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Facility variability in examination indication among women with prior breast cancer: implications and the need for standardization

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Abstract

Objective: We sought to identify and characterize examinations in women with a personal history of breast cancer (PHBC) likely performed for asymptomatic surveillance.

Methods: We included surveillance mammograms (1997–2017) in asymptomatic women with a personal history of breast cancer diagnosed at age   18 years (1996–2016) from 103 Breast Cancer Surveillance Consortium facilities. We examined facility-level variability in examination indication. We modeled the relative risk (RR) and 95% confidence intervals (CI) at the exam-level

of a: 1) non-screening indication and 2) surveillance interval 9 months using Poisson regression with fixed effects for facility, stage, diagnosis age, surgery, examination year and time since diagnosis.

Results: Among 244,855 surveillance mammograms, 69.5% were coded with a screening indication, 12.7% short-interval follow-up and 15.3% as evaluation of a breast problem. Within a facility, the proportion of examinations with a screening indication ranged from 6–100% (median 86%, interquartile range (IQR) 79–92%). Facilities varied the most for exams in the first 5 years post-diagnosis where 39.4% of surveillance mammograms had a non-screening indication. Within a facility, breast conserving surgery (BCS) compared to mastectomy (RR=1.64;95%CI=1.60–1.68) and less time since diagnosis (1 year vs. 5 year RR=1.69;95%CI=1.66–1.72; 3 year vs. 5 year=1.20;95%CI=1.18–1.23) were strongly associated with a non-screening indication with similar results for 9 month surveillance interval. Screening indication and >9-month surveillance intervals were more common in more recent years.

Conclusion: Variability in surveillance indications across facilities in the US supports including indications beyond screening in studies evaluating surveillance mammography effectiveness and demonstrates the need for standardization.

INTRODUCTION

More than 2.8 million women in the United States[1] with a personal history of breast cancer (PHBC) are recommended to receive annual surveillance mammography unless they have bilateral mastectomy with no residual breast tissue at risk.[2–6] Mammography surveillance after completing breast cancer treatment aims to detect early, asymptomatic second breast cancers in the ipsilateral or contralateral breast. No randomized controlled trials have studied benefits or harms of surveillance mammography. However, current national clinical guidelines[2–6] support annual surveillance mammography after initial breast cancer treatment based on meta-analyses of observational studies showing an association between surveillance mammography and reduced breast cancer mortality.[7–12] Evidence-based guidelines and comparative effectiveness analyses have been hindered by excluding women with a PHBC. There is a need to be able to evaluate the benefits, failures, and false alarms for women undergoing surveillance examination in order to generate surveillance effectiveness evidence in women with a PHBC.

An important challenge in further developing the evidence on surveillance strategies in women with a PHBC lies with variability and accuracy in examination indication for surveillance mammograms.[13, 14] The American College of Radiology (ACR) specifies that either screening or diagnostic examination codes can be used for mammography performed in asymptomatic surveillance of women with treated breast cancer, resulting in a variety of indications including: short-interval follow-up (typically 3–6 month intervals), diagnostic not-otherwise-specified (NOS), breast problem and screening.[14] Variability in indication may be a consequence of the ACR guidelines, Center for Medicare and Medicaid Services (CMS) higher reimbursement for diagnostic than screening mammography[15], provider practice patterns[16] and/or patient-centered diagnostic evaluation that enables women to receive same-day evaluations.

We evaluated variability in surveillance mammography exam indication in women with a PHBC across facilities in the Breast Cancer Surveillance Consortium (BCSC) over time and by time since diagnosis. We sought to identify and characterize examinations in women with a PHBC likely performed for asymptomatic surveillance, to inform evidence gaps in performance benchmarking and comparative effectiveness evaluations.

METHODS

This study includes data from five Breast Cancer Surveillance Consortium (BCSC) registries (Carolina Mammography Registry, Kaiser Permanente Washington Registry, New Hampshire Mammography Network, San Francisco Mammography Registry, and Vermont Breast Cancer Surveillance System).[17] BCSC registries and the Statistical Coordinating Center received institutional review board approval for active or passive consenting processes to enroll participants, link data, and perform analytic studies and a Federal Certificate of Confidentiality and other protections for the identities of participating women, physicians, and facilities. All procedures are Health Insurance Portability and Accountability Act compliant.

Surveillance study population

This study includes mammograms between 1996–2017 in women with their first breast cancer diagnosed at age 18 years in 1996–2016 with American Joint Committee on Cancer (AJCC) stage 0-III.[18] BCSC cancer data are collected from state and regional tumor registries, regional Surveillance Epidemiology and End Results programs linkages, and local pathology databases. Data collected include stage at diagnosis, age at diagnosis, and primary surgery. Women had to have evidence of definitive surgery (breast conserving surgery (BCS) or mastectomy).

Exam characteristics

We included mammograms that occurred 6-months after women's primary cancer diagnosis (to allow time for surgery).[14] The BCSC collects indication for examination reported by the facility as screening (asymptomatic) or diagnostic categories of additional evaluation of recent mammogram, short interval follow-up (SIFU), evaluation of breast problem, or other;. A category for diagnostic not otherwise specified (diagnostic NOS) is used when the specific diagnostic indications cannot be distinguished. Facilities may collect indication in more detailed categories, which get mapped into the BCSC categories by the registries. Indications vary by the mammography information system, which can change over time.[13] Each examination was linked to facility-level information including academic affiliation, profit status, and practice type (multi-specialty, full diagnostic, breast imaging only, non-radiology practice).

Patient questionnaires at the time of mammography collect demographic and breast cancer risk factor data including age, symptoms, prior breast procedures, and time since last mammogram. Time since last mammogram was based on the last mammogram recorded in the BCSC database (patient-reported, radiologist-reported or completed at a BCSC facility, whichever was more recent).

Surveillance mammogram definition

We aimed to include all mammograms, including screening or diagnostic exams that were likely performed for asymptomatic surveillance.[19, 20] ACR's Breast Imaging Reporting and Data System (BI-RADS) glossary[14] defines screening mammography as "an examination performed on an asymptomatic woman to detect early, clinically unsuspected breast cancer." The same glossary states diagnostic mammography may be performed for various reasons including "short interval follow-up for a cancer patient recently treated with breast conservation therapy…at the interpreter's discretion, after the period of short-interval follow-up is complete, the patient then may be returned to screening." The BI-RADS manual states that "Other types of special screening examinations, such as those performed on asymptomatic women with a personal history of breast cancer or benign breast biopsy, and those performed on asymptomatic women with breast augmentation, are often performed as diagnostic examinations, but for audit purposes should be included in the screening group." Therefore, we excluded mammograms with: 1) indications of additional evaluation of recent mammogram, other, or missing; 2) self-reported symptoms except generalized pain; 3) prior mammogram with any indication within 90 days; 4) self-reported bilateral mastectomy; 5) BI-RADS assessment category 6 (known malignancy); 6) diagnostic indication mammogram completed on the same day as a screening mammogram, or 7) indications of breast problem or diagnostics NOS if performed at facilities with missing self-reported symptom information.

Study dataset

Since our objective was to examine facility-level variability in exam indication over time, we only included examinations from facilities meeting a minimum number of surveillance mammograms. Our analytic dataset started with 157 BCSC facilities with data on 247,146 surveillance mammograms meeting the above definition. Facilities were excluded if they had less <10 surveillance exams each year (N=33), <3 consecutive years of data (N=10), or <100 total surveillance mammograms (N=11). These combined volume by year criteria were used to exclude facilities with less stable estimates by year and over time. The final study dataset included 103 facilities and 244,855 surveillance mammograms.

Analysis

Analyses were conducted at facility and mammogram levels. At the facility level, we examined facility characteristics and surveillance mammogram proportions for each indication. Anon-parametric rank sum test was used to evaluate whether facility characteristics were associated with the proportion of screening exams. Variability in indication across facilities stratified by time since diagnosis (up to 10-years) is shown with boxplots containing interquartile range (IQR).

At the mammogram-level, we examined surveillance mammography indication distribution by time since diagnosis, stratified on calendar year. We modeled the relative risk of a non-screening indication using a log-binomial model with Poisson regression. The model included fixed effects for facility, stage and age at diagnosis, surgery, examination year, and time since diagnosis and an independent working correction structure to account for multiple exams per woman. Facility was modeled as a fixed effect to control for indication variability

across facilities and to examine other factors within a facility. Facility relative risk was adjusted to be relative to the "average" facility by dividing the relative risk by the average risk across all facilities.

To evaluate surveillance interval, we looked for a prior mammogram up to 21 months. By definition, all mammogram were at least 3 months apart. We graphed the distribution of time since prior mammogram by indication of current examination overall and stratified by age and stage at diagnosis and surgery. We modeled the relative risk of a surveillance mammogram interval   9 months versus >9–21 months using the same Poisson model described above. Analysis were done using SAS 9.4 and Tableau 2019.1 for figures.

RESULTS

Facility-level

Most facilities were non-academic (93.2%) and not-for-profit (75.6%). Most facilities (57.3%) contributed   500 exams and most (68.0%) contributed at least 10 years of data (Table 1). The average number of surveillance mammograms across facilities was 2377 (median=916, interquartile range (IQR) 252–2782) and facilities contributed an average of 13 years (median=13, IQR 7–19) of data.

Variability by facility is shown in Figure 1. The proportion with a screening indication ranged from 6–100% across facilities. Nine of the 103 facilities used the diagnosis NOS indication. Diagnostic indications for facilities not using the diagnostic NOS indication ranged from 0–53% SIFU and 0–91% breast problem. For facilities using the diagnostic NOS indication, diagnostic variability ranged from 0–11% SIFU, 0–10% breast problem, and 1–43% diagnostic NOS. There was no association between screening indication and facility characteristics of academic status, profit status, or practice type (data not shown).

Variability in indication by number of years since diagnosis is shown in Figure 2, stratified by whether facilities use diagnostic NOS. A facility, represented by a dot, appears in each year post-diagnosis in which they contribute data with boxplots showing the median and IQR. Facilities not using diagnostic NOS had wide variability in indication in the first 5 years post-diagnosis with some facilities having over 50% of exams with breast problems or SIFU. However, after 5 years post-diagnosis, all facilities used SIFU for less than 30% of examinations while breast problem continued to be used at some facilities for over 50% of examinations. The proportion of examinations with a screening indication by facility increased from a median of 70.1% (IQR 49.3–81.6%; range 1.8–100) the first year following diagnosis to 97.6% (IQR 94.4–100; range 22.1.–100) by 10 years following diagnosis (Supplement Table 2). Facility variability persisted for screening and breast problem indications throughout 10 years of follow-up.

Facilities that used diagnostic NOS primarily used this indication within the first 5-years following diagnosis; the median (IQR) decreased over time from 25.3% (IQR 7.2–38.4%; range 2.1–59.1%) one-year post-diagnosis to 9.8% (IQR 0–15.0%; range 0–21.4%) 10 years post-diagnosis. Screening indication use reflected a corresponding increase over time since diagnosis from a median of 69.6% (IQR 61.6–75.6%; range 15.7–92.8%) in year-1 to 90.2%

(IQR 85–100%; range 78.6–100%) at 10 years post-diagnosis. The use of SIFU and breast problem was low due to only 3 of the 9 facilities using those indications.

Mammogram-level

Among all surveillance mammograms, 69.5% were coded with a screening indication, and 30.5% had a non-screening indication:12.7% SIFU and 15.3% as evaluation of a breast problem (Supplemental Table 1). Diagnostic NOS indication contributed up 3% of all exams and 20% of exams among facilities using that indication. Examinations with screening indications increased with increasing years since diagnosis regardless of calendar year (Figure 3). Overall, screening indication increased from 51% of all exams at 1-year post-diagnosis to 85% at 10 years post-diagnosis (data not shown). Calendar year was associated with indication with a greater proportion of examinations coded with a screening indication in more recent years (2012–2017) compared to earlier years (1997–2001).

The non-screening indication model included 243,777 mammograms from 101 facilities (excluded two facilities with 100% screening). All factors in the model were associated with a non-screening indication (Table 2). Facility relative risks compared to an "average" facility ranged from 0.03 (95%CI 0.01–0.08) to 4.56 (95%CI 4.33–4.80). Within a facility, women with BCS were more likely to have an exam with a non-screening indication compared to mastectomy (RR 1.64 95%CI 1.60–1.68). Non-screening indications occurred less with increasing time since diagnosis compared to 5 years post-diagnosis (1 year: RR=1.69; 95%CI 1.66–1.72 decreased monotonically to RR=1.09; 95%CI 1.07–1.10 by 4 years and RR=0.52; 95%CI 0.50–0.54 by 11+ year).

Figure 4 depicts time since last mammogram by indication for the current examination. Surveillance intervals peaked at 6 and 12 months across all indications with screening and breast problem examinations mostly centered at 12 months, SIFU examinations at 6-months and diagnostic NOS having two peaks at 6 and 12-months (larger). Surveillance interval did not differ by age or stage at diagnosis, but a greater proportion of exams among women with BCS occurred around 6-months and fewer at 12 months compared to women with mastectomy (Supplemental Figure 1A-C). The model for surveillance interval included 229,410 mammograms from all facilities. Facility relative risks compared to an "average" facility ranged from 0.23 (95%CI 0.09–0.54) to 2.51 (95%CI 2.38–2.65). Within a facility, more frequent imaging was strongly associated with examinations in women with BCS compared to mastectomy (RR 3.11;95%CI 2.99–3.23) (Table 3). More years since diagnosis was also associated with longer mammography intervals.

DISCUSSION

We examined variability in surveillance mammography indications among asymptomatic women with a PHBC across 103 facilities in the US and observed wide variability between facilities that was not explained by patient characteristics. While tailoring surveillance strategies for women with a PHBC could improve short- and long-term outcomes, there are no ongoing or planned clinical trials on surveillance intervals and modalities in women with a PHBC. Surveillance indication variability in current clinical practice across facilities and women at different time points following treatment limits the availability of accurate

information for performance benchmarking and comparative effectiveness evaluations of imaging technology and surveillance intervals. Given the growing population of breast cancer survivors, there is a need to evaluate high-quality longitudinal, observational data to inform developing tailored surveillance strategies. Surveillance mammography indication variability across US radiology facilities likely represents different coding and referral practices rather than true differences in clinical indication and supports including indications beyond screening to evaluate surveillance mammography effectiveness.

While this study demonstrates significant variability in facility-level surveillance mammograms indication use, it was beyond the scope of this analysis to determine exact indication attribution. Possible explanations include differential reimbursement by Center for Medicare and Medicaid Services (CMS) for annual screening or diagnostic mammograms[15] and ACR guidelines[14] that support variable coding strategies for surveillance mammograms; both policies have increased reimbursement to radiologists for diagnostic mammography. However, the profit-status of a facility was not associated with indication, suggesting reimbursement may not be driving indication. We have also reported that providers[16] and facilities may prefer diagnostic mammography orders and scheduling to allow them to add additional projections as needed in real-time for women with a PHBC (and not require the patient to get another order from a physician for additional diagnostic views after screening).

Performance outcomes of surveillance mammography that solely include screening indication would systematically exclude a substantial proportion of examinations in women with a personal history of breast cancer (39.4% in the first 5 years), disproportionately excluding surveillance examinations from women with BCS and examinations most proximal to initial breast cancer diagnosis. Previous BCSC studies have reported surveillance mammography sensitivity from 65.6%[21] to 70.3%[22] with high interval-cancer rates (2.9 per 1,000 examinations (95%CI 2.5–3.3).[23] Additionally, new breast imaging modalities and supplemental imaging could result in improved outcomes, but they complicate decision-making for women with a PHBC, providers and insurers. We also previously evaluated all mammograms following diagnosis to understand patterns of use in 19,955 women diagnosed with an incident breast cancer (stages 0-III) between 2005 and 2012.[20] In that study, we reported substantial woman-level variability in mammography receipt by examination indication and time since diagnosis, with screening indication increasing over time. Nearly one-third of women had two or more breast examination in the first-year post-diagnosis with examination frequency decreasing by time since diagnosis. Like Henderson et al[20], we observed different coding and examination frequency by primary surgery but not by stage. The current study provides additional information on facility-level variability in examination indication and time between exams.

Despite recommended annual surveillance intervals[2–6] for asymptomatic women with a PHBC, we observed more frequent screening intervals, particularly in women with breast conserving surgery. Although 6-month surveillance intervals were most commonly associated with SIFU, they were observed across all indications. Expanding the inclusion of different examination indications as surveillance will require additional consideration of examination intervals and their influence on performance. Traditional audit benchmarks use

12-month follow-up[14] to measure surveillance performance. Guidance for screening intervals (<12 months) have not yet been addressed for performance auditing and comparative studies. Performance measurement and comparative surveillance strategies in women with more frequent screening are likely to grow as more women with a PHBC have multi-modality screening, which has the potential to influence outcome attribution during overlapping follow-up periods of these tests. We recently reported more than 10% of women with a recent breast cancer diagnosis had a combination of surveillance mammography and MRI, which we expect will continue to rise.[20, 24]

Standardizing surveillance mammography coding practices could improve comparison of performance benchmarking and comparative effectiveness evaluations of surveillance strategies. Appropriately accounting for, and classifying, surveillance imaging exams impacts >2 million women with living with breast cancer treatment and impacting their clinical care. The ACR BI-RADS manual[14] notes that surveillance mammography is a special examination that is often performed as a diagnostic indication even though the woman is asymptomatic and should be included in medical audits as screening examinations. Formalizing this concept consistently in clinical practice likely requires a multifactorial approach. For example, facilities might create an examination code specific to surveillance to enable scheduling of screening examinations with immediate results interpretation and additional imaging as needed, and support inclusion of these examinations with screening mammography when performing medical audits. Additionally, a separate CPT code to accompany a new facility level examination code may be useful to consistently identify asymptomatic women receiving surveillance mammography examinations. Such a code would require consideration whether billing and reimbursement should be the same as for screening mammography or at a higher level if same day interpretation and additional diagnostic imaging are performed.

Limitations

We were unable to evaluate reasons behind facility coding patterns, which are likely multifactorial. Ordering provider practices may ultimately be determining indication coding; however, the BCSC does not have ordering provider information and ultimately facilities may recode exams based on standardized coding practices.[25] We were also unable to evaluate the potential influence of factors such as geography that ties to urbanicity and access, which may be important factors driving practice variability. Additionally, these results are not intended to provide surveillance mammogram performance benchmarks. Despite our best effort at limiting our evaluation to examinations in asymptomatic women, it is possible for residual misclassification if symptom data were missing.

Conclusions

Variability in surveillance mammography indication across US radiology facilities likely represents different coding and referral practices rather than true differences in clinical indication and supports including indications beyond screening to evaluate surveillance mammography effectiveness.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgements:

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TAKE-HOME POINTS

- We observed variability across United States facilities in use of screening, SIFU, breast problem and diagnostic NOS indications for surveillance mammography in women with treated breast cancer. Variability was most strongly driven by facility, time since diagnosis and primary surgery.

- Evaluations of surveillance mammography focused solely on screening indication may systematically exclude a substantial proportion of mammograms, particularly examinations within the first five years of treatment completion and in women who undergo breast conserving surgery.

- Our results suggest standardization in surveillance mammography indication coding practices could improve comparison performance benchmarking and comparative effectiveness evaluations of tailored screening strategies.
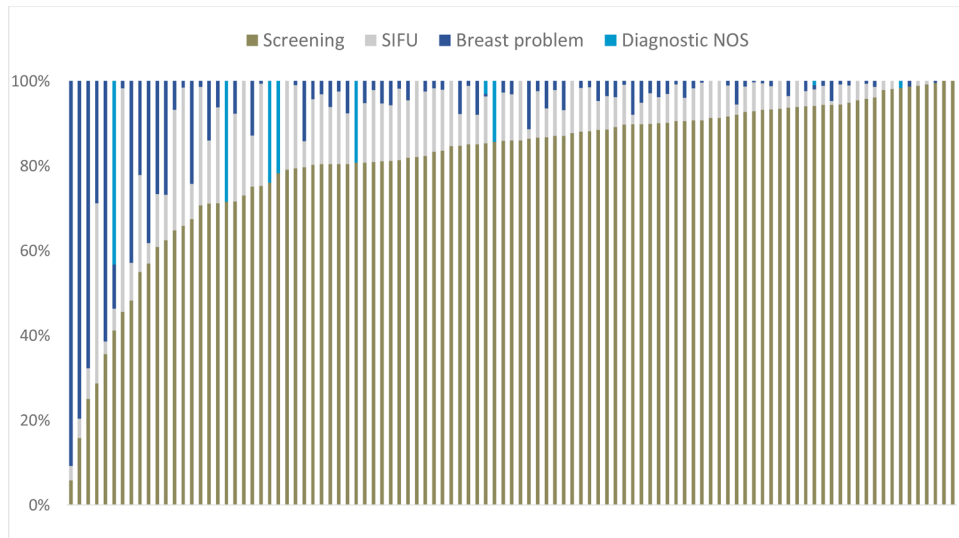
Figure 1.

Distribution surveillance mammograms examination indications in women with a personal history of breast cancer* for 103 BCSC facilities†

*Diagnosed age 18 years in 1996 or later AJCC stage 0-III

†Each bar represents a single facility. All facilities have 3 consecutive years of data, 100 surveillance mammograms. 244,855 surveillance mammograms occurring at 6-months after cancer diagnosis

SIFU: Short interval follow-up
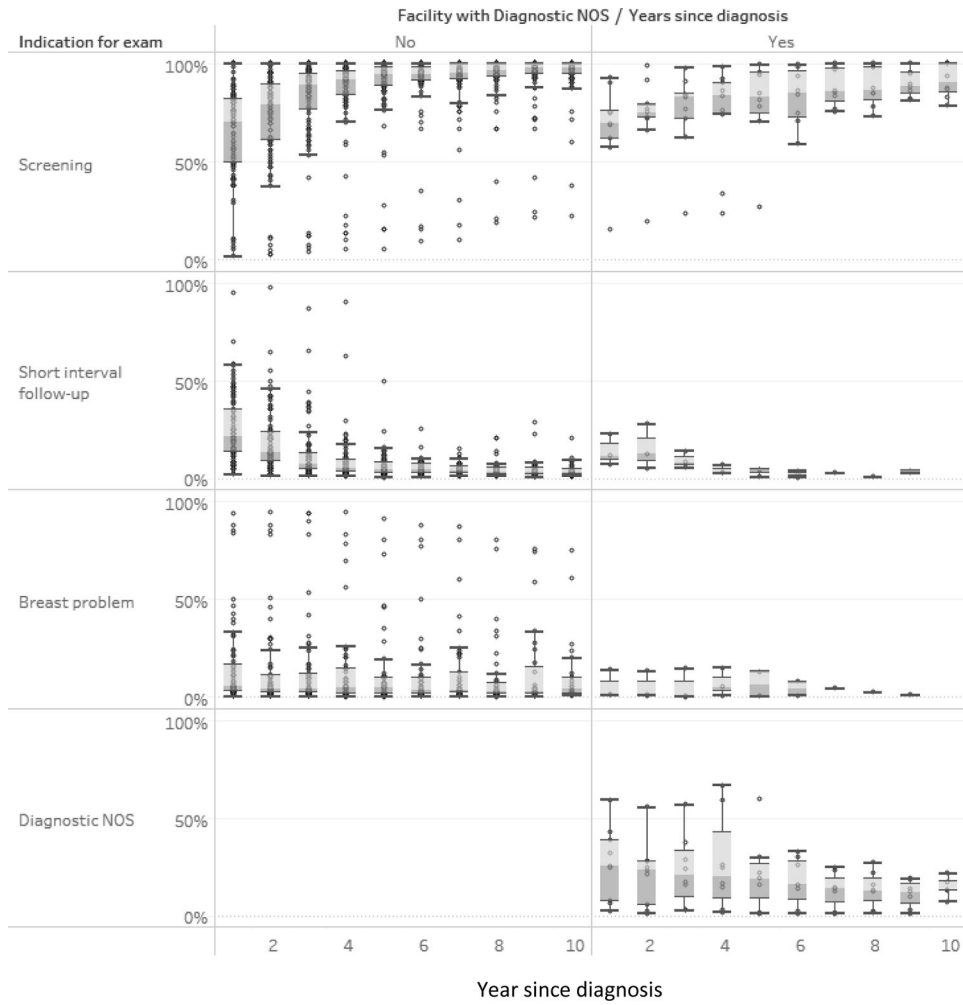
Figure 2.
Facility-level distribution of surveillance mammograms by indication by year since
diagnosis, stratified by facilities that use and do not use Diagnostic Not-Otherwise-Specified
(NOS)*
*Each dot represents a facility's proportion of each indication among exams within each
yearly interval post-diagnosis. Boxes contain interquartile range and whiskers are 1.5 times
the IQR.
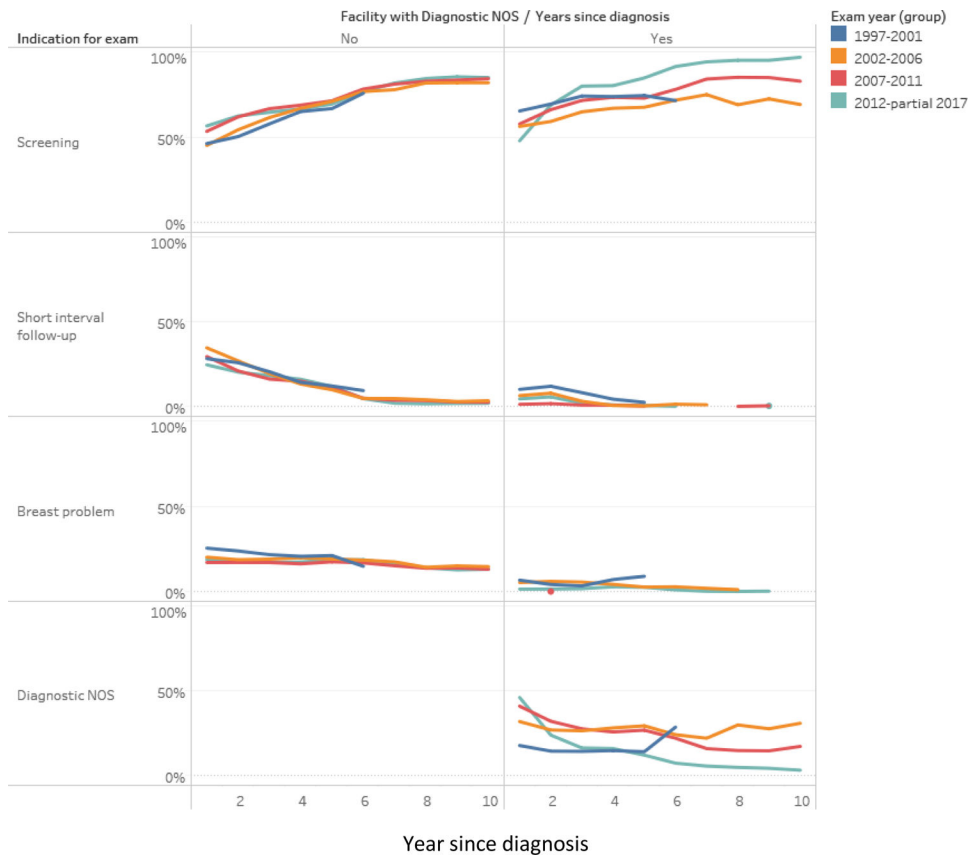
Figure 3.
Distribution of surveillance mammograms by exam year* by year since diagnosis stratified by indication and stratified by facilities that use and do not use Diagnostic Not-Otherwise-Specified (NOS)
*Colored lines represent the proportion of each indication among total exams within each yearly interval post-diagnosis stratified by exam year.
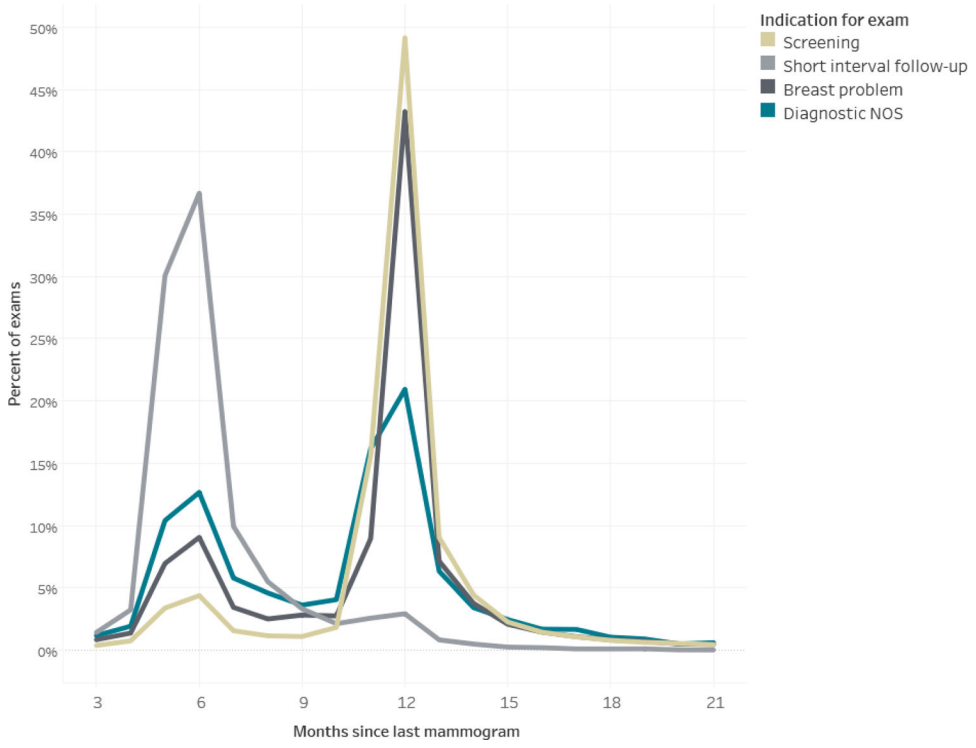
Figure 4.
Distribution of time since last exam (up to 21 months) by current indication for exam

Table 1.

Description of BCSC facilities conducting surveillance examinations between 1996–2017 in women with a personal history of breast cancer[*]

Characteristic	N = 103	(%)
Academic medical center		
Yes	7	(6.8)
No	96	(93.2)
Profit status		
For profit	20	(24.4)
Not for profit	62	(75.6)
Missing	21	
Practice type		
Multi-specialty breast center	22	(21.4)
Full diagnostic radiology practice	68	(66.0)
Radiology practice limited to breast imaging only	9	(8.7)
Non-radiology practice	4	(3.9)
Number of years in study		
3–5	17	(16.5)
6–9	16	(15.5)
10–19	49	(47.6)
20	21	(20.4)
Number of surveillance examinations in study		
100–499	44	(42.7)
500–1999	25	(24.3)
2000–4999	24	(23.3)
5000	10	(9.7)
Number of facilities in each time interval post-diagnosis (not mutually exclusive)		
1y (6-<18 months)	102	(99.0)
2y (18-<30 months)	103	(100)
3y (30-<42 months)	103	(100)
4y (42-<54 months)	102	(99.0)
5y (54-<66 months)	99	(96.1)
6y (66-<78 months)	100	(97.1)
7y (78-<90 months)	97	(94.2)
8y (90-<102 months)	92	(89.3)
9y (102-<114 months)	89	(86.4)
10y (114-<126 months)	85	(82.5)
>10y (126+ months)	79	(76.7)

[*] 244,855 surveillance mammograms in women with their first breast cancer diagnosed at age 18 years in 1996–2016 with stage 0-III

Table 2.

Relative risk (RR) and 95% confidence interval (CI) from Poisson model for a non-screening indication among N=243,777 mammograms from 101 facilities[*]

Characteristic		RR	95% CI	p-value
Facility	RR (95% CI) compared to "average" facility ranged from 0.03 (0.01, 0.08) to 4.56 (4.33, 4.80)			<.0001
AJCC Stage	0-IIA	1.00	(ref)	0.03
	IIB-III	1.02	(1.00, 1.04)	
Surgery	Mastectomy	1.00	(ref)	<.0001
	BCS	1.64	(1.60, 1.68)	
Age at diagnosis	<50 years	1.00	(ref)	<.0001
	50+ years	0.97	(0.96, 0.98)	
Year of exam	1997–2000	1.00	(ref)	<.0001
	2001–2004	1.06	(1.04, 1.09)	
	2009–2012	0.93	(0.91, 0.95)	
	2013–2017	0.89	(0.87, 0.91)	
Time since diagnosis	1 year (6-<18mo)	1.69	(1.66, 1.72)	<.0001
	3 years (30-<42 months)	1.20	(1.18, 1.23)	
	4 years (42-<54 months)	1.09	(1.07, 1.10)	
	5 years (54-<66 months)	1.00	(ref)	
	6 years (66-<78 months)	0.83	(0.81, 0.85)	
	7 years (78-<90 months)	0.73	(0.71, 0.75)	
	8 years (90-<102 months)	0.65	(0.62, 0.67)	
	9 years (102-<114 months)	0.61	(0.59, 0.64)	
	10 years (114-<126 months)	0.60	(0.57, 0.63)	
	11+ years (126+ months)	0.52	(0.50, 0.54)	

[*] Excludes n=1,078 mammograms (0.4% of total) from two facilities with 100% screening.

Table 3.

Relative risk (RR) and 95% confidence interval (CI) from Poisson model for a surveillance interval <9 months compared 9–21 months among N=229,410 mammograms from 103 facilities[*]

Characteristic		RR	95% CI	p-value
Facility	RR (95% CI) compared to "average" facility ranged from 0.23 (0.09, 0.54) to 2.51 (2.38, 2.65)			<.0001
AJCC Stage	0-IIA	1.00	(ref)	0.21
	IIB-III	0.98	(0.96, 1.01)	
Surgery	Mastectomy	1.00	(ref)	<.0001
	BCS	3.11	(2.99, 3.23)	
Age at diagnosis	<50 years	1.00	(ref)	0.03
	50+ years	0.98	(0.96, 1.00)	
Year of exam	1997–2000	1.00	(ref)	<.0001
	2001–2004	1.03	(1.00, 1.06)	
	2005–2008	0.95	(0.93, 0.98)	
	2009–2012	0.92	(0.89, 0.95)	
	2013–2017	0.83	(0.81, 0.86)	
Time since diagnosis	1 year (6-<18mo)	2.55	(2.49, 2.62)	<.0001
	3 years (30-<42 months)	1.51	(1.48, 1.55)	
	4–5 years (30-<66 months)	1.00	(ref)	
	6–10 years (66-<126 months)	0.41	(0.39, 0.43)	
	11+ years (126+ months)	0.25	(0.23, 0.28)	

[*] Excludes n=15,445 mammograms (6% of total) with no prior mammogram within 21 months