



Recent trends in adherence to continuous screening for breast cancer among Medicare beneficiaries



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ABSTRACT

Objective. The aim of this study is to examine recent trends in adherence to continuous screening, especially the rate of subsequent screening mammography following an initial screening before and after the U.S. Preventive Services Task Force (USPSTF) revised its guidelines on breast cancer in November 2009.

Methods. We retrospectively analyzed Medicare fee-for-service claims data to: 1) compare rate of subsequent screening mammography over 27 month periods for 317,150 women screened in either 2004 or 2009; and 2) examine patterns of subsequent screening by age and race.

Results. When adjusted for age, race, state of residence, county-level covariates, and clustered on ordering provider, the rate of subsequent screening decreased in 2009 relative to 2004 (OR = 0.75; 95% CI: 0.74–0.76). Adjusted odds ratios are similar for alternative follow-up windows (15 months, 0.71; 24 months, 0.70; 30 months 0.75). The decline was mostly attributable to women 75 and older who are now less likely to return for a subsequent screening. Although USPSTF guidelines call for 24 months, approximately half of women continue screening at 12-month intervals in both cohorts.

Conclusions. The rate of subsequent screening mammography has declined after 2009. Older women seem to follow the revised USPSTF guideline, but confusion by physicians and patients about competing guidelines may be contributing to these findings.

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Introduction

Breast cancer is the most common new cancer among American women and the second leading cause of cancer death in this group [Jemal et al., 2010](#). Although disputed by some [Gøtzsche and Olsen, 2000](#); [Bleyer and Welch, 2012](#); [Welch, 2010](#), prevailing evidence indicates that mammography is effective in detecting breast cancer in its early stages and reducing the likelihood of late-stage breast cancer and subsequent mortality [Humphrey et al., 2002](#); [Elmore et al., 2005](#); [Tabár et al., 1999](#). A key to any successful screening program is to ensure that patients adhere to continuous screening [Myers, 1993](#), as cancer is not a one-time event but rather an on-going phenomenon.

Various clinical societies and organizations have issued guidelines on breast cancer screening. An important change occurred in November 2009, when the U.S. Preventive Services Task Force (USPSTF) revised its

guideline from recommending screening mammography every 1 to 2 years for women aged 40 and older [U.S. Preventive Services Task Force, 2002](#), to 1) against routine screening mammography in women aged 40 to 49 years; 2) biennial screening for those aged 50 to 74; and 3) making no recommendations for those aged 75 and older [U.S. Preventive Services Task Force, 2009](#). That revision triggered intense debate among policy makers, medical societies, and patient advocacy groups, and has now resulted in conflicting authoritative guidelines. In particular, American Cancer Society (ACS) has maintained its previous guideline that women begin screening at age 40 and continue annual screening as long as in good health [Smith et al., 2014](#).

Since then, researchers have examined the impact of the guideline change on mammography utilization. Some examined the overall screening rate regardless of previous participation in screening program using national surveys [Block et al., 2013](#); [Pace et al., 2013](#); [Howard and Adams, 2012](#), Medicare claims data [Sharpe et al., 2013](#), private insurance claims data [Wang et al., 2014](#), and state mammography registry data [Sprague et al., 2014](#). These studies reported mixed findings.

A separate but related perspective is the rate of subsequent screening among those who were previously screened. In the context of guideline

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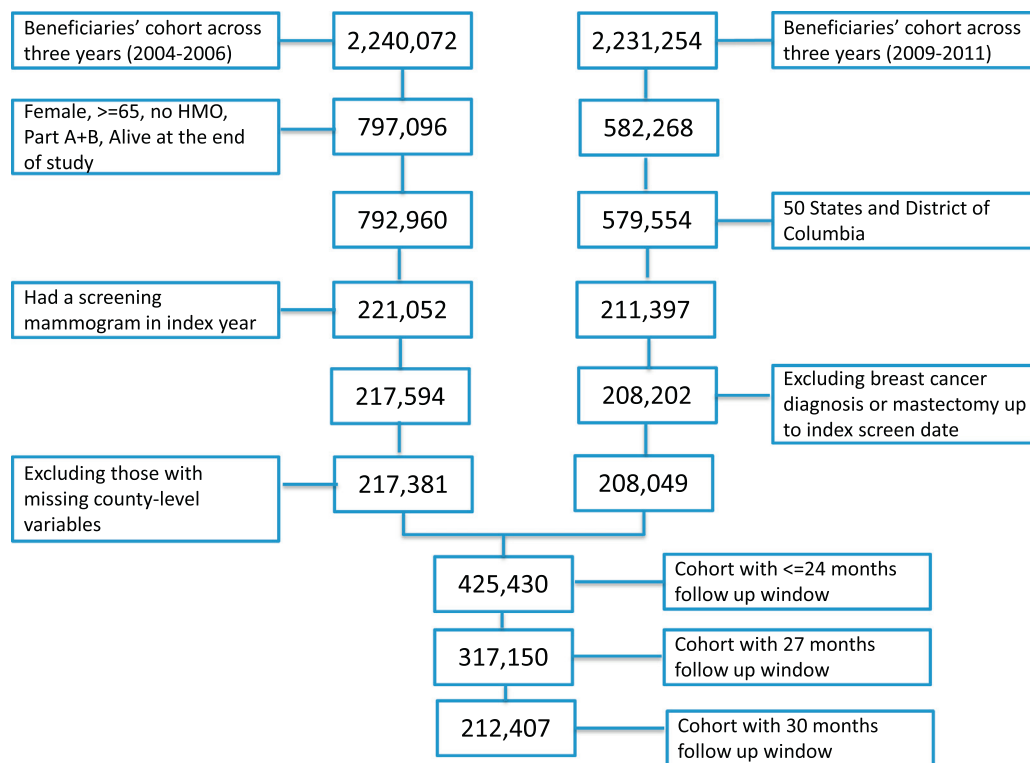


Fig. 1. Flowchart of cohort creation.

changes, this may be more relevant as the controversy arises on how often women should repeat screening. To our knowledge, no study has examined this before.

The objective of this study thus is to examine recent trends in adherence to continuous screening for breast cancer. We conducted a retrospective analysis of Medicare fee-for-service claims data during the periods 2004–2006 and 2009–2011 to 1) compare the rate of subsequent screening within 27 months among those who underwent a screening mammogram in either index year 2004 or 2009; and 2) examine whether the patterns of subsequent mammogram utilization varied by age and race. We also compared the overall screening rate in our study with previous studies.

Methods

Data

We used inclusive 2004–2006 and 2009–2011 claims data for a 5% random sample of Medicare beneficiaries. These claims data provide information on beneficiaries' medical service and reimbursement records, as well as their demographic information, which are easily linked to other data sources, such as census files and national and state vital statistics. Although lacking nuanced clinical information, Medicare claims data represent a widely accepted and reproducible information source to study population health. These data sets were studied under an exemption from our Institutional Review Board.

In this study, mammography utilization was captured from the Physician/Supplier Part B file, and demographic, enrollment, and vital status of beneficiaries was obtained from the associated denominator file. In addition, we obtained county-level median household income and the number of hospitals within each county for 2004 and 2009 from the Area Health Resource File (AHRF). This file can be linked to Medicare claims by the county code assigned to each beneficiary. Because Medicare uses Social Security Administration (SSA) codes and AHRF uses Federal Information Processing Standard (FIPS) codes, a SSA to FIPS State and County Crosswalk file was obtained from the Centers for Medicare and Medicaid Services (CMS)¹ to convert the county code between SSA and FIPS formats and link AHRF and Medicare claims files.

Study sample

We limited our sample to fee-for-service beneficiaries who are female; age 65 or older; had continuous part A and B coverage throughout the 3-year period of each cohort; resided in the 50 U.S. states and the District of Columbia; and were alive as of December 31, 2011 ($N = 797,096$ for 2004–2006; $N = 582,268$ for 2009–2011). Restricting our sample in this manner ensures that we have complete claims for each beneficiary through the study period. This is the denominator of our study sample.

As we wanted to examine screening mammography among average-risk women, we further limited the sample to those who underwent a screening mammogram² in 2004 ($N = 221,052$) or 2009 ($N = 211,397$) (thereafter referred to as “the index screen”), and excluded those who had an identifiable diagnosis of breast cancer³ including those who could be determined to have undergone a mastectomy⁴ prior to the index screen date ($N = 3458$ in 2004; $N = 3195$ in 2009). Those whose county-level variables were absent were excluded from the analysis ($N = 213$ in 2004; $N = 153$ in 2009).

Our final sample includes 425,430 ($N = 217,381$ in 2004; $N = 208,049$ in 2009) female beneficiaries who have up to 24 months of follow-up time. Among them, 317,150 have 27 months of follow-up, and 212,407 have 30 months of follow-up. Fig. 1 diagrams the cohort creation process.

Variables

The primary outcome is adherence to subsequent screening mammography, defined as subsequent screening study within 27 months after the index screen. We choose 27 months as the main follow-up window based on several considerations. The maximum interval that both previous and revised USPSTF guidelines recommend for breast cancer screening is 24 months. A 27-month window should provide a sufficiently long window to capture most women who returned for subsequent screening following recommendations under either the ACS or

² Screening mammogram is defined by three Healthcare Common Procedure Coding System (HCPCS) codes, 76092 (analog film, for 2004–06), 77057 (analog film, for 2009–11), or G0202 (digital), and a accompanying International Classification of Diseases, Ninth Revision (ICD-9) code of 76.10 (Breast screening, unspecified) or 76.12 (Other screening mammogram).

³ ICD-9 codes V10.3, 233.0, or 174.

⁴ ICD-9 codes 854.1–854.8 or HCPCS codes 19160, 19162, 19180, 19182, 19200, 19220, 19240, 19301–19307.

¹ Downloaded from <http://www.nber.org/data/ssa-fips-state-county-crosswalk.html>.

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