

Bölüm 1

MEME KANSERİ EPİDEMİYOLOJİSİ, RİSK FAKTÖRLERİ VE RİSK SKORLAMA SİSTEMLERİ

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GİRİŞ

Meme kanseri, menopoza yaklaşan kadınlarda tanısı en sık konulan neoplastik hastalık olup, sıklıkla kadınların günlük yaşamlarında normal fonksiyonları yerine getirme yeteneğinde önemli bir azalmaya yol açmaktadır. Globocan 2018 yılı Türkiye epidemiyolojik verilerine göre yeni meme kanseri olgularının sayısı 22,345 olup, tanısı konulan tüm kanser olgularının yaklaşık %10,6'si kadınlarda görülen kanserler içinde de yaklaşık %24,4 ünü oluşturmaktadır. Meme kanseri hastalarında yaş dağılımı da oldukça karakteristiktir. Bu kanserlerin %80'inin tanısı 50 yaş ve üzeri kadınlarda konulmaktadır. Ayrıca epidemiyolojik verilere göre meme kanseri olgularının %50'si 50-69 yaş arasındaki kadınlarda görülmektedir. Burada özellikle endişe verici olan nokta, son 20 yılda Türkiye toplumunda meme kanseri oluşumunda 2 katından fazla bir artış gözlemlenmiş olmamızdır. Ne yazık ki bu artış, tedavi sonuçlarında anlamlı bir iyileşme ile ilişkili olmamıştır. En son yapılan analize göre 5 yıllık sağ kalım, 2000-2002 yılları arasında tanı alan hastalarda %75 iken, bu oran 2003-2005 yılları arasında tanı alan hastalarda %77.5 olarak saptanmıştır. Epidemiyolojik çalışmalarda sosyal ve mesleki yaşama aktif bir şekilde katılan kadınlarda meme kanseri insidansında gözlenen artış, bu tür neoplazmaların oluşumuyla ilişkili risk faktörlerinin saptanması amacıyla çok yönlü çalışmalar yapmak gerektiğini göstermektedir. Geçtiğimiz birkaç yılda yapılan kapsamlı çalışmalarda, tanısı yeni konulan kanser olgularının %20-30'unun, meme hücrelerinin neoplastik dönüşümünün; aktif olarak sürecini başlatan veya modifiye eden çeşitli risk faktörlerinin oluşumuyla ilişkili olabileceği gösterilmiştir. Bu faktörlerin en önemlileri 40 yaş üzeri olmak, meme bezi hastalıkları öykü-

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düktif ve genetik deęişkenler dahil olmak üzere meme kanseri gelişiminin önemli risk faktörlerinin bir çoğunun deęiştirilmesi kolay deęildir. Meme kanserinin epidemiyolojisinin ayrıntılı bir şekilde anlaşılması etkili tarama uygulamalarında bilgi sağlayarak klinisyenlerin bireysel hastalarda risk deęerlendirmesine ve yönetim kararlarına yardımcı olabilir. Pek çok risk faktörü iyi tanımlanmış olmakla birlikte etnik köken genetik yatkınlık ve tümör histolojisinin rolü konusunda devam eden araştırmalar tarama ve tedaviyi yönlendirerek ileri taşıyacaktır.

KAYNAKLAR

1. Hill TD, Khamis HJ, Tyczynski JE, et al. Comparison of male and female breast cancer incidence trends, tumor characteristics, and survival. *Ann Epidemiol* 2005; 15: 773-780.
2. Howlader N, Noone AM, Krapcho M, et al. SEER cancer statistics review, 1975-2010. Bethesda (MD): National Cancer Institute. Available at: http://seer.cancer.gov/csr/1975_2010/, based on November 2012 SEER data submission. Accessed March 11, 2014.
3. Ferlay J, Shin HR, Bray F, et al. Estimates of worldwide burden of cancer in 2008:GLOBOCAN 2008. *Int J Cancer* 2010;127:2893-917.
4. Feuer EJ, Wun LM. How much of the recent rise in breast cancer incidence can be explained by increases in mammography utilization? *Am J Epidemiol* 1992;136:1423-36.
5. Kumle M. Declining breast cancer incidence and decreased HRT use. *Lancet* 2008;372:608-10.5.Lara-Medina F, Perez-Sanchez V, Saavedra-Perez D, et al. Triple-negative breast cancer in Hispanic patients. *Cancer* 2011;117:3658-69.
6. Cross CK, Harris J, Recht A. Race, socioeconomic status, and breast carcinoma in the U.S. *Cancer* 2002;95:1988-99.
7. Newman LA, Griffith KA, Jatoi I, et al. Meta-analysis of survival in African American and white American patients with breast cancer: ethnicity compared with socioeconomic status. *J Clin Oncol* 2006;24:1342-9.
8. Amirikia KC, Mills P, Bush J, et al. Higher population-based incidence rates of triple-negative breast cancer among young African-American women: implications for breast cancer screening recommendations. *Cancer* 2011;117:2747-53
9. Yasui Y, Potter JD. The shape of age-incidence curves of female breast cancer by hormone-receptor status. *Cancer Causes Control* 1999;10:431-7.
10. Hsieh CC, Trichopoulos D, Katsouyanni K, et al. Age at menarche, age at menopause,height and obesity as risk factors for breast cancer: associations and interactions in an international case-control study. *Int J Cancer* 1990;46(5):796-800.
11. Kelsey JL, Gammon MD, John EM. Reproductive factors and breast cancer. *Epidemiol Rev* 1993;15:36-47.
12. MacMahon B, Trichopoulos D, Brown J, et al. Age at menarche, urine estrogens and breast cancer risk. *Int J Cancer* 1982;30(4):427-31.
13. Apter D, Reinila M, Vihko R. Some endocrine characteristics of early menarche,a risk factor for breast cancer, are preserved into adulthood. *Int J Cancer* 1989;44:783-7.
14. Korzeniowski S, Dyba T. Reproductive history and prognosis in patients with operable breast cancer. *Cancer* 1994;74(5):1591-4.
15. Orgeas CC, Hall P, Rosenberg LU, et al. The influence of menstrual risk factors on tumor characteristics and survival in postmenopausal breast cancer. *Breast Cancer Res* 2008;10(6):R107.
16. MacMahon B, Cole P, Lin TM, et al. Age at first birth and breast cancer risk. *Bull World Health Organ* 1970;43(2):209.21.
17. Lee SH, Akuete K, Fulton J, et al. An increased risk of breast cancer after delayed first parity. *Am J Surg* 2003;186(4):409-12.
18. Nagata C, Hu YH, Shimizu H. Effects of menstrual and reproductive factors on the risk of breast

- cancer: meta-analysis of the case-control studies in Japan. *Jpn J Cancer Res* 1995;86(10):910–5.
19. Yang XR, Chang-Claude J, Good EL, et al. Associations of breast cancer risk factors with tumor subtypes: a pooled analysis from the Breast Cancer Association Consortium studies. *J Natl Cancer Inst* 2011;103(3):250–63
 20. Ma H, Bernstein L, Pike MC, et al. Reproductive factors and breast cancer risk according to joint estrogen and progesterone receptor status: a meta-analysis of epidemiological studies. *Breast Cancer Res* 2006;8(4):R43.
 21. Lambe M, Hsieh C, Trichopoulos D, et al. Transient increase in the risk of breast cancer after giving birth. *N Engl J Med* 1994;331:5–9.
 22. Russo J, Moral R, Balogh GA, et al. The protective role of pregnancy in breast cancer. *Breast Cancer Res* 2005;7:131–42.
 23. Collaborative Group on Hormonal Factors in Breast Cancer. Breast cancer and breastfeeding: collaborative reanalysis of individual data from 47 epidemiological studies in 30 countries, including 50302 women with breast cancer and 96973 women without the disease. *Lancet* 2002;360:187–95.
 24. Lipworth L, Bailey LR, Trichopoulos D. History of breast-feeding in relation to breast cancer risk: a review of the epidemiologic literature. *J Natl Cancer Inst* 2000;92(4):302–12.
 25. Tao SC, Yu MC, Ross RK, et al. Risk factors for breast cancer in Chinese women of Beijing. *Int J Cancer* 1988;4:495–8.
 26. Kotsopoulos J, Lubinski J, Salmena L, et al. Breastfeeding and the risk of breast cancer in BRCA1 and BRCA2 mutation carriers. *Breast Cancer Res* 2012;14(2):R42.
 27. Hildreth NG, Kelsey JL, Eisenfeld AJ, et al. Differences in breast cancer risk factors according to the estrogen receptor level of the tumor. *J Natl Cancer Inst* 1983;70:1027–31.
 28. Byers T, Graham S, Rzepka T, et al. Lactation and breast cancer. Evidence for a negative association in premenopausal women. *AmJ Epidemiol* 1985;12:664–74.
 29. Petrakis NL, Wrensch MR, Ernster VL, et al. Influence of pregnancy and lactation on serum and breast fluid estrogen levels: implications for breast cancer risk. *Int J Cancer* 1987;40:587–91.
 30. Russo J, Russo IH. Toward a physiological approach to breast cancer prevention. *Cancer Epidemiol Biomarkers Prev* 1994;3:353–64.
 31. Daling JR, Malone KE, Voigt LF, et al. Risk of breast cancer among young women: relationship to induced abortion. *J Natl Cancer Inst* 1994;86(21):1584–92.
 32. Brind J, Chinchilli VM, Severs WB, et al. Induced abortion as an independent risk factor for breast cancer: a comprehensive review and meta-analysis. *J Epidemiol Community Health* 1996;50:481–96.
 33. Melbye M, Wohlfahrt J, Olsen JH, et al. Induced abortion and the risk of breast cancer. *N Engl J Med* 1997;336(2):81–5.
 34. Collaborative Group on Hormonal Factors in Breast Cancer. Breast cancer and abortion: collaborative reanalysis of data from 53 epidemiological studies, including 83,000 women with breast cancer from 16 countries. *Lancet* 2004;363:1007–16.
 35. Trichopoulos D, MacMahon B, Cole P. Menopause and breast cancer risk. *J Natl Cancer Inst* 1972;48:605–13.
 36. Collaborative Group on Hormonal Factors in Breast Cancer. Menarche, menopause, and breast cancer risk: individual participant meta-analysis, including 118964 women with breast cancer from 117 epidemiological studies. *Lancet Oncol* 2012;13(11):1141–51.
 37. Rebbeck TR, Lynch HT, Neuhausen SL, et al. Prophylactic oophorectomy in carriers of BRCA1 or BRCA2 mutations. *N Engl J Med* 2002;346:1616–22.
 38. Hunter DJ, Colditz GA, Hankinson SE, et al. Oral contraceptive use and breast cancer: a prospective study of young women. *Cancer Epidemiol Biomarkers Prev* 2010;19(10):2496–502.
 39. Marchbanks PA, McDonald JA, Wilson HG, et al. Oral contraceptives and the risk of breast cancer. *N Engl J Med* 2002;346:2025–32.
 40. Collaborative Group on Hormonal Factors in Breast Cancer. Breast cancer and hormonal contraceptives: collaborative reanalysis of individual data on 53297 women with breast cancer and

- 100239 women without breast cancer from epidemiological studies. *Lancet* 1996;347:1713–27.
41. Collaborative Group on Hormonal Factors in Breast Cancer. Breast cancer and hormone replacement therapy: collaborative reanalysis of data from 51 epidemiological studies of 52,705 women with breast cancer and 108,411 women without breast cancer. *Lancet* 1997;350:1047–59.
 42. Chlebowski RT, Kuller LH, Prentice RL, et al. Breast cancer after use of estrogen plus progestin in postmenopausal women. *N Engl J Med* 2009; 360:573–87.
 43. Prentice RL, Chlebowski RT, Stefanick ML, et al. Conjugated equine estrogens and breast cancer risk in the Women's Health Initiative clinical trial and observational study. *Am J Epidemiol* 2008;167:1407–15.
 44. Lee SA, Ross RK, Pike MC. An overview of menopausal oestrogen-progestin hormone therapy and breast cancer risk. *Br J Cancer* 2005;92:2049–58.
 45. Narod SA. Hormone replacement therapy and the risk of breast cancer. *Nat Rev Clin Oncol* 2011;8:669–76.
 46. Saxena T, Lee E, Henderson KD, et al. Menopausal hormone therapy and subsequent risk of specific invasive breast cancer subtypes in the California Teachers Study. *Cancer Epidemiol Biomarkers Prev* 2010;19:2366–78.
 47. Kerlikowske K, Cook AJ, Buist DS, et al. Breast cancer risk by breast density, menopause, and postmenopausal hormone therapy use. *J Clin Oncol* 2010;28:3830–7.
 48. Eisen A, Lubinski J, Gronwald J, et al. Hormone therapy and the risk of breast cancer in BRCA1 mutation carriers. *J Natl Cancer Inst* 2008;100:1361–7.
 49. Beral V, Reeves G, Bull D, et al. Breast cancer risk in relation to the interval between menopause and starting hormone therapy. *J Natl Cancer Inst* 2011;103:296–305.
 50. Calle EE, Feigelson HS, Hildenbrand JS, et al. Postmenopausal hormone use and breast cancer associations differ by hormone regimen and histologic subtype. *Cancer* 2009;115:936–45.
 51. Ravdin PM, Cronin KA, Howlander N, et al. The decrease in breast-cancer incidence in 2003 in the United States. *N Engl J Med* 2007;356:1670–4.
 52. Stratton MR, Rahman N. The emerging landscape of breast cancer susceptibility. *Nat Genet* 2008;40:17–22.
 53. Evans JP, Skrzynia C, Susswein L, et al. Genetics and the young woman with breast cancer. *Breast Dis* 2006;23:17–29.
 54. Mavaddat N, Peock S, Frost D, et al. Cancer risks for BRCA1 and BRCA2 mutation carriers: results from the prospective analysis of EMBRACE. *J Natl Cancer Inst* 2013;111:812–22.
 55. Fackenthal JD, Olopade OI. Breast cancer risk associated with BRCA1 and BRCA2 in diverse populations. *Nat Rev Cancer* 2007;7:937–48.
 56. Chen JJ, Silver D, Cantor S, et al. BRCA1, BRCA2, and Rad51 operative in a common DNA damage response pathway. *Cancer Res* 1999;59:1752–6.
 57. Murphy CG, Moynahan ME. BRCA gene structure and function in tumor suppression: a repair-centric perspective. *Cancer J* 2010;16:39–47.
 58. Litton JK, Ready K, Chen H, et al. Earlier age of onset of BRCA mutation-related cancers in subsequent generations. *Cancer* 2012;118(2):321–5.
 59. Palacios J, Robles-Frias MJ, Castilla MA, et al. The molecular pathology of hereditary breast cancer. *Pathobiology* 2008;75:85–94.
 60. Walsh T, King MC. Ten genes for inherited breast cancer. *Cancer Cell* 2007;11:103–5.
 61. Hwang SJ, Lozano G, Amos CI, et al. Germline p53 mutations in a cohort with childhood sarcoma: sex differences in cancer risk. *Am J Hum Genet* 2003;72(4):975–83.
 62. Mouchawar J, Korch C, Byers T, et al. Population-based estimate of the contribution of TP53 mutations to subgroups of early-onset breast cancer: Australian Breast Cancer Family Study. *Cancer Res* 2010;70(12):4795–800.
 63. Melhem-Bertrandt A, Bojadziewa J, Ready KJ, et al. Early onset HER2-positive breast cancer is associated with germline TP53 mutations. *Cancer* 2012; 118(4):908–13.
 64. Waite KA, Eng C. Protean PTEN: form and function. *Am J Hum Genet* 2002;70(4):829–44.

65. Min-Han T, Mester JL, Ngeow J, et al. Lifetime cancer risks in individuals with germline PTEN mutations. *Clin Cancer Res* 2012;18(2):400–7.
66. Stephens PJ, Tarpey PS, Davies H, et al. The landscape of cancer genes and mutational processes in breast cancer. *Nature* 2012;486(7403):400–4.
67. Hartmann LC, Sellers TA, Frost MH, et al. Benign breast disease and the risk of breast cancer. *N Engl J Med* 2005;353:229–37.
68. Worsham MJ, Raju U, Lu M, et al. Risk factors for breast cancer from benign breast disease in a diverse population. *Breast Cancer Res Treat* 2009;118:1–7.
69. Dupont WD, Parl FF, Hartmann WH, et al. Breast cancer risk associated with proliferative breast disease and atypical hyperplasia. *Cancer* 1993;71:1258–65.
70. Collins LC, Baer HF, Tamimi RM, et al. Magnitude and laterality of breast cancer risk according to histologic type of atypical hyperplasia: results from the Nurses' Health Study. *Cancer* 2007;109:180–7.
71. Collaborative Group on Hormonal Factors in Breast Cancer. Alcohol, tobacco and breast cancer – collaborative reanalysis of individual data from 53 epidemiological studies, including 58 515 women with breast cancer and 95 067 women without the disease. *Br J Cancer* 2002;87:1234–45.
72. Smith-Warner SA, Spiegelman D, Yaun SS, et al. Alcohol and breast cancer in women: a pooled analysis of cohort studies. *JAMA* 1998;279:535–40.
73. Chen WY, Rosner B, Hankinson SE, et al. Moderate alcohol consumption during adult life, drinking patterns, and breast cancer risk. *JAMA* 2011;306:1884–90.
74. Cui T, Miller AB, Rohan TE. Cigarette smoking and breast cancer risk: update of a prospective cohort study. *Breast Cancer Res Treat* 2006;100:293–9.
75. Kobayashi LC, Janssen I, Richardson H, et al. Moderate-to-vigorous intensity physical activity across the life course and risk of pre- and post-menopausal breast cancer. *Breast Cancer Res Treat* 2013;139(3):851–61.
76. Friedenreich CM. Physical activity and cancer prevention: from observational to intervention research. *Cancer Epidemiol Biomarkers Prev* 2001;10:287–301.
77. Wu Y, Zhang D, Kang S. Physical activity and risk of breast cancer: a meta-analysis of prospective studies. *Breast Cancer Res Treat* 2013;137(3):869–82.
78. Schmidt ME, Chang-Claude J, Vrieling A, et al. Association of pre-diagnosis physical activity with recurrence and mortality among women with breast cancer. *Int J Cancer* 2013;133:1431–40.
79. Michels KB, Mohllajee AP, Roset-Bahmanyar E, et al. Diet and breast cancer. *Cancer* 2007;109:2712–49. *Epidemiology of Breast Cancer* 421
80. Yamamoto S, Sobue T, Kobayashi M, et al. Soy, isoflavones, and breast cancer risk in Japan. *J Natl Cancer Inst* 2003;95:906–13.
81. Horn-Ross PL, Hoggatt KJ, West DW, et al. Recent diet and breast cancer risk: the California Teachers Study (USA). *Cancer Causes Control* 2002;13:407–15.
82. Prentice RL, Caan B, Chlebowski RT, et al. Low-fat dietary pattern and risk of invasive breast cancer: the Women's Health Initiative Randomized Controlled Dietary Modification Trial. *JAMA* 2006;295:629–42.
83. Pierce JP, Natarajan L, Caan BJ, et al. Influence of a diet very high in vegetables, fruit and fiber and low in fat on prognosis following treatment for breast cancer: the Women's Healthy Eating and Living (WHEL) randomized trial. *JAMA* 2007;298:289–98.
84. Van den Brandt P, Spiegelman D, Yaun S, et al. Pooled analysis of prospective cohort studies on height, weight, and breast cancer risk. *Am J Epidemiol* 2000;152:514–27.
85. Renehan AG, Tyson M, Egger M, et al. Body-mass index and incidence of cancer: a systemic review and meta-analysis of prospective observational studies. *Lancet* 2008;317:569–78.
86. Suzuki R, Orsini N, Saji S, et al. Body weight and incidence of breast cancer defined by estrogen and progesterone receptor status – A meta-analysis. *Int J Cancer* 2009;124:698–712.

87. Toniolo PG, Levitz M, Zeleniuch-Jacquotte A, et al. A prospective study of endogenous estrogens and breast cancer in postmenopausal women. *J Natl Cancer Inst* 1995;87:190–7.
88. Thomas HV, Key TJ, Allen DS, et al. Re: reversal of relation between body mass and endogenous estrogen concentrations with menopausal status. *J Natl Cancer Inst* 1997;89:396–8.
89. John EM, Kelsey JL. Radiation and other environmental exposures and breast cancer. *Epidemiol Rev* 1993;15:157–62.
90. Land CE, Tokunaga M, Koyama K, et al. Incidence of female breast cancer among atomic bomb survivors, Hiroshima and Nagasaki, 1950–1990. *Radiat Res* 2003;160:707–17.
91. Preston DL, Mattsson A, Holmberg E, et al. Radiation effects on breast cancer risk: a pooled analysis of eight cohorts. *Radiat Res* 2002;158:220–35.
92. Travis LB, Hill D, Dores GM, et al. Cumulative absolute breast cancer risk for young women treated for Hodgkin lymphoma. *J Natl Cancer Inst* 2005;97:1428–37.
93. Ma H, Hill CK, Bernstein L, et al. Low-dose medical radiation exposure and breast cancer risk in women under age 50 years overall and by estrogen and progesterone receptor status: results from a case-control and case-case comparison. *Breast Cancer Res Treat* 2008;109:77–90.
94. Nelson HD, Tyne K, Naik A, et al. Screening for breast cancer: an update for the U.S. Preventive Services Task Force. *Ann Intern Med* 2009; 151:727.
95. Oeffinger KC, Fontham ET, Etzioni R, et al. Breast Cancer Screening for Women at Average Risk: 2015 Guideline Update From the American Cancer Society. *JAMA* 2015; 314:1599. Siu AL, U.S. Preventive Services Task Force. Screening for Breast Cancer: U.S. Preventive Services Task Force Recommendation Statement. *Ann Intern Med* 2016; 164:279.
96. Breast cancer risk in American women. National Cancer Institute Web site. <https://www.cancer.gov/types/breast/risk-fact-sheet>. (Accessed on January 05, 2017).
97. Chen S, Parmigiani G. Meta-analysis of BRCA1 and BRCA2 penetrance. *J Clin Oncol* 2007; 25:1329. Gail MH, Brinton LA, Byar DP, et al. Projecting individualized probabilities of developing breast cancer for white females who are being examined annually. *J Natl Cancer Inst* 1989; 81:1879.
98. Myers ER, Moorman P, Gierisch JM, et al. Benefits and Harms of Breast Cancer Screening: A Systematic Review. *JAMA* 2015; 314:1615.
99. Benichou J, Gail MH, Mulvihill JJ. Graphs to estimate an individualized risk of breast cancer. *J Clin Oncol* 1996; 14:103.
100. Gail MH, Costantino JP, Pee D, et al. Projecting individualized absolute invasive breast cancer risk in African American women. *J Natl Cancer Inst* 2007; 99:1782.
101. Barlow WE, White E, Ballard-Barbash R, et al. Prospective breast cancer risk prediction model for women undergoing screening mammography. *J Natl Cancer Inst* 2006; 98:1204.
102. Chen J, Pee D, Ayyagari R, et al. Projecting absolute invasive breast cancer risk in white women with a model that includes mammographic density. *J Natl Cancer Inst* 2006; 98:1215.
103. Claus EB, Risch N, Thompson WD. Autosomal dominant inheritance of early-onset breast cancer. Implications for risk prediction. *Cancer* 1994; 73:643.
104. Couch FJ, DeShano ML, Blackwood MA, et al. BRCA1 mutations in women attending clinics that evaluate the risk of breast cancer. *N Engl J Med* 1997; 336:1409.
105. Shattuck-Eidens D, McClure M, Simard J, et al. A collaborative survey of 80 mutations in the BRCA1 breast and ovarian cancer susceptibility gene. Implications for presymptomatic testing and screening. *JAMA* 1995; 273:535.
106. Frank TS, Manley SA, Olopade OI, et al. Sequence analysis of BRCA1 and BRCA2: correlation of mutations with family history and ovarian cancer risk. *J Clin Oncol* 1998; 16:2417.
107. Parmigiani G, Berry D, Aguilar O. Determining carrier probabilities for breast cancer-susceptibility genes BRCA1 and BRCA2. *Am J Hum Genet* 1998; 62:145. Tyrer J, Duffy SW, Cuzick J. A breast cancer prediction model incorporating familial and personal risk factors. *Stat Med* 2004; 23:1111.
108. Jacobi CE, de Bock GH, Siegerink B, van Asperen CJ. Differences and similarities in breast

- cancer risk assessment models in clinical practice: which model to choose? *Breast Cancer Res Treat* 2009; 115:381.
109. Amir E, Freedman OC, Seruga B, Evans DG. Assessing women at high risk of breast cancer: a review of risk assessment models. *J Natl Cancer Inst* 2010; 102:680.
 110. Tice JA, Cummings SR, Smith-Bindman R, et al. Using clinical factors and mammographic breast density to estimate breast cancer risk: development and validation of a new predictive model. *Ann Intern Med* 2008; 148:337.
 111. Rockhill B, Spiegelman D, Byrne C, et al. Validation of the Gail et al. model of breast cancer risk prediction and implications for chemoprevention. *J Natl Cancer Inst* 2001; 93:358.
 112. Matsuno RK, Costantino JP, Ziegler RG, et al. Projecting individualized absolute invasive breast cancer risk in Asian and Pacific Islander American women. *J Natl Cancer Inst* 2011; 103:951.
 113. Moyer VA, U.S. Preventive Services Task Force. Risk assessment, genetic counseling, and genetic testing for BRCA-related cancer in women: U.S. Preventive Services Task Force recommendation statement. *Ann Intern Med* 2014; 160:271.
 114. Nelson HD, Pappas M, Zakher B, et al. Risk assessment, genetic counseling, and genetic testing for BRCA-related cancer in women: a systematic review to update the U.S. Preventive Services Task Force recommendation. *Ann Intern Med* 2014; 160:255.
 115. Gilpin CA, Carson N, Hunter AG. A preliminary validation of a family history assessment form to select women at risk for breast or ovarian cancer for referral to a genetics center. *Clin Genet* 2000; 58:299.
 116. Evans DG, Eccles DM, Rahman N, et al. A new scoring system for the chances of identifying a BRCA1/2 mutation outperforms existing models including BRCAPRO. *J Med Genet* 2004; 41:474.
 117. Bellcross CA, Lemke AA, Pape LS, et al. Evaluation of a breast/ovarian cancer genetics referral screening tool in a mammography population. *Genet Med* 2009; 11:783.
 118. Hoskins KE, Zwaagstra A, Ranz M. Validation of a tool for identifying women at high risk for hereditary breast cancer in population-based screening. *Cancer* 2006; 107:1769.
 119. Ashton-Prolla P, Giacomazzi J, Schmidt AV, et al. Development and validation of a simple questionnaire for the identification of hereditary breast cancer in primary care. *BMC Cancer* 2009; 9:283.
 120. Wacholder S, Hartge P, Prentice R, et al. Performance of common genetic variants in breast-cancer risk models. *N Engl J Med* 2010; 362:986.