Table F-1. Breastfeeding and breast cancer: Summary of individual studies

| Author, Year  Study Design  Risk of Bias | Description of Study (N)  Description of Breast Cancer Cases (N) | Population Characteristics | Results: Ever Breastfed | Results: Duration of Breastfeeding | Confounders Adjusted for |
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| Al-Amri, 201566  Case-control  High | Case-control study of Saudi Arabian women screening for a mammogram; five age comparable controls with normal mammogram results were selected from the same mobile clinic as cases (348)  Diagnosed during mammogram screening and confirmed by clinical and pathological examination (58) | Mean age (SD):  Cases: 49 (7.1)  Controls: 49 (6.9)  Postmenopausal:  Cases: 55%  Control: 38% | Cases: 45 (78%)  Controls: 273 (94%)  OR, 0.30 (95% CI 0.13 or 0.69), p=0.004 | Total duration of all breastfeeding periods for all children  >2 years cases: 31 (36%)  >2 years controls: 231 (80%)  >2 years vs. ≤2 years: OR, 1.68 (95% CI, 0.98 to 4.53), p=0.073 | Ever breastfed analysis: Age at marriage, menopausal age, number of pregnancies, breastfeeding, family history of breast cancer were controlled for in adjusted analysis  Duration analysis: Unadjusted |
| Al-Qutub, 201367  Case-control  High | Case-control study of Saudi women ages 19–50 recruited at three government hospitals in Jeddah city, with controls recruited from community and hospital settings (317)  Breast cancer diagnosis during the previous 2 years (151) | Mean age (SD):  Cases: 40 (6.3)  Controls: 39 (7.0)    Use of exogenous hormones and/or contraception:  Cases: 8%  Controls: 2%  Current smokers:  Cases: 6%  Controls: 13% | NR | Sum of breastfeeding duration in months for each baby born to the participant  ≥12 months Cases: 81 (54%)  ≥12 months Controls: 112 (68%)  ≥12 months:  OR, 0.56 (95% CI, 0.35 to 0.88), p=0.01 | NR |

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| Atkinson, 201668  Case-control  High | Case-control study of women at a Texas cancer center with no prior history of cancer except for nonmelanoma skin cancer or cervical cancer in situ; controls underwent routine mammography screening at the cancer center between 2005-2006 (620)  Newly diagnosed inflammatory breast cancer at MD Anderson cancer center between 2004-2012 (224) | Mean age (SD),  range:  Cases: 51 (NR), 23-80  Controls: 51 (NR), 24-68  Nonwhite:  Cases: 23%  Controls: 0%  Postmenopausal:  Cases: 67%  Controls: 62%  Ever smoker:  Cases: 42%  Controls: 33% | Among parous women:  Triple-negative  OR, 0.30 (95% CI, 0.15 to 0.62)  HER2neu+  OR, 1.01 (95% CI, 0.55 to 1.87)  Luminal  OR, 0.35 (95% CI, 0.18 to 0.68) | NR | Age at menarche, menopausal status, number of children, age at first pregnancy, breastfeeding history, BMI, smoking history, breast cancer family history |
| Beaber, 200869  Case-control  Medium | Population-based case-control study in the U.S., with controls frequency matched to cases on age (5-year age groups) and reference year (898 parous)  Ductal and lobular tumors; based on histology review by study pathologists (when tissue available) or review of pathology reports by trained abstractors (when not) (469 parous) | Mean age (SD):  NR  % Nonwhite:  Cases: 17%  Controls: 16%  Current or prior HRT use:  Cases: 74%  Controls: 74%  Postmenopausal:  Cases: 66%  Controls: 73% | Ever breastfed ≥1 month  Ductal  Cases: 240  Controls: 264  OR, 0.7 (95% CI, 0.5 to 0.9), p<0.05  Lobular  Cases: 167  Controls: 264  OR, 0.9 (95% CI, 0.7 to 1.3), p=NS | Ductal  <1 month (37 exposed cases, 27 controls): OR, 1.1 (95% CI, 0.6 to 1.9)  1.0-5.9 months (96 exposed cases, 112 controls): OR, 0.7 (95% CI, 0.5 to 0.9)  6.0-11.9 months (61 exposed cases, 62 controls): OR, 0.8 (95% CI, 0.5 to 1.2)  12.0-23.9 months (58 exposed cases, 56 controls): OR, 0.8 (95% CI, 0.5 to 1.3)  ≥24.0 months (25 exposed cases, 34 controls): OR, 0.6 (95% CI, 0.3 to 1.0)  p for trend=0.43 | Reference age, Reference year, number of live births |

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| Beaber, 200869  (continued) |  |  | Ductal-Lobular  Cases: 97  Controls: 264  OR, 0.9 (95% CI, 0.6 to 1.4), p=NS  *Analysis excluded 97 women who BF<1 month* | Lobular  <1 month (17 exposed cases, 27 controls): OR, 1.0 (95% CI, 0.5 to 1.9)  1.0-5.9 months (65 exposed cases, 112 controls): OR, 0.9 (95% CI, 0.6 to 1.3)  6.0-11.9 months (43 exposed cases, 62 controls): OR, 1.0 (95% CI, 0.6 to 1.6)  12.0-23.9 months (42 exposed cases, 56 controls): OR, 1.1 (95% CI, 0.7 to 1.8)  ≥24.0 months 17 exposed cases, 34 controls): OR, 0.8 (95% CI, 0.4 to 1.6)  p for trend=0.85  Ductal-Lobular  <1 month (14 exposed cases, 27 controls): OR, 1.4 (95% CI, 0.7 to 3.0)  1.0-5.9 months (43 exposed cases, 112 controls): OR, 0.7 (95% CI, 0.4 to 1.2)  6.0-11.9 months (19 exposed cases, 62 controls): OR, 0.8 (95% CI, 0.4 to 1.5)  12.0-23.9 months (24 exposed cases, 56 controls): OR, 1.1 (95% CI, 0.6 to 2.0)  ≥24.0 months (22 exposed cases, 34 controls): OR, 1.9 (95% CI, 1.0 to 3.6)  p for trend=0.11  *Analysis excluded 97 women who BF<1 month* |  |

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| Castello, 201570  Case-control  Medium | Case-control study of women diagnosed with incident cases of breast cancer in the oncology departments of 23 hospital members of the Spanish Breast Cancer Group located in 9 of 17 regions in Spain; matched healthy controls of similar age (+/- 5 years) were selected from cases' in-law relatives, neighbors, or work colleagues residing in same town (1,946)  Incident breast cancer diagnosed in oncology department (973; sample size for BF analysis unclear) | Mean age (SD):  NR  Postmenopausal:  Cases: 43%  Controls: 47%  Current or former smokers:  Cases: 59%  Controls: 60% | NR | Cumulative BF duration <6 months, overall sample (n=1,946; OR is for lack of compliance with guideline to BF up to 6 months)  Cases: 394  Controls: 386  OR, 0.95 (95% CI, 0.70 to 1.27)  Cumulative BF duration <6 months, premenopausal (n=1,064)  Cases: 217  Controls: 210  OR, 0.89 (95% CI, 0.61 to 1.30)  Cumulative BF duration ≥6 months, postmenopausal  Cases: 177  Controls: 176  OR, 1.00 (95% CI, 0.69 to 1.45) | Total calorie intake, smoking habit, age at first delivery, education, history of breast problems, family history of breast cancer, menopausal study and composite score derived from adherence to WCRF/AICRa recommendations (excluding BF recommendation) |

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| Dalamaga, 201171  Case-control  High | Case-control study of women at the Army Share Fund Hospital, Veteran’s Hospital, with cases admitted in the Internal Medicine Department and controls randomly selected from women with negative mammograms and matched to cases based on age and proximity of the outpatient visit to the case's time of diagnosis (204)  Diagnosed with invasive breast cancer between October 2003 and September 2010 (102) | Mean age (SD), range:  Cases: 62 (8.2), NR  Controls: 63 (8.9), NR  Postmenopausal:  100%  Current or prior HRT:  Cases: 5%  Controls: 1%  Current or former smokers:  Cases: 38%  Controls: 27% | NR | >6 months breastfeeding:  Cases: 45 (44%)  Controls: 51 (50%)  p=0.9 | Analysis is unadjusted |

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| Ge, 201572  Case-control  High | Population-based case-control study of postmenopausal German women ages 50-74 recruited between 2001-2005 (8,399); each case was frequency matched by birth year and study region with 2 controls drawn from random lists provided by resident registries (8,399)  Diagnosed with histologically confirmed primary breast cancer (2,887) | Mean age (SD):  NR  Postmenopausal: 100%  Current or former smoker:  Cases: 45%  Controls: 46% | Cases: 63%  Controls: 67%  Article reports “Cases had BF their children less frequently”, but statistical tests NR | NR | NR |
| Hadji, 200773  Case-control  High | Case-control study of German women consecutively recruited from a university gynecological oncology and endocrinology clinic for routine gynecological checkup (2,492)  Incident breast operation (mean duration since operation 10±5 days) including a clear histological diagnosis of breast cancer (242) | Mean age (SD), range: 54 (10.3), 22-88  Postmenopausal: Cases: 71%  Controls: 67%  On HRT:  Cases: 29%  Controls: 42%  Current smoker:  Cases: 16%  Controls: 21% | Cases: 69%  Controls: 52%  p<0.001  *Only unadjusted analysis available for ever BF; adjusted analysis matched cases and controls for BF.* | Multiple linear regression showed that women with breast cancer had a significantly longer duration of breastfeeding (p<0.05) | NR |

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| Holm, 201774  Case-control  Medium | Case-control analysis of women from two cohort studies in Sweden: the KARolinska MAmmography Project for Risk Prediction of Breast Cancer (KARMA) from 2001-2008 and the Libro-1 cohort of breast cancer cases from 2011-2013; controls were frequency-matched to cases on age (18,577)  Primary invasive breast cancer with information on immunohistochemical stains diagnosed 2005 to 2015 (2,632)  Luminal A: estrogen receptor (ER+) and progesterone receptor (PR-) and HER2- and Ki167 low  Luminal B: ER+ and Ki167 high or ER+ and Ki167 low and HER2+  HER2-overexpressing: ER- and PR- and HER2+  Basal-like: ER- and PR- and HER2- | Mean age (SD), range:  Cases: 61 (10.3), 27-88  Controls: 58 (9.7), 25-88 | Cases: 96%  Controls: 97%  Any breast cancer a:  OR, 1.59 (95% CI, 1.23 to 2.03)  Luminal A breast cancer a:  OR, 1.49 (95% CI, 1.12 to 1.98)  Luminal B breast cancer a:  OR, 1.71 (95% CI, 0.81 to 3.53)  HER2-overexpressing breast cancer a:  OR, 0.90 (95% CI, 0.37 to 2.22)  Basal-like breast cancer a:  OR, 4.20 (95% CI, 2.20 to 7.99) | Any breast cancer b:  >0-1.5 years: OR, 0.70 (95% CI, 0.61 to 0.80)  >1.5 years: OR, 0.63 (95% CI, 0.54 to 0.75)  Luminal A breast cancer b:  >0-1.5 years: OR, 0.69 (95% CI, 0.59 to 0.82)  >1.5 years: OR, 0.63 (95% CI, 0.52 to 0.76)  Luminal B breast cancer b:  >0-1.5 years: OR, 0.55 (95% CI, 0.37 to 0.81)  >1.5 years: OR, 0.59 (95% CI, 0.37 to 0.95)  HER2-overexpressing breast cancer b:  >0-1.5 years: OR, 0.72 (95% CI, 0.49 to 1.07)  >1.5 years: OR, 0.64 (95% CI, 0.40 to 1.02)  Basal-like breast cancer b:  >0-1.5 years: OR, 1.02 (95% CI, 0.59 to 1.76)  >1.5 years: OR, 0.81 (95% CI, 0.43 to 1.60) | Country of birth, age, education level, parity, age at first birth, BMI |

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| Kabat, 201175  Case-control  Medium | Case-control analysis of parous women ages 50-79 from the Women's Health Initiative Study, recruited from 40 clinical centers in the U.S.; controls were not matched with cases (63,396)  Incident diagnosis of ductal carcinoma in situ breast cancer (664) | Mean age (SD), range:  Cases: 62 (6.8), NR  Controls: 623 (7.0), NR  Nonwhite:  Cases: 17%  Controls: 18%  Postmenopausal: 100%  Current or prior HRT:  Cases: 59%  Controls: 52% | NR | HR (95% CI)  1-6 months: 1.05 (0.86 to 1.28)  7-12 months: 1.04 (0.80 to 1.36)  >12 months: 1.01 (0.80 to 1.29)  p for trend=0.94 | Age, education, hormone therapy, family history of breast cancer, history of breast biopsy, and mammograms, age at menarche, age at menopause |
| Kotsopoulos, 201276  Case-control  Medium | Case-control study of women who sought BRCA mutation testing from one of 70 participating centers in 12 countries and were confirmed as carriers of deleterious mutations in the *BRCA1* or *BRCA2* genes, with controls matched to cases on mutation in the same gene), year of birth (within 1 year), and country of residence (5,708)  Diagnosis of invasive breast cancer (2,854) | Mean age (SD), range:  Cases: 47 (NR), 21-85  Controls: 47 (NR), 18-86  Postmenopausal:  Cases: 14%  Controls: 7% | NR | Mean months breastfed  Cases: 7.5 (0-102)  Controls: 9.6 (0-147)  p<0.0001  *BRCA1* Carriers: OR (95% CI)  ≤ 1 year: 0.81 (0.66 to 1.00), p=0.05  1 to ≤2 years: 0.65 (0.50 to 0.85), p=0.001  2 to ≤3 years: 0.51 (0.35 to 0.75), p=0.0006  >3 years: 0.45 (0.30 to 0.68), p=0.0002  *BRCA2* Carriers: OR (95% CI)  ≤ 1 year: 1.03 (0.76 to 1.40), p=0.85  1 to ≤2 years: 1.04 (0.70 to 1.53), p=0.86  2 to ≤3 years: 1.33 (0.76 to 2.32), p=0.31  >3 years: 1.02 (0.56 to 1.88), p=0.94 | Age at menarche, parity, and oral contraceptive use |

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| Kruk, 201477  Case-control  High | Case-control study of women ages 28-79 identified from the Szczecin Regional Cancer Registry in the Region of Western Pomerania; controls were randomly recruited from outpatient clinics and frequency matched to cases by age (5-year interval) and residence (urban, rural) (1,943)  Diagnosed with histologically confirmed invasive breast cancer (858) | Mean age (SD), range:  Cases: 55 (9.7), NR  Controls: 55 (9.5), NR | NR | Compared with case subjects, controls reported a longer duration of breastfeeding (P-value and values by group NR) | Analysis is unadjusted |

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| Lee, 200878  Case-control  Medium | Population-based case-control study in the U.S., with controls matched on race and age (within 5 years and ages 20-49) to a subset of case patients diagnosed between 7/2000-3/2003, and met the same eligibility criteria as cases (2,238)  Histologically confirmed first primary invasive breast cancer identified through the Los Angeles County Cancer Surveillance Program, a population-based registry sponsored by the NCI Seer program (1,794) | Mean age (SD):  Cases, *BRCA* carriers: 41 (6.4)  Cases, *BRCA* noncarriers: 43 (5.1)  Controls: 43 (4.9)  % Nonwhite: 9%  Current or prior HRT use: NR  Postmenopausal: 20% | NR | *BRCA* Carriers: OR (95% CI)  <1-6 months (22 exposed cases, 104 controls): 1.31 (0.45 to 3.82)  7-23 months (16 exposed cases, 111 controls): 0.73 (0.23 to 2.30)  ≥24 months (11 exposed cases, 64 controls): 1.29 (0.36 to 4.61)  p for trend=0.83  *BRCA* Non-carriers: OR (95% CI)  <1-6 months (326 exposed cases, 104 controls): 0.66 (0.43 to 1.02)  7-23 months (264 exposed cases, 104 controls): 0.52 (0.33 to 0.81)  ≥24 months (147 exposed cases, 104 controls): 0.49 (0.29 to 0.81)  p for trend=0.002 | Age at reference date, education, family history of breast or ovarian cancer, race, self-identified Ashkenazi Jewish origin, number of full-term pregnancies, age at first full-term pregnancy |

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| Lumachi, 2010 79  Case-control  High | Cases were identified by retrospective review of 404 consecutive women undergoing curative surgery for BC. Women were excluded who had a history pf previous cancer, BC onset during follow-up, had used estrogen + progestin therapy, or were non-OC users. (238)  Randomly selected age-matched healthy women from the same region, who had undergone screening mammography twice and were followed up for 2 years. (255) | Mean age (SD):  Cases: 62 (9.6)  Controls: 61 (8.4)  Postmenopausal: 100%  Current or prior HRT:  Cases: 58%  Controls: 36%  Current or former smokers:  Cases: 18%  Controls: 18% | Cases: 103 (57%)  Controls: 145 (70%)  OR, 1.82 (95% CI, 1.20 to 2.77), p=0.006 | Mean (SD) Months of breastfeeding  Cases: 10.2 (8.6)  Controls: 13.9 (10.0)  p<0.001 | Bivariate analyses reported. Multivariate analysis conducted with years between menarche and menopause, BF, OC and HRT use, but only a cumulative OR (rather than BF specific) was reported: 4.55 (95% CI, 2.13 to 9.71). |

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| Ma, 200680  Case-control  Medium | Case-control study among white or African American cases age 20-49 at time of diagnosis identified through LA Cancer Surveillance Program (CSP) and SEER registry, and controls from the same neighborhoods matched on age and race (within 5 years) (2,165)  Diagnosis of first primary invasive ER and PR breast cancer (1,725) | Mean age (SD):  Cases (known receptor): 423 (5.4)  Cases (borderline/undecided receptor): 43 (5.2)  Cases (no info on receptor): 44 (4.6)  Controls: 43 (4.9)    Nonwhite:  Cases (known receptor): 12%  Cases (borderline/undecided receptor): 7%  Cases (no info on receptor): 14%  Controls: 8% | NR | All participants: OR (95% CI)  <1 month: 0.99 (0.56 to 1.77)  1-6 months: 0.58 (0.37 to 0.91)  7-23 months: 0.52 (0.33 to 0.82)  24+ months: 0.51 (0.30 to 0.86)  p for trend=0.001  ER+PR+: OR (95% CI)  <1 month: 1.01 (0.53 to 1.90)  1-6 months: 0.57 (0.34 to 0.94)  7-23 months: 0.52 (0.31 to 0.87)  24+ months: 0.49 (0.27 to 0.87)  p for trend=0.002  ER-PR-: OR (95% CI)  <1 month: 1.19 (0.59 to 2.39)  1-6 months: 0.72 (0.41 to 1.27)  7-23 months: 0.55 (0.31 to 0.98)  24+ months: 0.62 (0.32 to 1.21)  p for trend=0.03 | Race, age, education, first-degree breast cancer family history, age at menarche, gravidity, number of full-term pregnancies, BMI 1 year before reference date, COC use, average alcoholic drinks per week in recent 5 years, and a variable combining menopausal status and hormone therapy usage. Age at first full-term pregnancy and duration of BF mutually adjusted for each other. |

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| Ma, 201781  Case-control  Medium | Pooled analysis of women from 3 population-based studies of breast cancer, predominantly in Los Angeles: Women’s Contraceptive and Reproductive Experiences (CARE), Women’s Breast Carcinoma in situ (BCIS), and Women’s Learning the Influence of Family and Environment (LIFE). Controls were frequency-match to controls on age, race, and geographic area of residence (5,106)  Newly diagnosed in situ and invasive breast cancer; some were first primary diagnoses and were histologically confirmed (2,658)  Triple-negative: ER-, PR-, HER2-  Luminal A-like: ER+ and/or PR+, HER2-  Luminal B-like: ER+ and/or PR+, HER2+  HER2-enriched: ER-, PR-, HER2+ | Mean age (SD), range  Cases:  Overall: 47 (8.1), 22-64  CARE: 49 (8.6), 35-64  BCIS: 52 (7.3), 35-64  LIFE: 43 (5.4), 22-49  Controls:  Overall: 48 (8.3), 24-64  CARE: 49 (8.4), 35-64  BCIS: NAc  LIFE: 43 (4.9), 24-49  African-American Race  Cases:  Overall: 26%  CARE: 43%  BCIS: 16%  LIFE: 11%  Controls:  Overall: 37%  CARE: 43%  BCIS: NAc  LIFE: 8% | OR (95% CI)  Triple-negative: 0.80 (0.63 to 1.02)  Luminal A-like: 0.78 (0.65 to 0.94)  Luminal B-like: 0.89 (0.65 to 1.23)  HER2-enriched: 0.91 (0.63 to 1.32) | Triple-negative: OR (95% CI)  <6 months: 0.96 (0.74 to 1.26)  6-11 months: 0.55 (0.37 to 0.82)  ≥12 months: 0.69 (0.50 to 0.96)  p for trend=0.006  Luminal A-like: OR (95% CI)  <6 months: 0.83 (0.68 to 1.02)  6-11 months: 0.76 (0.59 to 0.99)  ≥12 months: 0.71 (0.56 to 0.90)  p for trend=0.004  Luminal B-like: OR (95% CI)  <6 months: 0.99 (0.70 to 1.41)  6-11 months: 0.70 (0.44 to 1.12)  ≥12 months: 0.85 (0.56 to 1.30)  p for trend=0.28  HER2-enriched: OR (95% CI)  <6 months: 0.68 (0.43 to 1.07)  6-11 months: 1.28 (0.78 to 2.09)  ≥12 months: 1.10 (0.69 to 1.75)  p for trend=0.36 | Sub-study (CARE, BCIS, LIFE), study site (Los Angeles, Detroit), race, reference age, education, first-degree breast cancer family history, BMI, menopausal status, hormone therapy use, lifetime recreational physical activity, alcohol intake, smoking status, age at menarche, completed pregnancies, oral contraceptive use, age at first completed pregnancy |

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| Merritt, 201582  Cohort  Medium | Cohort study of women from the European Investigation into Cancer and Nutrition (EPIC) study, recruited from 23 study centers in 10 European countries (Denmark, France, Germany, Greece, Italy, the Netherlands, Norway, Spain, Sweden, United Kingdom; inclusion criteria varied slightly between centers).  (212,041 included in breast cancer mortality analysis)  Cases were women with breast cancer-specific mortality; vital status was collected via data linkages with cancer registries, boards of health, and death indices (484) | Mean age (SD):  50 (9.6)  Postmenopausal: 46%  Current smoker: 20% | Among parous women:  HR (95% CI) of breast cancer mortality:  1.01 (0.79 to 1.29) | HR (95% CI) of breast cancer mortality:  >1 to ≤3 months (102 exposed cases, 41,583 controls): 0.87 (0.62 to 1.21)  >3 to ≤6 months (82 exposed cases, 43,445 controls): 0.68 (0.48 to 0.96)  >6 to ≤12 months (101 exposed cases, 49,920 controls): 0.69 (0.49 to 0.97)  >12 to ≤ 18 months (63 exposed cases, 24,239 controls): 0.88 (0.60 to 1.27)  >18 months (74 exposed cases, 29,149 controls): 0.94 (0.65 to 1.37)  p for trend=0.35  *BF info only available for first three and last full-term pregnancies. BF duration calculated as sum of these pregnancies. For women with > 4 full term pregnancies, duration calculated as # of pregnancies x mean duration of BF per child.* | BMI, physical activity, smoking, education level, menopausal status |

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| Phillips, 200983  Case-control  Medium | Population-based case-control study of Caucasian and African-American women ages 20-74; cases were enrolled from the North Carolina Central Cancer Registry, and controls from the Department of Motor Vehicles and Health Care Finance Administration and frequency-matched based on race and 5-year age intervals (4,276; 904 DCIS, 3,372 IBC)  First breast cancer diagnoses (in situ or invasive) (2254; 446 DCIS, 1,808 IBC) | Mean age (SD), range:  DCIS cases: 55 (11.1), 27-74  DCIS controls: 55 (10.3), 22-74  IBC Phase 1 cases: 51 (11.8), 21-74  IBC Phase 2 cases: 52 (11.3), 24-74  IBC controls: 52 (11.5), 21-74  Nonwhite: 39%  Postmenopausal HRT: 29% | OR (95% CI)  DCIS All  1.02 (0.78 to 1.34)  DCIS Comedo  0.82 (0.57 to 1.20)  DCIS Non-comedo  1.02 (0.72 to 1.42)  IBC  0.77 (0.67 to 0.89) | NR | Age, race, and frequency-matching offset terms |

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| Pieta, 200884  Case-control  Medium | Case-control study of Polish women ages 35-70; control women had no changes in mammary glands revealed by examination and mammography and/or ultrasound imaging (555)  Malignant breast neoplasms according to pathological examination of breast tissue from biopsy or surgery (79) | Mean age (SD), range:  Malignant cases: 53 (9.0), 32-73  Controls: 48 (7.96), 35-71 | NR | Mean BF duration (months)  Cases with malignant neoplasms: 8.3  Cases with benign neoplasms: 6.3  Controls: 6.8  p=NS  BF ≥6 months  OR, 1.65 (95% CI, 0.78 to 3.48)  *Cases are those with malignant neoplasms; unclear whether those with benign neoplasms are considered controls in this analysis* | NR |
| Press, 201085  Case-control  High | Reanalysis of a 1926 case-control study in the UK and a 1931 case-control study in the U.S., designed to replicate the earlier study). In both studies, cases were women diagnosed with breast cancer from area hospitals and controls were recruited from the same hospitals (2,263)  Women diagnosed with breast cancer (1,187) | Postmenopausal:  UK cases: 65%  UK controls: 65%  U.S. cases: 59%  U.S. controls: 59% | NR | UK: OR (95% CI)  4-11 months: 1.05 (0.84 to 1.31)  12+ months: 0.49 (0.38 to 0.64)  U.S.: OR (95% CI)  4-11 months: 0.91 (0.78 to 1.07)  12+ months: 0.81 (0.68 to 0.96) | NR |

| Author, Year  Study Design  Risk of Bias | Description of Study (N)  Description of Breast Cancer Cases (N) | Population Characteristics | Results: Ever Breastfed | Results: Duration of Breastfeeding | Confounders Adjusted for |
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| Ritte, 201386  Cohort  Medium | Cohort study of women, mostly ages 25-70, enrolled in the EPIC Study with no prior history off cancer, enrolled between 1992-2000 at 23 regional and national research centers in 10 western European countries (311,097)  Women with first primary invasive breast cancer; breast tumor receptor status was standardized across EPIC centers (9,456) | Mean age (SD), range:  62 (NR), 21-102  Postmenopausal: 47% | Parous women only:  ER+PR+  HR, 0.99 (95% CI, 0.89 to 1.09), p=0.76  ER-PR-  HR, 0.98 (95% CI, 0.81 to 1.17), p=0.74 | Parous women who breastfed only:  ER+PR+: HR (95% CI)  1-3 months: 1.04 (0.89 to 1.20)  4-6 months: 0.97 (0.83 to 1.14)  7-12 months: 0.97 (0.83 to 1.13)  13-17 months: 0.92 (0.75 to 1.12)  ≥18 months: 1.11 (0.92 to 1.33)  ER-PR-: HR (95% CI)  1-3 months: 0.91 (0.69 to 1.21)  4-6 months: 0.99 (0.74 to 1.32)  7-12 months: 0.91 (0.68 to 1.23)  13-17 months: 1.12 (0.79 to 1.60)  ≥18 months: 1.07 (0.75 to 1.51)  ER+PR-: HR (95% CI)  1-3 months: 1.04 (0.79 to 1.37)  4-6 months: 1.08 (0.81 to 1.44)  7-12 months: 0.86 (0.64 to 1.16)  13-17 months: 1.09 (0.77 to 1.54)  ≥18 months: 0.83 (0.58 to 1.19)  ER-PR+: HR (95% CI)  1-3 months: 0.96 (0.52 to 1.77)  4-6 months: 0.89 (0.47 to 1.70)  7-12 months: 1.07 (0.57 to 2.04)  13-17 months: 0.72 (0.29 to 1.82)  ≥18 months: 1.33 (0.59 to 2.99)  ER or PR missing: HR (95% CI)  1-3 months: 0.91 (0.79 to 1.04)  4-6 months: 0.91 (0.78 to 1.06)  7-12 months: 0.88 (0.76 to 1.02)  13-17 months: 0.92 (0.77 to 1.10)  ≥18 months: 0.93 (0.79 to 1.10) | Age at recruitment and center, and further adjusted for BMI, height, menopausal status at recruitment, HRT use, physical activity, smoking status, alcohol consumption, and attained level of education |

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| Ritte, 201386  Cohort  Medium  (continued) |  |  |  | ER+: HR (95% CI)  1-3 months: 1.01 (0.90 to 1.14)  4-6 months: 0.89 (0.77 to 1.04)  7-12 months: 0.98 (0.87-1.11)  13-17 months: 0.91 (0.81-1.03)  ≥18 months: 1.01 (0.88-1.17)  ER-: HR (95% CI)  1-3 months: 0.88 (0.69 to 1.11)  4-6 months: 1.06 (0.78 to 1.42)  7-12 months: 0.93 (0.73 to 1.19)  13-17 months: 0.92 (0.72 to 1.18)  ≥18 months: 1.10 (0.83 to 1.47)  PR+: HR (95% CI)  1-3 months: 1.04 (0.90 to 1.20)  4-6 months: 0.91 (0.75 to 1.11)  7-12 months: 0.97 (0.83 to 1.13)  13-17 months: 0.98 (0.84 to 1.14)  ≥18 months: 1.12 (0.94 to 1.34)  PR-: HR (95% CI)  1-3 months: 0.98 (0.81 to 1.20)  4-6 months: 1.13 (0.88 to 1.45)  7-12 months: 1.05 (0.86 to 1.28)  13-17 months: 0.90 (0.73 to 1.11)  ≥18 months: 0.96 (0.75 to 1.23) |  |

| Author, Year  Study Design  Risk of Bias | Description of Study (N)  Description of Breast Cancer Cases (N) | Population Characteristics | Results: Ever Breastfed | Results: Duration of Breastfeeding | Confounders Adjusted for |
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| Ruszczyk, 201687  Case-control  Medium | Case-control study of African American and white women 20-75 from 12 targeted NY hospitals and the NJ State Cancer Registry through rapid case ascertainment; controls were identified through random digit dialing and community-based events, frequency matched to cases by telephone prefixes (1,912 parous)  Primary, newly diagnosed, histologically confirmed breast cancer (642 parous) | Mean age (SD):  Pure IDC cases: 51 (9.9)  Mixed IDC/DCIS cases: 51 (10.5)  Controls: 50 (9.4)  Nonwhite: 44%  Current/former smokers: 43%  Postmenopausal: 47%  Postmenopausal HRT use (among postmenopausal women): 32% | NR | Among parous women:  Pure IDC Cases: OR (95% CI)  0-12 months (28.0% cases exposed, 31.6% controls): 0.76 (0.49 to 1.19)  >12 months (19.6% cases exposed, 25.3% controls: 0.61 (0.37 to 1.02)  p for trend=0.07  Mixed IDC/DCIS Cases: OR (95% CI)  0-12 months (34.3% cases exposed, 31.6% controls): 1.15 (0.88 to 1.50)  >12 months (23.0% cases exposed, 25.3% controls): 0.94 (0.70 to 1.27)  p for trend=0.49 | Age, race, birthplace, family history, composite screening score, education, OC use, age at menarche, parity and menopausal status |

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| Stendell-Hollis, 201388  Cohort  Medium | Cohort study of healthy parous women in the Women’s Health Initiative (WHI) Hormone Trial (HT) and Observational Study (OS). OS participants were included in this analysis if the woman was post-hysterectomy at enrollment and using the same daily 0.625 mg CEE (conjugated equine estrogen preparation) as studied in the clinical trial, or had an intact uterus and was using the same daily CEE/MPA (0.625 CEE + 2.5 mg medroxyprogesterone acetate) combination as women in the clinical trial; if the woman had previously used postmenopausal hormones but was not currently using these preparations, or if the woman had never used Postmenopausal hormones (69,358) | Nonwhite: 15%  Postmenopausal: 100%  Current or prior HRT: 51%  Current or former smokers: 49% | Breastfed for ≥1 month:  Hormone Trial: HR (95% CI)  CEE: 0.72 (0.50 to 1.06)  CEE Placebo: 1.12 (0.80 to 1.57)  CEE/MPA: 1.06 (0.83 to 1.36)  CEE/MPA Placebo: 0.92 (0.70 to 1.21)  Observational Study: HR (95% CI)  CEE: 1.11 (0.89 to 1.39)  CEE/MPA: 1.16 (0.91 to 1.47)  No prior HT: 1.00 (0.86 to 1.18)  Prior HT: 0.97 (0.78 to 1.22)  P-values for trends were all NS | Cumulative lifetime months  Hormone Trial: HR (95% CI)  CEE  1-3 months: 0.70 (0.41 to 1.20)  4-12 months: 0.78 (0.48 to 1.26  13-23 months: 0.72 (0.35 to 1.46)  ≥24 months: 0.64 (0.27 to 1.49)  CEE Placebo  1-3 months: 0.86 (0.52 to 1.42)  4-12 months: 1.41 (0.95 to 2.08)  13-23 months: 1.15 (0.64 to 2.06)  ≥24 months: 0.71 (0.30 to 1.64)  CEE/MPA  1-3 months: 1.13 (0.81 to 1.59)  4-12 months: 1.02 (0.75 to 1.39)  13-23 months: 1.17 (0.79 to 1.72)  ≥24 months: 0.89 (0.54 to 1.45)  CEE/MPA Placebo  1-3 months: 0.87 (0.59 to 1.30)  4-12 months: 1.00 (0.71 to 1.40)  13-23 months: 1.00 (0.65 to 1.54)  ≥24 months: 0.70 (0.40 to 1.24) | HT: age, race/ethnicity, BMI, family history of breast cancer, age at first birth, age at menarche, and participation in WHI extension study.  Observational Study: age, race/ethnicity, BMI, smoking, family history of breast cancer, number live births, age at first birth (except in models for age first breastfed), years since menopause, duration of prior HRT use, and participation in WHI extension study. |

| Author, Year  Study Design  Risk of Bias | Description of Study (N)  Description of Breast Cancer Cases (N) | Population Characteristics | Results: Ever Breastfed | Results: Duration of Breastfeeding | Confounders Adjusted for |
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| Stendell-Hollis, 201388  (continued) | Invasive breast cancer, verified by medical record and pathology reports, centrally reviewed by study physicians (743) |  |  | Observational Study: HR (95% CI)  CEE  1-3 months: 1.08 (0.80 to 1.46)  4-12 months: 1.15, (0.87 to 1.51)  13-23 months: 1.19 (0.81 to 1.76)  ≥24 months: 0.96 (0.55 to 1.68)  CEE/MPA  1-3 months: 1.11 (0.79 to 1.55)  4-12 months: 1.06 (0.79 to 1.43)  13-23 months: 1.38 (0.97 to 1.97)  ≥24 months: 1.32 (0.84 to 2.06)  No Prior HT  1-3 months: 0.99 (0.79 to 1.24)  4-12 months: 0.96 (0.78 to 1.18)  13-23 months: 1.01 (0.77 to 1.32)  ≥24 months: 1.22 (0.90 to 1.66)  Prior HT  1-3 months: 0.94 (0.68 to 1.29)  4-12 months: 0.92 (0.69 to 1.23)  13-23 months: 1.15 (0.79 to 1.67)  ≥24 months: 1.05 (0.64 to 1.72) |  |

| Author, Year  Study Design  Risk of Bias | Description of Study (N)  Description of Breast Cancer Cases (N) | Population Characteristics | Results: Ever Breastfed | Results: Duration of Breastfeeding | Confounders Adjusted for |
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| Sugawara, 201389  Cohort  Medium | Analysis of data on parous women ages 40-70 years with no history of cancer who were enrolled in the Ohsaki National Health Insurance (NHI) Cohort Study in northeastern Japan (19,848)  Incident breast cancer cases ascertained from the Miyagi Prefactural Cancer Registry (148) | Mean age (SD), range:  Overall: NR (NR), 40-79  Breastfeeding only: 64 (8.4), NR  Mixed feeding: 56 (9.8), NR  Formula feeding only: 55 (9.3), NR  Postmenopausal: 71%  Current or prior use HRT: 7% | NR | Duration NR  Exclusivity  Mixed feeding  HR=1.12 (95% CI, 0.92 to 1.37), p=0.014  Formula feeding  HR=1.80 (95% CI, 1.14 to 2.86), p=0.014 | Age (continuous), BMI, family history of cancer, education, job status, smoking status, alcohol consumption, time spent walking, total calorie intake, menopausal status, age at menarche, age at first delivery, number of deliveries, history of oral contraceptive drug use, history of HRT use |

| Author, Year  Study Design  Risk of Bias | Description of Study (N)  Description of Breast Cancer Cases (N) | Population Characteristics | Results: Ever Breastfed | Results: Duration of Breastfeeding | Confounders Adjusted for |
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| Tamimi, 201690  Cohort  Medium | Female registered nurses between the ages of 30 and 55 years enrolled in the Nurses’ Health Cohort Study in 1976 and followed up between 1980 and 2010 through biennial questionnaires (112,951 postmenopausal women; 2,424,778 person-years)  Incident invasive breast cancer identified through self-report and confirmed through review of medical records (8,421 cases: 5,376 ER+ and 1,270 ER-) | Mean age (SD), range:  48 (6.9), NR  Postmenopausal: 100%  Current use HRT: 34% | Among parous women:  Invasive breast cancer  RR, 1.05 (95% CI, 1.00 to 1.10), p=0.07; PAR, 1.6% (95% CI, 0.1% to 3.4%)  ER+ invasive breast cancer  RR, 0.96 (95% CI, 0.91 to 1.02), p=0.24; PAR, 0 (95% CI, 2.2% to 2.2%)  ER- invasive breast cancer  RR, 1.07 (95% CI, 0.94 to 1.21), p=0.30; PAR, 2.4 (95% CI, 2.1% to 6.8%) | NR | Age in months, calendar year, age at menarche, BMI at age 18 years, height in inches, parity/age at first birth, benign breast disease history, family history of breast cancer, age at menopause, weight change since age 18 years, menopausal hormone use, alcohol consumption, physical activity |

| Author, Year  Study Design  Risk of Bias | Description of Study (N)  Description of Breast Cancer Cases (N) | Population Characteristics | Results: Ever Breastfed | Results: Duration of Breastfeeding | Confounders Adjusted for |
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| Warner, 201391  Cohort  Medium | Two cohort studies contributed to a sample of healthy women followed to track breast cancer incidence: 1) Nurse’s Health Study II, enrolling registered nurses ages 25-42 in 1989 (followup for this study began in 1995, to synchronize with BWHS cohort); 2)  Black Women's Health Study (BWHS), enrolling African-American women ages 21-69 in 1995, from communities in all regions of the U.S.. Women were excluded if they did not identify as white or African-American.  (BWHS: 35,338  NHS II: 105,576)  Self-reported, invasive ER+ breast cancer diagnosis; pathology data from hospital or cancer registry records were centrally reviewed by study staff to confirm diagnosis. ER status was determined by biochemical or immunohistochemical assays (1,506) | Race  Black women: 27%  White women: 73%  Mean age (SD):  Black women: 39.0 (5.5)  White women: 40.2 (4.7)  Postmenopausal:  Black women: 9%  White women: 7%  Current or past Postmenopausal HRT use:  Black women: 74%  White women: 91% | NR | Among parous women:  HR (95% CI)  <6 months: 0.85 (0.70 to 1.03)  ≥6 months: 0.95 (0.81 to 1.10) | Age, time, age at first birth, parity, lactation, age at menarche, menopausal status, age at menopause, first degree family history, BMI at age 18, weight change since age 18, history of benign breast disease, alcohol consumption, OC use, and Postmenopausal hormone use |

a Comparison was never breastfed compared with ever breastfed (referent).

b Referent group is nulliparous women.

c The BCIS study shared controls from the CARE study.

AICR = American Institute of Cancer Research; BC = breast cancer; BCIS = Women’s Breast Carcinoma in situ; BF = breastfeeding; BMI = body mass index; BRCA = BrCa gene mutations; BWHS = Black Women’s Health Study; and; CEE = conjugated equine estrogen; CI = confidence interval; COC = combined oral contraceptive; CSP = Cancer Surveillance Program; DCIS = ductal carcinoma in situ; EPIC = European Prospective Investigation into Cancer and Nutrition; ER = estrogen receptor; HR = hazard ratio; HRT = hormone replacement therapy; HT = hormone trial; IBC = inflammatory breast cancer; IDC = invasive ductal carcinoma; LA = Los Angeles; LIFE CARE = Women’s Learning the Influence of Family and Environment Women’s Contraceptive and Reproductive Experiences; MPA = medroxyprogesterone acetate; NCI = National Cancer Institute; NHI = National Health Insurance; NHS = National Health Service; NJ = New Jersey; NR = not reported; NS = not statistically significant; NY = New York; OC = oral contraceptive; OR = odds ratio; OS = observational study; PAR = population attributable risk; PR = progesterone receptor; SD = standard deviation; SEER = Surveillance, Epidemiology, and End Results; UK = United Kingdom; U.S. =United States; WCRF = World Cancer Research Fund; WHI = Women’s Health Initiative.