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Cancer Prevention in Primary Care: Perception of Importance, Recognition of Risk Factors and Prescribing Behaviors

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Abstract

Purpose: Acceptability and uptake of cancer preventive interventions is associated with physician recommendation, which is dependent on physician familiarity with available preventive options. The goal of this study is to evaluate cancer prevention perceptions, understanding of breast and ovarian cancer risk factors, and prescribing behaviors of primary care physicians.

Methods: Cross-sectional, web-based survey of 750 primary care physicians (250 each for OB/GYN, internal medicine and family medicine) in the United States. Survey respondents were recruited from an opt-in healthcare provider panel.

Results: Perception of importance and the practice of recommending general and cancer-specific preventive screenings and interventions significantly differed by provider type. These perceptions and behaviors reflected the demographics of the population that the primary care physicians see within their respective practices. The majority of respondents recognized genetic/hereditary risk factors for breast or ovarian cancer, while epidemiologic or clinical risk factors were less frequently recognized. Prescribing behaviors were related to familiarity with the interventions, with physicians indicating that they more frequently reinforced a specialist's recommendation rather than prescribed a preventive intervention.

Conclusions: Cancer prevention perceptions, recognition of cancer risk factors, and prescribing behaviors differ between practice types and were related to familiarity with preventive options. Cancer prevention education and risk assessment resources should be more widely available to primary care physicians.

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Keywords

cancer prevention; primary care physicians; survey

Introduction

There is growing evidence of the benefits of preventive interventions for cancer risk reduction in high-risk individuals including surgery and agents such as hormones, vaccines, and medications to inhibit, delay or reverse carcinogenesis before the development of invasive cancer (1–6). Nevertheless, uptake, level of adherence, and compliance with these preventive medications have been low, even as rates of risk-reducing surgery increase (7–10). Primary care physicians (PCPs) have a critical role in delivering preventive healthcare services to the general population. However, barriers including time restrictions, gaps in existing evidence, lack of training, reimbursement issues, difficulties in identifying high-risk patients who would benefit from therapy, and lack of approved agents for preventive use are associated with low uptake of cancer preventive interventions (7–9, 11).

The most important factor that predicts cancer prevention uptake is physician recommendation (12, 13). Studies have found that receiving a recommendation from their doctor influences a patient's willingness to use cancer preventive interventions (14–17). Furthermore, a patient's degree of risk is associated with their acceptability to undertake a preventive intervention, and they look to PCPs to provide accurate risk assessments and individualized recommendations for risk reduction (17).

Studies have also demonstrated that physicians may be more likely to recommend cancer preventive interventions if they are familiar with the options (18, 19). As cancer remains one of the leading causes of death in the United States, it is essential that PCPs be able to adequately address an individual's cancer risk, be familiar with cancer preventive options, and feel confident with recommendations and/or delivery (20). In recent years, cancer risk models have continuously evolved as additional etiologic and genetic risk factors have been identified (21). This increased complexity of risk assessment, coupled with time constraints (22, 23), highlight some of the challenges that PCPs face with respect to providing adequate cancer preventive care.

The purpose of this study was to better understand PCPs' understanding of breast and ovarian cancer prevention, their knowledge of cancer risk assessments, and the factors that influence their decisions to recommend cancer preventive interventions for individuals at elevated risk.

Methods

Study Design

The study was a cross-sectional, web-based survey of PCPs in the United States. Survey respondents were recruited from an existing opt-in healthcare provider panel developed and maintained by M3 Global Research, a healthcare market research firm. M3 validates their panel members' registration information against the American Medical Association's

(AMA) database. M3 adheres to all relevant industry privacy, ethical, and research standards. The survey and cognitive interview studies were reviewed and approved by ICF's Institutional Review Board (IRB).

The goal was to obtain 750 respondents [250 for each physician type—family medicine, internist and obstetrics/gynecology (OB/GYN)]. E-mail invitations describing the study were sent to random samples of panel members in batches of 1,500 daily until the target respondent sample size was met. The study was fielded from June 8–14, 2018. Respondents were directed to a password-protected survey site to complete screening questions. To be eligible, respondents were required to: (1) be a physician specializing in family medicine, internal medicine, or OB/GYN; (2) interact with patients on a weekly or daily basis; (3) reside and practice medicine in the United States; and (4) be able to read and understand English to provide informed consent and complete the survey. Participants meeting all inclusion criteria electronically provided informed consent before completing the online survey. Respondents received compensation for their participation.

Data Collection

The survey was developed based on previous studies by the authors (16, 24, 25) and a literature review (26–29). The survey was initially tested using semi-structured web-assisted cognitive interviews with 9 United States-based PCPs to evaluate whether they understood the survey questions and could respond as intended (30). The final questionnaire was developed based on this feedback. To reduce bias, each survey question was on a separate page, response options were randomized where appropriate, and data were monitored for duplicate or fraudulent responses. The final survey included 57-items (Supplementary Data 1) covering:

- participant demographics, practice demographics, and patient characteristics;
- perceptions of general preventive screenings, assessments, or interventions;
- recommendations for general preventive screenings, assessments, or interventions;
- familiarity with, knowledge of and comfort with risk factors for breast and/or ovarian cancer;
- prescribing behaviors regarding breast and ovarian cancer preventive interventions; and
- interest in learning more about breast and ovarian cancer prevention.

Analyses

Data from the completed surveys were analyzed using SPSS version 22 (SPSS Inc., Chicago, IL). Means (M), standard deviations (SD) and ranges were reported for continuous variables as appropriate; frequencies and percentages were reported for categorical variables. Between-group analyses to compare responses between the different specialty types were performed by using the Pearson chi-square test. If these tests were significant (p -value < 0.05), t-test analyses were conducted on pair-wise sub-group comparisons.

Because of the structure of some questions, some responses were dichotomized. To explore differences between physician specialties, perception ratings were dichotomized into “important” (“very important and “important”) and “not as important” (“moderately important”, “slightly important”, and “not important”).

Logistic regression models assessed the associations between physician characteristics and willingness to prescribe or reinforce a specialist’s recommendation. Independent variables were selected according to their *a priori* importance and from bivariate analyses. The potential independent variables were first examined for multicollinearity. To summarize the respondents’ familiarity with cancer preventive interventions with a single variable, we developed a *post hoc* scale to summarize familiarity with each of the options. The scale had good internal consistency, with a Cronbach α of 0.92. The familiarity with cancer preventive interventions variable was then categorized by visual binning of equal percentiles on scanned cases (25% of cases in each category): least, somewhat, moderately and most familiar. We also defined a dichotomous dependent variable for prescribing or reinforcing a specialist’s recommendation for a preventive intervention, coding “0” for never prescribed or reinforced a recommendation and “1” for doing so. A p -value<0.05 was considered statistically significant.

Results

Demographics of Survey Respondents

A total of 6,148 providers were invited over the 7-day fielding period, of whom 953 responded, with 750 completing the survey (250 for each physician type). The average completion time was 22 minutes. Table 1 presents a selection of respondent characteristics. Reported gender ($\chi^2 = 35.66$; p -value<0.001) and race ($\chi^2 = 21.169$; p -value<0.001 for White and $\chi^2 = 6.128$; p -value< 0.05 for Asian) significantly differed by provider type. All participant demographic and professional characteristics are presented in Supplementary Data 2.

Perception of Importance of Preventive Screenings and Interventions

Provider perceptions of eight general and cancer preventive screenings and interventions are depicted in Figure 1. Although most respondents perceived preventive screenings and interventions as important (*e.g.* 97.5% for blood pressure control and 96.9% for breast cancer screening), there were significant differences between provider types (Figure 1; see Supplementary Data 3 for p -values and 95% CI). OB/GYN physicians were significantly more likely than family medicine physicians or internists to perceive cervical cancer screening and HPV vaccination as important, and they were significantly more likely than internists to perceive breast cancer screening as important. Family medicine physicians were significantly more likely than internists and OB/GYN physicians to perceive non-HPV vaccinations as important. OB/GYN physicians were also significantly less likely than family medicine physicians or internists to perceive cholesterol evaluation, and screening for alcohol abuse as important (Supplementary Data 3).

Recognition of Risk Factors

Breast Cancer Risk Factors—Most respondents reported that a personal history of pre-cancerous breast diseases (*e.g.*, atypical hyperplasia, lobular carcinoma *in situ*) (95.5%), presence of a *BRCA1* or *BRCA2* mutation (98.5%), and a family history of one or more first-degree relatives with breast or ovarian cancer (98.0%) were factors that increase breast cancer risk. Other known factors, including combination hormone replacement therapy, oral contraceptives, early menstruation, late menopause, Ashkenazi Jewish background, Lynch syndrome, and having dense breasts, were not as universally recognized as breast cancer risk factors (Figure 2).

Recognition of breast cancer risk factors significantly differed by provider type (Figure 2; see Supplementary Data 4 for p-values and 95% CI). OB/GYN physicians, as compared to family medicine physicians and internists, were significantly more likely to respond that the following factors increased breast cancer risk: age >50; menopause after age 55; Eastern European or Ashkenazi Jewish background; alcohol consumption; and having dense breasts. OB/GYN physicians, as compared to internists, were significantly more likely to respond that previous chest radiation and never having a full-term pregnancy increased breast cancer risk. Internists, as compared to OB/GYN physicians, were significantly more likely to respond that using combination hormone replacement therapy for >5 years, and, as compared to family medicine physicians and OB/GYN physicians, that taking oral contraceptives for >10 years increased breast cancer risk.

Ovarian Cancer Risk Factors—Most respondents indicated that a family history of one or more first-degree relatives with breast or ovarian cancer increased ovarian cancer risk (94.1%). Other ovarian cancer risk factors were less recognized, particularly by family medicine and internist practitioners (Figure 2).

Recognition of ovarian cancer risk factors significantly differed by provider type (Figure 2; see Supplementary Data 4 for p-values and 95% CI). OB/GYN physicians, as compared to family medicine physicians and internists, were significantly more likely to respond that the following factors increased ovarian cancer risk: *BRCA1* or *BRCA2* mutation; first-degree relatives with breast or ovarian cancer; age >50; never having a full-term pregnancy; menopause after age 55; Eastern European or Ashkenazi Jewish background; genetic abnormality associated with Lynch syndrome; endometriosis. OB/GYN physicians were significantly more likely than family medicine physicians and internists to respond that taking oral contraceptives for >10 years had a decreased effect on ovarian cancer risk. Internists and family medicine physicians, as compared to OB/GYN physicians, were significantly more likely to respond that being overweight or obese after menopause increased ovarian cancer risk.

Recommendation and Prescribing Behaviors of Preventive Screenings and Interventions

Provider recommendations for eight general and cancer preventive screenings and interventions are depicted in Figure 1. Most respondents reported regularly recommending preventive screenings and interventions to their patients (*e.g.* 92.5% for blood pressure screening and 95.9% for breast cancer screening). The practice of recommending preventive

screenings and interventions also significantly differed by provider type (Figure 1; see Supplementary Data 3 for p-values and 95% CI). OB/GYN physicians were significantly more likely than family medicine physicians or internists to regularly recommend cervical cancer screening. OB/GYN physicians and family medicine physicians were significantly more likely than internists to regularly recommend HPV vaccination and breast cancer screening. However, OB/GYN physicians were significantly less likely than family medicine physicians or internists to recommend colon cancer screening. Family medicine physicians, as compared to internists and OB/GYN physicians, were significantly more likely to recommend blood pressure control, and vaccinations other than HPV. Family medicine physicians, as compared to OB/GYN physicians, were significantly more likely to recommend smoking cessation and nutritional counseling. OB/GYN physicians were also significantly less likely than family medicine physicians or internists to regularly recommend cholesterol evaluation and screening for alcohol abuse (Supplementary Data 3).

Factors that Influence Cancer Preventive Intervention Recommendations

55.7% and 51.1% of respondents reported prescribing a cancer preventive intervention to reduce a patient's risk of breast cancer or ovarian cancer, respectively, at least once in the last 12 months, while 84.1% and 66.4% had reinforced a specialist's recommendation for breast or ovarian cancer preventive interventions, respectively (Table 2).

Prescribing and reinforcing recommendations for cancer preventive interventions in the last 12 months significantly differed by provider type for both breast and ovarian cancer (Table 2; see Supplementary Data 5 for p-values and 95% CI). OB/GYN physicians more frequently reported prescribing breast cancer interventions and reinforcing recommendations for breast cancer preventive interventions as compared to family medicine physicians. OB/GYN physicians, as compared to family medicine physicians and internists, more frequently reported prescribing ovarian cancer interventions and reinforcing recommendations for ovarian cancer preventive interventions.

Respondents most familiar with cancer preventive interventions were more likely to have prescribed or reinforced a recommendation for a preventive intervention for breast cancer (odds ratio [OR] 5.59, 95% CI 2.50 to 12.51) or ovarian cancer (OR 3.45, 95% CI 1.90 to 6.26), than respondents who were least familiar with preventive interventions. OB/GYN physicians were more likely to have prescribed or reinforced a recommendation for an ovarian cancer preventive intervention than family medicine respondents (OR 3.22, 95% CI 1.87 to 5.57). In addition, comfort in estimating a patient's risk for ovarian cancer was associated with an increased likelihood of having prescribed or reinforced a recommendation for an ovarian cancer preventive intervention (OR 1.31, 95% CI 1.20 to 1.44). Age, gender, and years practicing specialty did not significantly predict prescribing or reinforcing a recommendation for a preventive intervention. Logistic regression models explored the predictor variables associated with prescribing or reinforcing recommendations for preventive interventions (Table 3). Predictor variables were able to distinguish prescribing or reinforcing a recommendation of a breast cancer preventive intervention ($\chi^2=52.05$ (9, n=624, p-value<0.001, Nagelkerke $R^2 = 0.14$) or an ovarian cancer preventive intervention ($\chi^2=157.073$ (9, n=624, p-value<0.001, Nagelkerke $R^2 = 0.31$). Because of the

strong link between familiarity and prescribing behavior, the survey queried which resources the respondents use to gather information about cancer risk reduction and prevention. Most stated that they obtain this information from Continuing Medical Education (CME) courses (56.1% online and 57.7% in person) and from the scientific literature (61.9%), while only 21.3% indicated that they obtain this information from professional organization conferences.

Discussion

The survey shows that most PCPs consider general preventive screenings and interventions to be important and regularly recommend them. However, PCPs more frequently reinforced a specialist's recommendation for breast and ovarian cancer rather than prescribed one themselves, even though risk assessment is well established and preventive interventions are in clinical use.

The degree to which the various interventions were perceived as important and prescribed or reinforced differed by provider type, supporting previous studies demonstrating variation between PCPs in perception and implementation of cancer preventive care (31–34). In general, the perceptions and recommendations were consistent for the patient population that the PCPs see within their respective practice (*e.g.* breast cancer screening for OB/GYN, non-HPV vaccinations for family medicine practitioners), although the survey did not provide adequate granularity to assess these associations.

Regarding cancer risk assessments, most respondents identified the hereditary risk factors for breast or ovarian cancer but were less likely to identify clinical or epidemiologic risk factors, particularly family medicine physicians and internists. This poses a challenge because as women age out of child-bearing, they increasingly rely on internal or family medicine physicians rather than OB/GYN physicians for risk assessment. This reliance that patients have on their PCPs to advise on risk and possible prevention options (12, 13, 16, 17), coupled with the association between physician familiarity and recommendation (18, 19), strongly indicate that risk assessment education and resources should be more widely available to all PCPs to address the increased cancer risk in the population seen by these physicians.

Survey respondents indicated that they received information about cancer risk reduction and prevention from multiple sources. Cancer prevention-related CME credits offered by medical societies that represent these practitioners (American Academy of Family Physicians, American College of Obstetricians and Gynecologists, and American College of Physicians) include sessions on preventive interventions, risk assessment, genetics counseling and screening, and risk reduction strategies (35–38). Programs from recent annual meetings of these organizations include sessions on female cancer prevention and screening, and specialty-specific education on genetic testing and risk reduction (39–41). Our survey results suggest that although educational and other resources for risk assessment and cancer prevention are available, PCPs feel that additional information would be valuable. The challenge remains how to efficiently provide this continuously evolving information to busy PCPs.

The study design has two major limitations. First, respondents were identified from a database of physicians who had agreed to participate in scientific research studies and therefore their responses may not be generalizable to the overall physician population. To overcome this limitation, we aimed for a large sample size representing three specialties. Second, the structured survey design limits conversation-driven exploration of perceptions and behaviors; working groups or similar studies should be considered to further explore the study findings. A minor limitation is that the survey design does not allow for clarification of questions, which we minimized by cognitive testing the survey with a pilot physician group, and using their feedback to refine and clarify the final survey.

PCP perceptions of cancer prevention, familiarity of cancer risk assessments, and the factors that influence their prescribing behaviors for individuals at elevated cancer risk differ between practice types and are consistent with the population that the physicians see within their respective practice. Physician recommendations of cancer prevention is associated with physician familiarity with these interventions. Because patients rely on their PCPs to provide cancer risk assessment and prevention recommendations, educational resources should be more widely available to PCPs.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Clinical Significance

- Primary care physicians rely on specialists for risk assessment and preventive intervention options.
- Physician recommendations of cancer prevention are associated with physician familiarity with these interventions.
- Because patients rely on their primary care physicians to provide cancer risk assessment and prevention recommendations, risk assessment resources should be more widely available to primary care physicians.



Figure 1. Perceptions and Recommendations of General and Cancer-Specific Preventive Screenings or Interventions. Percentages of respondents who perceived the specified preventive screening or intervention as “very important” and “important”, and percentages of respondents who reported prescribing and reinforcing recommendations for the specified preventing screening or intervention, by provider type. p-value<0.05 between ^afamily medicine and internists for regularly recommends; ^binternists and OB/GYN physicians for regularly recommends; ^cfamily medicine and OB/GYN physicians for regularly recommends; ^dfamily medicine and internists for perceived as important; ^einternists and OB/GYN physicians for perceived as important; ^ffamily medicine and OB/GYN physicians for perceived as important.

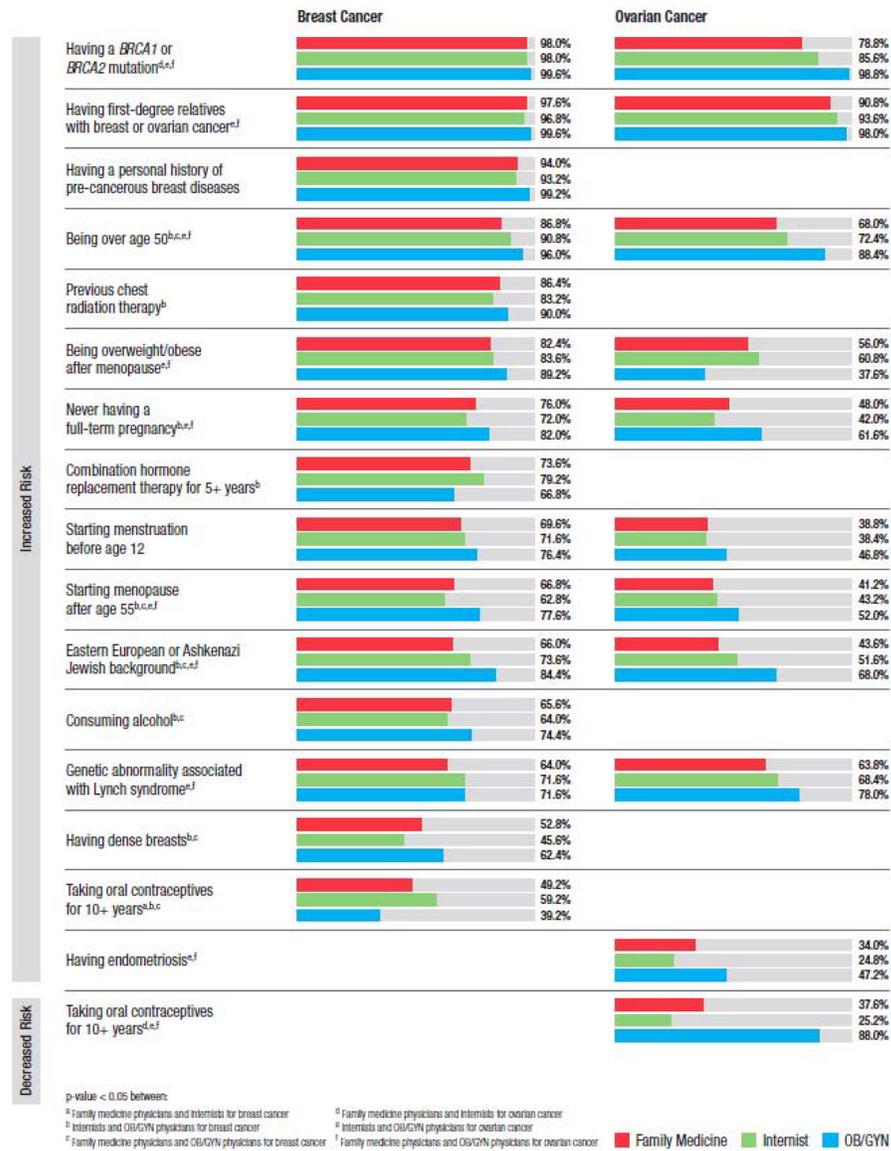


Figure 2. Recognition of Factors Associated with Cancer Risk.

Percentages of respondents who indicated the specified factor as either increasing or decreasing risk, by provider type. p-value<0.05 between ^afamily medicine and internists for breast cancer; ^binternists and OB/GYN physicians for breast cancer; ^cfamily medicine and OB/GYN physicians for breast cancer; ^dfamily medicine and internists for ovarian cancer; ^einternists and OB/GYN physicians for ovarian cancer; ^ffamily medicine and OB/GYN physicians for ovarian cancer.

Table 1.

Self-Reported Demographic Data from Survey (n=750).

| | Family Medicine | Internist | OB/GYN | Total |
|--------------------------------------------|--------------------|--------------------|--------------------|--------------------|
| Age, yrs, M (SD; range) | 46.7 (11.6; 28–85) | 45.6 (11.7; 25–77) | 48.1 (11.6; 28–77) | 46.8 (11.7; 25–85) |
| Prefer not to answer, n (%) | 31 (12.4%) | 43 (17.2%) | 29 (11.6%) | 103 (13.7%) |
| Gender ^a , n (%) | | | | |
| Male | 146 (58.4%) | 162 (64.8%) | 105 (42.0%) | 413 (55.1%) |
| Female | 100 (40.0%) | 79 (31.6%) | 142 (56.8%) | 321 (42.8%) |
| Prefer not to answer | 4 (1.6%) | 9 (3.6%) | 3 (1.2%) | 16 (2.1%) |
| Race, n (%) | | | | |
| White ^a | 179 (71.6%) | 145 (58.0%) | 191 (76.4%) | 515 (68.7%) |
| Black or African-American | 3 (1.2%) | 5 (2.0%) | 6 (2.4%) | 14 (1.9%) |
| Asian ^a | 44 (17.6%) | 62 (24.8%) | 42 (16.8%) | 148 (19.7%) |
| Native Hawaiian or other Pacific Islander | 2 (0.8%) | 0 (0%) | 1 (0.4%) | 3 (0.4%) |
| American Indian or Alaska Native | 0 (0%) | 3 (1.2%) | 0 (0%) | 3 (0.4%) |
| Other | 8 (3.2%) | 7 (2.8%) | 3 (1.2%) | 18 (2.4%) |
| Prefer not to answer | 18 (7.2%) | 30 (12.0%) | 12 (4.8%) | 60 (8.0%) |
| Ethnicity, n (%) | | | | |
| Hispanic or Latino | 7 (2.8%) | 9 (3.6%) | 16 (6.4%) | 32 (4.3%) |
| Prefer not to answer | 14 (5.6%) | 25 (10.0%) | 8 (3.2%) | 47 (6.3%) |
| Country of birth, n (%) | | | | |
| United States of America | 203 (81.2%) | 180 (72.0%) | 195 (78.0%) | 578 (77.1%) |
| India | 8 (3.2%) | 14 (5.6%) | 8 (3.2%) | 30 (4.0%) |
| Canada | 7 (2.8%) | 3 (1.2%) | 5 (2.0%) | 15 (2.0%) |
| Philippines | 5 (2.0%) | 7 (2.8%) | 1 (0.4%) | 13 (1.7%) |
| China | 1 (0.4%) | 3 (1.2%) | 4 (1.6%) | 8 (1.1%) |
| Other | 21 (8.4%) | 35 (14.0%) | 31 (12.4%) | 87 (11.6%) |
| Prefer not to answer | 1 (0.4%) | 7 (2.8%) | 1 (0.4%) | 9 (1.2%) |
| Years practicing, M (SD; range) | 16.1 (10.3; 1–47) | 15.2 (10.0; 1–45) | 17.7 (10.7; 1–40) | 16.4 (10.4; 1–47) |
| Prefer not to answer, n (%) | 22 (8.8%) | 37 (14.8%) | 21 (8.4%) | 80 (10.7%) |
| Family history of cancer, n (%) | | | | |
| Yes | 151 (60.4%) | 139 (55.6%) | 146 (58.4%) | 436 (58.1%) |
| Family history of breast or ovarian cancer | 57 (37.7%) | 56 (40.3%) | 79 (54.1%) | 192 (44.0%) |
| No | 92 (36.8%) | 95 (38.0%) | 97 (38.8%) | 284 (37.9%) |
| Prefer not to answer | 7 (2.8%) | 16 (6.4%) | 7 (2.8%) | 30 (4.0%) |

^a p-value<0.05

Table 2.

Prescribing and Recommending Breast and Ovarian

| | Family Medicine n (%) | Internist n (%) | OB/GYN n (%) | Total n (%) | Family Medicine n (%) | Internist n (%) | OB/GYN n (%) | Total n (%) |
|----------------------------------------------------------------------------------------------------------------|-----------------------------|--------------------|-----------------|----------------|-----------------------------|--------------------|-----------------|----------------|
| | Breast Cancer ¹ | | | | Ovarian Cancer ² | | | |
| Prescribed a cancer preventive intervention in past 12 months ^a | | | | | | | | |
| 11 or more times | 17 (6.8%) | 30 (12.0%) | 28 (11.2%) | 75 (10.0%) | 3 (1.2%) | 16 (6.4%) | 28 (11.2%) | 47 (6.3%) |
| 6 to 10 times | 27 (10.8%) | 21 (8.4%) | 43 (17.2%) | 91 (12.1%) | 8 (3.2%) | 11 (4.4%) | 41 (16.4%) | 60 (8.0%) |
| 1 to 5 times | 78 (31.2%) | 99 (39.6%) | 75 (30.0%) | 252 (33.6%) | 75 (30.0%) | 84 (33.6%) | 117 (46.8%) | 276 (36.8%) |
| 0 times | 128 (51.2%) | 100 (40.0%) | 104 (41.6%) | 332 (44.3%) | 164 (65.6%) | 139 (55.6%) | 64 (25.6%) | 367 (48.9%) |
| Reinforced a specialist's recommendation for a cancer preventive intervention in past 12 months ^{a,b} | | | | | | | | |
| 11 or more times | 29 (11.6%) | 39 (15.6%) | 43 (17.2%) | 111 (14.8%) | 8 (3.2%) | 18 (7.2%) | 33 (13.2%) | 59 (7.9%) |
| 6 to 10 times | 42 (16.8%) | 43 (17.2%) | 60 (24.0%) | 145 (19.3%) | 20 (8.0%) | 20 (8.0%) | 35 (14.0%) | 75 (10.0%) |
| 1 to 5 times | 133 (53.2%) | 124 (49.6%) | 118 (47.2%) | 375 (50.0%) | 107 (42.8%) | 112 (44.8%) | 145 (58.0%) | 364 (48.5%) |
| 0 times | 48 (18.4%) | 44 (17.6%) | 29 (11.6%) | 119 (15.9%) | 115 (46.0%) | 100 (40.0%) | 37 (14.8%) | 252 (33.6%) |
| Types of preventive interventions prescribed or reinforced ^c | | | | | | | | |
| Prophylactic Mastectomy | 109 (52.7%) | 112 (53.3%) | 117 (52.2%) | 338 (52.7%) | | | | |
| Prophylactic Oophorectomy ^a | 52 (25.1%) | 61 (29.0%) | 138 (61.6%) | 251 (39.2%) | | | | |
| Tamoxifen | 147 (71.0%) | 149 (71.0%) | 142 (63.4%) | 438 (68.3%) | | | | |
| Raloxifene | 85 (41.1%) | 80 (38.1%) | 76 (33.9%) | 241 (37.6%) | | | | |
| Aromatase Inhibitor | 79 (38.2%) | 91 (43.3%) | 94 (42.0%) | 264 (41.2%) | | | | |
| Other ^d | 6 (2.9%) | 7 (3.3%) | 7 (3.1%) | 20 (3.1%) | | | | |
| Risk-reducing salpingo-oophorectomy ^a | | | | | 93 (67.4%) | 99 (64.3%) | 211 (95.0%) | 403 (78.4%) |
| Oral contraceptives ^a | | | | | 86 (62.3%) | 92 (59.7%) | 163 (73.4%) | 341 (66.3%) |
| Other ^d | | | | | 6 (4.3%) | 6 (3.9%) | 7 (3.2%) | 19 (3.7%) |

^a p-value<0.05^b Significant only for reinforced a specialist's recommendation for an ovarian cancer preventive intervention in past 12 months.

^c Among those who had prescribed or reinforced a recommendation for a cancer preventive intervention.

^d Other preventive interventions specified includes: genetic testing, lifestyle modification, mammogram screening, and referral to specialist.

¹ <https://www.cancer.gov/types/breast/risk-reducing-surgery-fact-sheet> (accessed 11/12/2019)

² https://www.cancer.gov/types/ovarian/patient/ovarian-prevention-pdq#_11 (accessed 11/12/2019)

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Table 3.

Logistic Regression Models of predictor variables associated with prescribing or reinforcing recommendations for preventive interventions

| | Prescribing or reinforcing a recommendation for a preventive intervention for breast cancer | Prescribing or reinforcing a recommendation for a preventive intervention for ovarian cancer |
|------------------------------------------------------------|---------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| | OR (95% CI) | OR (95% CI) |
| Age | 1.01 (.95, 1.07) | 1.01 (.96, 1.06) |
| Gender | | |
| Female | 1 [Reference] | 1 [Reference] |
| Male | .78 (.48, 1.28) | 1.03 (.68, 1.54) |
| Specialty | | |
| Family medicine | 1 [Reference] | 1 [Reference] |
| Internist | 1.09 (.63, 1.86) | 1.10 (.71, 1.70) |
| OB/GYN | 1.04 (.56, 1.93) | 3.22 (1.87, 5.57) ^a |
| Years practicing specialty | 1.00 (.93, 1.06) | .98 (.93, 1.04) |
| Comfort in estimating a patient's risk (breast cancer) | 1.11 (.99, 1.24) | - |
| Comfort in estimating a patient's risk (ovarian cancer) | - | 1.31 (1.20, 1.44) ^a |
| Familiarity with cancer preventive interventions | | |
| Least familiar | 1 [Reference] | 1 [Reference] |
| Somewhat familiar | 3.26 (1.80, 5.90) ^a | 3.03 (1.85, 4.94) ^a |
| Moderately familiar | 3.99 (1.93, 8.23) ^a | 2.14 (1.24, 3.68) ^a |
| Most familiar | 5.59 (2.50, 12.51) ^a | 3.45 (1.90, 6.26) ^a |

^ap-value<0.01