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Decision-making processes for breast, colorectal, and prostate cancer screening: results from the DECISIONS study

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Abstract

Background—Patients should understand the risks and benefits of cancer screening in order to make informed screening decisions.

Objectives—Evaluate the extent of informed decision making in patient-provider discussions for colorectal (CRC), breast (BrCa), and prostate (PCa) cancer screening.

Design—National random-digit dial telephone survey.

Subjects—English-speaking U.S. adults aged 50 and older who had discussed cancer screening with a health care provider within the previous two years.

Measurements—Cancer screening survey modules that asked about sociodemographic characteristics, cancer knowledge, the importance of various sources of information, and self-reported cancer-screening decision-making processes.

Results—Overall, 1,082 participants completed one or more of the three cancer modules. Although participants generally considered themselves well informed about screening tests, half or more could not correctly answer even one open-ended knowledge question for any given module. Participants consistently overestimated risks for being diagnosed with and dying from each cancer and overestimated the positive predictive values of PSA tests and mammography. Providers were the most highly rated information source, usually initiated screening discussions (64–84%), and often recommended screening (73–90%). However, participants reported providers elicited their screening preferences in only 31% (CRC women) to 57% (PCa) of discussions. While over 90% of the discussions addressed the pros of screening, only 19% (BrCa) to 30% (PCa) addressed the cons of screening.

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Limitations—Recall bias is possible because screening process reports were not independently validated.

Conclusions—Cancer screening decisions reported by patients who discussed screening with their health care providers consistently failed to meet criteria for being informed. Given the high ratings for provider information and frequent recommendations for screening, providers have important opportunities to ensure that informed decision-making occurs for cancer screening decisions.

Keywords

prostatic neoplasms; breast neoplasms; colorectal neoplasms; early detection of cancer; decision making

Introduction

Screening can reduce cancer morbidity and mortality, though relatively few patients who undergo screening actually achieve this benefit. More commonly, patients face potential downsides from screening, including false positive tests, psychological distress, additional testing, overdiagnosis, and treatment complications (1). Given the potential benefits and harms associated with screening, experts have argued that cancer-screening decisions should depend on patient preferences and that patients should be provided the opportunity to participate in an informed decision-making process (2). The elements of this process include a discussion addressing the patient's desired role in the decision making, the nature of the decision, alternative options, uncertainties associated with decision, the patient's understanding, and the patient's preferences (3).

While cancer screening is usually initiated in primary care, the extent to which informed decision-making occurs in everyday practice has not been well characterized. Much of the literature addresses only a single cancer, a selected patient population, or provides a limited description of the screening discussions and decision factors (4–10).

The National Survey of Medical Decisions (DECISIONS) was a nationally representative telephone survey of English-speaking adults aged 40 and older who recently faced one of nine common medical decisions, including three types of cancer screening (11). DECISIONS data provide detailed characterizations of screening discussions and decision-making from the patient's perspective. Hoffman and colleagues previously characterized decision-making processes for men aged 40 and older in the DECISIONS study who faced prostate cancer screening decisions (12). The purpose of the current analysis was to characterize discussions of colorectal, breast, and prostate cancer screening between patients aged 50 and older and their health care providers. We specifically evaluated the variability in the sources of information that patients relied upon, knowledge, decision processes, and reported patient-provider communication across these three different types of cancer screening.

Methods

Design

The DECISIONS study was a list-assisted random-digit-dial telephone survey of a national probability sample of English-speaking adults aged 40 and older conducted in 2006–7. Overall, 3,010 subjects completed interviews for a weighted cooperation rate of 86.5% and weighted response rate of 51.6%. Participants answered a variety of questions about nine common types of medical decisions, including screening for breast, colorectal, and prostate

cancer. Complete details of the sampling, response rate, instrument development, and data collection methodologies are detailed elsewhere (11). All procedures and instruments received approval from the University of Michigan and Veterans Affairs Ann Arbor Medical Center institutional review boards.

The survey instrument included an introductory section that assessed decision prevalence, followed by decision-specific question modules. Participants were deemed eligible to participate in cancer screening modules if they reported having a screening test within the preceding two years and/or reported discussing a screening test with their health care providers. Participants were randomly assigned to complete up to two decision modules drawn from the set for which they were eligible, with higher probabilities of module assignment given to the least prevalent decisions.

Within each cancer screening module, participants answered a variety of questions about their knowledge of basic facts about the particular cancer, the importance of various sources of information used in making screening decisions, the processes used in making screening decisions, the communications with their health care providers, and the outcomes of the decision-making process. The present manuscript focuses on the subset of DECISIONS participants aged 50 and older who were eligible for breast, colorectal, or prostate cancer screening modules, were randomly selected to complete one or two of these cancer screening modules, and who reported discussing cancer screening with a health care provider before either undergoing testing or electing to not be tested.

We restricted our analyses to participants aged 50 and older to minimize selection bias because screening for prostate and colorectal cancer in younger age groups has routinely been recommended for only high-risk individuals (13). Furthermore, breast cancer screening recommendations for average-risk women aged 40 to 49 are inconsistent (14).

Measures

Participant characteristics—Participants answered standard demographic questions, including age, gender, race, income, marital status, and education. They also rated their health status, reported whether they currently had health insurance or a health care provider, and stated whether they felt that they were at low, average, or high risk for the cancer in question.

Sources of information—Participants rated, on a 0 to 10 scale (with 0 being “not at all important” and 10 being “extremely important”), the importance of cancer screening information obtained from their health care providers, their friends and family, and the media, respectively, for making their decision about cancer screening. Participants also indicated whether they (or a designee) had used the Internet to search for information about the screening decision and, if so, rated the importance of Internet-derived information on the same 0 to 10 scale.

Cancer-specific knowledge—Each cancer-screening module included 3 to 5 open-ended knowledge questions (15). All modules asked participants to estimate the lifetime risks for cancer diagnosis and cancer mortality. We considered responses within a 5 percentage point range that included the actual mortality risk and within a 10 percentage point range that included the actual incidence risk to be correct. The breast and prostate cancer screening modules asked about the positive predictive value—the proportions of patients with positive screening tests that turn out to have cancer, the colorectal cancer screening module asked about the recommended interval for screening colonoscopy following a negative examination, and the breast and colorectal cancer screening modules asked whether there was evidence for the efficacy of screening. The accompanying

knowledge paper by Fagerlin et al. provides the algorithms used to define the correct answers and the data sources (15). Participants also rated their perceptions of how well informed they were about the screening tests using a 0 to 10 scale (with 0 being “not informed at all” and 10 being “extremely well informed”) (16).

Decision processes and patient-provider communications—The modules asked participants about the decision-making process for cancer screening, including who raised the issue of screening, whether the participant had spoken with more than one health care provider about screening, whether providers elicited the participant’s preference for screening, and whether the final decision about screening was made by the participant, provider, or was shared. Modules also asked participants about their communications with health care providers regarding screening, including the degree to which health care providers had addressed reasons for or against screening, whether the providers offered opinions regarding screening and made explicit screening recommendations, and whether reasons for screening were well explained. The survey also asked participants whether they underwent testing, their confidence that they made the correct decision about getting or not getting screened on a 0 to 10 scale (with 0 being “not at all confident” and 10 being “extremely confident”), and their satisfaction with their level of involvement in the decision-making process.

Analyses

For each module, we estimated sample means and proportions with 95% confidence intervals to describe participant characteristics, cancer-specific knowledge, information sources, and the screening discussion. We used the survey procedures (PROC SURVEYFREQ and PROC SURVEYMEANS) in SAS 9.13 to adjust for selection, non-response, post-stratification, and module-randomization weights (11). The standard errors and statistical tests account for the fact that some respondents completed two modules. Missing data on selected demographic variables were imputed using sequential regression imputation, implemented in IVEWare (17, 18). Data were most frequently missing for income (12.2%) and then race (1.3%); data were available for 99.5% to 100% of the other demographic variables. For descriptive statistics, we also collapsed the 11-point response scales for the importance of various information sources, feeling informed about screening tests, and confidence in screening decisions into five categories (0, 1–3, 4–7, 8–9, and 10) because the data were highly skewed and these categories captured much of the underlying variation. We used a global chi-square test to compare discussion characteristics across the 4 modules (we reported colorectal cancer screening results separately for each gender).

Results

Overall, 2213 participants (924 men, 1289 women) aged 50 and older had discussed or undergone any cancer screening within the previous two years (Figure 1). We randomly selected 1308 to complete 1572 cancer-screening decision modules. In this paper, we evaluated the 1271 modules (completed by 1082 participants) where participants reported discussing screening before taking an action—either to undergo screening or not undergo screening (shaded boxes in Figure 1). Those discussing screening included 198 (66.7%) of the men selected for the prostate module, 258 (86.0%) of the men selected for the colorectal module, 355 (89.0%) of the women selected for the colorectal module, and 460 (79.9%) of the women selected for the breast module. Sixty-seven men completed both the prostate and colorectal cancer screening modules, while 122 women completed both the breast and colorectal cancer screening modules.

Table 1 shows sociodemographic and clinical characteristics of the participants. The majority of participants were white, with at least a high-school education, and nearly all had health care insurance and a regular health care provider. Women had lower socioeconomic status based on education and income and were less likely to be married. About half of the participants reported their health as being excellent or very good. Most (80–90%) considered themselves to be at low or average risk for cancer, but more participants considered themselves to be at high risk for prostate or breast cancer than for colorectal cancer.

Sources of information

Health care providers were most often cited as being an extremely important information source in the survey (Table 2). Women were more likely than men to report that health care providers were an extremely important (= 10) source of cancer screening information for colorectal cancer. Although media and family/friends were less often reported as extremely important sources of information compared to providers, women were also more likely than men to rate these sources highly. The majority of participants did not access the Internet for cancer screening information, with the lowest use (10.2%) among those aged 70 and older compared to 22.3% in those aged 60 to 69, and 24.9% in those aged 50 to 59 ($P = 0.001$).

Knowledge

Women were more likely than men to report feeling highly informed about cancer screening, though less than half of the participants in any of the modules were able to correctly answer either the incidence or mortality knowledge questions (Table 2). Participants were more likely to correctly answer both questions for colorectal cancer than for prostate and breast cancer. Among men, only 3.9% were able to correctly answer both the incidence and mortality knowledge questions for prostate cancer, a significantly lower proportion than the 31.1% who correctly answered both questions for colorectal cancer ($P < 0.001$). Only 6.8% of women correctly answered both risk questions for breast cancer, while 22.7% of women correctly answered both risk questions for colorectal cancer ($P < 0.001$).

Most of the participants markedly overestimated the risks for cancer incidence and mortality. Figure 2 shows the cancer incidence and mortality risks estimated by the Surveillance, Epidemiology, and End Results program (19) and the comparable risks estimated by our participants. The proportions of men who overestimated the risk for being diagnosed with cancer by at least threefold were relatively high for both prostate cancer (29.5%) and colorectal cancer (54.7%). Men similarly overestimated mortality risks for prostate cancer (66.3%) and colorectal cancer (54.2%). The proportions of women who overestimated the risk for being diagnosed with cancer by at least threefold were also high for breast cancer (44.1%) and colorectal cancer (64.7%). Women similarly overestimated the risk for dying from breast cancer (68.1%) and colorectal cancer (65.8%).

A higher perceived risk of cancer was associated with higher estimates for cancer incidence and mortality; associations were significant for prostate and colorectal cancer though not for breast cancer (data not shown). However, even respondents who perceived themselves to be at low risk consistently and markedly overestimated the risks for cancer incidence (ranging from two- to four-fold overestimates) and mortality (ranging from five- to ten-fold overestimates).

Participants knew that screening reduced mortality for breast cancer (89.0%) and colorectal cancer (95.8% of men, 92.2% of women). However, only 16.6% of men were able to correctly estimate the predictive value of an abnormal PSA test as being within 21% to 40% and only 23.6% of women were able to correctly estimate the predictive value of an abnormal mammogram as being between 1% to 14%. Substantial proportions of participants

overestimated predictive values for PSA (35.8%) and mammography (30.1%). Additionally, most participants (87.7% men, 78.7% women) did not know that a screening colonoscopy should be repeated 10 years following a normal examination. Overall, half or less of participants were able to correctly answer even one question for any given module.

Decision processes and communication

Participants' perspectives on the characteristics of the various screening discussions are shown in Table 3. They usually reported that providers presented the screening test as part of a plan to get screened regularly, though least frequently for colorectal cancer screening in women. While providers were usually reported to have raised the idea of screening for all four groups, men were more likely to report raising the idea of screening for prostate cancer. Although an infrequent event, men facing prostate cancer screening decisions were more likely to report seeking second opinions about screening. With the exception of prostate cancer screening, the majority of participants reported that health care providers did not ask their preferences for screening. Over half of the participants in each module felt that decisions were shared and very few reported that the health care provider alone was the final decision maker.

Nearly all participants reported discussing the pros of screening with a health care provider, and the pros of screening were most likely to be discussed "a lot" for breast cancer (49.9%). The proportion of participants who reported discussing the cons of screening to any extent was consistently low, ranging from just 19.5% (breast cancer screening) to 29.6% (prostate cancer screening). Nonetheless, a high proportion of participants in each module felt that the reasons for screening were well explained--84.4% for prostate cancer, 87.2% for colorectal cancer (men), 93.8% for colorectal cancer (women), and 88.6% for breast cancer.

Most health care providers reportedly offered an opinion about cancer screening with very few recommending against it. The proportions of participants who reported receiving a recommendation for screening ranged from 72.9% (prostate cancer) to 90.2% (colorectal cancer for men).

Screening decisions

Most participants underwent cancer screening following discussions, though least often among women facing colorectal cancer screening decisions (Table 3). Women facing breast cancer screening decisions were most likely to report undergoing screening; they also had the highest level of confidence in their screening decision. Most participants felt that their amount of involvement in the screening decision was appropriate, though 11.9% of women would have preferred more involvement in colorectal cancer screening and 16.4% of men would have preferred more involvement in prostate cancer screening decisions.

Discussion

Our study demonstrated the challenges of achieving informed decision-making for cancer screening decisions. Even though all participants reported discussing screening and most described themselves as being informed about screening tests, half or less of the participants in each module were able to correctly answer even one knowledge question. Respondents rated providers as their most important information source, and reported that providers most often initiated screening discussions and generally recommended screening. However, participants reported that providers did not routinely elicit screening preferences and screening discussions were much more likely to address the pros of screening compared to the cons of screening.

The consistently poor performance on knowledge questions about cancer incidence and mortality across all cancer types was disconcerting. Knowledge of the clinical issue is considered an essential element for informed decision-making (3). Although most participants considered themselves informed about screening, the proportions that correctly answered both incidence and mortality questions ranged from only 2.9% (breast cancer) to 20.7% (colorectal cancer, men) among those who considered themselves extremely well informed (= 10). Although most respondents considered themselves to be at average or low risk for cancer, they consistently and markedly overestimated the risks for cancer incidence and mortality across all levels of perceived risk. They also overestimated the predictive value of PSA tests and mammography for detecting cancer. One possible explanation for these findings is that cancer has been widely publicized in the popular media and the messages often do not accurately reflect the burden of disease and the relatively limited benefits of screening (20–23). Most messages uncritically support screening, often failing to address absolute risks, potential harms, alternatives, uncertainty, and evidence-based screening guidelines. A consequence of these messages, as shown in a national survey of adults without a history of cancer by Schwartz and colleagues (24), was that most (87%) adults believed that routine cancer screening is almost always a good thing and 74% believed that finding cancer early saves lives most or all of the time.

Health care providers can play an important role in conveying accurate information about cancer screening to patients. Our participants reported that the process for discussing cancer screening usually began with the provider raising the issue. Participants consistently rated provider information as being far more important than information from other sources such as family and friends or the media. However, the exaggerated perceptions of cancer risk suggest that the media messages are perhaps more powerful than participants acknowledge. Part of the problem may be that providers are not sufficiently countering the media messages by providing patients with comprehensive and objective information about screening.

Even though many experts emphasize that providers should be discussing the benefits and risks of cancer screening (2, 25), patient surveys and interviews of both patients and providers agree that patients often do not receive enough information to support screening decisions (6–9, 26–28). The DECISIONS results confirmed the limitations in cancer screening decisions, but went beyond the existing literature by comprehensively characterizing the decision-making process across multiple screening decisions.

Although most participants felt that screening had been well explained by the provider, they reported that discussions for each of the cancers consistently addressed the pros of screening more than the cons. While the pros of screening were discussed “a lot” most frequently for breast cancer, nearly all discussions addressed the pros to some degree. However, the subjects reported that 70% to 80% of discussions failed to address the cons of screening at all. This may reflect a biased recall of the discussions, particularly given the general enthusiasm for cancer screening (24), with respondents less likely to retain negative information. Nonetheless, in describing the screening discussions, participants also reported that health care providers frequently had opinions about screening, with the majority favoring screening so that a biased presentation is certainly plausible. Provider recommendations are recognized as powerful factors for undergoing screening (29–31), but when presented without discussing the pros and cons they undermine the goal of achieving informed decision-making (3).

The majority of participants reported being satisfied with their level of involvement in the decision. Indeed, studies have shown that patients value being involved in the decision-making process for cancer screening (4, 32). However, most discussions reported by our

participants did not clearly meet criteria for being informed because providers did not routinely elicit screening preferences, particularly for colorectal cancer. Braddock et al have shown that patients are often not made aware of their opportunity to participate in decision making, emphasizing that this process should include patients exploring their preferences (3).

A striking finding in our survey was the relatively low reported uptake of colorectal cancer screening after a discussion. Only about 70% of women and 79% of men who reported having a discussion underwent colorectal cancer screening compared to 86% for prostate cancer screening and 90% for breast cancer screening. A previous analysis of men aged 40 and older who completed the prostate cancer screening module found that a provider recommendation for screening was the most important discussion factor associated with undergoing testing (12). In the current analyses, we observed lower uptake for colorectal cancer screening even though most women and men did receive provider recommendations for screening, valued provider information, and felt well informed.

Additionally, only about 63% of participants indicated that they were extremely confident in their colorectal cancer screening decision; this was significantly lower than reported by women completing the breast cancer module (85%), suggesting some ambivalence. Embarrassment and anxiety about the screening tests may be a barrier for even informed patients (33). Lafata et al identified other issues in a survey of primary care patients where only 61% of those who discussed screening actually underwent testing (7). Discussing lower endoscopy and instructing patients on how to make appointments and get test results were associated with a greater likelihood of screening. However, patients who were offered a choice among multiple screening test options or who wanted additional information were less likely to be screened. This suggests that incomplete information may hinder informed decision-making.

One possible solution for improving the decision-making process is to offer patients decision aids. These aids are defined as interventions, which can be written, oral, video, or web-based, that are designed to help patients make decisions by providing information on the disease, presenting alternative strategies, describing the possible beneficial and harmful outcomes, and helping patients clarify their values (2, 34). Given that screening discussions often are incomplete or omitted, using a decision aid would allow providers to be able to consistently present comprehensive, objective information. Decision aids have been shown to increase shared decision-making, improve knowledge, and improve concordance between patients' values and their decisions (35). Prostate cancer decision aids have also been associated with decreased interest in screening (36), while other cancer-specific decision aids have increased uptake of breast (37) and colorectal cancer screening (38, 39). Because providers are highly rated as important sources for cancer screening information, having them provide decision aids could be an acceptable and powerful antidote to misleading media messages and receiving incomplete information.

The survey had some important potential limitations. Participants were asked to recall discussions that could have occurred up to 2 years before completing the survey module. This step could have led to recall bias because we did not attempt to validate the responses. However, the screening rates were similar to other national surveys, including the National Health Interview Survey (40) and Health Information National Trends Survey (30, 41), where participants were asked about screening or discussions that had occurred within the previous year. Additionally, the participants were highly selected because most had access to health care, and all had telephones and spoke English. We also required that a module participant had either undergone or discussed cancer screening within the past 2 years. Study results may not be generalizable to lower income, minority, or less health-conscious

populations. We also were unable to determine whether respondents who reported testing within the past 2 years had ever been previously tested. A screening discussion might be structured differently for patients with previous testing, with less effort to ensure informed decision-making. However, given changing guidelines and new research findings, providers should not assume that screening preferences would necessarily remain constant. While we assessed cancer knowledge in association with informed decision-making, we were not able to determine whether the health care provider actually provided any cancer information. Furthermore, the knowledge questions, though based on validated measures, addressed only a limited spectrum of cancer screening knowledge. We did not ask subjects about the potential downstream consequences of screening, including false positive tests and undergoing biopsy, overdiagnosis, and complications from overtreatment, that are also considered important for making informed decisions for cancer screening. Finally, we are not able to know what kind of information is most important for decision making from a patient's perspective. However, the poor performance on the knowledge questions suggests that patients may not be able to accurately determine whether they are well informed. Patients should have some key objective knowledge, though determining what constitutes essential knowledge remains a challenge.

Cancer screening discussions across all screening tests apparently did not routinely meet criteria for informed decision-making. Participants reported that health care providers frequently failed to discuss the cons of screening and did not routinely elicit patient preferences. Although participants reported feeling well informed, they performed poorly in answering knowledge questions, and significantly overestimated incidence and mortality risks and the predictive values of PSA tests and mammography. Participants highly valued health care provider information and recommendations, suggesting that providers can have a vital role in ensuring that informed decision-making occurs for cancer screening decisions. Further research should address strategies, such as provider training, decision aids, or coaching interventions, to facilitate this process.

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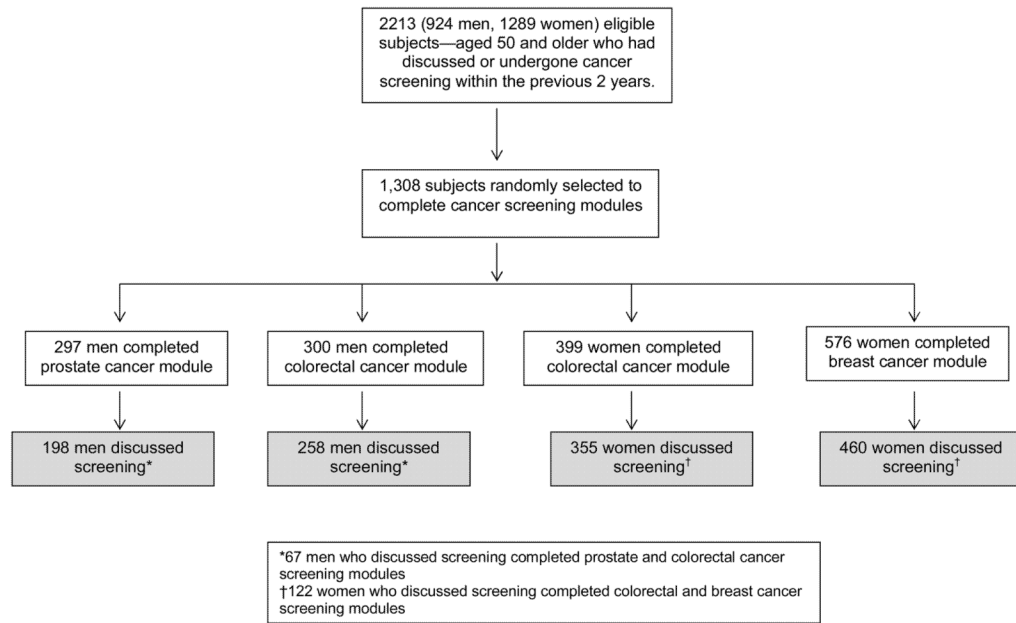


Figure 1. Cohort assembly. Shaded boxes indicate subjects included in this manuscript.

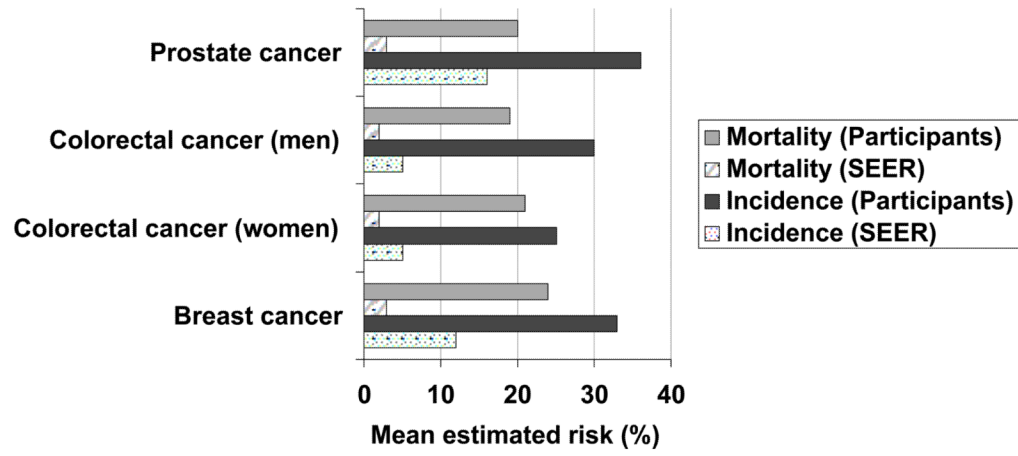


Figure 2. Surveillance Epidemiology End Results (SEER) registry and participant estimates for cancer incidence and mortality.

Table 1

Participant characteristics (weighted percentages)*

Variable	Prostate cancer N = 198	Colorectal cancer men N = 258	Colorectal cancer women N = 355	Breast cancer N =460	P-value [†]
Participant characteristics					
Age (years)					
50-69	47.1	44.4	44.5	51.2	0.22
60-69	35.5	30.4	34.9	24.5	
70+	17.4	25.2	20.6	24.2	
Race/ethnicity					0.83
White	79.2	82.3	72.7	74.6	
African American	16.1	12.8	20.9	18.8	
Other	4.7	4.9	6.4	6.5	
Marital status					<0.001
Married/cohabiting	81.5	84.4	62.6	62.0	
Other	18.5	15.6	37.4	38.0	
Education					0.07
< High school	7.0	4.8	6.5	6.0	
High school graduate	29.5	27.7	34.6	44.6	
Some college	23.0	17.6	23.4	19.4	
College graduate	20.0	25.4	21.0	16.0	
Postgraduate	20.5	24.4	14.5	14.1	
Employed					0.35
Yes	50.8	52.0	44.0	52.4	
Income					<0.0001
<\$25,000	3.9	7.7	21.6	22.2	
\$25-49,999	27.6	24.6	25.7	30.2	
\$50-99,999	31.0	37.9	34.9	35.0	
\$100,000+	28.2	29.8	17.7	12.5	

Variable	Prostate cancer N = 198	Colorectal cancer men N = 258	Colorectal cancer women N = 355	Breast cancer N = 460	P-value [†]
Have health insurance coverage	95.9	94.7	95.9	94.5	0.88
Have a primary care provider	96.8	96.2	95.0	93.8	0.51
Health status					0.77
Excellent	13.9	13.5	14.5	19.0	
Very good	32.6	35.3	34.0	34.3	
Good	37.0	34.2	36.4	31.6	
Fair	9.1	12.9	11.1	12.5	
Poor	7.4	4.1	4.0	2.7	
Perceived risk for cancer					0.03
Low	37.3	48.6	54.4	50.6	
Average	44.3	42.7	33.3	31.3	
High	18.4	8.8	12.3	18.1	

* Column percentages may not sum to 100% due to rounding.

† P-values reflect overall chi-squared tests of proportions across the four decision groups.

Table 2
Sources of information and knowledge about cancer and screening tests (weighted percentages)*

Variable	Prostate cancer N = 198	Colorectal cancer men N = 258	Colorectal cancer women N = 355	Breast cancer N = 460	P-value [†]
Sources of information about cancer screening					
Health care provider important source					0.002
0 ("not at all")	0.9	0.4	1.5	2.3	
1-3	0.9	2.1	4.5	2.3	
4-7	10.6	15.1	10.7	13.7	
8-9	32.0	35.2	23.4	16.9	
10 ("extremely")	55.6	47.2	60.0	64.8	
Media important source					< 0.001
0 ("not at all")	11.0	15.1	14.6	10.0	
1-3	27.7	20.7	19.5	10.8	
4-7	34.0	40.0	29.6	37.3	
8-9	14.7	13.1	22.3	16.9	
10 ("extremely")	12.7	11.2	13.9	25.0	
Family/friends important source					0.01
0 ("not at all")	9.1	18.5	9.2	11.3	
1-3	16.2	9.6	12.1	9.6	
4-7	31.2	33.2	29.7	28.8	
8-9	21.3	22.5	19.7	14.4	
10 ("extremely")	22.3	16.1	29.4	35.8	
Internet important source					0.06
No internet use	79.5	73.6	76.9	84.8	
0-3	0.5	0.6	1.0	1.4	
4-7	5.7	15.7	9.5	5.1	
8-9	10.3	5.2	6.7	3.4	
10 ("extremely")	4.0	4.9	5.9	5.4	

Variable	Prostate cancer N = 198	Colorectal cancer men N = 258	Colorectal cancer women N = 355	Breast cancer N = 460	P-value [†]
Knowledge					
How well informed about cancer screening					
0 ("not at all")	0.5	0.5	2.3	1.2	< 0.0001
1-3	2.1	1.7	4.6	1.1	
4-7	33.0	31.3	21.1	19.2	
8-9	39.6	37.0	32.4	31.7	
10 ("extremely well")	24.8	29.5	39.7	46.9	
Knowledge					
No correct answers	67.2	55.5	64.9	64.1	< 0.0001
Incidence correct	9.7	9.0	5.4	20.8	
Mortality correct	19.2	4.4	6.9	8.3	
Both correct	3.9	31.1	22.7	6.8	

* Column percentages may not sum to 100% due to rounding.

[†] P-values reflect overall chi-squared tests of proportions across the four decision groups.

Table 3

Characteristics of screening discussions (weighted percentages)*

Variable	Decision processes			P-value [†]
	Prostate cancer N = 198	Colorectal cancer men N = 258	Colorectal cancer women N = 355	
Test was part of plan to get screened regularly	87.8	84.2	71.9	<0.001
Person raising idea of getting screened				
Participant	35.8	23.4	16.5	0.001
Health care provider	64.2	76.6	83.5	
Discussed screening with > 1 health care provider	29.1	30.0	27.0	0.24
Seeking a second opinion	51.1	17.2	16.4	<0.01
Health care provider asked participant about screening preferences	56.7	41.0	31.1	<0.001
Final decision maker on whether to have screening				
Participant	32.1	47.1	37.7	0.13
Health care provider	6.5	1.6	3.8	
Shared	61.5	51.3	58.6	
Communication				
Discussed pros of screening with health care provider				
A lot	40.1	36.0	40.1	0.03
Some/a little	54.1	61.8	57.4	
Not at all	5.8	2.2	2.5	
Discussed cons of screening with health care provider				
A lot	4.1	5.1	6.5	0.20
Some/a little	25.5	22.3	19.7	
Not at all	70.4	72.6	73.8	
Reasons for screening explained well by health care provider	84.4	87.2	93.8	0.02
Health care provider had opinion about screening	85.2	91.2	84.6	0.17

Variable	Prostate cancer N = 198	Colorectal cancer men N = 258	Colorectal cancer women N = 355	Breast cancer N = 460	P-value [†]
Screening Decisions					
Health care provider recommendation					
For screening	72.9	90.2	77.7	82.5	<0.001
Against screening	1.3	0.1	3.9	0.3	
No opinion/other	25.8	9.6	18.4	17.2	
Underwent screening following discussion	86.0	78.9	70.4	90.4	<0.001
Confidence in screening decision					<0.0001
0 ("not at all")	0.4	1.9	4.1	2.1	
1-3	0.7	0.4	6.3	0.8	
4-7	9.4	13.8	10.4	4.0	
8-9	30.6	20.9	15.3	8.4	
10 ("extremely")	58.9	63.0	63.8	84.7	
Preferred amount of involvement in screening decision					0.10
Less	2.4	1.2	2.9	2.6	
Same	81.2	93.7	85.2	89.6	
More	16.4	5.1	11.9	7.8	

* Column percentages may not sum to 100% due to rounding

[†] P-values reflect overall chi-squared tests of proportions across the four decision groups