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Comparing Mammographic Density Assessed by Digital Breast Tomosynthesis or Digital Mammography: The Breast Cancer Surveillance Consortium

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Conflicts of interest are listed at the end of this article.

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Background: Consistency in reporting Breast Imaging Reporting and Data System (BI-RADS) breast density on mammograms is important because breast density is used for breast cancer risk assessment and is reported directly to women and clinicians to inform decisions about supplemental screening.

Purpose: To assess the consistency of BI-RADS density reporting between digital breast tomosynthesis (DBT) and digital mammography (DM) and evaluate density as a breast cancer risk factor when assessed using DM versus DBT.

Materials and Methods: The Breast Cancer Surveillance Consortium is a prospective cohort study of women undergoing mammography with DM or DBT. This secondary analysis included women aged 40–79 years who underwent at least two screening mammography examinations less than 36 months apart. Percentage agreement and κ statistic were estimated for pairs of BI-RADS density assessments. Cox proportional hazards regression was used to calculate hazard ratios (HRs) of breast density as a risk factor for invasive breast cancer.

Results: A total of 403 326 pairs of mammograms from 342 149 women were evaluated. There were no significant differences in breast density assessment in pairs consisting of one DM and one DBT examination (57 516 of 74 729 [77%]; κ = 0.64), two DM examinations (238 678 of 301 743 [79%]; κ = 0.67), and two DBT examinations (20 763 of 26 854 [77%]; κ = 0.65). Results were similar when restricting the analyses to pairs read by the same radiologist. The breast cancer HRs for breast density were similar for DM and DBT ($P = .45$ for interaction). The HRs for density acquired using DM and DBT, respectively, were 0.55 (95% CI: 0.49, 0.63) and 0.37 (95% CI: 0.21, 0.66) for almost entirely fat, 1.47 (95% CI: 1.37, 1.58) and 1.36 (95% CI: 1.02, 1.82) for heterogeneously dense, and 1.72 (95% CI: 1.54, 1.93) and 2.05 (95% CI: 1.25, 3.36) for extremely dense breasts.

Conclusion: Radiologist reporting of Breast Imaging Reporting and Data System density obtained with digital breast tomosynthesis did not differ from that obtained with digital mammography.

Online supplemental material is available for this article.

Because breast density can mask breast cancers, mammography has lower sensitivity in breasts with higher density (1,2). The American College of Radiology Breast Imaging Reporting and Data System (BI-RADS) defines four categories of breast density, noting potential for masking cancers in dense breasts (3). This reduced sensitivity motivated legislation in most U.S. states requiring that women with dense breasts (BI-RADS heterogeneously or extremely dense) be notified about the implications of density for their health (4).

In addition, mammographic density is an important risk factor for breast cancer (5). It has been shown to improve the discrimination of breast cancer risk models, such as the Gail (6) and Tirer-Cuzick models (7). Density is also a core risk factor for the Breast Cancer Surveillance Consortium (BCSC) model (8,9).

However, mammography technology has evolved substantially during the past 2 decades. First, there was the transition from film to digital mammography (DM) acquisition of breast images. We have previously shown that this transition did not change the reported BI-RADS density categories (10). Now, more than 68% of radiology facilities in the United States use digital breast tomosynthesis (DBT) (11). We recently showed that the overall distribution of breast density in women from the BCSC was not different for DBT versus DM examinations (12). In this study, we assessed the consistency of BI-RADS density reporting between DBT and DM using data from

Abbreviations

BCSC = Breast Cancer Surveillance Consortium, BI-RADS = Breast Imaging Reporting and Data System, DBT = digital breast tomosynthesis, DM = digital mammography, HR = hazard ratio

Summary

No evidence of a difference between density categories was found using digital mammography or digital breast tomosynthesis, nor was there a difference in strength of the association between breast density and invasive breast cancer.

Key Results

- An observational study of 342 149 women from the Breast Cancer Surveillance Consortium found no significant differences in breast density assessment in pairs consisting of one digital mammography (DM) and one digital breast tomosynthesis (DBT) examination (57 516 of 74 729 [77%]; κ = 0.64), two DM examinations (238 678 of 301 743 [79%]; κ = 0.67), and two DBT examinations (20 763 of 26 854 [77%]; κ = 0.65).
- The breast cancer hazard ratios (HRs) for the four breast density categories were similar for DM (HR = 0.55, 1, 1.47, 1.72) and DBT (HR = 0.37, 1, 1.36, 2.05; *P* = .45).

consecutive examinations on women in the BCSC. We also evaluated the strength of density as a breast cancer risk factor when assessed using DM versus DBT.

Materials and Methods

Study Sample

We performed a secondary analysis of prospective data from six mammography registries in the BCSC. Age, race and ethnicity, family history of breast cancer, history of breast biopsies, age at first live birth, menopausal status, and height and weight were obtained primarily from participants' self-report at the time of mammography. Interpreting radiologists (*n* = 495) classified breast density as part of routine clinical practice using the American College of Radiology BI-RADS categories (almost entirely fat = A, scattered fibroglandular densities = B, heterogeneously dense = C, extremely dense = D). Breast biopsy results were obtained from linkages with regional pathology databases and Surveillance, Epidemiology, and End Results or statewide cancer registries. We grouped benign diagnoses as nonproliferative, proliferative without atypia, proliferative with atypia, or lobular carcinoma in situ (5). Breast cancer outcomes (3471 invasive cancers) diagnosed at least 3 months after index mammography were obtained at each site through linkage with the regional population-based Surveillance, Epidemiology, and End Results program, state tumor registries, and pathology databases. Each registry and the Statistical Coordinating Center received institutional review board approval and a Federal Certificate of Confidentiality and other protection for the identities of the research subjects. All procedures are Health Insurance Portability and Accountability Act compliant. Data generated or analyzed during the study are available from the corresponding author by request.

Breast Density Agreement

For the analyses assessing the agreement of BI-RADS density assessments between consecutive mammograms, we included women aged 40–79 years who underwent mammography with DM or DBT at least twice between 2010 and 2017, with examinations performed no more than 36 months apart. We limited the pairs of mammograms to women who were either premenopausal at both examinations or postmenopausal at both examinations to minimize the association of the menopausal transition with breast density (13).We excluded women who had a prior breast cancer diagnosis or breast augmentation or who used medications that could change mammographic density (oral contraception, postmenopausal hormone therapy, tamoxifen, or raloxifene) currently or within the prior year (Fig 1).

Statistical Analysis

We calculated the percentage agreement and κ statistic between BI-RADS breast density categories as reported with DM versus DBT mammography overall and stratified by which examination was performed first. The κ statistic accounts for the percentage agreement expected by chance alone and ranges from 0 to 1, with 1 representing perfect agreement and 0 representing agreement no better than chance alone. A κ statistic between 0.6 and 0.8 represents substantial agreement, and a κ statistic between 0.8 and 1 represents almost perfect agreement (14). We conducted similar analyses for pairs of mammograms that were both acquired with DM or were both acquired with DBT. We also analyzed the results sorted into dense (BI-RADS categories C and D) and non-

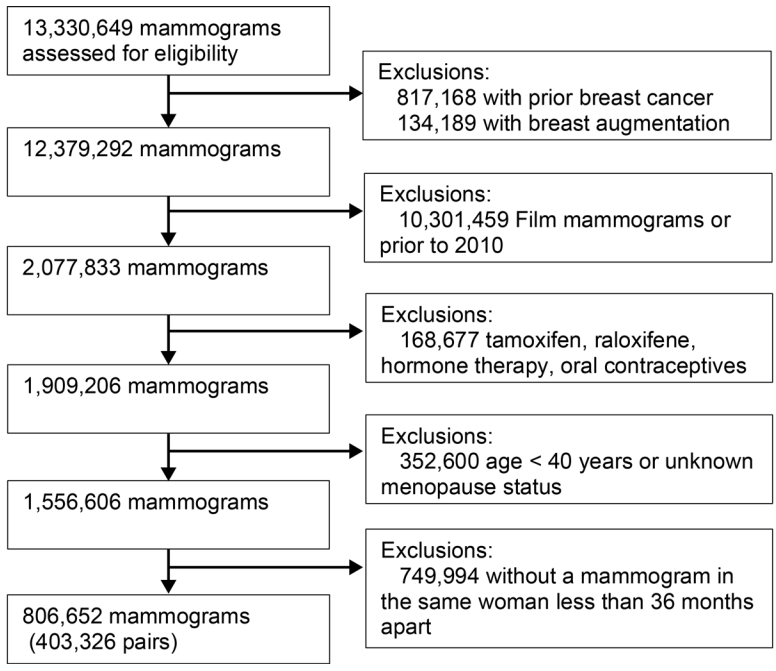

Figure 1: Flowchart of mammograms in the Breast Cancer Surveillance Consortium with pairs of mammograms in the same woman obtained less than 36 months apart from 2010 to 2017 that were not screen-film mammograms.

dense (BI-RADS categories A and B) breasts to assess any changes relevant to breast density reporting legislation (4). We used a bootstrap approach to estimate the confidence intervals for the measures of agreement (15).

In sensitivity analyses, we restricted the analysis to pairs of mammograms read by the same radiologist to eliminate variation between radiologists, and we also restricted the analysis to mammograms obtained in 2014 and later to eliminate variation due to the change in BI-RADS density category definitions published in November 2013 (3).

We used Cox proportional hazards regression to estimate hazard ratios (HRs) for invasive breast cancer associated with BI-RADS breast density assessed on DM versus DBT images by including an interaction between density and mammogram acquisition method. The interaction effect tests whether the association is modified by mammogram acquisition method. Women entered the study 3 months after each DM or DBT in the BCSC. The primary outcome was invasive breast cancer, and women were censored for death, ductal carcinoma in situ diagnosis, mastectomy, end of complete cancer capture, or 5 years of follow-up. We adjusted the HRs for patient age at study entry, year of study entry, body mass index, family history, history of breast biopsies, menopausal status, age at first live birth, and race and ethnicity, then we stratified the analyses by site. The model was inversely weighted by the number of observations for a woman to account for potentially informative cluster size, and robust variances were estimated to account for clustering within women (16).

Data were analyzed by using SAS, version 9.4 (SAS Institute). Two-sided $P < .05$ indicated a significant difference.

Results

Characteristics of Women in Study Samples

Table 1 shows the characteristics of the 342 149 women who contributed 403 326 pairs of mammograms to the breast density agreement analyses. This included 74 729 women who had at least one DM examination and one DBT examination within 36 months of each other. For comparison, our analyses included 301 743 women with two DM examinations and 26 854 women with two DBT examinations. Women with two DBT examinations during the study period were slightly younger (56.9 years) than women with two DM examinations (58.2 years) and women with one DM examination and one DBT examination (58.7 years) ($P < .001$) and were more likely to be White ($P < .001$). As expected, among women who underwent both DM and DBT within the study period, most underwent DM first (92%). An illustrative example of a woman's mammogram is shown in Figure 2.

Table 2 shows the characteristics of women in the time to invasive breast cancer analysis. Women in the DBT analysis group were more likely to be White (81% for DBT vs 68% for DM, $P < .001$), but the age distributions were similar. The median time to event was 3.2 years (interquartile range, 1.9–4.4 years). The number of invasive breast cancers was 5324 in the DM cohort and 281 in the DBT cohort.

Table 1: Characteristics of Women Included in Breast Density Agreement Analyses

Characteristic	DM-DBT or DBT-DM (n = 74 729)	DM-DM (n = 301 743)	DBT-DBT (n = 26 854)
Age at first mammogram			
40–44 years	8322 (11)	39 541 (13)	4123 (15)
45–49 years	8707 (12)	38 120 (13)	3486 (13)
50–54 years	8866 (12)	34 557 (11)	3445 (13)
55–59 years	9845 (13)	35 797 (12)	3685 (14)
60–64 years	14 736 (20)	60 761 (20)	5172 (19)
65–69 years	12 510 (17)	46 662 (15)	3783 (14)
70–74 years	8152 (11)	30 988 (10)	2253 (8)
75–79 years	3591 (5)	15 317 (5)	907 (3)
Race and ethnicity*			
American Indian/ Alaska Native	254 (<1)	742 (<1)	109 (<1)
Asian/Native Hawaiian/ Pacific Islander	3180 (4)	34 394 (11)	1476 (5)
Hispanic	2810 (4)	18 759 (6)	1029 (4)
Non-Hispanic Black	5768 (8)	38 763 (13)	731 (3)
Non-Hispanic White	59 808 (80)	193 104 (64)	22 440 (84)
Other or Mixed	923 (1)	3828 (1)	486 (2)
Which came first			
DM	68 543 (92)	NA	NA
DBT	6186 (8)	NA	NA
Time between DM and DBT			
9–18 months	54 780 (73)	234 716 (78)	22 851 (85)
19–30 months	16 372 (22)	57 252 (19)	3498 (13)
31–36 months	3577 (5)	9775 (3)	505 (2)

Note.—Data are numbers of patients, and data in parentheses are percentages. DBT = digital breast tomosynthesis, DM = digital mammography, NA = not applicable.

* Missing data for 1986 (3%) women for DM-DBT or DBT-DM, 12 153 (4%) for DM-DM, and 583 (2%) for DBT-DBT.

Breast Density Agreement

The agreement in mammographic density assessments in pairs of mammograms was not significantly different, regardless of the acquisition method (Table 3). The percentage agreement ranged from 52 717 of 68 543 (76.9%) for pairs in which women underwent DM before DBT to 238 678 of 301 743 (79.1%) for pairs in which women had two DMs, with a similar pattern for the κ statistics (κ = 0.64–0.67). Breast density was reported as lower with DBT for 752 of 5618 (13.4%) of the DBT-DM pairs and 8938 of 61 141 (14.6%) of the DM-DBT pairs. Breast density was reported as higher with DBT for 635 of 5714 (11.1%) of the DBT-DM pairs and 6888 of 63 228 (10.9%) of the DM-DBT pairs. The second density reading was higher than the first for 6888 of 63 228 (10.9%) of the DM-DBT pairs, 29 747 of 280 464 (10.6%) of the DM-DM pairs, and 2963 of 24 390 (12.1%) of the DBT-DBT pairs. As would be expected because of the decrease in density with

increasing age, the percentage in which the second density reading was lower than the first was generally slightly greater (8938 of 61 141 [14.6%] for DM-DBT pairs, 33 318 of 270 323 [12.3%] for DM-DM pairs, and 3128 of 24 406 [12.8%] for DBT-DBT pairs). The detailed changes across each of the four BI-RADS density categories are available in Table E1 (online).

Agreement was even higher after we categorized the mammograms as either dense (BI-RADS categories C or D) or nondense (BI-RADS categories A or B), as required by breast density legislation (Table 4). The percentage agreement ranged from 66 058 of 74 729 (88.4%) to 269 081 of 301 743 (89.2%), and the κ statistics ranged from 0.76 to 0.78. None of the differences was significant.

Results from Sensitivity Analyses

Results from several sensitivity analyses were consistent with our primary results. When limiting mammogram pairs to those read by the same radiologist (Table E2 [online]), the percentage agreement (11 682 of 14 361 [81.3%] to 56 200 of 66 293 [84.8%]) and κ statistics (κ = 0.71–0.76) were higher than in the main analysis, without significant differences. When limiting mammogram pairs to those no more than 18 months apart (Table E3 [online]), the percentage agreement (42 566 of 54 780 [77.7%] to 186 942 of 234 716 [79.6%]) and κ statistics (κ = 0.65–0.68) were higher than in the main analysis but did not differ significantly. When evaluating agreement before (from 2010 to 2013) and after (from 2014 to 2017) the change to the fifth edition of the BI-RADS density lexicon (Tables E4 and E5 [online], respectively), there were no significant differences.

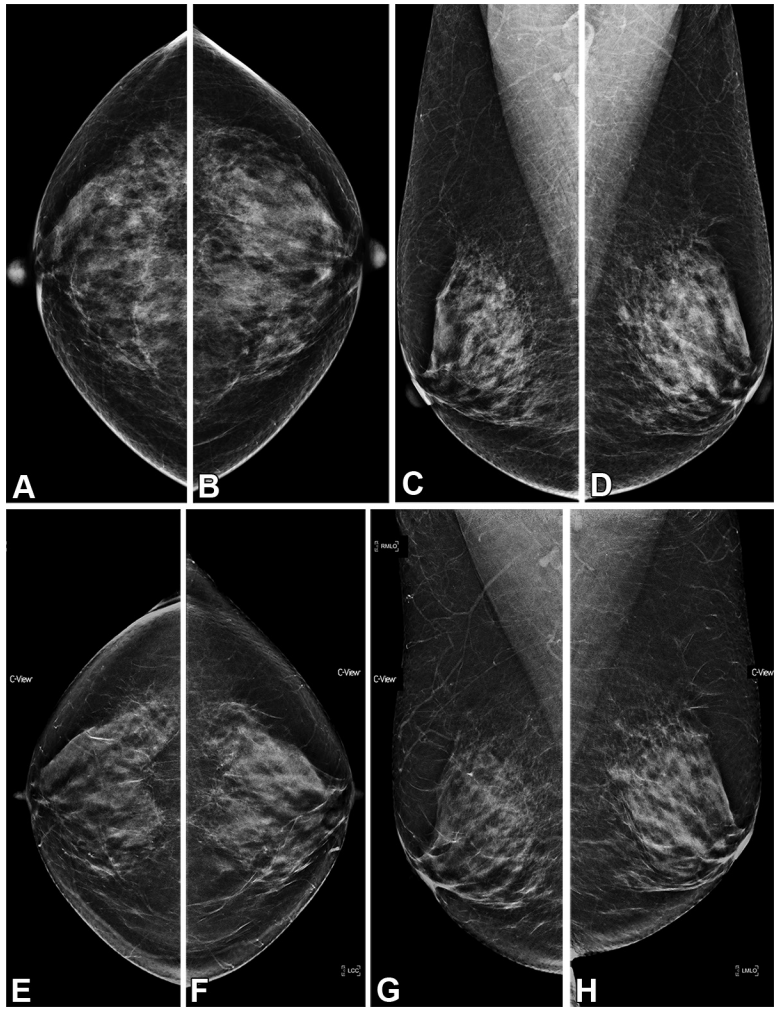

Figure 2: This 65-year-old woman underwent two-dimensional full-field digital screening mammography in 2015. **(A, B)** Bilateral craniocaudal and **(C, D)** mediolateral oblique views show that mammographic breast density was assessed as heterogeneously dense. The woman returned 1 year later for screening digital breast tomosynthesis mammography. Mammographic breast density was assessed as heterogeneously dense in the **(E, F)** bilateral craniocaudal and **(G, H)** mediolateral oblique synthetic two-dimensional images.

Association between Breast Density Categories and Incident Invasive Breast Cancer

We did not find evidence of a difference in the strength of the association between breast density categories and incident invasive breast cancer according to acquisition method (Table 5, *P* value for interaction = .45). When density was assessed with DM, women with almost entirely fatty breasts were at lower risk for breast cancer than were those with scattered fibroglandular density (HR = 0.55; 95% CI: 0.49, 0.63), and women with extremely dense breasts were at increased risk (HR = 1.72; 95% CI: 1.54, 1.93). Similarly, when density was assessed with DBT, women with almost entirely fatty breasts were at lower risk for breast cancer than were those with scattered fibroglandular density (HR = 0.37; 95% CI: 0.21, 0.66), and women with extremely dense breasts were at increased risk (HR = 2.05; 95% CI: 1.25, 3.36) (Table 5).

Discussion

In a secondary analysis of a cohort study of a large geographically diverse sample of mammography sites broadly representative of the United States (17), we found that the transition from digital mammography (DM) to digital breast tomosynthesis (DBT) has not appreciably altered the reporting of breast density. The κ statistics were not significantly different for pairs of mammograms whether both were obtained with DM (238 678 of 301 743 [79.1%], κ = 0.67), both were obtained with DBT (20 763 of 26 854 [77.3%], κ = 0.65), or one was obtained with DM and one with DBT (57 516 of 74 729 [77.0%], κ = 0.64). We also showed that the association between breast density categories and invasive breast cancer did not significantly vary by acquisition method (*P* = .45).

Prior work examining the transition from film mammography to DM in an earlier sample from the BCSC, which presented greater differences in image appearance,

Table 2: Characteristics of Women Included in Time to Invasive Breast Cancer Analyses

Characteristic	Digital Mammography (*n* = 330 121)	Digital Breast Tomosynthesis (*n* = 46 534)
Age at mammography		
40–44 years	42 788 (13)	4748 (10)
45–49 years	43 619 (13)	6007 (13)
50–54 years	53 520 (16)	7434 (16)
55–59 years	54 798 (17)	7890 (17)
60–64 years	52 991 (16)	7192 (15)
65–69 years	42 430 (13)	6790 (15)
70–74 years	26 239 (8)	4263 (9)
75–79 years	13 736 (4)	2210 (5)
Race and ethnicity		
American Indian/Alaska Native	779 (<1)	94 (<1)
Asian/Native Hawaiian/Pacific Islander	52 369 (16)	2621 (6)
Hispanic	20 363 (6)	1546 (3)
Non-Hispanic Black	23 782 (7)	3805 (8)
Non-Hispanic White	223 710 (68)	37 729 (81)
Other or Mixed	9118 (2.8)	739 (2)
Extended family history		
No family history	219 650 (67)	30 404 (65)
Second degree only	56 119 (17)	8425 (18)
First degree only, at least one	34 563 (10)	4499 (10)
First degree only, at least two	2662 (<1)	329 (<1)
Second degree and at least one first degree	15 378 (5)	2616 (6)
Second degree and at least two first degree	1749 (<1)	261 (<1)
Breast biopsy		
No prior biopsy	271 981 (82)	36 047 (77)
Prior biopsy but diagnosis unknown	39 103 (12)	5412 (12)
Nonproliferative	13 063 (4)	3253 (7)
Proliferative without atypia	4944 (1)	1512 (3)
Atypical hyperplasia	852 (<1)	262 (<1)
Lobular carcinoma in situ	179 (<1)	49 (<1)
Body mass index (kg/m^2)		
Underweight (<18.5)	6775 (2)	670 (1)
Normal (18.5–24.9)	144 583 (44)	17 826 (38)
Overweight (25.0–29.9)	90 734 (27)	13 651 (29)
Obese I (30.0–34.9)	47 959 (15)	7923 (17)
Obese II/III (≥35)	40 071 (12)	6464 (14)
Menopausal status		
Before	89 967 (27)	10 119 (22)
After	203 285 (62)	31 780 (68)
Woman did not know	36 869 (11)	4635 (10)
Age at first live birth		
Nulliparous	82 937 (25)	8798 (19)
<20 years	35 362 (11)	6323 (14)
20–24 years	46 494 (14)	10 511 (23)
25–29 years	37 976 (12)	8966 (19)
<30 years	46 864 (14)	2501 (5)
30+ years	38 926 (12)	1574 (3)
30–34 years	23 474 (7)	5263 (11)
35–39 years	10 862 (3)	2030 (4)
40+ years	7228 (2)	569 (1)

Note.—Data are numbers of patients, and data in parentheses are percentages.

also reported no change in reported density categories (10). The percentage agreement and κ statistic were similar for pairs of mammograms, whether both were acquired with film mammography (175 575 of 259 046 [67.8%]; κ = 0.49), both were acquired with DM (60 771 of 87 066 [69.8%]; κ = 0.54), or one was acquired with film mammography and one was acquired with DM (60 394 of 89 639 [67.4%]; κ = 0.49; *P* value not reported) (10). Of note, the agreement for pairs of mammograms acquired with DM is greater in our new study (percentage agreement, 238 678 of 301 743 [79.1%] vs 60 771 of 87 066 [69.8%]; κ = 0.67 vs κ = 0.54). This may reflect greater attention paid to density assessment in more recent years.

Mammographically dense breast tissue can mask cancers, thus lowering the sensitivity of mammography. Masking is the primary motivation for breast density laws in many states that require that a woman be informed that she has dense breasts (BI-RADS C or D), because it reduces sensitivity, and supplemental imaging may be appropriate (4). DBT has both a higher cancer detection rate and a lower recall rate than DM, so it may reduce the masking effect. When we grouped the density readings as either dense or not dense, the agreement was even higher. These findings are consistent with earlier work that found that the proportion of mammograms in each of the four BI-RADS categories did not change significantly from 2005 to 2016 (12).

Our study had limitations. First, the primary limitation was that we used an observational design and did not experimentally test whether the acquisition method changes density assessment. Second, we included breast density interpretations based on both the fourth and fifth editions of the BI-RADS lexicon. Third, we were unable to assess differences by equipment manufacturer. Fourth, with the breast density legislation, practices may be motivated to keep their breast density readings consistent from year to year, which may encourage radiologists to rely on the density reading from the prior mammogram.

In summary, our study found no important differences when density category was assigned based on digital mammography (DM) or digital breast tomosynthesis (DBT) results, nor did we find a difference in the strength of the association of breast density with invasive breast cancer by imaging modality. Thus, the transition from DM to DBT should not appreciably impact the use of breast density for recommending supplemental imaging or when using density in tools estimating breast cancer risk.

Table 3: Reader Agreement for BI-RADS Density by Acquisition Method

Method	DBT < DM (%)*	DM < DBT (%)†	Second > First Acquisition (%)‡	Second < First Acquisition (%)§	Agreement (%)	κ Value
DM-DBT or DBT-DM	14.5	10.9	11.1	14.4	77.0	0.64 (0.61, 0.71)
DBT first	13.4	11.1	13.3	11.4	77.6	0.65 (0.61, 0.72)
DM first	14.6	10.9	10.9	14.6	76.9	0.64 (0.60, 0.72)
DM-DM	NA	NA	10.6	12.3	79.1	0.67 (0.65, 0.73)
DBT-DBT	NA	NA	12.1	12.8	77.3	0.65 (0.61, 0.72)

Note.—Data in parentheses are the 95% CI. Pairwise comparisons are all nonsignificant: (κ DM-DBT or DBT-DM)–(κ DM-DM) estimated difference = –0.029; 95% CI: –0.0874, 0.0184. (κ DM-DBT or DBT-DM)–(κ DBT-DBT) estimated difference = –0.004; 95% CI: –0.0653, 0.0502. (κ DM-DM)–(κ DBT-DBT) estimated difference = 0.0249; 95 CI: –0.0377, 0.0948. (κ DBT first)–(κ DM first) estimated difference = 0.009; 95% CI: –0.0566, 0.0604. BI-RADS = Breast Imaging Reporting and Data System, DBT = digital breast tomosynthesis, DM = digital mammography, NA = not applicable.

* Among BI-RADS density B, C, or D on digital mammograms.

† Among BI-RADS density A, B, or C on digital mammograms.

‡ Among BI-RADS density A, B, or C at first interpretation.

§ Among BI-RADS density B, C, or D at first interpretation.

Table 4: Reader Agreement for Mammographically Dense or Nondense Classification by Acquisition Method

Method	DBT before DM (%)*	DM before DBT(%)†	Second > First Acquisition (%)‡	Second < First Acquisition (%)§	Agreement (%)	κ Value
DM-DBT or DBT-DM	15.0	8.7	8.9	14.8	88.4	0.77 (0.72, 0.81)
DBT first	14.3	8.6	11.4	10.9	88.9	0.77 (0.72, 0.84)
DM first	15.1	8.7	8.7	15.1	88.4	0.76 (0.72, 0.81)
DM-DM	NA	NA	8.8	13.4	89.2	0.78 (0.76, 0.82)
DBT-DBT	NA	NA	10.7	12.0	88.7	0.77 (0.73, 0.82)

Note.—Pairwise comparisons are all nonsignificant: (κ DM-DBT or DBT-DM)–(κ DM-DM) estimated difference = –0.014; 95% CI: –0.0759, 0.0198. (κ DM-DBT or DBT-DM)–(κ DBT-DBT) estimated difference = –0.007; 95% CI: –0.0579, 0.0317. (κ DM-DM)–(κ DBT-DBT) estimated difference = 0.0072; 95 CI: –0.0354, 0.0683. (κ DBT first)–(κ DM first) estimated difference = 0.009; 95% CI: –0.0365, 0.0603. DBT = digital breast tomosynthesis, DM = digital mammography, NA = not applicable.

* Among dense on digital mammograms.

† Among nondense on digital mammograms.

‡ Among nondense at first interpretation.

§ Among dense at first interpretation.

Table 5: Hazard Ratios for Invasive Breast Cancer by Acquisition Method

BI-RADS Density	DM HR	DBT HR
Almost entirely fat (category A)	0.55 (0.49, 0.63)	0.37 (0.21, 0.66)
Scattered fibroglandular density (category B)	Reference	Reference
Heterogeneously dense (category C)	1.47 (1.37, 1.58)	1.36 (1.02, 1.82)
Extremely dense (category D)	1.72 (1.54, 1.93)	2.05 (1.25, 3.36)

Note.—Data in parentheses are the 95% robust CI. Model includes interaction between acquisition method and Breast Imaging Reporting and Data System (BI-RADS) density (P = .45); adjusts for age at study entry, year of study entry, race and ethnicity, extended family history, breast biopsy, body mass index, menopausal status, and age at first live birth; and stratifies by site. DBT = digital breast tomosynthesis, DM = digital mammography, HR = hazard ratio.

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