American Cancer Society Cancer Action Network℠

Out of Pocket Costs for Follow-Up Tests After Abnormal Screening Mammogram and Their Impact on Breast Cancer Survival

Executive Summary

Breast cancer is the second most common cancer amongst women in the United States with 287,850 new cases reported nationwide in 2022.[1, 2] In 2024, an estimated 42,250 patients will die from breast cancer.[3] In an effort to reduce the prevalence of breast cancer, multiple guideline-recommending bodies, including the U.S. Preventive Services Task Force (USPSTF)[4] and the American Cancer Society[5] recommend routine screening mammograms to detect breast cancer early. If a patient receives an abnormal result from a mammogram, follow-up diagnostic testing (i.e., MRI, ultrasound, biopsy) is needed to verify whether the abnormal finding is cancerous or not. The good news for patients is that the Affordable Care Act (ACA) mandated zero-dollar, out-of-pocket cost sharing for screening mammograms.[6] However, follow-up diagnostic services after an abnormal mammogram are not always fully covered by insurance and often result in out-of-pocket cost sharing for patients.

The American Cancer Society Cancer Action Network (ACS CAN) partnered with FTI Consulting to perform an economic analysis estimating the impact of cost sharing on follow-up breast cancer imaging and diagnostic testing after a screening mammogram. In addition, we used a simulation modeling approach to examine how out-of-pocket costs impact patients' timely access to follow-up breast cancer diagnostic testing and treatment.

Our study shows that 70.4% of insured patients had to pay out-of-pocket costs for follow-up breast cancer diagnostic tests in 2023. Patients who enrolled in a high-deductible plan had the highest out-of-pocket costs. The data also noted a geographic variation with the lowest out-of-pocket costs for those residing in the eastern U.S.

Eliminating cost sharing for diagnostic testing following a mammogram would not only reduce costs to patients but also would improve health outcomes. Our analysis found that out-of-pocket cost sharing is estimated to result in 1.1 million women delaying necessary breast cancer diagnostic testing and imaging in 2024 due to affordability issues. Just as alarming, out-of-pocket costs appear to have an impact on future screening. Approximately 378,000 more women are likely to skip future mammograms in 2024 due to fear of subsequent out-of-pocket cost sharing from follow-up diagnostic tests. This study estimated that eliminating patient cost-sharing would lead to 7,568 fewer patients diagnosed with later-stage (i.e., regional or distant) breast cancer. Moreover, diagnosing breast cancer earlier would save $11,434 per patient diagnosed with breast cancer and more than $2 billion across all patients over their lifetime.

To reduce the financial burden on patients, increase rates of early cancer detection, and reduce lifetime cancer treatment costs on a societal level, policymakers and payers should work together on expanding women's access to all breast cancer diagnostic testing services following an abnormal screening mammogram.

Introduction

Breast cancer is the leading cause of mortality amongst women in the United States. In 2024, there will be approximately 310,720 newly diagnosed cases in the U.S. and 42,250 breast cancer deaths in women.[3] However, with the advances in early detection approaches and treatments, breast cancer survival rates have improved significantly in the past decades. The 10-year survival rate has increased from 81.5% in 2010 to 85.3% in 2022.[7] The 5-year survival rate for patients with localized and regionalized breast cancer reached 99.6% and 86% in 2021, respectively.[7] Part of the reason for the improved survival is not only improved treatment options but also regular screening. The U.S. Preventive Services Task Force (USPSTF) strongly recommends women aged 40 to 74 years old receive screening mammograms every other year,[4] which has led to the early detection of breast cancer and has reduced the related mortality rate by 40% among women over 40 years of age.[8] Given the benefits of preventive screenings, all ACA-compliant private insurance plans provide coverage for a range of screening and early detection services, including screening mammography with no patient cost sharing.

Although screening mammograms are free to most insured women starting at age 40, any follow-up care or testing, diagnostic services, and treatment costs result in varied out-of-pocket cost sharing for patients. After an abnormal mammogram, follow-up testing—such as diagnostic mammograms, ultrasounds, MRIs, and biopsies—helps examine areas of concern. Diagnostic imaging further investigates suspicious areas, while a biopsy is used if cancer is suspected.[9] While some states have adopted legislation eliminating out-of-pocket costs for post-mammogram diagnostic testing, for patients living in other states and those enrolled in non-state-regulated health plans, out-of-pocket costs for follow-up tests can be significant.

The objective of this study was to answer three key research questions. First, the study assessed the typical out-of-pocket costs associated with having breast cancer diagnosed. Second, the study identified the characteristics of patients likely to have high costs for diagnosis. Third, the study examined the impact of out-of-pocket costs on breast cancer stage at diagnosis and subsequent treatment costs.

Methodology

The study used Truven MarketScan health insurance claims data from 2018 through 2019 and from 2022 through June 2023. Truven MarketScan data is a large healthcare database that provides detailed information on healthcare claims, including inpatient and outpatient services, prescription claims, clinical utilization records, and medical expenditures, aggregating data from employers, Medicare, and Medicaid.[10] This study is restricted to outpatient claims, given that follow-up diagnostics are generally performed in outpatient facilities. Specifically, data from 2018 to 2019 were used exclusively to quantify the impact of out-of-pocket costs on patients' stage of diagnosis and treatment costs, given that a 12-month follow-up period after initial screening mammogram was needed. Data from 2020 and 2021 were excluded to avoid abnormal screening, diagnosis, and treatment patterns caused by the COVID-19 pandemic.

The study adopted a five-step methodology to measure out-of-pocket costs for post-mammography diagnostic testing. First, women aged ≥40 years old who received an initial screening mammogram during the study period were identified as the eligible population. Patients with a previous breast cancer diagnosis prior to their mammogram were excluded from the study. Second, the study identified the

types of follow-up breast cancer diagnostic tests (i.e., diagnostic screening, biopsy) received by patients after a mammogram (Appendix, Table 1). CPT codes for screening mammogram and follow-up diagnostic tests are shown in Appendix, Table 2. Third, the study estimated the out-of-pocket costs for these follow-up diagnostic tests in terms of two measures: 1) the dollar amount of out-of-pocket costs paid by patients and 2) the proportion of out-of-pocket costs within the total cost. The out-of-pocket cost was calculated as the sum of any patient deductibles, copayments, and coinsurance related to post-mammogram diagnostic tests. Moreover, the study examined the out-of-pocket costs by type of health plan that patients were enrolled in and the patient's state of residence.

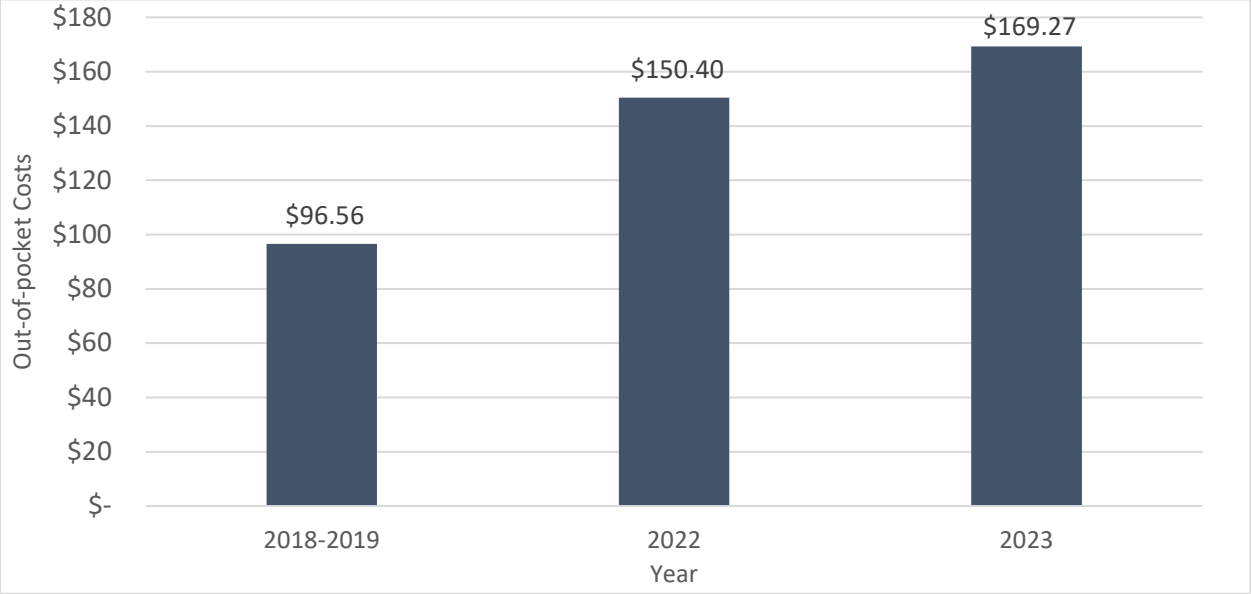
The study combined data from existing research with the results from FTI's out-of-pocket cost analysis to evaluate the impact of out-of-pocket cost sharing on patients' stage of breast cancer diagnosis and treatment costs. Our research and analysis focused on the impact of cost sharing on the following: 1) delays in follow-up testing, 2) the likelihood patients skip screening mammograms in subsequent years, 3) the patient's breast cancer diagnosis stage and 4) the patient's lifetime breast cancer-attributable costs. A four-step methodology was used to measure these outcomes. First, delays in follow-up testing were determined by establishing an association between out-of-pocket costs and delays in follow-up using evidence from Ngo et al. (2023)[11] and the California Health Benefits Review Program (CHBRP)(2022).[12] The cumulative monthly probabilities of receiving follow-up tests between patients with out-of-pocket cost sharing compared to those without any cost sharing were modeled to estimate the magnitude of the delay associated with out-of-pocket costs. Second, the study used evidence from Tran et al. (2022)[13] to estimate the number of women who would not go through a subsequent screening mammogram due to out-of-pocket costs in follow-up tests in the prior year. Third, the breast cancer stage distribution at diagnosis between patients with out-of-pocket cost sharing and those without were quantified using the combination of results from prior steps and evidence from Rutter et al. (2018).[14] Moreover, breast cancer-attributable lifetime medical costs between the group with out-of-pocket cost sharing and those with zero dollar out-of-pocket costs were estimated using the cancer stage distribution and the lifetime cancer-attributable costs from the literature (Appendix, Table 3).[15-17] Additional detailed descriptions of the methodology are presented in the Appendix.

Results

The typical patient in 2023 paid $169.27 for the follow-up testing, and the number of patients facing out-of-pocket cost sharing for follow-up tests and imaging rose by 8% between 2018 and 2023.

Among non-Medicare private market patients who received diagnostic mammogram, ultrasound, biopsy or MRI, the average out-of-pocket costs for follow-up breast cancer diagnostic tests increased from $96.56 to $169.27 from 2018 to June 2023 (Figure 1). The study also examined the average out-of-pocket costs across all follow-up tests, which had increased from $96.19 to $168.37 during the study period. Similarly, the patient population facing out-of-pocket costs for follow-up diagnostic tests increased by 8.2 percentage points between 2018 to 2023 (2018: 62.2%, 2022: 70.2%, 2023: 70.4%).

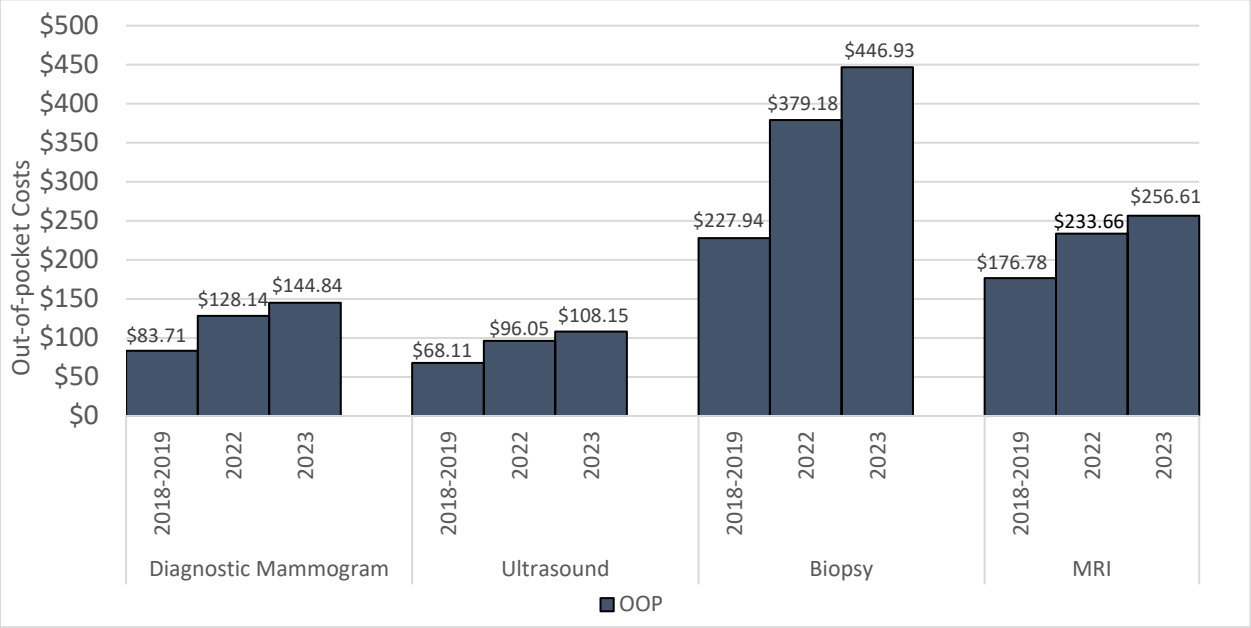
Figure 1. Average Out-of-pocket Costs by Year, 2018 – 2023



Note: The average out-of-pocket cost is the average across diagnostic mammogram, ultrasound, biopsy and MRI. Medicare patients were not included in this analysis.

Out-of-pocket costs for four main follow-up tests increased between 2018 and June 2023. Biopsy had the highest increase in out-of-pocket costs of 96% (from $227.94 to $446.93), followed by 73% for diagnostic mammogram, 59% for ultrasound, and 45% for MRI (Figure 2). As the most common procedures, the average proportion of out-of-pocket costs on total payments of diagnostic mammograms and ultrasounds increased by 10 (from 27% to 37%) and 14 percentage points (from 27% to 41%) respectively, between 2018 and June 2023. Out-of-pocket costs for biopsy and MRI increased by six (from 18% to 23%) and five (from 17% to 22%) percentage points between 2018 and June 2023, respectively. Additional details on out-of-pocket costs of other follow-up tests are available in Appendix, Figure 1.

Figure 2. Out-of-pocket Costs by Main Follow-up Tests and Year, 2018 – 2023

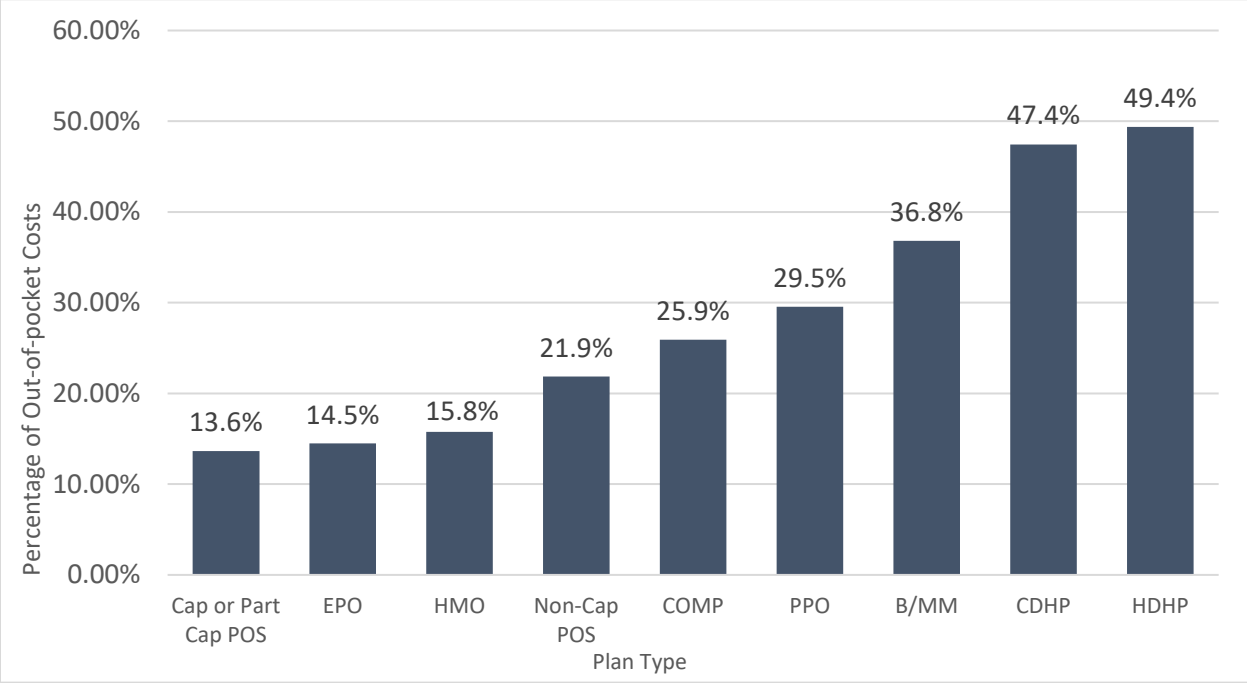


Note: Medicare patients were not included in this analysis.

Patients enrolled in a high-deductible plan have higher out-of-pocket costs than others.

Patients enrolled in high-deductible health plans had the highest overall out-of-pocket cost sharing for breast cancer diagnostic testing costs compared to other types of plans. Specifically, out-of-pocket costs—measured as a share of total cost—across plan types were highest for high-deductible plans (49.4%), followed by consumer-driven health plans (47.4%) (Figure 3).

Figure 3. Average Percentage of Out-of-Pocket Costs as a Share of Total Payment Across Plan Types, 2018 –2023



Source: Truven MarketScan Data, 2018-2023
Note: Abbreviation: B/MM: Basic/Major Medical Plan; COMP: Comprehensive Plan; EPO: Exclusive Provider Organization Plan; Non-Cap POS: Non-Capitated (Non-Cap) Point-of-Service Plan; PPO: Preferred Provider Organization Plan; Cap or Part Cap POS: Capitated (Cap) or Partially Capitated (Part Cap) Point-of-Service Plan; CDHP: Consumer-Driven Health Plan; HDHP: High-Deductible Health Plan. Medicare patients were not included in this analysis.

Share of out-of-pocket costs varied nationally, with those residing in the eastern U.S. having the lowest share.

The average share of out-of-pocket costs across procedures varied across states, with North Dakota having the highest average share of out-of-pocket costs (51.8%). States in the eastern U.S., such as Delaware (9.0%) and New York (12.9%), had the lowest share of out-of-pocket costs (Table 1). A full list of each state's average share of out-of-pocket costs is shown in Appendix, Table 4.

Table 1. Top Five (and Bottom Five) States with Highest (Lowest) Average Share of Out-of-pocket Cost Sharing of Total Payment Across Procedures, 2018 – 2023

State	Average % Out-of-pocket Costs
Top Five States	
North Dakota	51.8%
South Dakota	48.6%
Georgia	45.4%
Kentucky	45.2%
Idaho	43.7%
Bottom Five States	

Delaware	9.0%
New York	12.9%
Washington, DC	16.2%
Massachusetts	19.9%
Alabama	21.4%

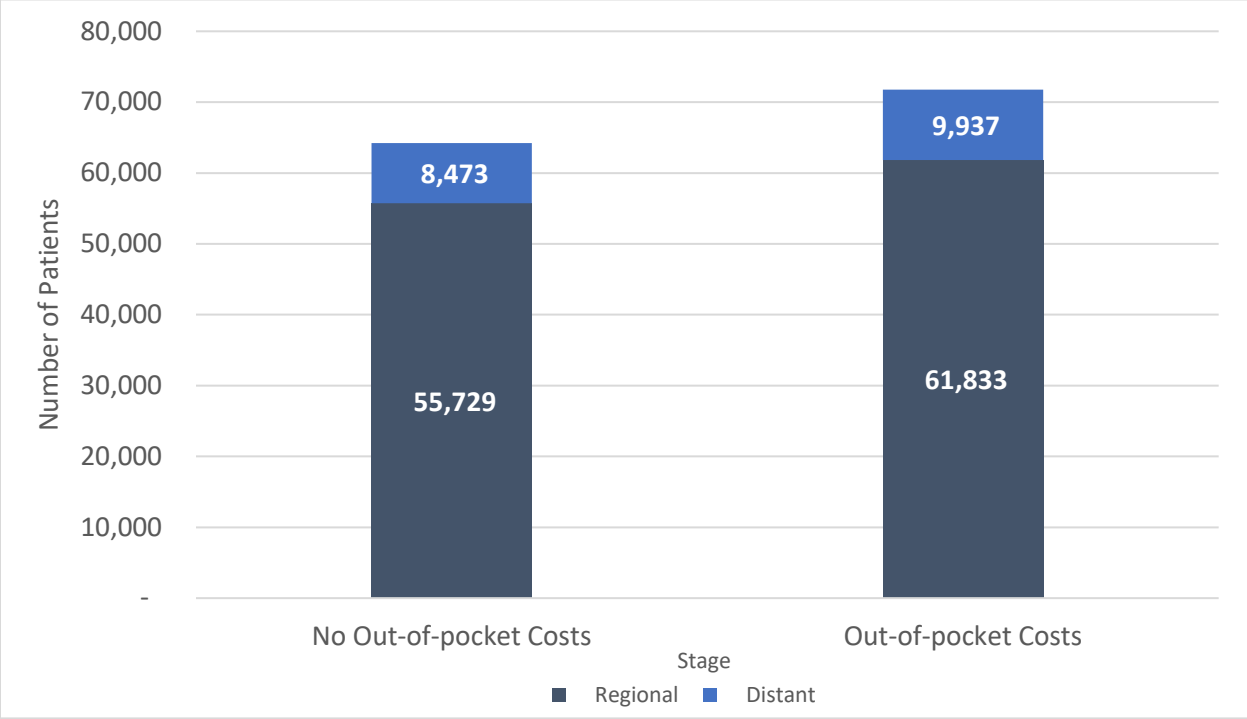
Note: Medicare patients were not included in this analysis.

Eliminating patient costs for breast cancer diagnostic testing would lead to 7,568 fewer people diagnosed with late-stage (i.e., regional or distant) breast cancer each year.

Patients whose health plan did not fully cover all follow-up diagnostic testing were more likely to experience delays in receiving these tests. Specifically, patients with no out-of-pocket cost sharing for post-mammogram diagnostic testing were 17.1% more likely to receive a follow-up diagnostic test within 14 days after the initial screening mammogram (Appendix, Figure 2). Similarly, patients with zero out-of-pocket cost sharing were 10.3% more likely to access follow-up diagnostic testing within a year after the initial screening mammogram. Applying these findings to the full U.S. population, an estimated 1.1 million women will delay necessary follow-up tests due to the out-of-pocket cost sharing associated with follow-up diagnostic testing (Appendix, Table 5). Not only does the presence of out-of-pocket cost sharing decrease the likelihood that patients will access diagnostic tests in a timely manner, but it may also impact their decision to undergo a subsequent screening mammogram in the future. Approximately 378,000 more women are likely to skip future mammograms (in 2024) due to fear of subsequent out-of-pocket cost sharing from follow-up diagnostic tests (Appendix, Table 6).

Delays in diagnostic testing and the reduced rates of future screening mammograms, will result in higher cost sharing for post-mammogram diagnostic testing and later state cancer diagnoses. Our simulation model estimates that over 190,000 breast cancer cases will be diagnosed among patients aged between 40 and 75 with out-of-pocket cost sharing for follow-up tests. Under the current insurance coverage scenario, 71,770 of 190,294 (37.7%) patients with out-of-pocket cost sharing will be diagnosed at late stage (i.e. regional, distant), while only 64,202 (33.7%) patients with zero out-of-pocket costs will have later-stage diagnosis (Figure 4, Appendix, Table 7).

Figure 4. Stage Distribution of Cancer Cases (No Out-of-pocket Costs vs Out-of-pocket Costs)

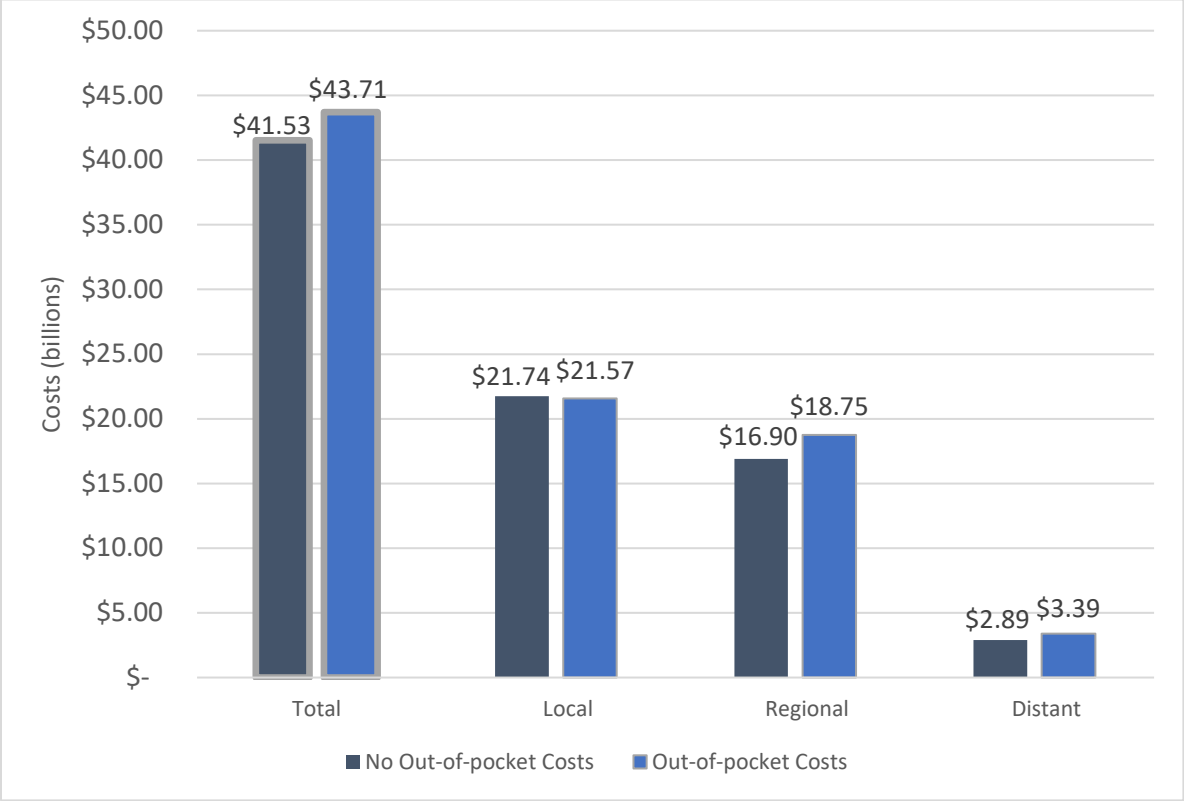


Note: Medicare patients were not included in this analysis.

Eliminating patient's cost burden for diagnostic testing following an abnormal screening mammogram would save the U.S. $2.2 billion per year.

While eliminating out-of-pocket cost sharing for follow-up tests may result in short-term costs for payers, the long-term impact of removing out-of-pocket cost sharing for diagnostic testing following an abnormal screening will be substantial. The simulation model incorporated the all-payer breast cancer-attributable lifetime medical costs per person for different breast cancer stages, with $231,363 for local stage, $303,172 for regional stage, and $341,521 for distant stage (Appendix, Table 3).[15-17] The model estimates that removing out-of-pocket cost sharing for follow-up tests will save nearly $12,000 of lifetime cancer treatment costs per diagnosed patient ($11,434.62) from diagnosis through survivorship, leading to $2.2 billion in savings in total lifetime cancer treatment costs nationwide. This cost savings occurs because early-stage (i.e., localized) breast cancer is less expensive to treat than later-stage (i.e., regional or distant) forms of breast cancer. Early-stage breast cancer can often be treated at relatively low cost using surgical resection and radiation. In contrast, metastatic breast cancer requires ongoing systemic treatments, such as chemotherapy, targeted therapies and immunotherapies, along with management of complications. This results in increased hospitalizations, emergency department visits, and significantly higher and sustained costs.

Figure 5. Lifetime Cancer Treatment Costs by Stage (No Out-of-pocket Costs vs Out-of-pocket Costs)



Note: Medicare patients were not included in this analysis.

Discussion

This study found that many patients face substantial out-of-pocket cost sharing for diagnostic testing and imaging following an abnormal screening mammogram. Due to these costs, many patients delay receiving follow-up diagnostic tests (and future mammograms), resulting in later-stage cancer diagnoses and higher healthcare costs. More than 70% of women in the U.S. face cost barriers to accessing follow-up breast cancer diagnostic tests and the typical patient had to pay approximately $170 in out-of-pocket costs. Specifically, patients who enrolled in high-deductible plans or reside outside of the eastern U.S. are subject to higher financial burdens compared with their counterparts. Patients facing out-of-pocket cost sharing are more likely to experience a delay in follow-up tests and subsequent screening mammograms. More specifically, patients with out-of-pocket costs were less likely to complete the follow-up tests within a year after the initial screening and more likely to skip the future screening mammogram, leading to the later-stage diagnosis.

While federal law requires all ACA-compliant private insurance plans to cover USPSTF recommended screening mammograms for women starting at age 40, the majority of women at average risk face cost burdens to receiving timely follow-up tests, resulting in later-stage cancer diagnoses. It is estimated that in 2024, over 1 million women aged 40 to 75 will experience a delay in follow-up testing and imaging due to out-of-pocket cost sharing. Patients enrolled in high-deductible plans face the highest out-of-pocket cost sharing and are more likely to skip follow-up tests after an abnormal screening.[18] Given the increasing number of patients enrolling in high-deductible health plans,[11] it is expected that the number of patients facing financial barriers to follow-up tests will also increase in the future.

Although not the focus of this research, it is important to consider race and income disparities as significant factors contributing to delays in timely receipt of follow-up diagnostic testing and imaging for countless women in the U.S. Not only have disparities resulted in delays in follow-up testing, but they have also contributed to later stage cancer diagnoses and higher mortality rates. Black women, who have the highest breast cancer mortality rate among all races, were more likely to have delays in diagnostic follow-up tests compared with white women.[19] Women with lower education levels or lower household incomes were at higher risk of breast cancer death.[20]

Despite the wealth of evidence supporting breast cancer screening tests and imaging, the full benefit of screening has not been achieved because barriers, like cost, still exist. Out-of-pocket cost sharing is a significant barrier for individuals who need access to the full continuum of early detection services – especially for women with limited incomes, for whom even minimal cost sharing will represent a significant percentage of their income. Early detection of breast cancer through screening, follow-up testing, and imaging can improve survival and reduce mortality by detecting cancer at an earlier stage when treatment is more effective and less costly. Removing cost barriers to follow-up diagnostic care will also help reduce patient out-of-pocket spending and healthcare expenditures in the U.S.

Policymakers and payers should be aware that cancer screening is a continuum of testing and recognize that removing cost barriers to screening and diagnostic care will directly improve patient health outcomes and reduce healthcare spending for late-stage cancer diagnoses. Eliminating cost sharing for follow-up tests will facilitate patient access to timely screening and diagnostic care and increase the likelihood that patients will have their cancers diagnosed earlier.

Appendix

Medicare

The study extrapolated the average out-of-pocket costs on follow-up tests among Medicare patients based on commercial patients' results shown previously. A fixed Medicare and commercial ratio in terms of outpatient services (0.35) was applied to adjust total payment rate from commercial results and get the total payment rate of Medicare.[17] Assuming that Medicare patients have a 20% cost sharing of follow-up tests and imaging for Part B claims, the study used 20% times the total payment rates of Medicare to get the cost sharing of follow-up tests among Medicare patients. Similar to the commercial results, the out-of-pocket costs increased across most procedures from 2018 to June 2023. However, out-of-pocket costs among Medicare Fee-For-Service patients had a more modest growth rate compared with those among commercial patients. The growth rate of out-of-pocket cost sharing across procedures ranged from 6.5% (MRI) to 30.2% (biopsy) (Appendix, Figure 3).

Additional Methodology: Evaluation of Delays in Follow-up Testing

The key evidence to establish the association between out-of-pocket costs and delay in follow-up comes from Ngo et al. (2023)[11] and California Health Benefits Review Program (CHBRP).[12] Ngo et al. (2023) found that 65.8% of the survey respondents would still choose to get the follow-up tests when facing out-of-pocket costs. In other words, 65.8% of the population would complete follow-up tests immediately, and 34.2% of the population would experience a delay in follow-up tests. CHBRP (2024) estimated that removing out-of-pocket costs can lead to a 6.2% increase in diagnostic screening. Therefore, the study combined the evidence from these studies with the results from commercial claims to evaluate the impact of out-of-pocket costs on delays in follow-up tests.

First, the study estimated the population of women aged ⩾40 years old in the U.S. Second, the study calculated the baseline (no out-of-pocket group) rate of having a diagnostic test within 12 months by using MarketScan data and recall rate from AHRQ. Third, the study identified the baseline monthly hazard rate (the monthly rate of getting diagnostic tests for the no-out-of-pocket group), assuming a constant monthly hazard rate. Fourth, the study estimated the rate of diagnostic tests for an out-of-pocket group within 12 months, which is 6.2 percentage points lower than the baseline rate according to CHBRP. Then, the monthly hazard rate for the out-of-pocket group was calculated assuming a constant monthly hazard rate. Once the hazard rates for the no-out-of-pocket and out-of-pocket groups are set, the cumulative probability of getting (or not getting) diagnostic tests by month (from 14 days to 12 months) for the two groups was evaluated. The differences in the cumulative probability between no out-of-pocket group and out-of-pocket group in 14 days, 3 months, 6 months and 12 months after the initial screening were calculated as well.

Appendix Tables

Appendix Table 1. List of Follow-up Tests Identified

Follow-up Tests
Diagnostic Mammogram
Ductography
Magnetic Resonance Imaging (MRI)
Ultrasound
Molecular Breast Imaging (MBI)
Breast Biopsy
Biopsy Ancillary Services
Genetic Testing

Appendix Table 2. CPT Codes of Initial Screening and Follow-up Tests

Procedure	Definition	Code	Code Type
Breast Cancer		C50*,D05*,C79.81, D48.60, D49.30	ICD-10
Breast-related diagnosis		C50*,D05*, C79.81, D48.60, D49.30, N60.09, N60.19, N60.29, N60.39, N60.49, N60.89, N60.99, N61, N62, N64.0, N64.1, N64.2, N64.89, N64.3, N64.9, N65.0, N65.1, O91.23, Q83.0, Q83.1, Q83.2, Q83.8, R92.8, S21.009A, S21.029A, Z85.3, Z80.3, Z42.1, Z12.39, Z12.31, Z15.01	ICD-10
Initial Screening			
Screening Mammogram	Screening mammography	77067	CPT
		77063(digital breast tomosynthesis, add-on code, used with G0202)	
		G0202	HCPCS

Follow-up test - Breast Imaging Procedures			
Diagnostic Mammogram	A procedure used to check for breast cancer after a lump or other sign or symptom of the disease has been found. More x-ray pictures of the breast are taken from different angles to allow an area of the breast to be examined more closely	77065	CPT
		77066	CPT
		G0279 (digital breast tomosynthesis, add-on code used with G0204 or G0206)	HCPCS
		77061	CPT
		77062	CPT
		G0204	HCPCS
		G0206	
Ductography	A procedure that takes pictures of the breast ducts so that doctors can learn more about certain kinds of abnormal nipple discharge or a breast mass. Pictures are taken using a contrast material that is given through an injection to help breast ducts show up clearly.	19030	CPT
		77053	
		77054	
MRI	A procedure in which radio waves and a powerful magnet linked to a computer are used to create detailed pictures of areas inside the breast. An MRI can help your doctor learn more about a breast mass or enlarged lymph nodes that were found during a clinical breast exam but were not seen on a mammogram or ultrasound.	77046	CPT
		77047	
		77048	
		77049	
		77022	
		76498	
		C8903	
		C8905	
		C8906	
		C8908	
Ultrasound	A procedure that that uses high-energy sound waves to look at tissues and organs inside the body. The sound waves make echoes that form images (called a sonogram) of the tissues and organs on a computer screen. These images can show if a breast lump is solid or is filled with fluid.	76641	CPT
		76642	
		3014F	Revenue Code
MBI	Molecular breast imaging	78800 78801	CPT

Follow-up test - Breast Biopsy			
(When an imaging procedure shows an abnormal breast change, a biopsy may be needed to make a definitive diagnosis.)			
Needle Biopsy	A procedure that removes cells, small tissue samples, or fluid so that it can be examined under a microscope		
Fine-needle Aspiration Biopsy	A fine-needle aspiration biopsy uses a thin needle to drain fluid or to remove cells.	10021 10004-10012	CPT
Core Needle Biopsy	A core needle biopsy (also called a core biopsy) uses a wide needle to remove small tissue sample(s) that are about the size of a grain of rice.	19100	CPT
Vacuum-assisted Biopsy	A vacuum-assisted core biopsy (also called a vacuum-assisted biopsy) is used to remove a small sample of breast tissue with a probe that is connected to a vacuum device. The tiny cut made in the breast is much smaller than with surgical biopsy.	19100	CPT
Surgical Biopsy	A procedure that removes breast tissue so that it can be examined under a microscope.		
Incisional Biopsy	An incisional biopsy procedure removes a sample of breast tissue.	19101	CPT
Excisional Biopsy	An excisional biopsy procedure removes the entire lump or suspicious area.	19100, 19120, 19125, 19126, 19281-19288	CPT
		0HBT0ZZ, 0HBT3ZZ, 0HBT0ZX, 0HBT3ZX, 0HBU0ZZ, 0HBU3ZZ, 0HBU0ZX, 0HBU3ZX, 0HBV0ZZ, 0HBV3ZZ, 0HBV0ZX, 0HBV3ZX, 0HBW0ZZ, 0HBW3ZZ, 0HBWXZZ, 0HBW0ZX, 0HBW3ZX, 0HBWXZX, 0HBX0ZZ, 0HBX3ZZ, 0HBXXZZ, 0HBX0ZX, 0HBX3ZX, 0HBXXZX	ICD10
Wide Local Excision	A wide local excision is used to cut out a tumor or other abnormal lesion and some normal tissue around it.	19100	CPT

Percutaneous Imaging-Guided Core Breast Biopsy	Sometimes an imaging procedure is used to help a surgeon find and remove an abnormal area during a biopsy		
Stereotactic Biopsy	A biopsy procedure that uses a computer and a 3-dimensional scanning device to find a tumor site and guide the removal of tissue for examination under a microscope.	19081 19082	CPT
Ultrasound-guided Biopsies	A biopsy procedure that uses an ultrasound imaging device to find an abnormal area of tissue and guide its removal for examination under a microscope.	19083, 76942 19084	CPT
MRI-guided Biopsies	A procedure that uses an MRI scan to find an abnormal area in the breast or prostate to guide the removal of a tissue sample from that area with a needle. The tissue sample is then checked under a microscope for signs of disease, such as cancer. An MRI-guided biopsy may be done when a lump or mass cannot be felt or when the abnormal area cannot be seen on other imaging tests.	19085, 77021 19086	CPT
Tomographic-guided Breast Biopsy	A biopsy procedure that uses CT to find the abnormal area.	19499, 76098	CPT
Supplies	Physicians' unlisted supplies and materials used in non-surgical procedures	99070	CPT
	Surgical trays	A4550	HCPCS
	Surgical supply; miscellaneous	A4649	HCPCS
Follow-up test - Genetic Testing			
BRCA1 and BRCA2 Genetic Testing		81162-81167, 81212, 81215, 81216, 81217,81432, 81433	CPT
Follow-up test - Office Visit			
Established Patient Office Visit, 10-19 Minutes		99212	CPT
Established Patient Office Visit, 20-29 Minutes		99213	CPT

Established Patient Office Visit, 30-39 Minutes		99214	
Established Patient Office Visit, 40-54 Minutes		99215	
Prolonged Office Visit		G2212	

Appendix Table 3. All-payer Lifetime Breast Cancer Attributable Costs, 2024

All-payer Lifetime Breast Cancer Attributable Costs	
Local	$ 231,362.79
Regional	$ 303,172.44
Distant	$ 341,521.05

Source: Yeh et al. (2020), Shi et al. (2015), KFF

Appendix Table 4. Average Share of Out-of-pocket Costs of Total Payment Across Procedures by State, 2018 – 2023

State	Average % Out-of-pocket Costs
North Dakota	51.8%
South Dakota	48.6%
Georgia	45.4%
Kentucky	45.2%
Idaho	43.7%
South Carolina	43.1%
Nebraska	42.8%
Utah	42.6%
Mississippi	41.3%
Missouri	40.7%
Arkansas	40.0%
Montana	40.0%
Oklahoma	39.1%
Arizona	38.1%
Iowa	37.4%
Tennessee	37.0%
North Carolina	36.4%

Maine	34.7%
Kansas	34.7%
Ohio	34.3%
Louisiana	34.3%
West Virginia	34.3%
Oregon	33.8%
Indiana	33.2%
Illinois	33.1%
Pennsylvania	31.6%
Wyoming	31.5%
Hawaii	30.8%
Colorado	30.8%
Minnesota	30.3%
New Mexico	28.9%
Virginia	28.8%
Alaska	28.1%
Florida	28.0%
Vermont	27.7%
Wisconsin	27.6%
Washington	27.5%
Nevada	26.6%
New Hampshire	26.5%
Texas	25.4%
Maryland	24.9%
California	24.1%
Connecticut	23.5%
New Jersey	23.3%
Rhode Island	23.3%
Michigan	21.6%
Alabama	21.4%
Massachusetts	19.9%
Washington, DC	16.2%
New York	12.9%
Delaware	9.0%

Note: Medicare patients were not included in this analysis.

Appendix Table 5. Population Who Need Follow-up and Will Experience a Survival impact due to Out-of-pocket Costs

Parameter	Value	Source
U.S. women aged between 40 and 75	**69,964,000**	Census (2023)[21]
US breast cancer incidence (per 100,000) New breast cancer cases per year	133.8 93,612	CDC (2024)[22]
Total U.S. women w/o breast cancer and need screening (40 - 75)	**69,870,388**	
% of female (>=40) with breast cancer screening mammogram	67.5%	National Center for Health Statistics (2019)[23]
% of female (>=40) with abnormal screening mammogram and need follow-up ("recall rate")	9.5%	AHRQ (2018)[24]
Total U.S. women who screened and need follow-up	**4,480,439**	
% of female (>=40) experience out-of-pocket in breast cancer follow-up test	70.4%	MarketScan (2023)
% of the above population with follow-up decisions impacted by out-of-pocket costs	34.2%	Calculated from Ngo et al. (2023)[11]
Total U.S. women who need follow-up and will experience survival impact due to out-of-pocket costs	**1,079,359**	

Note: Medicare patients were not included in this analysis.

Appendix Table 6. Population Who May Skip Future Mammograms Due to Out-of-pocket Costs in the Follow-up Tests for the Prior Year

Parameter	No Out-of-pocket Costs	Out-of-pocket Impact	With Out-of-pocket Costs
Among women aged over 40		**69,964,000**	
Previously confirmed breast cancer cases (from last year's follow-up tests)	96,595		84,661
Total U.S. women w/o breast cancer and need screening	**69,867,405**		**69,879,339**
Mammogram	65.3%	2.7%	62.6%
Recalled back	9.5%		9.5%
Follow-up %	66.3%	6.2%	60.1%
Total Screened and f/u (%)	**4.1%**		**3.6%**
Total population screened and f/u	**2,875,351**		**2,497,523**
Difference (No Out-of-pocket Costs vs. Out-of-pocket Costs)		**377,828**	

Note: Medicare patients were not included in this analysis.

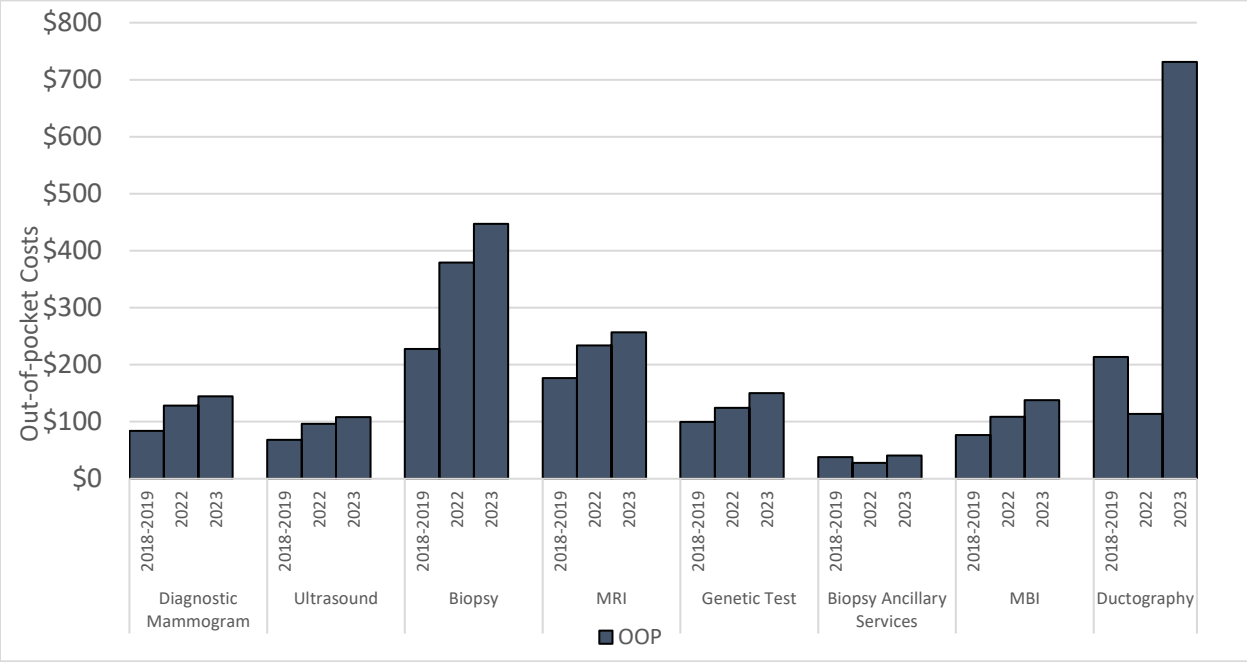
Appendix Table 7. Confirmed Cancer Diagnoses, No Out-of-pocket Costs vs Out-of-pocket Costs

Confirmed Cancer Diagnoses	No Out-of-pocket Costs		Out-of-pocket Costs	
	Number of Patients	Distribution	Number of Patients	Distribution
Ductal Carcinoma In Situ (DCIS)	32,127	16.9%	25,313	13.3%
Local	93,965	49.4%	93,212	49.0%
Regional	55,729	29.3%	61,833	32.5%
Distant	8,473	4.5%	9,937	5.2%
Total	**190,294**	**100%**	**190,294**	**100%**

Note: Medicare patients were not included in this analysis.

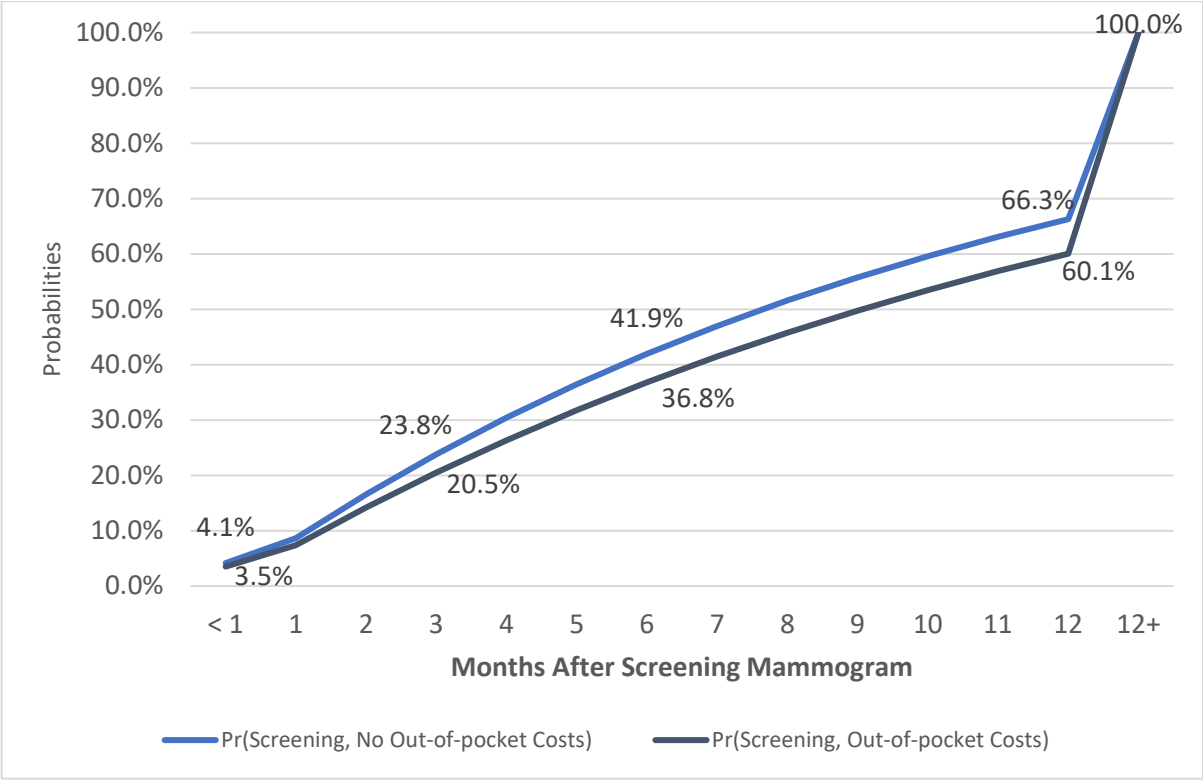
Appendix Figures

Appendix Figure 1. Out-of-pocket Costs by Follow-up Tests and Year, 2018 – 2023



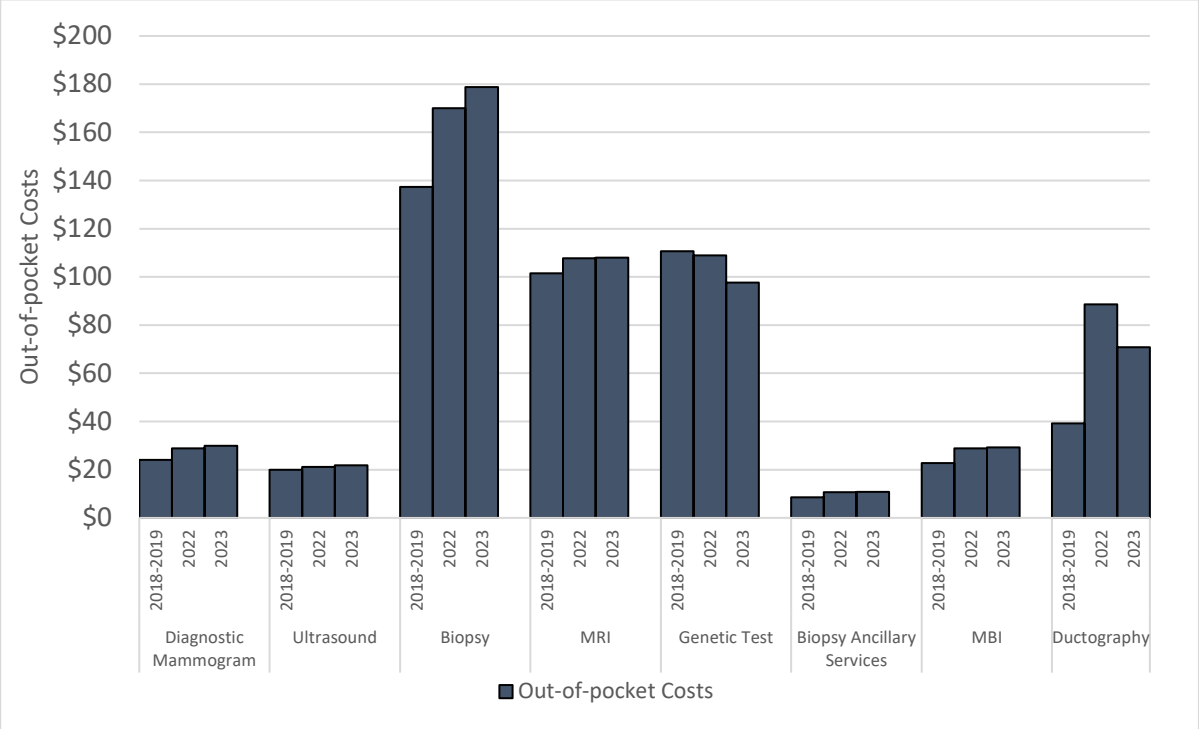
Note: Given that ductography had extremely small volumes and its out-of-pocket cost sharing might be biased by the volume, the share of out-of-pocket cost sharing for ductography may be less generalizable. Medicare patients were not included in this analysis.

Appendix Figure 2. Cumulative Probabilities of Getting Follow-up Tests by Month, No Out-of-pocket Costs vs. Out-of-pocket Costs



Note: "<1 month" refers to within 14 days after the mammogram. Medicare patients were not included in this analysis.

Appendix Figure 3. Average Out-of-pocket Costs by Procedure and Year, 2018 - 2023 (Medicare)



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