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Linking physician attitudes to their breast cancer screening practices: A survey of US primary care providers and gynecologists^{☆, ☆ ☆}

Archana Radhakrishnan^{a,*,1}, Sarah A. Nowak^b, Andrew M. Parker^c, Kala Visvanathan^{d,e},
Craig E. Pollack^{e,f}

^a Division of General Medicine, University of Michigan, Ann Arbor, MI, United States

^b RAND Corporation, Santa Monica, CA, United States

^c RAND Corporation, Pittsburgh, PA, United States

^d Department of Oncology, Johns Hopkins School of Medicine, Baltimore, MD, United States

^e Department of Epidemiology and Health Policy and Management, Johns Hopkins Bloomberg School of Public Health, Baltimore, MD, United States

^f Division of General Internal Medicine, Johns Hopkins University, Baltimore, MD, United States

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ABSTRACT

Despite changes to breast cancer screening guidelines intended to decrease screening in younger and older women, mammography rates remain high. We investigated physician attitudes towards screening younger and older women. Surveys were mailed to US primary care providers and gynecologists between May and September 2016 (871/1665, 52.3% adjusted response rate). We assessed physician (1) attitudes towards screening younger (45–49 years) and older (75+ years) women and (2) recommendations for routine mammography. We used exploratory factor analysis to identify underlying themes among physician attitudes and created measures standardized to a 5-point scale. Using multivariable logistic regression models, we examined associations between physician attitudes and screening recommendations. Attitudes identified with factor analysis included: potential regret, expectations, and discordant guidelines (referred to as potential regret), patient-related hazards due to screening, physician limitations and uncertainty, and concerns about rationing care. Gynecologists had higher levels of potential regret compared to internists. In adjusted analyses, physicians with increasing potential regret (1-point increment on 5-point scale) had higher odds of recommending mammography to younger (OR 8.68; 95% CI 5.25–14.36) and older women (OR 4.62; 95% CI 3.50–6.11). Increasing concern for patient-related hazards was associated with decreased odds of recommending screening to older women (OR 0.68; 95% CI 0.56–0.83). Physicians were more motivated by potential regret in recommending screening for younger and older women than by concerns for patient-related hazards in screening. Addressing physicians' most salient concerns, such as fear of missing cancer diagnoses and malpractice, may present an important opportunity to improving delivery of guideline-concordant cancer screening.

1. Introduction

Evolving breast cancer screening guidelines have shifted towards reducing screening for younger (ages 40–49) and older (ages 75 and over) women given concerns that these groups of women may be more likely to experience the harms of mammography screening relative to its potential benefits (Siu and U.S. Preventive Services Task Force, 2016; Oeffinger et al., 2015; American College of Obstetricians-Gynecologists, 2017). In spite of guideline changes, rates of

mammography screening continue to remain high among younger and older women (Anderson et al., 2013; Jiang et al., 2015; Wharam et al., 2015; Royce et al., 2014). For example, following the 2009 US Preventive Services Task Force (USPSTF) recommendations to start biennial mammography screening for women 50–74 years, rather than starting at age 40, screening rates for younger women were unchanged by 2011 (Pace et al., 2013). Prior research highlights the difficulty with the 'de-implementation'—abandonment of medical practices that are not evidence-based—of guidelines. Factors such as inertia,

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^{*} Corresponding author at: University of Michigan, Division of General Medicine, 2800 Plymouth Rd, Building 16, 430W, Ann Arbor, MI 48109, United States.

E-mail address: arra@umich.edu (A. Radhakrishnan).

¹ Current address: University of Michigan, Division of General Medicine, 2800 Plymouth Road, NCRC Bldg 16, 430W, Ann Arbor, MI 48109-2800, United States.

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organizational culture, financial incentives, personal values, and patient expectations may influence physician behavior, overriding evidence such as from randomized controlled trials (Hahn et al., 2017; Prasad and Ioannidis, 2014).

A key determinant of breast cancer screening is whether a primary care provider (PCP) or gynecologist recommends mammography to their patient (Peterson et al., 2016). Existing research suggest that these recommendations are informed by organizational guidelines. Physicians who report trusting the USPSTF recommendations—which have tended to be the most conservative guidelines—are less likely to recommend screening (Anderson et al., 2013; Radhakrishnan et al., 2017; Meissner et al., 2011). At the same time, a majority of physicians who report trusting USPSTF, for example, continue recommending screening in excess of these guidelines, with rates of screening remaining largely unchanged following guideline changes (Haas et al., 2016). Physician specialty has also been linked with screening recommendations. Gynecologists, in part reflecting the recommendations of their professional society, were most likely to recommend mammography screening starting at an early age, recommending annual rather than biennial screening, and continuing screening among older women compared to internists or family physicians (Meissner et al., 2011; Corbelli et al., 2014).

To inform efforts to implement guidelines that seek to reduce screening in younger and older women, it is critical to better understand the drivers of physician screening recommendations including the underlying physician attitudes and beliefs towards mammography screening in their younger and older patients. These attitudes and beliefs may help decide which organizational guideline physicians report trusting, explain variable adherence to these guidelines, and be shaped by specialty training and experiences. However, prior studies investigating physicians' attitudes and beliefs towards breast cancer screening have tended to focus on a very limited set of attitudes and beliefs, often using a single question concerning perceived clinical effectiveness, not examining the subsequent impact on physician screening recommendations, and sometimes only including smaller/regional physician samples. These studies have found significant heterogeneity in attitudes around the influence of various organizational guidelines and concerning effectiveness of breast cancer screening in younger and older women (Meissner et al., 2011; Haas et al., 2016; Haas et al., 2017).

Building on the prior literature and drawing upon a large national survey of primary care providers and gynecologists, we sought to investigate a broad range of attitudes and beliefs towards mammography screening, using factor analysis to group them into underlying themes. We then investigated whether these themes varied according to which guidelines physicians trusted the most and physician specialty. Lastly, we examined whether attitudes and beliefs were associated with physician breast cancer screening recommendations for women of different age groups.

2. Methods

Data for our study were obtained from the Breast Cancer Social Networks study (CanSNET), a national survey of primary care physicians. The Johns Hopkins University Institutional Review Board approved this study.

2.1. Physician recruitment

Primary care providers were randomly sampled from the American Medical Association Masterfile, including 1500 internal medicine (IM), family medicine (FM) and general practice (GP) physicians and 500 gynecologists. Physicians were included if they provided primary care or general gynecologic care to women ages 40 and older. Mailed surveys were sent between May and September 2016 and an unconditional \$10 incentive was provided in the first mailing. All non-responders

received an additional two mailings. In the third mailing, we offered a \$40 gift card upon completion of the survey. Physicians had the opportunity to respond to the survey online and phone calls were made to non-responders.

2.2. Outcome

To determine breast cancer screening practices, we asked physicians how often they typically recommended mammograms to women in different age groups “with no family history and no prior breast issues, including no prior positive biopsies or increased genetic susceptibility to breast cancer”. Response options included: I do not recommend screening, recommend screening yearly, recommend screening every other year or recommend screening at another interval. Responses were dichotomized as recommending screening or not.

2.3. Primary independent variable

Physicians were asked for degree of agreement with a series of statements regarding their attitudes and beliefs around mammography screening for women ages 45–49 and ages 75+, age groups for which guidelines are the most discordant (Appendix B). Statements were based on prior literature and modified based on pilot testing with physicians who provide routine primary or gynecologic care to women ages 40+ (Haas et al., 2016; Pollack et al., 2012a; Armstrong et al., 2006; Pollack et al., 2012b). A series of 9 statements were asked to physicians regarding screening younger women. This was similarly repeated for screening older women, but an additional 3 statements specific to discontinuing cancer screening were included. Physicians rated their agreement using a 5-point Likert scale.

2.4. Covariates

Physician and practice characteristics that previously have been shown to influence screening practices were obtained from the survey (Meissner et al., 2011; Corbelli et al., 2014; Wallace et al., 2006). Physician characteristics included race/ethnicity, gender, specialty, whether the physician worked full time in outpatient practice, and if the physician was personally sued for failing to diagnose any type of cancer. AMA data was used to obtain respondents' ages and for missing survey data on gender (N = 20) and specialty (N = 39). Additionally, physicians were asked to select the organization's guideline they trusted most for breast cancer screening – options included American Cancer Society (ACS), USPSTF, American Congress of Obstetricians and Gynecologists (ACOG), other, and I am not sure/no preference. Responses for other and I am not sure/no preference were combined given small sample sizes. Practice characteristics included size of the physician's practice, employer type, and percentage of uninsured patients seen.

2.5. Statistical analysis

We used descriptive statistics to summarize physician and practice characteristics. We performed a series of three analyses. First, to identify underlying themes among physician attitudes and beliefs, we performed exploratory factor analysis using the principal-component factor method and varimax rotation (Kim and Mueller, 1978). All factors with Eigenvalues greater than one were considered further. Within each factor, item loadings were similar. Because of this, we created summary scores by computing unweighted averages of items loading on each factor. Scores ranged from 1 to 5, with greater scores representing greater concern with the attitude or belief.

Second, we determined whether physician attitudes and beliefs varied by (1) physician specialty and (2) most trusted guidelines. To do this, we used Kruskal-Wallis ranks tests, given that the distributions of scores for physician attitudes and beliefs were not normal, followed by multivariable linear regression models. In our regression models, our

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