





Selected Scientific Publications on Breast Density


MAMMOGRAPHY

1. Bernardi D, Pellegrini M, Di Michele S, Tuttobene P, Fantò C, Valentini M, Gentilini M, Ciatto S. **Interobserver agreement in breast radiological density attribution according to BI-RADS quantitative classification.** Radiol Med. 2012 Jun; 117(4):519-528. Epub 2012 Jan 7. PubMed PMID: 22228132.  

** Key Point: The readers showed good agreement for visual classification of mammography density, however, the classification of dense breasts showed some variation among readers. (Range 6%-15%). The authors suggest comparing the visual classification with the computer-density category attribution.*

2. Britton P, Warwick J, Wallis MG, O'Keeffe S, Taylor K, Sinnatamby R, Barter S, Gaskarth M, Duffy SW, Wishart GC. **Measuring the accuracy of diagnostic imaging in symptomatic breast patients: team and individual performance.** Br J Radiol. 2012 Apr; 85(1012):415-22. Epub 2011 Jan 11. PubMed PMID: 21224304.  



** Key Point: The reporting sensitivity between radiologists varied widely (53.1-74.1% for mammography and 67.1-87.0% for ultrasound) and was correlated with the radiologist experience.*

3. Checka CM, Chun JE, Schnabel FR, Lee J, Toth H. **The relationship of mammographic density and age: implications for breast cancer screening.** AJR Am J Roentgenol. 2012 Mar; 198(3):W292-5. PubMed PMID: 22358028. 



** Key Point: Breast density has an inverse relation to the patient age, with exceptions at extremes of ages. The authors suggest that for women with high risk of the disease, breast density should be considered prior to extending imaging of breast cancer.*

4. Ciatto S, Bernardi D, Calabrese M, Durando M, Gentilini MA, Mariscotti G, Monetti F, Moriconi E, Pesce B, Roselli A, Stevanin C, Tapparelli M, Houssami N. **A first evaluation of breast radiological density assessment by QUANTRA software as compared to visual classification.** Breast. 2012 Jan 27. [Epub ahead of print] PubMed PMID: 22285387.



** Key Point: The breast density computed by QUANTRA software is absolutely reproducible and thus preferred over visual classification.*

5. Couto E, Qureshi SA, Hofvind S, Hilsen M, Aase H, Skaane P, Vatten L, Ursin G. **Hormone therapy use and mammographic density in postmenopausal Norwegian women.** Breast Cancer Res Treat. 2012 Feb; 132(1):297-305. Epub 2011 Nov 4. PubMed PMID: 22052325.  

** Key Point: The authors conclude that the mammographic density is higher in women that used hormone therapy with estrogen and progesterone, especially in women that used high-dose norethisterone acetate regimens.*

6. Evans DG, Warwick J, Astley SM, Stavrinou P, Sahin S, Ingham S, McBurney H, Eckersley B, Harvie M, Wilson M, Beetles U, Warren R, Hufton A, Sergeant JC, Newman WG, Buchan I, Cuzick J, Howell A. **Assessing Individual Breast Cancer Risk within the U.K. National Health Service Breast Screening Program: A New Paradigm for Cancer Prevention.** Cancer Prev Res (Phila). 2012 May 25. [Epub ahead of print] PubMed PMID: 22581816.  

** Key Point: The authors conclude that mammographic density and genetic factors should be considered in addition to the standard risk factors for determining breast cancer risk and acting on the information for population-based mammographic screening.*

7. Häberle L, Wagner F, Fasching PA, Jud SM, Heusinger K, Loehberg CR, Hein A, Bayer CM, Hack CC, Lux MP, Binder K, Elter M, Münzenmayer C, Schulz-Wendtland R, Meier-Meitinger M, Adamietz BR, Uder M, Beckmann MW, Wittenberg T. **Characterizing mammographic images by using generic texture features.** Breast Cancer Res. 2012 Apr 10; 14(2):R59. [Epub ahead of print] PubMed PMID: 22490545.  

** Key Point: The authors conclude that larger control studies should be conducted to investigate if the texture features contribute to the prediction of risk of breast cancer accurately.*

8. Kallenberg MG, Karssemeijer N. **Compression paddle tilt correction in full-field digital mammograms.** Phys Med Biol. 2012 Feb 7; 57(3):703-15. Epub 2012 Jan 13. PubMed PMID: 22241616.

** Key Point: The authors explain the paddle tilts affects the breast thickness, which influence the grey-level values of the image. The authors state this affect can hamper image analysis, such as volumetric breast density estimation. This paper describes and validates the tilt correction methods.*

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9. Kerlikowske K. **Screening mammography in women less than age 50 years.** Curr Opin Obstet Gynecol. 2012 Feb; 24(1):38-43. Review. PubMed PMID: 22037165.  



** Key Point: The authors conclude that for women aged 40-49 years, the practitioners should discuss the potential benefits and harms of screening mammography before offering them screening.*

10. Lobbes MB, Cleutjens JP, Lima Passos V, Frotscher C, Lahaye MJ, Keymeulen KB, Beets-Tan RG, Wildberger J, Boetes C. **Density is in the eye of the beholder: visual versus semi-automated assessment of breast density on standard mammograms.** Insights Imaging. 2012 Feb; 3(1):91-9. Epub 2011 Nov 20. PubMed PMID: 22696002; PubMed Central PMCID: PMC3292640.  



** Key Point: The authors conclude that visual classification of breast density from the mammograms is inaccurate and observer-dependent.*

11. Meggiorini ML, Cipolla V, Rech F, Labi L, Vestri A, de Felice C. **Mammographic features in infertile women as a potential risk for breast cancer: a preliminary study.** Eur J Gynaecol Oncol. 2012; 33(1):51-5. PubMed PMID: 22439405.



** Key Point: The authors suggest that patients from age 35 that undergo fertility treatments should be screened for breast cancer; this may allow them to identify higher risk patients and can closely monitor their breast exams.*

12. Pearce MS, Tennant PW, Mann KD, Pollard TM, McLean L, Kaye B, Parker L. **Lifecourse predictors of mammographic density: the Newcastle Thousand Families cohort Study.** Breast Cancer Res Treat. 2012 Jan; 131(1):187-95. Epub 2011 Aug 11. PubMed PMID: 21833624.  



** Key Point: The study shows that babies with higher birth weight have a higher risk of developing breast cancer.*

13. Pérez-Gómez B, Ruiz F, Martínez I, Casals M, Miranda J, Sánchez-Contador C, Vidal C, Llobet R, Pollán M, Salas D. **Women's features and inter-/intra-rater agreement on mammographic density assessment in full-field digital mammograms (DDM-SPAIN).** Breast Cancer Res Treat. 2012 Feb; 132(1):287-95. Epub 2011 Nov 1. PubMed PMID: 22042363.  



** Key Point: The study concludes that the radiologists had good agreement in the intra-rater assessment in images with low mammographic density, however the same was not true for images with higher mammographic density.*

14. Pollán M, Lope V, Miranda-García J, García M, Casanova F, Sánchez-Contador C, Santamaría C, Moreno P, Vidal C, Peris M, Moreno MP, Vázquez-Carrete JA, Collado F, Pedraz-Pingarrón C, Ascunce N, Salas-Trejo D, Aragonés N, Pérez-Gómez B, Ruiz-Perales F; DDM-Spain. **Adult weight gain, fat distribution and mammographic density in Spanish pre- and post-menopausal women (DDM-Spain).** Breast Cancer Res Treat. 2012 Jun 12. [Epub ahead of print] PubMed PMID: 22689088.  

** Key Point: The study found that when BMI, fat distribution and other confounders were taken into consideration, the results show a clear dose-response gradient between weight gain during adulthood and the proportion of dense tissue in the breast.*

15. Qureshi SA, Couto E, Hofvind S, Wu AH, Ursin G. **Alcohol intake and mammographic density in postmenopausal Norwegian women.** Breast Cancer Res Treat. 2012 Feb; 131(3):993-1002. Epub 2011 Oct 13. PubMed PMID: 21993860.  



** Key Point: The study found no evidence of an association between alcohol intake and mammographic density.*

16. Shepherd JA, Kerlikowske K. **Do fatty breasts increase or decrease breast cancer risk?** Breast Cancer Res. 2012 Jan 25; 14(1):102. [Epub ahead of print] PubMed PMID: 22277587.  



** Key Point: The authors provide a review of research associating non-dense breast tissue with breast cancer risk.*

17. Smith J, Dilawari A, Ursin G, Andreopoulou E, Checka C, Axelrod D, Guth A, Toth H, Utate M, Carapetyan K, Reich E, Diflo T, Muggia F. **A pilot study of letrozole for one year in women at enhanced risk of developing breast cancer: effects on mammographic density.** Anticancer Res. 2012 Apr; 32(4):1327-31. PubMed PMID: 22493366.



** Key Point: This study supports the use of letrozole for reducing breast cancer risk, using mammographic density as a biomarker.*

18. Spayne MC, Gard CC, Skelly J, Miglioretti DL, Vacek PM, Geller BM. **Reproducibility of BI-RADS Breast Density Measures Among Community Radiologists: A Prospective Cohort Study.** Breast J. 2012 May 21. doi:10.1111/j.1524-4741.2012.01250.x. [Epub ahead of print] PubMed PMID: 22607064.  



** Key Point: The study findings underscore the need for additional evaluation of the BI-RADS breast density categorization system in clinical practice, due to intra-radiologist variability.*

19. Sprague BL, Trentham-Dietz A, Gangnon RE, Buist DS, Burnside ES, Aiello Bowles EJ, Stanczyk FZ, Sisney GS, Skinner HG. **The vitamin D pathway and mammographic breast density among postmenopausal women.** Breast Cancer Res Treat. 2012 Jan; 131(1):255-65. Epub 2011 Aug 17. PubMed PMID: 21847642; PubMed Central PMCID: PMC3250989.  

** Key Point: The study suggests no strong independent association between the use of vitamin D and mammographic breast density in post-menopausal women.*

20. Stone J, Dite GS, Giles GG, Cawson J, English DR, Hopper JL. **Inference about Causation from Examination of Familial Confounding: Application to Longitudinal Twin Data on Mammographic Density Measures that Predict Breast Cancer Risk.** Cancer Epidemiol Biomarkers Prev. 2012 May 22. [Epub ahead of print] PubMed PMID:22539605.  

** Key Point: The authors found that mammographic density measurements are highly correlated over time, and that familial/genetic components of their variations are established before mid-life.*

21. Varghese JS, Thompson DJ, Michailidou K, Lindström S, Turnbull C, Brown J, Leyland J, Warren RM, Luben RN, Loos RJ, Wareham NJ, Rommens J, Paterson AD, Martin LJ, Vachon CM, Scott CG, Atkinson EJ, Couch FJ, Apicella C, Southey MC, Stone J, Li J, Eriksson L, Czene K, Boyd NF, Hall P, Hopper JL, Tamimi RM; MODE Consortium, Rahman N, Easton DF. **Mammographic breast density and breast cancer: evidence of a shared genetic basis.** *Cancer Res.* 2012 Mar 15; 72(6):1478-84. Epub 2012 Jan 19. PubMed PMID: 22266113; PubMed Central PMCID: PMC3378688.  



** Key Point: The authors' research found a shared genetic basis between breast cancer and PMD (percent mammographic breast density) that is facilitated by a number of common variants.*

22. Wang X, Li L, Xu W, Liu W, Lederman D, Zheng B. **Improving performance of computer-aided detection of masses by incorporating bilateral mammographic density asymmetry: an assessment.** *Acad Radiol.* 2012 Mar; 19(3):303-10. Epub 2011 Dec 14. PubMed PMID: 22173323; PubMed Central PMCID: PMC3274572.  



** Key Point: The study demonstrated that use of mammographic density in conjunction with CAD could substantially increase CAD performance in mass detection.*

23. Woolcott CG, Koga K, Conroy SM, Byrne C, Nagata C, Ursin G, Vachon CM, Yaffe MJ, Pagano I, Maskarinec G. **Mammographic density, parity and age at first birth, and risk of breast cancer: an analysis of four case-control studies.** *Breast Cancer Res Treat.* 2012 Apr; 132(3):1163-71. Epub 2012 Jan 6. PubMed PMID: 22222356; PubMed Central PMCID: PMC3336030.  



** Key Point: The authors found that parity did not modify the breast cancer risk attributed to mammographic density.*

24. Yaghjian L, Colditz GA, Rosner B, Tamimi RM. **Mammographic breast density and breast cancer risk by menopausal status, postmenopausal hormone use and a family history of breast cancer.** *Cancer Causes Control.* 2012 May; 23(5):785-90. doi:10.1007/s10552-012-9936-7. Epub 2012 Mar 23. PubMed PMID: 22438073.  

** Key Point: The authors state that findings on associations by menopausal status/hormone use are suggestive and should be examined in larger studies.*

25. Yaghjian L, Mahoney MC, Succop P, Wones R, Buckholz J, Pinney SM. **Relationship between breast cancer risk factors and mammographic breast density in the Fernald Community Cohort.** *Br J Cancer.* 2012 Feb 28; 106(5):996-1003. doi:10.1038/bjc.2012.1. Epub 2012 Jan 26. PubMed PMID: 22281662; PubMed Central PMCID: PMC3305977.  



** Key Point: The authors conclude that the associations of alcohol and parity with breast density appear to be in reverse direction, but stronger in women with a family history and women who have used HRT.*

26. Zheng B, Sumkin JH, Zuley ML, Wang X, Klym AH, Gur D. **Bilateral mammographic density asymmetry and breast cancer risk: A preliminary assessment.** *Eur J Radiol.* 2012 May 12. [Epub ahead of print] PubMed PMID: 22579527.  

** Key Point: The study found that bilateral mammographic density asymmetry may be a stronger risk factor associated with the risk of women developing breast cancer in near-term than the woman's age and assessed mean mammographic density.*


MAMMOGRAPHY/TOMOSYNTHESIS



27. Olgar T, Kahn T, Gosch D. **Average Glandular Dose in Digital Mammography and Breast Tomosynthesis.** *Rofo.* 2012 Jun 18. [Epub ahead of print] PubMed PMID: 22711250.



28. Packard NJ, Abbey CK, Yang K, Boone JM. **Effect of slice thickness on detectability in breast CT using a prewhitened matched filter and simulated mass lesions.** *Med Phys.* 2012 Apr; 39(4):1818-30. PubMed PMID: 22482604; PubMed Central PMCID: PMC3316691.  

29. Tagliafico A, Tagliafico G, Astengo D, Cavagnetto F, Rosasco R, Rescinito G, Monetti F, Calabrese M. **Mammographic density estimation: one-to-one comparison of digital mammography and digital breast tomosynthesis using fully automated software.** *Eur Radiol.* 2012 Jun; 22(6):1265-70. Epub 2012 Feb 24. PubMed PMID: 22358426.  





MAGNETIC RESONANCE IMAGING

30. DeMartini WB, Liu F, Peacock S, Eby PR, Gutierrez RL, Lehman CD. **Background parenchymal enhancement on breast MRI: impact on diagnostic performance.** *AJR Am J Roentgenol.* 2012 Apr; 198(4):W373-80. PubMed PMID: 22451576. 









31. Kim BS. **Usefulness of breast-specific gamma imaging as an adjunct modality in breast cancer patients with dense breast: a comparative study with MRI.** *Ann Nucl Med.* 2012 Feb; 26(2):131-7. Epub 2011 Oct 18. PubMed PMID: 22006539.  





32. Wei CH, Li Y, Huang PJ, Gwo CY, Harms SE. **Estimation of breast density: an adaptive moment preserving method for segmentation of fibroglandular tissue in breast magnetic resonance images.** *Eur J Radiol.* 2012 Apr; 81(4):e618-24. Epub 2012 Jan 21. PubMed PMID: 22266417.  





ULTRASOUND





33. Chew GL, Huang D, Lin SJ, Huo C, Blick T, Henderson MA, Hill P, Cawson J, Morrison WA, Campbell IG, Hopper JL, Southey MC, Haviv I, Thompson EW. **High and low mammographic density human breast tissues maintain histological differential in murine tissue engineering chambers.** Breast Cancer Res Treat. 2012 Jun 23. [Epub ahead of print] PubMed PMID: 22729891.  
34. Choi BB, Shu KS. **Metaplastic carcinoma of the breast: multimodality imaging and histopathologic assessment.** Acta Radiol. 2012 Feb 1; 53(1):5-11. Epub 2011 Nov 16. PubMed PMID: 22090465.  

OTHER

35. Carney PA, Cook AJ, Miglioretti DL, Feig SA, Bowles EA, Geller BM, Kerlikowske K, Kettler M, Onega T, Elmore JG. **Use of clinical history affects accuracy of interpretive performance of screening mammography.** J Clin Epidemiol. 2012 Feb; 65(2):219-30. Epub 2011 Oct 15. PubMed PMID: 22000816; PubMed Central PMCID: PMC3253253.  
36. Conroy SM, Woolcott CG, Koga KR, Byrne C, Nagata C, Ursin G, Vachon CM, Yaffe MJ, Pagano I, Maskarinec G. **Mammographic density and risk of breast cancer by adiposity: an analysis of four case-control studies.** Int J Cancer. 2012 Apr 15; 130(8):1915-24. doi: 10.1002/ijc.26205. Epub 2011 Sep 17. PubMed PMID: 21630258; PubMed Central PMCID: PMC3254813.  
37. Darabi H, Czene K, Zhao W, Liu J, Hall P, Humphreys K. **Breast cancer risk prediction and individualised screening based on common genetic variation and breast density measurement.** Breast Cancer Res. 2012 Feb 7; 14(1):R25. [Epub ahead of print] PubMed PMID: 22314178.
38. Davey DA. **Update: estrogen and estrogen plus progestin therapy in the care of women at and after the menopause.** Womens Health (Lond Engl). 2012 Mar; 8(2):169-89. Review. PubMed PMID: 22375720.  
39. Dite GS, Stone J, Chiarelli AM, Giles GG, English DR, Cawson JC, Hopper JL. **Are genetic and environmental components of variance in mammographic density measures that predict breast cancer risk independent of within-twin pair differences in body mass index?** Breast Cancer Res Treat. 2012 Jan; 131(2):553-9. Epub 2011 Aug 27. PubMed PMID: 21874311.
40. Eriksson L, Czene K, Rosenberg L, Humphreys K, Hall P. **The influence of mammographic density on breast tumor characteristics.** Breast Cancer Res Treat. 2012 Jun 19. [Epub ahead of print] PubMed PMID: 22710708.  

41. Eriksson L, Hall P, Czene K, Dos Santos Silva I, McCormack V, Bergh J, Bjohle J, Ploner A. **Mammographic density and molecular subtypes of breast cancer.** Br J Cancer. 2012 May 29. doi: 10.1038/bjc.2012.234. [Epub ahead of print] PubMed PMID: 22644308.  
42. Ghosh K, Brandt KR, Reynolds C, Scott CG, Pankratz VS, Riehle DL, Lingle WL, Odogwu T, Radisky DC, Visscher DW, Ingle JN, Hartmann LC, Vachon CM. **Tissue composition of mammographically dense and non-dense breast tissue.** Breast Cancer Res Treat. 2012 Jan; 131(1):267-75. Epub 2011 Aug 30. PubMed PMID: 21877142.  
43. Heusinger K, Jud SM, Häberle L, Hack CC, Adamietz BR, Meier-Meitingner M, Lux MP, Wittenberg T, Wagner F, Loehberg CR, Uder M, Hartmann A, Schulz-Wendtland R, Beckmann MW, Fasching PA. **Association of mammographic density with hormone receptors in invasive breast cancers: Results from a case-only study.** Int J Cancer. 2012 Mar 6. doi: 10.1002/ijc.27515. [Epub ahead of print] PubMed PMID: 22392346.  
44. Izzo L, Meggiorini ML, Nofroni I, Pala A, De Felice C, Meloni P, Simari T, Izzo S, Pugliese F, Impara L, Merlini G, Di Cello P, Cipolla V, Forcione AR, Paliotta A, Domenici L, Bolognese A. **Insulin-like growth factor-I (IGF-1), IGF-binding protein-3 (IGFBP-3) and mammographic features.** G Chir. 2012 May; 33(5):153-62. PubMed PMID: 22709450.
45. Kricker A, Disipio T, Stone J, Goumas C, Armes JE, Gertig DM, Armstrong BK. **Bodyweight and other correlates of symptom-detected breast cancers in a population offered screening.** Cancer Causes Control. 2012 Jan; 23(1):89-102. Epub 2011 Oct 22. PubMed PMID: 22020871.  
46. Lee E, Ingles SA, Van Den Berg D, Wang W, Lavalley C, Huang MH, Crandall CJ, Stanczyk FZ, Greendale GA, Ursin G. **Progestogen levels, progesterone receptor gene polymorphisms, and mammographic density changes: results from the Postmenopausal Estrogen/Progestin Interventions Mammographic Density Study.** Menopause. 2012 Mar; 19(3):302-10. PubMed PMID: 22105149.  
47. Lope V, Pérez-Gómez B, Sánchez-Contador C, Santamariña MC, Moreo P, Vidal C, Laso MS, Ederra M, Pedraz-Pingarrón C, González-Román I, García-López M, Salas-Trejo D, Peris M, Moreno MP, Vázquez-Carrete JA, Collado F, Aragonés N, Pollán M; DDM-Spain. **Obstetric history and mammographic density: a population-based cross-sectional study in Spain (DDM-Spain).** Breast Cancer Res Treat. 2012 Apr; 132(3):1137-46. Epub 2012 Jan 4. PubMed PMID: 22215386; PubMed Central PMCID: PMC3332340.  
48. Peplonska B, Bukowska A, Sobala W, Reszka E, Gromadzinska J, Wasowicz W, Lie JA, Kjuus H, Ursin G. **Rotating Night Shift Work and Mammographic Density.** Cancer Epidemiol Biomarkers Prev. 2012 May 22. [Epub ahead of print] PubMed PMID: 22539602.  

49. Phipps AI, Buist DS, Malone KE, Barlow WE, Porter PL, Kerlikowske K, O'Meara ES, Li CI. **Breast density, body mass index, and risk of tumor marker-defined subtypes of breast cancer.** Ann Epidemiol. 2012 May; 22(5):340-8. Epub 2012 Feb 25. PubMed PMID: 22366170; PubMed Central PMCID: PMC3338877.  
50. Stevens KN, Lindstrom S, Scott CG, Thompson D, Sellers TA, Wang X, Wang A, Atkinson E, Rider DN, Eckel-Passow JE, Varghese JS, Audley T, Brown J, Leyland J, Luben RN, Warren RM, Loos RJ, Wareham NJ, Li J, Hall P, Liu J, Eriksson L, Czene K, Olson JE, Shane Pankratz V, Fredericksen Z, Diasio RB, Lee AM, Heit JA, Deandrade M, Goode EL, Vierkant RA, Cunningham JM, Armasu SM, Weinshilboum R, Fridley BL, Batzler A, Ingle JN, Boyd NF, Paterson AD, Rommens J, Martin LJ, Hopper JL, Southey MC, Stone J, Apicella C, Kraft P, Hankinson SE, Hazra A, Hunter DJ, Easton DF, Couch FJ, Tamimi RM, Vachon CM. **Identification of a novel percent mammographic density locus at 12q24.** Hum Mol Genet. 2012 May 14. [Epub ahead of print] PubMed PMID: 22532574.  

51. Stone J, Willenberg L, Apicella C, Treloar S, Hopper J. **The association between mammographic density measures and aspirin or other NSAID use.** Breast Cancer Res Treat. 2012 Feb; 132(1):259-66. Epub 2011 Oct 30. PubMed PMID: 22037829.  
52. Vachon CM, Li J, Scott CG, Hall P, Czene K, Wang X, Liu J, Fredericksen ZS, Rider DN, Wu FF, Olson JE, Cunningham JM, Stevens KN, Sellers TA, Pankratz SV, Couch FJ. **No evidence for association of inherited variation in genes involved in mitosis and percent mammographic density.** Breast Cancer Res. 2012 Jan 7; 14(1):R7. [Epub ahead of print] PubMed PMID: 22226020.  
53. Yaghjian L, Colditz GA, Drake B. **Vitamin D and mammographic breast density: a systematic review.** Cancer Causes Control. 2012 Jan; 23(1):1-13. Epub 2011 Oct 8. Review. PubMed PMID: 21984232. 