

# Effect of a High-Deductible Health Plan on Patients' Willingness to Undergo Indicated Breast Imaging

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Screening mammography reduces the mortality rate from breast cancer by means of early detection (1). To encourage increased use of screening mammography, the Affordable Care Act (ACA) in 2011 mandated most private health insurance plans, Medicaid, and Medicare to cover this examination for women aged 40–75 years at no cost to the consumer (2). This change was based on a study that found that even a nominal copayment can deter patients from regularly attending screening mammography (3).

The ACA reduced out-of-pocket (OOP) costs, with one study finding an increase in women without OOP costs from 81.9% in 2009 to 96.8% in 2017 after ACA enactment (4). Even widespread adoption of digital breast tomosynthesis, which is not covered under the ACA, had no effect on patient OOP costs (5). However, a deductible or copayment remains for recommended diagnostic follow-up tests to evaluate an abnormal finding at screening mammography, especially for patients with high-deductible health plans (HDHPs) (4,6). In one study, more than 60% of women with follow-up examinations made OOP payments, which were associated with lower compliance for subsequent screening examinations when compared with women without OOP payment (2). Furthermore, Lowry et al (6) found that OOP costs for diagnostic breast imaging are becoming more common and more expensive as the number of people with HDHPs steadily increases.

Given the high percentage of people with OOP payments for diagnostic imaging, we hypothesized that cost may drive nonadherence to follow-up imaging in patients with HDHPs. We expected OOP costs would disincentivize patients from participating in diagnostic breast imaging and possibly even screening examinations, despite the latter being free of OOP expense. We investigated the relationship between the insurance type and patients' willingness to undergo indicated breast imaging by conducting a cross-sectional survey at an urban academic medical center, the largest safety net hospital in New England. Our primary outcome was the percentage of people who would hypothetically skip diagnostic imaging if OOP expenses existed. The secondary outcome was the differences in responses between various sociodemographic groups.

## Study Design and Findings

After institutional review board approval, we provided a paper survey in English or Spanish to all 6110 patients presenting for breast imaging at the medical center from

September 2021 to February 2022. The survey consisted of demographic questions (age, race or ethnicity, education level, annual household income, insurance payor), deductible or copayment status, and scenarios about the use of breast imaging, with a five-point Likert scale used to measure agreement. The survey included a paragraph before the scenario questions that provided context for the possible cost of diagnostic imaging (Appendix S1). A total of 932 patients participated in the study by returning the survey to the reception desk or designated bins. Only 10 surveys in Spanish were returned. Of the 932 patients, 88 were excluded for missing responses to all sociodemographic factors. For the patients who disclosed age, race or ethnicity, education, or insurance, the  $\chi^2$  test (or Fisher exact test when appropriate) was used to assess differences in responses to the scenario questions by demographic factors. We grouped Medicaid and no insurance together because this study was performed in a state where patients with no insurance qualify for the state's Medicaid program. With use of PROC SURVEYIMPUTE in SAS 9.4 software (SAS Institute), an analysis with imputation was also performed to account for the missing responses. We considered  $P < .05$  to indicate statistically significant difference in all analyses.

Of 844 patients, 714 responded to the hypothetical statement, "If I knew that I had to pay a deductible for the additional imaging [to make sure my screening mammogram is normal], I would skip this additional imaging." A total of 21.1% (151 patients) agreed they would skip imaging, 59.4% (424 patients) disagreed, and 19.5% (139 patients) were undecided, with responses dependent on race or ethnicity, education level, annual household income, and insurance payor ( $P = .003$ ,  $P = .001$ ,  $P < .001$ , and  $P < .001$ , respectively, with  $P$  values for the imputed analysis of .004,  $< .001$ ,  $< .001$ , and  $< .001$ , respectively). The groups with the highest percentage of patients who would skip additional imaging were those identifying as Hispanic (33.0% [30 of 91 patients]), those who were high school-educated or less (31.0% [48 of 155 patients]), those with an annual household income of less than \$35 000 (27.0% [50 of 185 patients]), and those with Medicaid or no insurance (31.5% [68 of 216 patients]). Patients with insurance from their employer were the least likely to agree to skip imaging (10.8% [35 of 324 patients]). Not all 714 respondents disclosed race or ethnicity, education level, annual household income, and insurance payor (Table, Figure).

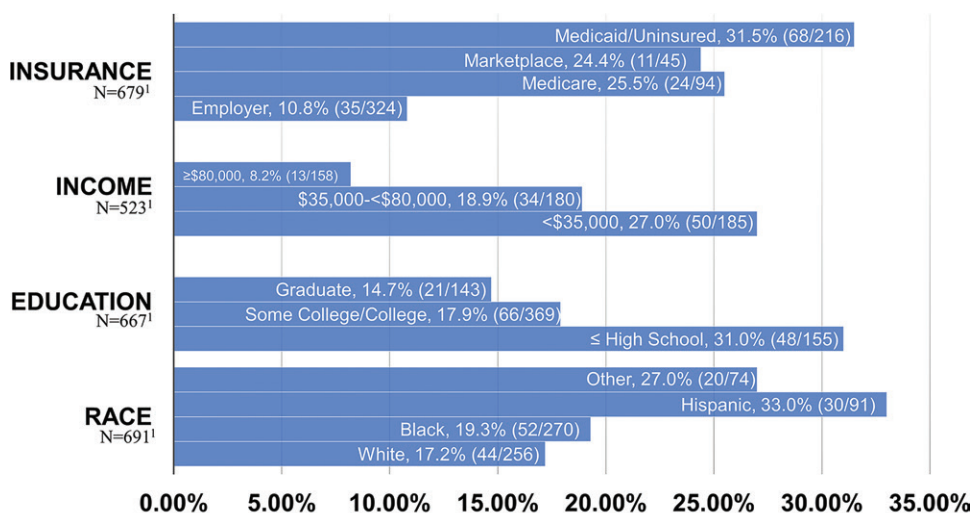
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Supplemental material is available for this article.

Only 707 patients responded to the hypothetical statement, "If I knew that I had to pay a deductible for follow-up tests, such as imaging or biopsy, after screening mammogram, I would not

undergo screening for breast cancer." A total of 18.2% (129 patients) agreed that they would skip screening mammography if they knew that they had to pay a deductible for follow-up tests (imaging or biopsy), while 65.8% (465 patients) disagreed and 16.0% (113 patients) were undecided, with responses dependent on race or ethnicity, education level, annual household income, and insurance payor ( $P = .004$ ,  $P < .001$ ,  $P < .001$ , and  $P < .001$ , respectively, with  $P$  values for the imputed analysis of .005,  $< .001$ ,  $< .001$ , and  $< .001$ , respectively).



<sup>1</sup> Of the 714 respondents to this hypothetical scenario, some patients did not disclose their race (23), education (47), income (191), or insurance payor (35). These patients were not included in the chi-square analysis.

Bar graph shows the percentage of women who agreed with the statement "If I knew that I had to pay a deductible for the additional imaging, I would skip this additional imaging" by insurance payor ( $P < .001$ ), annual household income ( $P < .001$ ), education ( $P = .001$ ), and race or ethnicity ( $P = .003$ ).

Of the patients who provided demographic information, the groups most likely to skip screening mammography were those who self-reported as other race or ethnicity (26.4% [19 of 72 patients]), those who were high school-educated or less (27.1% [42 of 155 patients]), those with an annual household income of

#### Responses to "If I Knew That I Had to Pay a Deductible for the Additional Imaging, I Would Skip This Additional Imaging" by Race or Ethnicity, Education, Income, and Insurance Payor

Characteristic	Agree (Would Skip Imaging)	Disagree	Undecided	Total	<i>P</i> Value
Race or ethnicity					.003
Black	19.3 (52)	58.5 (158)	22.2 (60)	270	
Hispanic	33.0 (30)	46.2 (42)	20.9 (19)	91	
Other race or ethnicity	27.0 (20)	51.4 (38)	21.6 (16)	74	
White	17.2 (44)	67.6 (173)	15.2 (39)	256	
Total				691*	
Education					.001
High school or less	31.0 (48)	47.7 (74)	21.3 (33)	155	
College or some college	17.9 (66)	62.3 (230)	19.8 (73)	369	
Graduate school	14.7 (21)	69.9 (100)	15.4 (22)	143	
Total				667*	
Annual household income					<.001
Less than \$35 000	27.0 (50)	44.9 (83)	28.1 (52)	185	
\$35 000 up to \$80 000	18.9 (34)	59.4 (107)	21.7 (39)	180	
\$80 000 or higher	8.2 (13)	86.7 (137)	5.1 (8)	158	
Total				523*	
Insurance payor					<.001
Employer	10.8 (35)	73.5 (238)	15.7 (51)	324	
Medicare	25.5 (24)	56.4 (53)	18.1 (17)	94	
Marketplace	24.4 (11)	62.2 (28)	13.3 (6)	45	
Medicaid or no insurance	31.5 (68)	42.6 (92)	25.9 (56)	216	
Total				679*	

Note.—Unless otherwise specified, data are percentages of patients, with numbers of patients in parentheses.

\* Of the 714 respondents to this hypothetical scenario, some patients did not disclose their race or ethnicity ( $n = 23$ ), education ( $n = 47$ ), income ( $n = 191$ ), or insurance payor ( $n = 35$ ). These patients were not included in the  $\chi^2$  analysis.

less than \$35 000 (23.6% [43 of 182 patients]), and those with Medicaid or no insurance (28.0% [60 of 214 patients]).

## Discussion

We found that a deductible for diagnostic imaging generated from an abnormal screening examination may discourage 21.1% of women (151 of 714) from returning for recommended diagnostic imaging, with 18.2% (129 of 707) reporting that they would skip screening altogether. This result is consistent with another study in New York City, which found that 19.9% of its sample did not return for additional imaging after an abnormal screening mammogram (7). Having a fifth of patients with abnormal screening mammography results consider forgoing or postponing indicated diagnostic imaging is concerning. Such behaviors may lead to delays in breast cancer diagnosis and treatment, which have been associated with adverse outcomes, such as more advanced stage at diagnosis and lower survival rates (8).

According to a recent study, 78.7% of a safety net sample screened positive for at least one social determinant of health, which resulted in a longer lapse between diagnostic imaging and biopsy (9). Given that our study sample largely consisted of patients already at risk for delay in breast care, the high percentage of respondents who may delay indicated breast imaging due to OOP costs highlights the concern that these payments only exacerbate existing gaps in breast cancer outcomes for patients with food insecurity, housing insecurity, lack of reliable transportation, and other social factors that may influence health outcomes.

In addition, our study found that patients who may delay their breast imaging care due to OOP costs disproportionately come from groups known to have lower adherence to preventative services, which at least partially contributes to the existing disparities in breast cancer outcomes. These groups include patients identifying as members of racial minority groups and those in a lower income bracket, with a lower education level, or with Medicaid or no insurance. Specifically, Black women or those living in neighborhoods with 20%–100% of residents below the federal poverty level have longer delays between screening and diagnostic examinations. Consequently, these women often experience increased breast cancer mortality as compared with White women or those from wealthier neighborhoods (8). Based on our results, financial costs of diagnostic imaging may account for at least part of the delay in seeking care.

Before the ACA, gaps existed in screening mammography rates between the highest and lowest quartile for education and income (10). When OOP expenditures for preventative services, such as screening mammography, were eliminated by the adoption of the ACA, the gaps in screening mammography rates between those two quartiles decreased and overall screening rates increased (10). Ideally, removing deductibles for diagnostic imaging, especially imaging indicated after an abnormal screening examination, would produce a similar effect and further decrease the existing disparity by increasing overall compliance with screening mammography and downstream diagnostic imaging.

Our study had several limitations. First, the findings are theoretical, as the patients reported how they believe they would respond rather than recording actual behavior. Additionally, there were missing responses from a substantial number of respondents

for some of the questions, which may affect the reliability of the findings. However, given the similarity between the imputed and nonimputed analyses, the results are more likely to represent the current impact of financial barriers faced by patients eligible for screening mammography. Whether patients with a HDHP or OOP costs have a higher noncompliance with indicated diagnostic imaging was not assessed but is worth further study, given that 18% reported that they would skip screening when presented with that theoretical scenario. Such a prospective study could also address other potential effects, such as delay in treatment between women with substantial OOP costs versus those without such costs.

Advocating for legislation and policies to address financial barriers, such as abolishing OOP expenditures for screening and diagnostic imaging, may mitigate existing health care disparities. Seven states (New York, Connecticut, Illinois, Georgia, Texas, Louisiana, and Colorado) have already passed bills covering diagnostic imaging without any copayment or other OOP expenses. We hope our findings will encourage the remaining 43 states to pass similar legislation, as such action would likely alleviate existing health care disparities and improve breast cancer outcomes for all women, especially those who face financial barriers to indicated health care.

**Data sharing:** Data generated or analyzed during the study are available from the corresponding author by request.

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