guidance, and I am incredibly grateful to have her as a mentor and role model. Furthermore, I would like to extend my immense gratitude to Dr. S. Sriram from the University of Michigan Ross School of Business, who graciously donated his time to help with the statistical analysis and financial quantification of the data. I would also like to thank my committee members, Dr. Marshall Duke and Dr. Arri Eisen for their support, time, and flexibility while I was conducting this thesis. I would like to thank my parents for unconditionally encouraging and supporting me.

Table of Contents

Introduction

Cost-of-care is a barrier for individuals seeking access to healthcare. The National Health Interview Survey indicates that, in 2015, approximately 6% of the United States population delayed medical care and 4.5% avoided it due to concerns about cost or inability to afford care.[1] High-deductible insurance plans and costly examinations and treatments in the American healthcare system contribute to the rising out-of-pocket (OOP) costs experienced by patients.[2,3] Because of this, patients may find themselves choosing between their health and financial stability. In 2007, approximately 62% of all bankruptcies were medical.[4] This number has likely increased in recent years due to rising annual deductibles, an increasing number of individuals with high-deductible healthcare plans, and ever-increasing healthcare costs.[5] This creates a dilemma for physicians and practices, who may find themselves needing to balance patients' financial constraints and medical needs without having adequate knowledge of the costs associated with healthcare interventions.[2,6]

Cost-of-care discussions

OOP costs impact most patients' clinical and healthcare decisions, yet clinicians rarely initiate cost-of-care discussions.[2,6] To prevent financial hardship resulting from expensive treatments and interventions, providers should incorporate cost-of-care discussions when making healthcare recommendations to facilitate more informed healthcare decision-making for patients.[6] More than half of the patients (ranging between 50% to 94%) indicated that they would welcome cost-of-care discussions with healthcare providers, specifically, before receipt of medical services.[7-9] However, only 15 to 20% of respondents reported having such discussions.[8,9] Over half of the participants wanted their doctors to consider OOP costs when recommending treatments.[9]

In a study of 67 clinical encounters observed by an interviewer, less than 46% of encounters included cost of care discussions and most of these discussions did not provide patients with organized information or resources to take home.[10] This indicates the need to incorporate both provider-level and patient-level financial awareness into healthcare, particularly among those who encounter financially vulnerable populations.[10] Encouraging clinical interactions related to patients' financial concerns can help reduce OOP costs incurred by patients.[11]

Price transparency and CMS mandate

Consumers are often faced with undisclosed pricing and inadequate information about the costs associated with their treatment options, and this is concerning because it might increase hesitation to seek needed healthcare services.[12-14] The U.S. healthcare system is confusing to navigate (for patients, providers, and healthcare institutions) due to a complex system of reimbursement codes, which contributes to an increased financial burden on patients and non-adherence to treatment plans.[12,13,15] There is significant variation in the frequency of cost-of-care discussions for diagnostic tests and treatments ordered by providers during office visits. Similarly, there is variation in the availability of OOP cost information offered by imaging or lab facilities before a patient receives their examination.

To address these issues, the Centers for Medicare and Medicaid Services (CMS) mandated a price transparency rule. Effective January 1, 2021, all hospitals are required to publish their gross charges, payer-specific negotiated charges, discounted cash prices, and de-identified minimum and maximum negotiated charges for items and services (e.g., supplies, procedures, room costs, facility fees, physician and professional charges) available to patients during inpatient admissions or outpatient department visits.[16] Additionally, they are required to

post payer-specific negotiated charges, discounted cash prices, and de-identified minimum and maximum negotiated charges for 300 shoppable services.[16] Shoppable services are services that can be scheduled in advance by patients (e.g., imaging, laboratory tests, outpatient procedures, elective surgeries).[17,18]

Furthermore, by January 1, 2022, health insurers will have to publish negotiated prices for covered items, services, and prescription drug plans for in-network prices, in addition to historical payments to and bills from out-of-network providers.[16] By January 1, 2023, consumers should be able to access real-time and individualized estimates of their OOP costs for specific health care items, services, and prescription drugs (including a list of 500 shoppable services).[16] By January 1, 2024, these self-service tools are required to have pricing information for all available items and services.[16] This is being required to give patients control to obtain their OOP cost and to promote price comparison and competition in the health care sector so that patients can receive the most competitive pricing.[16,18,19] One study found that increasing price transparency is projected to lead to savings between 9.0% and 12.8% by driving competition and decreasing consumer spending.[20]

However, the current and proposed price transparency tools lack metrics indicating the quality of care provided compared to the price. Prior research shows that quality metrics are vital to optimizing healthcare consumer engagement with and derived benefits from price transparency tools. One study found that when consumers were presented with cost information, many conflated low cost with low-quality care and high cost with high-quality care.[21] Consumers were more likely to choose high-value (lost-cost, high-quality) providers if data about cost and quality were presented together.[21] Availability of cost and quality metrics will drive value-based competition.[22,23]

Purpose

The purpose of this study is to evaluate public preferences about OOP cost discussions as it pertains to imaging examinations and how they weigh cost versus quality in their imaging-related healthcare decisions. Additionally, we investigated how this relationship is moderated by the severity of underlying conditions.

Method

The Emory Institutional Review Board approved this survey-based study. In December 2020, we recruited volunteers using Amazon Mechanical Turk (MTurk; Amazon Inc, Seattle, Washington), an online crowdsourcing platform that reimburses participants for completing tasks. Participants completed the consent (Appendix B) and the survey (Appendix C) via the Advantage platform of SurveyMonkey (San Mateo, California) and were compensated $1 for survey completion. The survey took an average of six minutes to complete.

Study population

We enrolled 1,025 English-speaking volunteers (Figure 1) 18-years or older who reside in the United States. Individuals residing in Puerto Rico, Guam, or the US Virgin Islands were excluded.

Survey measurements

The survey consisted of 30 questions that assessed participants' preferences regarding cost-of-care discussions (e.g., timing, format, and delivery), factors that influence the choice of an imaging center, and how participants would weigh cost versus quality of imaging depending on the severity of their health concern. The quality of the imaging center was assessed using metrics such as accuracy of results, online reviews, accreditations, doctor recommendations, and version of the technology used presented in a ranked-choice format.

Patient preferences for cost versus quality of imaging were assessed by presenting patients with two clinical scenarios: mild, tolerable back pain that does not impact daily activity and severe back pain that limits daily activity. Participants were asked to rank their preferred imaging center at which to receive a back MRI based on the OOP cost and quality. OOP cost options were $50, $400, and unknown cost ranging between $50 and $3500. Quality metrics were accuracy (87% vs. 96%), doctor recommendation (doctor recommended vs. doctor was unfamiliar with the imaging center), and online reviews (2.5 vs. 4.5 stars). We selected 96% to represent high accuracy because the reported average error rate for an average radiologist is 4%.[24-26]

Sociodemographic variables

The survey queried participants' demographics, including age, ethnicity, race, insurance status, insurance deductible status, level of education, marital status, employment status, household income, and 5-digit zip code. The Agency for Healthcare Research and Quality (AHRQ) socioeconomic status (SES) index was used to tabulate the Neighborhood Deprivation Index (NDI) for respondents' five-digit zip codes based on a weighted combination of the following factors: percentage of households with a mean of more than 1 person per room, the median value of owner-occupied units, the percentage of individuals living in poverty, median household income, level of education, and unemployment rates.[27] NDIs can range from 0 to 100, with a lower NDI value representing a greater degree of socioeconomic deprivation in a geographic area.[28,29] NDIs were calculated by cross-referencing participants' five-digit zip codes with county-level data from the 2019 Health Resource and Services Administration Area Health Resources File, which includes data on population characteristics and economics organized by

Federal Information Processing System (FIPS) county codes.[30] Aggregate means were used when a zip code represented multiple FIPS codes.

Statistical analysis

Categorical variables were reported by frequency and percentage. Numerical variables were reported by mean and standard deviation. The alpha level for significance was set at $p<0.05$. For rank order questions, the average rank of each option was calculated by multiplying the weight of the ranked position by the response count for the answer choice and dividing the product by the total response count.[31] Answer choices were weighted in reverse such that the choice ranked as number one received the largest weight.

We conducted an ordered logistic regression to assess the individual importance of cost and quality attributes. We developed six models to account for three different quality metrics (accuracy, doctor recommendation, and online reviews) and two degrees of back pain (mild or severe). Each model consisted of two levels of cost (high vs. low) and two levels of quality (high vs. low). Unknown cost was used as a reference. β-coefficients and 95% confidence intervals are reported. Using the coefficients from the regression, we calculated the relative importance of cost and quality in each model: 100*(difference between coefficients for cost or difference between coefficients for quality metric) / [(difference between coefficients for cost) + (difference between coefficients for quality metric)]. Since the difference between the low and high OOP cost conditions was constant across all models ($350), we used this and the respective coefficients to calculate the extra costs participants would be willing to pay for higher quality imaging: [350 * (difference between coefficients for quality metric)] / (difference between coefficients for cost).

Results

Study population

A total of 1,310 participants consented to participate in the study. After excluding incomplete surveys (n = 11) and ineligible participants (n = 274), we conducted analysis on remaining 1,025 participants (Figure 1). The mean age of participants was 38.7 years (min = 18, max = 80, SD = 11.4). A total of 78.7% (n = 784) of participants were White and 14.8% (n = 147) were Hispanic or Latino. A total of 47.0% (n = 468) of participants had private insurance, 28.2% (n = 281) had Medicare, and 10.9% (n = 109) had Medicaid. 7.9% (n = 29) of participants did not have health insurance. Median NDI (IQR = 3.0) was 54.8. A total of 78.3% (n = 803) reported receiving an imaging test in the last five years. Demographic characteristics are reported in Table 2.

Preferences for OOP cost discussion delivery

A total of 94.9% (n = 973) reported that they would like to know about the OOP costs of their imaging test before its receipt. A total of 83.0% (n = 851) indicated that their doctor should consider OOP costs when making medical decisions and ordering imaging tests.

A total of 43.4% (n = 445) of respondents indicated that the ideal time to talk about OOP costs of imaging would be when they are scheduling their test with the imaging center, followed by 38.6% (n = 396) indicating that the ideal time for this discussion would be on the day of their doctor visit when the imaging test is recommended (Table 2). While only 5.1% (n = 52) reported receipt of OOP cost on the day of imaging service as ideal, 25.5% (n = 261) still found it acceptable (Table 2).

A total of 62.2% (n = 638) reported that the doctor or provider ordering the test would be the best person to discuss OOP cost (Table 2). A majority (44.2%, n = 453) reported that the best

time to receive the OOP cost estimate would be at least 2 weeks before the imaging test (Table 2). Overall, 60.7% (n = 622) preferred to receive the OOP cost estimate written on paper (handed or mailed), followed by 53.0% (n = 543) who preferred to receive the estimate electronically via a secure website personalized to the individual (Table 2).

Participants' stated preferences for imaging centers

A total of 89.5% (n = 917) of participants indicated that they would not be willing to pay more than a $200 OOP cost for an MRI examination (Table 2). According to respondents, the most important factors in choosing an imaging center are high accuracy of the imaging interpretation, followed by physician recommendations and newness of the technology and machinery at the center (Table 3). During multivariable analysis of preferences, we did not identify any demographic factors significantly associated with the factors they ranked as important when choosing an imaging center.

Participants' decisions: quality vs. cost in clinical scenarios

For mild back pain, a multivariable model adjusting for the importance of OOP costs of imaging ($50 vs. $400) and quality of the imaging center (accuracy of 96% vs. 87%) individually indicated that a $50 OOP cost imaging test (β = 1.97 [95% CI, 1.81-2.13]) was the most desirable option, followed by an imaging center with 96% accuracy (β = 1.60 [95% CI, 1.43-1.77]) (Table 5). However, when presented with combinations of cost and quality, obtaining high-cost, high-quality imaging was more important than having low-cost, low-quality imaging (Table 4), with accuracy having a relative importance of 52.3% compared to cost (Table 6). Participants are projected to pay an extra $753 to have a 9% increase in the accuracy of their imaging (from 87% to 96%) (Table 6). These observations remained consistent when the quality metric was presented as doctor recommendation or online ratings. In multivariable models

adjusting for OOP costs and doctor recommendation or online ratings, a doctor-recommended imaging center or a center with 4.5-stars online was the most desirable option, followed by $50 OOP cost imaging (Table 6). Participants are projected to pay an extra $862 to get imaging in a center recommended by their doctor and an extra $933 to get imaging in a center with 4.5-stars (versus 2.5-stars) (Table 6).

For severe back pain, a multivariable model adjusting for the importance of OOP costs of imaging ($50 vs. $400) and quality of the imaging center (accuracy of 96% vs. 87%) individually indicated that an imaging center with 96% accuracy ($\beta = 3.60$ [95% CI, 3.40-3.79]) was the most desirable option, followed by $50 OOP cost imaging ($\beta = 2.07$ [95% CI, 1.90-2.23]) (Table 5). When presented with combinations of cost and quality, obtaining high-cost, high-quality imaging was more important than having low-cost, low-quality imaging (Table 4), with accuracy having a relative importance of 65.8% when compared to cost (Table 6). Participants are projected to pay an extra $1215 to have a 9% increase in the accuracy of their imaging (from 87% to 96%) (Table 6). These observations remained consistent when the quality metric was presented as doctor recommendation or online ratings. In the multivariable models adjusting for OOP costs and doctor recommendation or online ratings, a doctor-recommended imaging center or a center with 4.5-stars online was the most desirable option, followed by $50 OOP cost imaging (Table 6). Participants are projected to pay an extra $1124 to get imaging in a center recommended by their doctor and an extra $1256 to get imaging in a center with 4.5-stars (versus 2.5-stars) (Table 6).

Regardless of the severity of back pain or the definition of quality of an imaging center, when patients were presented with both quality and cost metrics, not knowing the cost of imaging or not obtaining the imaging test were the least preferred options (Table 4).

Surprisingly, in a multivariable analysis of participants' choice of imaging center by accuracy or OOP cost of imaging, we did not identify any demographic factors that were significantly associated with participants' selection in both the mild and severe back pain scenarios.

Discussion

In this survey of 1,025 MTurk participants, we found that 94.9% of participants want to know their OOP costs for imaging tests before receiving the tests. Most participants preferred having the OOP cost estimate delivered by the doctor or provider ordering the test and wanted to receive these estimates at least two weeks before the test either written on a paper physically handed to or mailed to them. Participants indicated that accuracy was the most important factor they would consider when choosing an imaging center, followed by physician recommendation and newness of the technology and machinery at the center. When participants were presented with the choices of quality of the imaging center versus OOP costs of imaging, quality was always the most important factor in the selection of an imaging center, regardless of the definition of quality (e.g., accuracy, doctor recommendation, or online ratings) or severity of the condition (e.g., mild or severe back pain). Unsurprisingly, knowing the OOP costs – regardless of whether the costs were high or low – was consistently preferred over getting imaging without knowing the OOP costs beforehand.

When ranking combinations of quality and cost in different clinical scenarios, participants preferred high-quality, high-OOP cost combinations in all clinical scenarios. Interestingly, 89.5% of participants reported that they would not be willing to pay more than $200 OOP for an MRI examination, yet in all clinical scenarios, over 30% of participants ranked the high-quality, high-OOP cost ($400) imaging center as their top preference. Moreover, our

analyses project that patients would pay between $743 and $1,256 extra for a higher quality imaging center. Some of these discrepancies in willingness to pay and decision-making regarding cost versus quality might also be attributed to inconsistencies in human behavior, with what people say and how they act being two different things.

Our study results have clinical implications. With the new CMS mandate, hospitals are now required to provide price transparency tools so that patients can look up their estimated OOP costs beforehand. However, many of these price transparency tools lack quality metrics and can be misleading. Our analyses show that when the effects of OOP costs and center quality are separated, patients prefer a low-cost imaging test for mild back pain. Conversely, when the attributes (cost and quality) are presented together, a high-quality test becomes more important, and patients will pay extra for the gain in quality. For severe back pain, quality is consistently the most important factor patients consider when selecting an imaging center, regardless of whether quality metrics are presented with cost or independently analyzed. If price transparency tools are presented without quality metrics, it could increase healthcare spending, especially if patients assume high cost is a proxy for high quality.[21] Price transparency tools with quality metrics can help patients identify high-quality, low-cost options and increase public access to affordable high-quality care.[21] Our study highlights the need to include quality metrics in price transparency tools because the inclusion of quality can change how patients weigh the cost.

Despite the aforementioned concerns associated with price transparency tools that do not include quality metrics, our study confirms the value of price transparency platforms in general; not knowing the cost of imaging was the least desirable option in selecting an imaging center regardless of disease severity. Efforts should be made to incorporate quality metrics with price transparency tools to make them more beneficial and compelling for patients. It should be noted

that there might be limitations in adding quality metrics to price transparency platforms. When asked about the importance of different quality metrics, accuracy was the most important, followed by doctor recommendations. Accuracy is a combination of different factors, including scanner quality, the interpreting radiologist's skill, and the technologist's performance (for imaging modalities that are operator-dependent). Information about an imaging center's accuracy is not readily available or reflected on any imaging center's website, likely because it is difficult to quantify the combination of all factors that contribute to accuracy. Similarly, doctor recommendations are not easy to collect and aggregate on a website. Regardless, patients should be encouraged to discuss their choices of imaging facility with their physicians. Of course, this can still have its own limitations, particularly if the doctor has conflicts of interest in referring patients to a specific facility.[32] Other quality metrics, such as scanner magnitude, facility accreditations, or online reviews might be more feasible to incorporate into price transparency tools.

In addition to expanding the information provided by price transparency tools, attempts need to be made to deliver OOP costs to patients at an optimal time. Many patients prefer to discuss their OOP costs with the physician ordering a specific healthcare service, but this is often impractical from a physician's perspective given that the brief nature of their patient encounters necessitates that a majority of that time is spent on patients' treatment plans. Furthermore, physicians may not be fully equipped to conduct extensive OOP cost discussions because they may not be fully informed about an individual patient's OOP costs since this varies based on insurance status and type. It might be more practical to deliver OOP costs immediately before receipt of service after having time to assess a patients' individual needs and insurance status, but most patients would like to have this information available at least 2 weeks prior since this may

help them mentally and financially prepare for imaging. Ultimately, cost-of-care discussions need to be incorporated into mainstream healthcare practice to promote informed patient decisions, but it is also important to consider the physician's ability to have such discussions.

Limitations

This study utilized Amazon MTurk. MTurk survey respondents are generally younger, with one study finding that 88% of MTurk respondents are under the age of 50.[33] Therefore, the respondents of this survey may not represent older adults who generally have higher healthcare needs. However, a large proportion of older people may not utilize price transparency tools due to technological literacy barriers, so the MTurk population may be representative of the people who will most frequently use price transparency tools. Even then, prior research suggests that price transparency tools are not frequently utilized for a variety of reasons. One study found that only 10% of patients who had access to price transparency tools used it, which might be due to information barriers, infrequent need to seek healthcare, or patients not finding the information compelling.[34] Hopefully, adding quality metrics to price transparency tools will encourage greater utilization of these tools.

Additionally, we used a fractional factorial design and therefore, could not compare the importance of different quality metrics in the same conjoint model. In other words, conclusions can be drawn from comparisons within models, but not between models due to our design. This limits the comparisons we can make among quality metrics (accuracy, doctor recommendation, and online ratings).

Lastly, we quantified the various levels of cost and quality (e.g., $50 vs. $400 cost, 87% vs. 96% accuracy), so our data are only applicable to these specific values. Therefore, the results may not be generalizable to other quantities (e.g., $100 vs. $500 cost, 50% vs. 55% accuracy).

We can only draw definitive conclusions about the prices and quality metrics assessed in this paper.

Future directions

Future studies with a full factorial design that incorporates multiple quality metrics into one model can improve upon our findings and enable a more thorough comparison among different quality metrics. Additionally, it would be valuable to include other quality metrics such as newness of technology and practice accreditations into these models since our data (Table 3) indicates that people rank these metrics as more important than online ratings; online ratings were included in the current study's models, but some of the other higher-ranked metrics were not. Such studies can provide more insight into how healthcare consumers prioritize different quality metrics relative to each other, enabling the development of price transparency tools that are the most helpful for patients.

Conclusion

CMS has mandated price transparency tools, which are beneficial as they help patients make more informed decisions about their healthcare. Despite prior research suggesting that a majority of patients would be receptive to cost-of-care discussions and price transparency, there is limited literature about how and when these tools should be offered to patients. We investigated public preferences about cost of care discussions and the influence of cost versus quality in patients' healthcare decision-making, providing insight into what type of information should be incorporated into price transparency tools and OOP cost discussions.

Ultimately, quality metrics should be included in price transparency tools because quality is one of the most important factors to individuals choosing an imaging center, regardless of the severity of their condition. There needs to be greater transparency in medical care so that patients

can make the most informed decisions for themselves. Price and quality transparency can be beneficial for patients by encouraging providers to provide lower-cost and higher-quality care, making healthcare more accessible to a larger population, and alleviating some of the financial burden of healthcare in the United States.

References

1.   QuickStats: Percentage of Persons of All Ages Who Delayed or Did Not Receive Medical Care During the Preceding Year Because of Cost, by U.S. Census Region of Residence* - National Health Interview Survey, 2015(dagger). *MMWR Morb Mortal Wkly Rep.* 2017;66(4):121.

2.   Perez SL, Weissman A, Read S, et al. U.S. Internists' Perspectives on Discussing Cost of Care With Patients: Structured Interviews and a Survey. *Ann Intern Med.* 2019;170(9_Suppl):S39-S45.

3.   Mooney MA, Yoon S, Cole T, et al. Cost Transparency in Neurosurgery: A Single-Institution Analysis of Patient Out-of-Pocket Spending in 13 673 Consecutive Neurosurgery Cases. *Neurosurgery.* 2019;84(6):1280-1289.

4.   Himmelstein DU, Thorne D, Warren E, Woolhandler S. Medical bankruptcy in the United States, 2007: results of a national study. *Am J Med.* 2009;122(8):741-746.

5.   Claxton G, Rae M, Panchal N, et al. Health benefits in 2013: moderate premium increases in employer-sponsored plans. *Health Aff (Millwood).* 2013;32(9):1667-1676.

6.   Politi MC, Yen RW, Elwyn G, et al. Encounter Decision Aids Can Prompt Breast Cancer Surgery Cost Discussions: Analysis of Recorded Consultations. *Med Decis Making.* 2020;40(1):62-71.

7.   Peppercorn J. The financial burden of cancer care: do patients in the US know what to expect? *Expert Rev Pharmacoecon Outcomes Res.* 2014;14(6):835-842.

8.   Tewkesbury G, Carlos RC, Duszak R, Jr., et al. Perceptions and experiences of multiple sclerosis patients regarding out-of-pocket costs of care discussions. *Mult Scler Relat Disord.* 2020;45:102344.

9. Irwin B, Kimmick G, Altomare I, et al. Patient experience and attitudes toward addressing the cost of breast cancer care. *Oncologist.* 2014;19(11):1135-1140.

10. Bradham DD, Garcia D, Galvan A, Erb C. Cost-of-Care Conversations During Clinical Visits in Federally Qualified Health Centers: An Observational Study. *Ann Intern Med.* 2019;170(9_Suppl):S87-S92.

11. Ubel PA, Zhang CJ, Hesson A, et al. Study Of Physician And Patient Communication Identifies Missed Opportunities To Help Reduce Patients' Out-Of-Pocket Spending. *Health Aff (Millwood).* 2016;35(4):654-661.

12. Decker TF. Understanding Costs and Supporting Transparency-Keys to Quality Care. *Front Health Serv Manage.* 2019;35(3):14-24.

13. Miller EL. Confusing Costs of Healthcare and Impact on Patients and Families. *Pain Manag Nurs.* 2019;20(4):303-304.

14. Sadigh G, Carlos RC, Krupinski EA, Meltzer CC, Duszak R, Jr. Health Care Price Transparency and Communication: Implications for Radiologists and Patients in an Era of Expanding Shared Decision Making. *AJR Am J Roentgenol.* 2017;209(5):959-964.

15. Patel MR, Piette JD, Resnicow K, Kowalski-Dobson T, Heisler M. Social Determinants of Health, Cost-related Nonadherence, and Cost-reducing Behaviors Among Adults With Diabetes: Findings From the National Health Interview Survey. *Med Care.* 2016;54(8):796-803.

16. Transparency in Coverage Final Fact Sheet (CMS-9915-F). Center for Medicare & Medicaid Services. https://www.cms.gov/newsroom/fact-sheets/transparency-coverage-final-rule-fact-sheet-cms-9915-f. Published 2020.

17.   Medicare and Medicaid Programs: CY 2020 Hospital Outpatient PPS Policy Changes and Payment Rates and Ambulatory Surgical Center Payment System Policy Changes and Payment Rates. Price Transparency Requirements for Hospitals To Make Standard Charges Public. In: Department HaHS, ed. Vol 0938-AU222019:83.

18.   Miller BJ, Mandelberg MC, Griffith NC, Ehrenfeld JM. Price Transparency: Empowering Patient Choice and Promoting Provider Competition. *J Med Syst.* 2020;44(4):80.

19.   Hospital Price Transparency. Centers for Medicare & Medicaid Services. https://www.cms.gov/hospital-price-transparency/hospitals#key-provisions. Accessed January 28, 2021.

20.   Sinaiko AD, Kakani P, Rosenthal MB. Marketwide Price Transparency Suggests Significant Opportunities For Value-Based Purchasing. *Health Aff (Millwood).* 2019;38(9):1514-1522.

21.   Hibbard JH, Greene J, Sofaer S, Firminger K, Hirsh J. An experiment shows that a well-designed report on costs and quality can help consumers choose high-value health care. *Health Aff (Millwood).* 2012;31(3):560-568.

22.   Durand DJ, Narayan AK, Rybicki FJ, et al. The health care value transparency movement and its implications for radiology. *J Am Coll Radiol.* 2015;12(1):51-58.

23.   Wu SJ, Sylwestrzak G, Shah C, DeVries A. Price transparency for MRIs increased use of less costly providers and triggered provider competition. *Health Aff (Millwood).* 2014;33(8):1391-1398.

24.   Waite S, Scott J, Gale B, Fuchs T, Kolla S, Reede D. Interpretive Error in Radiology. *AJR Am J Roentgenol.* 2017;208(4):739-749.

25.   Sabih DE, Sabih A, Sabih Q, Khan AN. Image perception and interpretation of
        abnormalities; can we believe our eyes? Can we do something about it? *Insights Imaging.*
        2011;2(1):47-55.

26.   Berlin L. Accuracy of diagnostic procedures: has it improved over the past five decades?
        AJR Am J Roentgenol. 2007;188(5):1173-1178.

27.   Chapter 3: Creation of New Race-Ethnicity Codes and SES Indicators for Medicare
        Beneficiaries - Chapter 3. January 2008. Agency for Healthcare Research and Quality,
        Rockville, MD. http://archive.ahrq.gov/research/findings/final-
        reports/medicareindicators/medicareindicators3.html.

28.   Bhavsar NA, Gao A, Phelan M, Pagidipati NJ, Goldstein BA. Value of Neighborhood
        Socioeconomic Status in Predicting Risk of Outcomes in Studies That Use Electronic
        Health Record Data. *JAMA Netw Open.* 2018;1(5):e182716.

29.   Berkowitz SA, Traore CY, Singer DE, Atlas SJ. Evaluating area-based socioeconomic
        status indicators for monitoring disparities within health care systems: results from a
        primary care network. *Health Serv Res.* 2015;50(2):398-417.

30.   Area Health Resources Files. Available at: https://data.hrsa.gov/topics/health-
        workforce/ahrf. Accessed on June 19, 2020.

31.   Ranking Question. Survey Monkey. https://help.surveymonkey.com/articles/en_US/
        kb/How-do-I-create-a-Ranking-type-question. Accessed2021.

32.   Hughes DR, Sunshine JH, Bhargavan M, Forman H. Physician self-referral for imaging
        and the cost of chronic care for Medicare beneficiaries. *Med Care.* 2011;49(9):857-864.

33.   Hitlin P. Research in the crowdsourcing age, a case study. *Pew Research Center.* 2016.

34.   Desai S, Hatfield LA, Hicks AL, Chernew ME, Mehrotra A. Association Between

        Availability of a Price Transparency Tool and Outpatient Spending. *JAMA*.
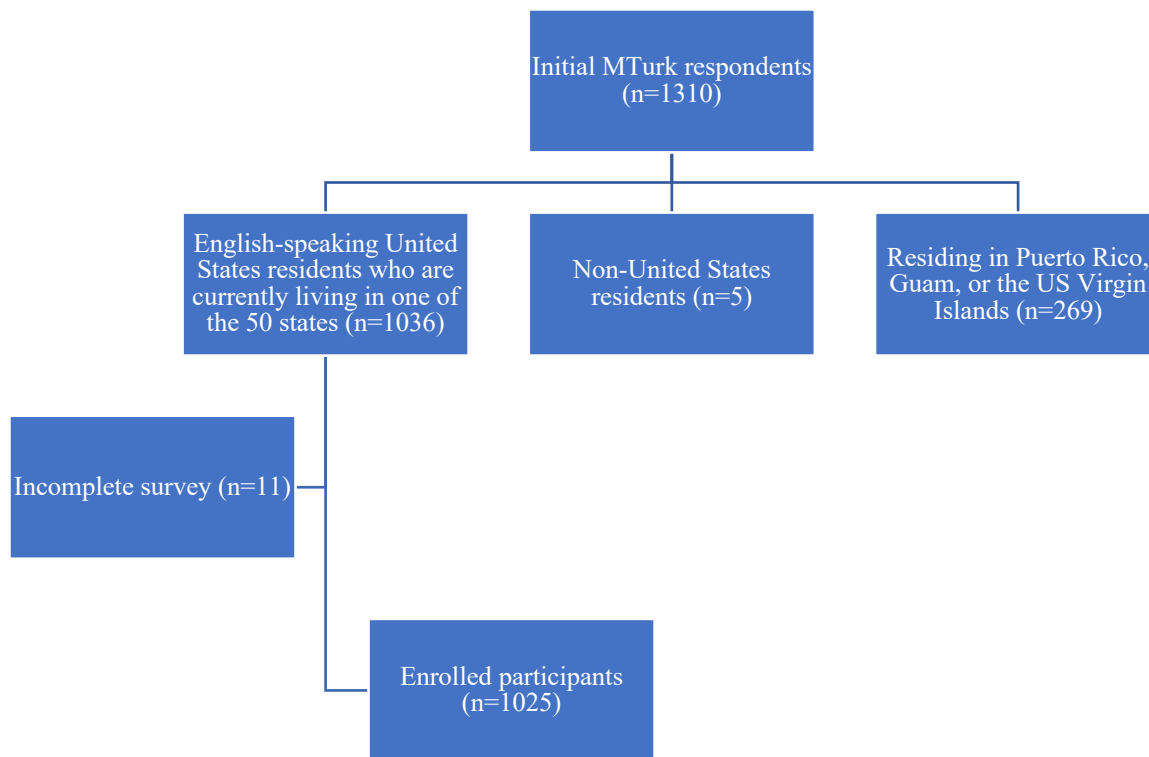
        2016;315(17):1874-1881.

Appendix A: Figures and Tables

Figure 1. Survey respondents

Table 1. Demographic characteristics of study participants

Characteristic	Data
Age, mean (SD)	38.7 (11.4)
Race, % (n)*	
White or Caucasian	78.7 (784)
Black or African American	10.8 (108)
Asian or Asian American	10.4 (104)
American Indian or Alaskan Native	1.7 (17)
Native Hawaiian or other Pacific Islander	0.8 (8)
Other	1.5 (15)
Ethnicity, % (n)	
Hispanic or Latino	14.8 (147)
Not Hispanic or Latino	85.2 (849)
Insurance, % (n)	
Medicare	28.2 (281)
Medicaid	10.9 109)
Private insurance	47.0 (468)
Military health care	2.3 23)
Indian health service	0.8 (8)
None	7.9 (79)
Education, % (n)	
≤ 8th grade	0.0 (0)
Some high school	0.4 (4)
High school diploma or GED	7.3 (73)
Some college or 2-year degree	19.8 (197)
4-year college graduate	55.7 (555)
More than 4-year college degree	16.8 (167)
Employment status, % (n)	
Employed full-time	76.8 (765)
Employed part-time	11.8 (117)
Unemployed	5.4 (54)
Short-term or long-term disability/leave of absence	0.5 (5)
Unpaid work	3.6 (36)
Retired	1.1 (11)
Disabled or health does not permit work	0.8 (8)
Household income, % (n)	
<$15,000	4.5 (45)
$15,000 - $29,999	15.3 (152)
$30,000 - $59,999	40.4 (402)
$60,000 - $100,000	28.6 (285)
>$100,000	11.2 (112)
Neighborhood Deprivation Index, median (IQR)	54.8 (3.0)
Reported having imaging test in last 5 years, % (n)	78.3 (803)

The cumulative percentage is over 100% given some patients have chosen more than one race.

Table 2. Public preferences for OOP cost discussions

Aspect of OOP Discussions	Frequency, % (n)	
Timing of OOP cost discussion	**Ideal time**	**Acceptable time***
On day of doctor visit	38.6 (396)	59.4 (609)
When scheduling test with imaging center	43.4 (445)	73.1 (749)
After scheduling test with imaging center, but before receiving test	10.8 (111)	39.8 (408)
On day of receiving imaging test	5.1 (52)	25.5 (261)
After receipt of imaging test, but before receipt of bill	1.6 (16)	10.3 (106)
After receipt of bill	0.5 (5)	1.9 (19)
Best person to discuss OOP costs with (if discussion is on day of doctor visit)		
Doctor or provider ordering the test	62.2 (638)	
Office personnel (e.g., nurse, social, worker, financial counselor)	37.8 (387)	
Best time to receive OOP costs (if information is communicated before scheduled test)		
At least 2 weeks before	44.2 (453)	
At least 1 week before	38.8 (398)	
At least 2 days before	8.5 (87)	
Any time before	8.5 (87)	
How to receive OOP cost estimate*		
Verbally	43.3 (444)	
Written on paper (handed to patient directly or mailed)	60.9 (662)	
Electronically via secure website personalized to patient	53.0 (543)	
Electronically via text	27.7 (284)	
Electronically via email	44.4 (455)	
Electronically through health system public website	17.7 (181)	
Willingness to pay		
$20	6.3 (65)	
$50	23.7 (243)	
$100	36.7 (376)	
$200	22.7 (233)	
$500	9.1 (93)	
$1000	1.5 (15)	

* The survey allowed participants to select multiple acceptable times for OOP cost discussions and multiple ways in which to receive their OOP cost estimate.

24

Table 3. Individual factors considered in imaging center selection

Most important factor to consider when choosing imaging center	Average rank
Has more than 96% accurate reporting of results	6.0
Recommended by doctor	5.8
Has newest technology	5.6
Offers affordable OOP costs for imaging	4.5
Accreditations/ratings for quality of practice	3.9
Recommended by family/friends	3.6
Online reviews from other patients	3.5
Within reasonable driving distance	3.1

Note: Participants were given 8 choices and asked to rank them based on their preference. Average rank ranges between 1 and 8, with higher scores representing a more preferred option among participants.

Table 4. Cost and quality combinations considered in imaging center selection

Mild back pain	Average rank
Accuracy	
96% accuracy + $400 OOP cost	3.8
87% accuracy + $50 OOP cost	3.7
96% accuracy + unknown OOP cost between $50 and $3,500	3.2
87% accuracy + unknown OOP cost between $50 and $3,500	2.2
Would not get test regardless of accuracy	2.2
Doctor recommendation	
Doctor recommended + $400 OOP cost	3.8
Doctor unfamiliar with center + $50 OOP cost	3.7
Doctor recommended + unknown OOP cost between $50 and $3,500	3.2
Would not get test regardless of doctor recommendation	2.3
Doctor unfamiliar with center + unknown OOP cost between $50 and $3,500	2.0
Online rating	
4.5-star online reviews + $400 OOP cost	3.9
4.5-star online reviews + unknown OOP cost between $50 and $3,500	3.3
2.5-star online reviews + $50 OOP cost	3.2
Would not get test regardless of online reviews	2.4
2.5-star online reviews + unknown OOP cost between $50 and $3,500	2.1
Severe back pain	**Average rank**
Accuracy	
96% accuracy + $400 OOP cost	4.2
96% accuracy + unknown OOP cost between $50 and $3,500	3.6
87% accuracy + $50 OOP cost	3.5
87% accuracy + unknown OOP cost between $50 and $3,500	2.2
Would not get test regardless of accuracy	1.6
Doctor recommendation	
Doctor recommended + $400 OOP cost	4.1
Doctor unfamiliar with center + $50 OOP cost	3.6
Doctor recommended + unknown OOP cost between $50 and $3,500	3.5
Doctor unfamiliar with center + unknown OOP cost between $50 and $3,500	2.2
Would not get test regardless of doctor recommendation	1.6
Online rating	
4.5-star online reviews + $400 OOP cost	4.3
4.5-star online reviews + unknown OOP cost between $50 and $3,500	3.6
2.5-star online reviews + $50 OOP cost	3.3
2.5-star online reviews + unknown OOP cost between $50 and $3,500	2.2
Would not get test regardless of online reviews	1.6

Note: Participants were given 5 choices per combination of cost + quality attribute and asked to rank them based on their preference. Average rank ranges between 1 and 5, with higher scores representing a more preferred option among participants.

Table 5. Ordered logistic regressions for mild and severe back pain

Model	Variable	Mild back pain β (95% CI)	Severe back pain β (95% CI)
Cost vs. accuracy	Unknown cost	Ref	Ref
	$50 cost	1.97 (1.81, 2.13)*	2.07 (1.90, 2.23)*
	$400 cost	0.81 (0.66, 0.96)*	0.99 (0.83, 1.14)*
	87% accuracy	0.33 (0.16, 0.50)*	1.51 (1.34, 1.69)*
	96% accuracy	1.60 (1.43, 1.77)*	3.60 (3.40, 3.79)*
Cost vs. doctor recommendation	Unknown cost	Ref	Ref
	$50 cost	2.15 (1.99, 2.31)*	2.13 (1.96, 2.29)*
	$400 cost	0.77 (0.62, 0.91)*	1.04 (0.88, 1.19)*
	Doctor unfamiliar	-0.06 (-0.23, 0.10)	1.63 (1.45, 1.81)*
	Doctor recommended	1.41 (1.24, 1.58)*	3.55 (3.36, 3.75)*
Cost vs. online rating	Unknown cost	Ref	Ref
	$50 cost	1.49 (1.34, 1.65)*	1.66 (1.50, 1.83)*
	$400 cost	0.82 (0.67, 0.97)*	1.13 (0.97, 1.29)*
	2.5-stars rating	-0.11 (-0.28, 0.06)	1.65 (1.47, 1.83)*
	4.5-stars rating	1.49 (1.32, 1.66)*	3.80 (3.60, 4.00)*

Note: This table includes six different ordered logistic regression models (three per level of back pain – mild or severe). Each model assessed cost versus a different quality metric (accuracy, doctor recommendation, or online rating). A higher coefficient indicates a greater preference for that individual variable. We did not include the "will not get imaging" option in our model. Additionally, coefficients can only be compared within models, not between models. * indicates statistically significant ($p < 0.05$) β-coefficients.

Table 6. Relative importance of cost and quality

Mild back pain			
Model	**Attribute**	**Relative importance (%)**	**Extra cost participants would be willing to pay for higher quality ($)**
Model 1: cost vs. accuracy	Cost	47.7	743.00
	Accuracy	52.3	
Model 2: cost vs. doctor recommendation	Cost	48.4	862.62
	Doctor recommendation	51.6	
Model 3: cost vs. online rating	Cost	29.6	933.35
	Online rating	70.4	
Severe back pain			
Model	**Attribute**	**Relative importance (%)**	**Extra cost participants would be willing to pay for higher quality ($)**
Model 4: cost vs. accuracy	Cost	34.2	1215.47
	Accuracy	65.8	
Model 5: cost vs. doctor recommendation	Cost	36.1	1123.73
	Doctor recommendation	63.9	
Model 6: cost vs. online rating	Cost	20.0	1255.57
	Online rating	80.0	

Note: relative importance was calculated as follows: 100* (difference between coefficients for cost or difference between coefficients for quality) / [(difference between coefficients for cost) + (difference between coefficients for quality metric)] for each model. Financial quantification of higher quality services was calculated as follows: [350 * (difference between coefficients for quality)] / (difference between coefficients for cost) for each model. Quality metrics and levels were accuracy (96% vs. 87%), doctor recommendation (doctor recommended the imaging center vs. doctor was unfamiliar with the imaging center), and online ratings (4.5-stars vs. 2.5-stars).

Appendix B: Consent

Study Title: Public Perceptions and Experience with discussion of out-of-pocket cost of imaging tests

IRB #: STUDY00001776

Principal Investigator: Gelareh Sadigh, MD; Department of Radiology and Imaging Sciences

Introduction and Study Overview
Thank you for your interest in our survey-based research study. We would like to tell you everything you need to think about before you decide whether or not to join the study. It is entirely your choice. If you decide to take part, you can change your mind later on and withdraw from the research study.

The purpose of this study is to evaluate public perceptions and experience with a discussion of out-of-pocket costs of imaging tests. The study's funding for incentives are from Department of Radiology at Emory University. This study will take about 10 minutes to complete.

If you join, you will be asked to complete an online 10-minute survey.

Potential risks include minimal chance of loss of confidentiality. This study is not intended to benefit you directly, but we hope this research will benefit others in the future.

You will be compensated about $1 for your participation in this study through Amazon Mechanical Turk platform.

Contact Information
If you have questions about this study, your part in it, or if you have questions, or concerns about the research you may contact the following:
Gelareh Sadigh, MD, Study Principal Investigator: gsadigh@emory.edu

If you have questions about your rights at research participant, complaints about the research or an issue you rather discuss with someone outside the research team, contact the Emory Institutional Review Board at 404-712-0720 or toll-free at 877-503-9797 or by email at irb@emory.edu.

Appendix C. Survey

1. Are you a United States resident?
   ☐ No → Exclude
   ☐ Yes

2. Are you currently residing in Puerto Rico, Guam, or the U.S. Virgin Islands?
   ☐ No
   ☐ Yes → Exclude

3. Are you 18 years or older?
   ☐ No → Exclude
   ☐ Yes

4. Do you speak English fluently?
   ☐ Yes
   ☐ No → Exclude

The following questions are about your preferences in discussing the out-of-pocket costs **if you need to get an imaging test. Out-of-pocket costs** include your expenses for medical care that are **not** reimbursed by insurance, including deductibles, coinsurance, and copayments for covered services plus all costs for services that are not covered.

5. Please rate your agreement or disagreement with the following statements regarding imaging tests.

	Strongly Disagree	**Disagree**	**Unsure**	**Agree**	**Strongly Agree**
I would like to know about the out-of-pocket costs of my imaging tests before I receive them.	1	2	3	4	5
My doctor/ healthcare provider *should* consider my out-of-pocket costs as he/she makes medical decisions and orders my imaging tests.	1	2	3	4	5

6. Have you ever done an imaging test, such as X-ray, CT scan, MRI, ultrasound, mammography, PET scan, etc. in the last 5 years?
   ☐ Yes
   ☐ No
   ☐ Cannot remember

7. Which of the following would be an **acceptable time** to talk about your out-of-pocket costs for your test? (select all that apply)
   ☐ On the day of my doctor/healthcare provider visit
   ☐ When I am scheduling my test with the imaging center
   ☐ After I schedule my test with the imaging center, but before receiving the test
   ☐ On the day of receiving the imaging test
   ☐ After receipt of the imaging test, but before receipt of the bill
   ☐ I do not want to talk about the costs until I receive the bill

8. Which of the following would be the **best time** to talk about your out-of-pocket costs for your test? (choose only one option)
   ☐ On the day of my doctor visit
   ☐ When I am scheduling my test with the imaging center
   ☐ After I schedule my test with the imaging center, but before receiving the test
   ☐ On the day of receiving the imaging test
   ☐ After receipt of the imaging test, but before receipt of the bill
   ☐ I do not want to talk about the costs until I receive the bill

9. If the out-of-pocket cost for your imaging test is communicated with you on the day of your doctor visit, who would be the **best person** to discuss this information with? (choose only one option)
   ☐ My doctor or provider who is ordering the test
   ☐ Office personnel (e.g., nurse, social workers, financial counselor) after I meet with my doctor

10. If your out-of-pocket cost is communicated with you before your scheduled test, when would be the **best time** to receive this information? (choose only one option)
    ☐ At least 2 weeks before my test
    ☐ At least 1 week before my test
    ☐ At least 2 days before my test
    ☐ Any time before my test

11. How would you like to receive your out-of-pocket estimate (select all that apply)
    ☐ Verbally
    ☐ Written in a paper handed to me or mailed to me

☐ Electronically via a secure website personalized to me (e.g., patient portal)
☐ Electronically via text message
☐ Electronically via email
☐ Electronically through a health system's public website

12. How much would you be willing to pay out-of-pocket for an MRI examination?
    ☐ $20
    ☐ $50
    ☐ $100
    ☐ $200
    ☐ $500
    ☐ $1000

In the next set of questions, we will ask **how you choose an imaging center when you need an imaging test.** Please rank options from best to worst. Rank order 1 = the best option.

13. Please rank from 1 (most important) to 8 (least important) factors you would consider when choosing an imaging center.
    ☐ Has latest version of scanners (MRI, CT, ultrasound, or X-ray machine)
    ☐ Accurately reports imaging test results more than 96% of the time
    ☐ Recommended by my doctor
    ☐ Recommended by my family or friends
    ☐ Has online reviews by other patients (i.e., recommended by others)
    ☐ Has accreditations or ratings for practice quality
    ☐ Is within reasonable driving distance
    ☐ Offers affordable out-of-pocket cost for my imaging test

---

Suppose you are having **back pain** and need to get an MRI of your back. All imaging centers below are **within driving distance**. You have the option of choosing between different imaging centers. Which one would you choose? Please rank the choice you are most likely to choose with 1 and the choice you are least likely to choose with 5.

14. Your back pain is **mild**, you can tolerate it, and it **does not impact your daily activity.**
    ☐ Imaging center that correctly reads the test results more than 96% of the time, and you need to pay $400 out-of-pocket for the test

☐ Imaging center that correctly reads the test results more than 96% of the time, and you don't know your out-of-pocket cost (it likely ranges between $50-$3500)
☐ Imaging center that correctly reads the test results 87% of the time, and you need to pay $50 out-of-pocket for the test
☐ Imaging center that correctly reads the test results 87% of the time, and you don't know your out-of-pocket cost (it likely ranges between $50-$3500)
☐ I will not get my test, as I cannot afford it

15. Your back pain is **mild**, you can tolerate it, and it **does not impact your daily activity.**
☐ Imaging center that your doctor recommended, and you need to pay $400 out-of-pocket for the test
☐ Imaging center that your doctor recommended, and you don't know your out-of-pocket cost (it likely ranges between $50-$3500)
☐ Imaging center that your doctor is not familiar with, and you need to pay $50 out-of-pocket for the test
☐ Imaging center that your doctor is not familiar with, and you don't know your out-of-pocket cost (it likely ranges between $50-$3500)
☐ I will not get my test, as I cannot afford it

16. Your back pain is **mild**, you can tolerate it, and it **does not impact your daily activity.**
☐ Imaging center that has 4.5-star online reviews, and you need to pay $400 out-of-pocket for the test
☐ Imaging center that has 4.5-star online reviews, and you don't know your out-of-pocket cost (it likely ranges between $50-$3500)
☐ Imaging center that has 2.5-star online reviews, and you need to pay $50 out-of-pocket for the test
☐ Imaging center that has 2.5-star online reviews, and you don't know your out-of-pocket cost (it likely ranges between $50-$3500)
☐ I will not get my test, as I cannot afford it

17. Your back pain is **severe** and **is limiting your daily activity.**
☐ Imaging center that correctly reads the test results more than 96% of the time, and you need to pay $400 out-of-pocket for the test
☐ Imaging center that correctly reads the test results more than 96% of the time, and you don't know your out-of-pocket cost (it likely ranges between $50-$3500)
☐ Imaging center that correctly reads the test results 87% of the time, and you need to pay $50 out-of-pocket for the test
☐ Imaging center that correctly reads the test results 87% of the time, and you don't know your out-of-pocket cost (it likely ranges between $50-$3500)
☐ I will not get my test, as I cannot afford it

18. Your back pain is **severe** and **is limiting your daily activity.**
- ☐ Imaging center that your doctor recommended, and you need to pay $400 out-of-pocket for the test
- ☐ Imaging center that your doctor recommended, and you don't know your out-of-pocket cost (it likely ranges between $50-$3500)
- ☐ Imaging center that your doctor is not familiar with, and you need to pay $50 out-of-pocket for the test
- ☐ Imaging center that your doctor is not familiar with, and you don't know your out-of-pocket cost (it likely ranges between $50-$3500)
- ☐ I will not get my test, as I cannot afford it

19. Your back pain is **severe** and **is limiting your daily activity.**
- ☐ Imaging center that has 4.5-star online reviews, and you need to pay $400 out-of-pocket for the test
- ☐ Imaging center that has 4.5-star online reviews, and you don't know your out-of-pocket cost (it likely ranges between $50-$3500)
- ☐ Imaging center that has 2.5-star online reviews, and you need to pay $50 out-of-pocket for the test
- ☐ Imaging center that has 2.5-star online reviews, and you don't know your out-of-pocket cost (it likely ranges between $50-$3500)
- ☐ I will not get my test, as I cannot afford it

Demographics: This set of questions is about your general background. Please read each question and then select the response that best fits your answer. All of the information that you provide is confidential and your responses will not be linked to your name.

20. What is your age (in years)? _____

21. Are you of Hispanic, Latino, or Spanish origin or descent?
- ☐ Yes
- ☐ No
- ☐ Prefer not to say

22. What is your race? Select all that apply.
- ☐ White or Caucasian
- ☐ Black or African American
- ☐ Asian or Asian American
- ☐ American Indian or Alaskan Native
- ☐ Native Hawaiian or other Pacific Islander

☐ Other
☐ Prefer not to say

23. What is your **primary** health insurance provider?
☐ Medicare
☐ Medicaid
☐ Private insurance
☐ Military health care (TRICARE/VA/CHAMP-VA)
☐ Indian health service
☐ I don't have any health insurance
☐ Prefer not to say

24. Do you have a high deductible health plan? A high deductible health plan is any plan where you pay all of the health care costs yourself until you reach your deductible, after which the insurance company starts to pay its share. The deductible is at least $1,350 for an individual or $2,700 for a family.
☐ Yes
☐ No
☐ Not sure
☐ Prefer not to say

25. What is the highest grade or level of school that you have completed?
☐ 8th grade or less
☐ Some high school, but did not graduate
☐ High school graduate or GED
☐ Some college or 2-year degree
☐ 4-year college graduate
☐ More than a 4-year college degree

26. What is your current marital/relationship status?
☐ Single or never married
☐ Married
☐ Living with a partner in a committed relationship
☐ Separated
☐ Divorced
☐ Widowed
☐ Prefer not to answer

27. How would you describe your **current** employment status?
☐ I am employed for pay full-time (35+ hours per week)
☐ I am employed for pay part-time (1-34 hours per week)
☐ I am unemployed

☐ I am on short-term or long-term disability/leave of absence
☐ I am not employed for pay, but do unpaid work (e.g., student, homemaker, or volunteer)
☐ I am retired
☐ I am disabled or my health does not permit me to do paid or unpaid work at this time

28. Using the categories below, please indicate the annual income of your household. Include yourself and anyone you live with and share finances with.
☐ Less than $15,000
☐ $15,000-$29,999
☐ $30,000-$59,999
☐ $60,000-$100,000
☐ More than $100,000

29. How many people live in your household, including yourself? _____

30. In what ZIP code is your home located? Enter a 5-digit ZIP code) _____