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Do men make informed decisions about prostate cancer screening? Baseline results from the "Take the Wheel" Trial

Jennifer D. Allen, RN, MPH, ScD[1,2], **Megan K. D. Othus, AM**[3], **Alton Hart Jr., MD, MPH**[4], **Anshu P. Mohllajee, ScD**[1], **Yi Li, PhD**[1,3], **Christopher Lathan, MD, MPH**[1,5], and **Deborah Bowen, PhD**[6]

[1]Dana-Farber Cancer Institute, Boston, MA

[2]William Connell School of Nursing, Boston College, Chestnut Hill, MA

[3]Harvard School of Public Health, Boston, MA

[4]Virginia Commonwealth University, Richmond, VA

[5]Harvard Medical School, Boston, MA

[6]Boston University School of Public Health, Boston, MA

Abstract

Background—The efficacy of prostate cancer (CaP) screening with the prostate specific antigen test is debated. Most medical organizations recommend that men make individual, informed decisions about whether to undergo screening. Informed decision-making (IDM) requires: adequate knowledge about CaP as well as the risks and benefits of screening; confidence in the ability to participate in decision-making at a personally desired level (decision self-efficacy); and decision-making that reflects one's values and preferences (decisional consistency).

Methods—Baseline data from a randomized trial in 12 worksites were analyzed. Men aged 45+ (n=812) completed surveys documenting screening history, screening preferences and decisions, CaP knowledge, decision self-efficacy and decisional consistency. Psychosocial and demographic correlates of IDM were also assessed.

Results—Approximately half of the sample had a prior PSA test, although only 35% reported having made an explicit screening decision. Across the sample, CaP knowledge was low (mean=56%), though decision self-efficacy was high (mean=78%), and the majority of men (81%) made decisions consistent with their stated values. Compared with those who were undecided, men who made an explicit screening decision had significantly higher levels of knowledge, greater decisional self-efficacy, and were more consistent in terms of making a decision in alignment with their values. They tended to be White, have high levels of income and education, and had discussed screening with their health care provider.

Conclusions—Many men undergo CaP screening without being fully informed about the decision. These findings support the need for interventions aimed at improving IDM about

Corresponding Author and reprint requests: Jennifer Allen, RN, MPH, DSc, Center for Community-Based Research, Dana-Farber Cancer Institute, 44 Binney Street, Boston, MA 02115, Tel: 617 632-2269, Fax: 617 632- 3161, jennifer_allen@dfci.harvard.edu.

screening, particularly among men of color, those with lower levels of income and education, and those who have not discussed screening with their provider.

INTRODUCTION

Prostate cancer (CaP) is the most common non-cutaneous malignancy diagnosed among men and is the second leading cause of cancer death.[1] Established risk factors (age, family history and Black race) are non-modifiable.[2] Therefore, CaP control efforts have focused mainly on early detection through screening with the prostate specific antigen (PSA) test and the digital rectal exam. Results from two randomized trials have recently been released. A U.S. study found no CaP mortality reduction associated with PSA and DRE.[3] At the same time, a European trial found a 20% reduction in CaP mortality, but also a high risk of over-diagnosis and treatment.[4] These studies have intensified the debate about the value of screening.[5]

At the current time, most medical organizations remain steadfast in their recommendations that men at average risk for CaP discuss potential risks and benefits of screening with their providers and make individualized screening decisions,[6–8] through a process termed "informed decision-making" (IDM).[9,10] The US Preventive Services Task Force (USPSTF) defines an informed decision as one in which an individual has: (1) adequate knowledge about the risks, benefits, and limitations of screening; (2) the ability to participate in decision-making at a personally desired level (decision self-efficacy); and (3) made a decision that is consistent with personal preferences and values (decisional consistency).[9]

National data reveal that more than half of men over age 50 report having had a PSA test,[11] and there is a trend toward increasing use over time.[12] Despite widespread use of the PSA,[14] little is currently known about the extent to which men have been fully informed or involved in decisions about screening. Nor is there sufficient data to understand the psychosocial factors that influence decision-making processes; information critical to the development of effective IDM interventions.

While the literature on this topic is growing,[9,15–17] the majority of intervention studies have focused on improvements in knowledge only.[18,19] There has been a call for studies to more comprehensively evaluate IDM; a particular need has been cited for studies that examine men's decision self-efficacy and decisional consistency.[9,17–19] There is also a need for information regarding the cognitive, affective and social factors that influence decision-making.[20] Theories of health behavior and decision-making,[21–23],[20,24] suggest that men who perceive themselves to be at high risk, who desire a greater level of control in decision-making, and those who report positive social influences (i.e., approval of screening by significant others, provider recommendation of screening) should be more likely to make explicit, informed decisions, although there are few studies of these factors.

The purpose of this study was to: (1) assess the extent to which men are involved in making decisions about CaP screening; (2) describe men's knowledge, decision self-efficacy, and decisional consistency (IDM); (3) examine relationships between decisional status and psychosocial correlates (i.e., perceived risk, preference for control in decision-making,

social influences that are supportive of screening); and (4) determine if the correlates of decisional status are different for those who have previously had a PSA, versus those who have not, since prior screening is the strongest predictor of future screening.[25,26] This is the first study to assess all three components of IDM as defined by the USPSTF, to examine psychosocial correlates of IDM, or to assess differences among men who have previously been screened versus those who have not. Results from this study can help to guide future IDM interventions, which call for moving beyond assessment of CaP knowledge and helping men to feel competent in their ability to make informed decisions.

METHODS

Study setting

Data for this study come from baseline assessments conducted among men employed in 12 Massachusetts worksites that participated in a randomized, controlled cluster trial to test the efficacy of a computer-tailored IDM intervention ("Take the Wheel"). The Dun & Bradstreet database was used to identify worksites with Standard Industrial Classification (SIC) codes 20–39 that represent manufacturing industries. Eligible worksites had: (1) ≥100 men in the targeted age range; (2) ≤20% employee turn-over in the year prior to study initiation; and (3) were located within 90 minutes of the study center. A total of 161 companies were contacted to determine eligibility. Seventy-one companies (44%) did not return the required eligibility survey; 74 (46%) completed the eligibility survey and were found ineligible (n=45 due to insufficient size). Four sites (n=2.5%) declined participation, citing lay-offs, acquisitions, or re-structuring as reasons for non-participation. The 12 participating worksites were manufacturing and production sites, and ranged in size from 100 to 1000 employees (mean=650).

Study sample

Men eligible to participate in surveys were ≥ 45 years of age and permanently employed > 20 hours per week. The survey sample was drawn from employee rosters. In sites ≤ 100 eligible employees, a census was surveyed. In sites with > 100 eligible men, 100 men were selected randomly. The survey was self-administered at the work site during work hours. Data collection took place in 2005. Non-respondents were contacted up to three times by telephone or by electronic mail. A financial incentive ($25) was provided for survey completion. All study procedures were approved by the Institutional Review Board at the Dana-Farber Cancer Institute.

Measures

Recognition of the PSA test was assessed with a standard item (*"The prostate specific antigen test (PSA) is a blood test that is used to find prostate cancer. Before now, had you ever heard of the PSA test?"*). Using the Stage of Decision-making scale,[27] respondents were asked about their decisional status. The question stem is: "At this time, would you say you are…" Five response options range from "I haven't thought about it before" to "I have made a decision and I am not likely to change my mind." Men were classified as having 'decided' if they stated either that they had made a decision, but were willing to reconsider, or if they responded that they had made a decision, but were unlikely to change their mind.

Those 'undecided' responded that they hadn't thought about the screening decision, or were uncertain. The following components of IDM were also assessed: (1) CaP knowledge; (2) decision self-efficacy; and (3) consistency between values and screening preference (decisional consistency).

Prostate Cancer Knowledge—Fourteen questions were taken from a validated knowledge scale[28] and reviewed by experts in genitor-urinary oncology for content validity. Questions included the prevalence of CaP, risk factors, screening modalities, diagnostic procedures and treatment-related complications. The proportion of accurate responses was transformed to a 0% to 100% scale. The internal reliability in our sample was adequate (Cronbach's alpha=0.69).

Decision Self-Efficacy—Confidence in the ability to make an informed decision and to participate in the decision-making at a personally desired level was assessed with the 11-item Decision Self-Efficacy Scale.[29,30] Questions ask the respondent to reflect on how confident they feel about various aspects of the decision-making process (e.g. "I feel confident that I can get the facts that I need to make an informed choice"; "I feel confident that I can figure out the screening option that best suits me"), with three response options including "very confident" (score=4), "somewhat confident" (score=2), and "not at all confident" (score=0). Scores are summed, divided by 11 and multiplied by 25, to arrive at a range of scores from 0 (low self-efficacy) to 100 (high self-efficacy).[29] The internal consistency in this sample was high (Cronbach's alpha=0.91).

Consistency between Values and Screening Decision—No validated measures existed to assess decisional consistency. Therefore, we assessed screening preference, as well as values related to screening. To assess screening preference, men were asked, "If you had to decide now, what would you choose?" Options included: (a) "to get a PSA test"; (b) "not to get a PSA test"; (c) "I could not decide."

Measures of values have been assessed primarily through probability-based risk-benefit trade-offs.[18,31,32] Individuals are asked to choose between a longer life with compromised health, or a shorter life with better health. In pre-testing, we found that items using risk-benefit trade-off were difficult for men to understand. As such, we developed items to assess the personal importance or relative worth of the advantages and limitations of screening, as deemed most salient to decision-making based on focus group findings, cognitive interviews (n=5), expert opinion, and existing literature. Questions (see Table 2) were rated on a four-point likert scale. For positive values questions, the response options were strongly agree (score=2), agree (score=1), disagree (score=−1), and strongly disagree (score=−2). Negative values questions were scaled correspondingly, so that high positive scores reflect values strongly in favor of screening, and high negative scores reflect low relative importance of screening (range +16 to −16).

Based on an ROC curve of the sensitivity and specificity of responses to questions related to values, we set the cut-off for favorable versus unfavorable value ratings of screening at a score of zero (AUC=0.77; sensitivity= 0.73; specificity= 0.66). An individual's screening decision was considered to be "consistent" with their values if they reported an intention to

be screened *and* their values score was greater than zero. Likewise, having a zero or negative value score accompanied by a lack of intention to be screened was considered "consistent." Those "inconsistent" had value ratings that did not align with screening preference. The internal reliability of the values questions was good (Cronbach's alpha = 0.81). In test-retest assessments conducted six months apart, men (n=334 men who did not receive the intervention) rated their values consistently (concordance coefficient=0.68). Principle components analysis was conducted as a check of construct validity. All eight items loaded on the first component and for the second component there were positive loadings for the positive values and negative loadings for the negative values.

Perceived Risk for CaP—Standard items to assess perceived risk for CaP were included.[33,34] Absolute perceived risk of CaP was assessed with the question, "How likely do you think it is that you will develop CaP in the next five years?" which included three response options: "no chance/unlikely," "moderate chance" and "likely/certain." The second question, "Compared to the average man your age, would you say that you are…more, less or about as likely to get CaP?" assessed comparative risk. Scores were summed and could range from 3 (lowest risk) to 9 (highest risk). In analyses, we categorized scores into low, moderate and high based on tertiles of this range.

Preference for Control in Decision-making—The validated Control Preference Scale,[35] asks "Who should make medical decisions?" with response options including: (a) "I make the final make decision on my own"; (b) "I make the decision after seriously considering my doctor's opinion"; (c) "my doctor and I share responsibility for the decision"; (d) "I prefer that the doctor make the decision after seriously considering my opinion"; and (e) "I prefer that the doctor make the decision." Responses were collapsed to reflect active decision-making styles (options a,b), collaborative styles (option c), and passive styles (options d,e).[35]

Social Influences on Decision-making—Based on our prior work on the relationship between social influences and cancer screening[36,37] we assessed: (1) *subjective norms* (perceptions of what family/friends think about CaP screening and the extent to which this motivated the respondent's screening decision); (2) *social norms* (perception that CaP testing is normative among one's peers); and (3) discussion with one's primary care provider about screening. Scores on the subjective norms scale could theoretically range from −6 (strong disapproval of screening among significant others that was highly influential in the respondent's decision-making process) to +6 (strong approval of screening that was highly influential in respondent's decision-making). Social norms was a categorical variable with three response options, with scores ranging from 0 (lack of awareness of peers' screening behaviors) to 3 (perception that most peers had undergone screening). Discussion with one's physician was dichotomous (yes/no).

Demographic characteristics, screening history, and access to health care were also assessed, using standard items from the Behavioral Risk Factor Surveillance Surveys.[38]

Data analysis

We will summarize the methods broken down by analysis.

Decision status as the dependent variable—Bivariate associations between decision status (decided/undecided) across individual IDM components (knowledge, self-efficacy, decisional consistency), socio-demographic characteristics, and potential psychosocial correlates (perceived risk, preferences for decisional control, social influences) were assessed using t-tests and Rao-Scott Chi-Squared tests. Adjusted associations between decisional status (the dependent variable), IDM components, socio-demographic characteristics, and psychosocial correlates were assessed using multivariable logistic regression.

IDM components as the dependent variables—Results for IDM variables were stratified by previous PSA status because: (1) prior screening is a potent predictor of future screening; and (2) prior screening could potentially impact the correlates of screening (e.g., having a prior abnormal PSA may heighted perceived risk).. Multivariable linear regression was used to assess the association of the dependent variables knowledge and self-efficacy scores with socio-demographic variables and psychosocial correlates. Due to sample size constraints, univariate logistic regression stratified by previous PSA status was employed to examine the relationship between decisional consistency (the dependent variable) with social-demographic variables and psychosocial correlates. Each analysis used a complete case analysis based on the variables involved in that analysis.

For all analyses—P-values from Wald F-tests were used to assess the overall significance of variables with more than two categories in regression models. P-values less than 0.05 were deemed significant. All analyses accounted for the cluster design of the study using SAS survey procedures from SAS version 9.1 (SAS Institute Inc., Cary, NC; (intraclass correlation coefficient= 0.009 for previous PSA status, 0.023 for knowledge, 0.008 for self-efficacy, and 0.015 for consistency). SAS's survey procedures use Taylor series expansion approximations to account for clustering designs in estimation of regression parameters and standard errors. The Rao-Scott Chi-squared test is a design-adjusted version of the Pearson Chi-squared test.

RESULTS

Characteristics of the Study Sample

The mean response rate among men across sites was 71% (range= 59%–86%). Sample characteristics by decisional status and prior use of PSA are presented in Table 1. The majority of men in the sample were white, non-Hispanic and the mean age was 52 years (s.d.=5). Most were married, had at least a high school education, and over half had annual household incomes over $75,000. Nearly all of the men (97%) had health insurance and 95% reported having a usual source of care (data not shown).

Descriptive Results

Decisional Status and Prior Screening—Approximately two-thirds of men reported that they had not made a definitive decision about whether or not to undergo PSA testing in the future. However, when asked if they had to decide *immediately*, 79% said they would opt to be screened (data not shown). Older age, White race, higher income, college education, prior PSA screening, previous discussion with physician regarding screening, and family history of CaP were all significantly associated with having made a screening decision (see Table 1).

Sixty-seven percent reported having had a prior PSA test; two-thirds had the test within the past year. An even greater percentage (81%) had a prior DRE. Men who had a previous PSA were significantly older and more educated than those who had not previously had a PSA (both $p < 0.01$). Men who had a previous PSA were also more likely to have spoken with a physician about screening or have a family history of CaP (both $p=0.01$). There was moderate evidence that men who had a previous PSA had higher incomes and were more likely to be white and non-Hispanic, compared with men who had not previously been screened ($p=0.07$ for each) (see Table 1).

Decisional Status and IDM Components

Table 2 presents individual IDM component variables for the entire sample and by decisional status. Across the entire sample (including those who had made a decision and those who had not), knowledge was low (mean score=56%). Decision self-efficacy was universally high (mean score=78%). Most expressed values that were highly supportive of screening (mean score=8 on scale of −16 to +16). The majority of respondents (81%) expressed screening preferences that were consistent with their personal values. Men who had made a definitive screening decision had significantly higher levels of knowledge ($p < 0.01$), higher levels of decision self-efficacy ($p<0.01$), and were more likely to make a decision consistent with their values ($p<0.01$), compared with those who were undecided.

Decisional Status and Psychosocial Correlates

While there were no significant differences between men who were decided versus undecided in terms of their perceived risk of developing CaP or their desire for control in decision-making, there were significant differences in perceived social influences between the two groups (see Table 2). Specifically, men who had made a screening decision were significantly more likely to report positive subjective norms ($p<0.01$), a perception that all or most or more than half of their peers underwent screening ($p<0.01$), and having had a prior discussion about the PSA test with their physician ($p<0.01$).

Multivariate Results

Decisional Status, IDM and Psychosocial Correlates—Table 3 presents multivariate logistic regression results for having made a screening decision. Controlling for socio-demographic and psychosocial correlates, men who had made a screening decision had significantly higher levels of knowledge (OR =1.02, 95% CI=1.01, 1.03), self-efficacy (OR=1.03; 95% CI=1.01, 1.04), and marginally higher consistency (OR=2.41, 95% CI 0.93,

6.27). Odds ratios are for a one-unit change in scores. Men who had made a decision were also much more likely to have had a prior PSA (OR=6.40, 95% CI= 3.77, 11.01) and to have had a discussion about screening with their provider (OR=3.30, 95% C I= 1.67, 6.50). A number of characteristics that were significant on bivariate analysis did not remain significant in the multivariate analysis including age, education, income, subjective norms, and social norms.

Decisional Status, IDM and Psychosocial Correlates by Prior Screening

Due to the strong influence of prior screening on future screening decisions,[39,40] we analyzed correlates of IDM components knowledge, self-efficacy, and decisional consistency as dependent variables separately for those who had a previous PSA and for those who had not. Table 4 presents analyses among those who had previously had a PSA test. Among these men, CaP knowledge was positively associated with education (some college or more, regression coefficient = 11.56; 95% CI= 2.58, 20.53), decision-making preference (active versus passive, regression coefficient = 12.94, 95% CI= 6.67, 19.21), and reporting a previous discussion with a physician about screening (regression coefficient = 3.89, 95% CI =0.69, 7.26). Self-efficacy was positively associated with education (some college or more, regression coefficient = 8.29, 95% CI =2.70, 13.88) and reporting a previous discussion with a provider regarding screening (regression coefficient = 5.18, 95% CI =1.09, 9.28), controlling for socio-demographic and psychosocial correlates. Decisional consistency was only associated with race/ethnicity; White, non-Hispanic men were more likely to have made a decision consistent with their values, compared with men of other races/ethnicities (OR = 3.58, 95% CI = 1.17, 10.91).

Among men who had not previously undergone PSA screening (Table 5), knowledge was negatively associated with social norms (regression coefficient = −8.06 95% CI = −14.87, −1.26, comparing those with no knowledge of screening among peers to those reporting that less than half of men of comparable age had been screened), controlling for socio-demographic and psychosocial correlates. In multivariate analyses, decision self-efficacy was positively associated with younger age (50–54 versus 45–49, regression coefficient = −9.56 95% CI= −18.79, −0.43). Men with positive subjective norms (OR 3.02, 95% CI=1.29, 7.05) and those who reported a previous discussion with a physician regarding screening were more likely to make decisions that were consistent with their values (OR = 2.31, 95% CI =1.06, 5.03).

DISCUSSION

The balance between benefits and harms of PSA testing is unknown. Therefore, men are advised to make individualized screening decisions, assuming that they have adequate knowledge, are confident in their ability to make a decision, and make decisions that are concordant with their values. Overall, men in this study had low levels of knowledge about CaP screening. Specifically, they were unfamiliar with the limitations of the PSA test and lacked information about risk factors for CaP. Despite (or perhaps because of) low levels of knowledge, the majority of men, regardless of decisional status, expressed high levels of confidence in their ability to make an informed decision and to participate in decision-

making at a personally desired level. Notably, the vast majority of men (94%) who made an explicit screening decision expressed a screening preference that was consistent with their individual values. Most men reported that they wanted to be screened, even in the face of potential risks.

Nonetheless, we found that only about a third of men had actually made an explicit decision about screening, although nearly half had undergone PSA screening in the past. Men who had made a screening decision were older, had higher levels of income and education, were more likely to report a family history of CaP, and tended to be White. Compared with those who were undecided, men who had made an explicit screening decision had higher levels of knowledge, greater decisional self-efficacy, and were marginally more consistent in terms of making a decision in alignment with their values, compared with those who had not decided. That is, those who consciously made a choice about screening were more "informed" according to the USPSTF definition.

Contrary to our expectations, perceived risk, control preferences and social influences were not associated with decisional status across the sample. We did find that the correlates of decisional status were different for those who had previously undergone screening, compared with those who had not. Among men who had previously had a PSA test, higher levels of knowledge were associated with the desire for a more active role in decision-making, and having had a discussion with one's provider about screening. This suggests that men are receiving some degree of information about screening from their providers, and indeed, may be more aware of the controversy. This may stimulate the desire for a greater role in making an individualized decision. Confidence in decision-making was also associated with having spoken to one's provider about this issue, which is also suggestive that providers are assisting men in making screening choices. Decisional consistency was not associated with any of these factors among men who had a previous PSA. However, among men who had not had a prior PSA, decisional consistency was associated with subjective norms and having discussed the topic with ones physician.

Before a discussion of implications, study limitations must be acknowledged. The data are cross-sectional, so temporal relationships cannot be assessed, nor can causality be inferred. We used self-reports of PSA testing, which may overestimate or underestimate the prevalence of screening participation.[39] Of greater importance is the fact that worksites in this study tended to employ relatively homogeneous populations with regard to race/ethnicity, and that respondents had higher-than-expected levels of education and income. This may be due to the fact that the manufacturing industry has undergone major changes in the last decade, due to technological advances that have reduced the need for 'unskilled labor' and operations being 'outsourced' or moved overseas. With these changes, the remaining workforce has become increasingly "white collar".[40,41] Despite these limitations, our sample does represent workers in 12 manufacturing worksites, and the high survey response rate (71%) provides support for validity of our results.

Another limitation is that we developed our own measure to assess values associated with screening. Existing measures designed to elicit probability-based risk-benefit trade-offs are not well-understood and require a high level of numeracy.[42] Although empirical validation

of a values measure is fraught with difficulty, as it would require knowing individual's true values,[43] we found high internal consistency, and that test-retest concordance coefficient was acceptable. However, additional work is needed to test the validity of this scale.

This study contributes new insights regarding men's decision-making about screening. To our knowledge this is the first published response to the call for comprehensive measurement of IDM[18,19] and that examines psychosocial correlates of decisional status. There is a growing demand for interventions that educate men about Cap screening, most in the form of 'decision aids,' or educational tools that assist individuals to deliberate among choices. Yet most of these interventions have focused on improvements in knowledge only. A recent review of decision aid interventions for CaP screening identified 18 trials, the majority of which reported increased CaP knowledge.[17] Only two studies examined decision self-efficacy,[44–47] finding a significant improvement in the proportion of men reporting an affirmative response to the question: "I feel confident that I can make an informed choice about PSA screening." None examined the consistency between stated values and screening preferences. Moreover, the vast majority of studies (n=16) were conducted in health care settings,[17] despite a call for additional interventions conducted in community settings.[9] This study, conducted in worksites, begins to answer that call.

An underlying assumption of IDM interventions is that increased knowledge, self-efficacy and decisional consistency will lead to "better decisions"—which are presumed to be associated with enhanced decision satisfaction and diminished decisional conflict.[15] Yet, in this study, despite having inadequate information about screening, men expressed high decision self-efficacy and largely made decisions that were consistent with their values. In the context of low levels of knowledge, high decision self-efficacy and decisional consistency may reflect a lack of awareness about the potential risks associated with screening. Indeed, other research has suggested that convincing men that there is, in fact, a decision to be made about CaP screening is a challenge because they have strong favorable views regarding screening[48] and because providers frequently offer the test as part of routine care.[49,50] In this context, enlightening men about the controversy may actually diminish decision self-efficacy, interfere with decisional consistency, and possibly result in diminished satisfaction and heightened decisional conflict.

On a related note, these finding suggest that perceived risk and control preferences may not necessarily be germane to IDM interventions. We did not find evidence that men who thought themselves to be at higher risk for Cap were more likely to have made a screening decision. Nor were men who expressed a desire for greater involvement in the process of decision-making more likely to have made a decision. Having a discussion with one's provider about screening may be a more important aspect of the decision-making process, as has been shown to be the case for most cancer screening tests.[25]

Prospective studies are needed to understand the underlying relationships among IDM components and theorized correlates of decision-making. While the number of published IDM studies has been proliferating at a rapid rate, there has recently been a call for conceptual and theoretical clarity in the field.[19,43] For example, there is considerable overlap in many of the constructs used to measure IDM outcomes.[18] In addition, the prospective

relationships between IDM with decision satisfaction and decisional regret remain unknown. Studies are needed to elucidate the interrelationships between what have traditionally been considered IDM components, potential correlates, and what would be considered more proximal outcomes of IDM (decision satisfaction, decisional regret), in order to inform future intervention and evaluation efforts.

Until there are definitive data on the efficacy of CaP screening, men are left to make their own decisions about screening. Medical and public health professionals have been highly successful in educating the public about the importance of early detection for many cancers. Both men[48] and medical providers[49,50] overestimate the benefits of screening. Media campaigns, celebrity endorsements, and mandates for insurance coverage of screening have created an environment where use of a test with unknown efficacy is the norm. In this context, it is extremely challenging to convince men that opting out of screening may be a reasonable decision. Prospective studies are needed to better understand decisional processes in the context of uncertain benefits of screening. Additional research is also needed to understand the most effective ways to ensure that men are fully informed of both risks and benefits prior to undergoing screening.

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Table 1

Characteristics of sample (n=812), by decisional status and prior PSA testing

Characteristic	Total Sample	Decided	Undecided	P-value	Prior PSA	No Prior PSA	P-value**
	N=812	N=285 (35%)	N=511 (63%)		N=373 (67%)	N=177 (33%)	
	N (%)	N (%)	N (%)		N (%)	N (%)	
Age							
45–49	271 (33)	68 (24)	198 (39)	<0.01	72 (19)	78 (44)	<0.01
50–54	232 (29)	67 (24)	162 (32)		106 (28)	60 (34)	
55 or older	246 (30)	133 (47)	106 (21)		168 (45)	28 (16)	
Race/ethnicity							
White, NH	726 (89)	261 (92)	451 (88)	0.01	347 (93)	157 (89)	0.07
Other	76 (9)	20 (7)	55 (11)		20 (5)	19 (11)	
Household Income							
<$49,999	124 (15)	27 (10)	94 (18)	<0.01	39 (10)	32 (18)	0.07
$49,999 –74,999	197 (24)	59 (21)	132 (26)		78 (21)	43 (24)	
>$75,000	442 (54)	185 (65)	253 (50)		234 (63)	92 (52)	
Education							
HS or less	205 (25)	54 (19)	145 (28)	<0.01	76 (20)	50 (28)	<0.01
Some college or more	600 (74)	228 (80)	363 (71)		295 (79)	126 (71)	
Marital Status							
Married/living as married	661 (81)	240 (84)	409 (80)	0.1	308 (83)	141 (80)	0.49
Other	145 (18)	42 (15)	100 (20)		63 (17)	35 (20)	
Family History of CaP							
Yes	96 (12)	50 (18)	45 (9)	0.02	56 (15)	16 (9)	0.01
No	701 (86)	229 (80)	458 (90)		310 (83)	159 (90)	
Prior PSA							

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Characteristic		Total Sample N=812	Decided N=285 (35%)	Undecided N=511 (63%)	P-value	Prior PSA N=373 (67%)	No Prior PSA N=177 (33%)	P-value**
		N (%)	N (%)	N (%)		N (%)	N (%)	
	Yes	373 (46)	124 (44)	239 (47)	<0.01		NA	NA
	No	177 (22)	148 (52)	28 (5)				
Physician Discussion								
	Yes	360 (46)	216 (76)	137 (27)	<0.01	256 (69)	54 (31)	<0.01
	No	412 (54)	59 (21)	354 (69)		105 (28)	117 (66)	

** P-value is for a chi-square test comparing decided and undecided individuals.

** P-value is for a Rao-Scott chi-square test comparing individuals who had and had not undergone prior PSA test.

*** Some percentages may not add to 100 due to missing data

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Table 2

Bivariate results: IDM components and psychosocial correlates by decisional status, (n=812)

Characteristic	Total Sample N=812		Decided N=285 (35%)		Undecided N=511 (63%)		P-value*
IDM Components							
CaP Knowledge (N=785)	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**	
	56%	0.72	65	1.10	51	0.88	< 0.01
Decision Self-efficacy (N=791)	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**	
	78%	0.75	87	0.98	73	0.97	<0.01
Decisional Consistency** (N=786)							
	N	**(%)**	**N**	**(%)**	**N**	**(%)**	
Consistent	656	(81)	267	(94)	378	(74)	<0.01
Inconsistent	130	(16)	13	(5)	115	(23)	
Psychosocial Correlates	**N**	**(%)**	**N**	**(%)**	**N**	**(%)**	
Risk Perception (N=793)							
High/Medium	401	(49)	143	(50)	254	(50)	0.97
Low	392	(48)	138	(48)	244	(48)	
Control Preferences (N=802)							
Active	523	(65)	182	(64)	333	(65)	0.42
Collaborative	222	(28)	85	(30)	132	(26)	
Passive	57	(7)	16	(6)	39	(8)	
Subjective Norms (N=796)							
Positive	457	(57)	204	(72)	245	(48)	<0.01
Negative	339	(43)	77	(27)	255	(50)	
Social Norms (N=803)							
All/most	137	(17)	60	(21)	75	(15)	<0.01
more than half	107	(13)	55	(19)	48	(9)	
less than half	60	(7)	18	(6)	42	(8)	

Characteristic		Total Sample N=812		Decided N=285 (35%)		Undecided N=511 (63%)		P-value*
	Don't know	499	(62)	148	(52)	342	(67)	

*P-values for knowledge and decision self-efficacy are from t-tests, all other p-values are from chi-square tests.

**Items on values scale used for determining consistency. Each item was evaluated on a 4-point Likert scale (strongly agree (score=2), agree (score=1), disagree (score=−1), strongly disagree (score=−2)).

1. It is important to me to have a PSA test, even if my doctors are not sure that screening can save lives.
2. It is important to me to have a PSA test, even if there is a chance that the results could be wrong.
3. Finding prostate cancer early and getting treatment is worth any possible side effect, including difficulty having sex or leaking urine.
4. If I had prostate cancer, I would want to know- even if it wasn't going to kill me.
5. I do not want to have a PSA test, unless doctors are reasonably certain that it can save lives.
6. I prefer not to be screened for prostate cancer if there is a chance that the results could be wrong.
7. If getting treated for prostate cancer meant that I wouldn't be able to have sex or that I might not be able to control my urine, I might choose not to get treated.
8. If I had prostate cancer, I would rather not know- especially if it wasn't going to kill me.

Table 3

Multivariable logistic regression results* for having made a screening decision (N=812)

Characteristic	OR (95% CI)	Overall p-value**
Age		
45–49	(ref)	0.34
50–54	0.90 (0.44, 1.82)	0.76
55 or older	1.50 (0.74, 3.01)	0.26
Race/ethnicity		
White, NH	0.93 (0.33, 2.60)	0.88
Other	(ref)	
Income		
<$49,999	(ref)	0.77
$49,000–$74,999	0.75 (0.31, 1.82)	0.52
$75,000 or more	0.84 (0.29, 2.41)	0.74
Education		
HS or less	(ref)	
Some college for more	0.97 (0.40, 2.32)	
Marital Status		
Married/living as married	0.99 (0.46)	0.98
Other	(ref)	
Previous PSA		
Yes	6.44 (3.77, 11.01)	<0.01
No	(ref)	
Family History of CaP		
Yes	0.87 (0.38, 2.02)	0.75
No	(ref)	
Physician Discussion		
Yes	3.30 (1.67, 6.50)	<0.01

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Characteristic	OR (95% CI)	Overall p-value**
No	(ref)	
Psychosocial Correlates		
Risk Perception		
High/Medium	0.91 (0.59, 1.42)	0.69
Low	(ref)	
Control Preferences		
Active	1.29 (0,41, 4.06)	0.67
Collaborative	1.68 (0.47, 5.94)	0.42
Passive	(ref)	
Subjective Norms		
Positive	1.24 (0.65, 2.37)	0.51
Negative	(ref)	
Social Norms		
All/most	0.72 (0.23, 2.27)	0.57
More than half	1.04 (0.20, 3.53)	0.96
Less than half	(ref)	
Don't know	0.92 (0.41, 2.05)	0.84
Components of IDM		
Knowledge**	1.15 (1.07, 1.24)	0.03
Self-efficacy**	1.31 (1.09, 1.56)	<0.01
Consistency		
Consistent	2.41 (0.93, 6.27)	0.07
Not consistent	(ref)	

* All characteristics were included in one model.

** Overall p-values are Wald F-tests for variables with more than one category.

***ORs for knowledge and self-efficacy are for a one-item increase in score. Since both knowledge and self-efficacy were transformed to be between 0% and 100%, the presented results are equivalent to a 7.14% increase in knowledge and a 9.09% increase in self-efficacy.

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Table 4

Summary of regression results among men who HAD a previous PSA -- predictors of knowledge, self-efficacy, and decisional consistency.

Characteristic	Knowledge		Self-efficacy		Decisional consistency	
	Coefficent (SE)	(overall p-value†) 95% CI	Coefficient (SE)	(overall p-value†) 95% CI	OR (SE of logOR)	(overall p-value††) 95% CI
Age						
45–49	(ref)	(0.59)	(ref)	(0.28)	NA	
50–54	−3.15 (4.56)	−13.2, 6.90	−1.37 (2.29)	−6.42, 3.67	NA	
55 or older	0.38 (3.36)	−7.02, 7.78	2.26 (2.43)	−3.08, 7.60	NA	
Race/ethnicity						
White, non-Hsipanic	7.31 (3.76)	−0.97, 15.60	6.67 (5.43)	−5.28, 18.62	3.58 (0.57)	1.17, 10.91 (0.03)*
Other	(ref)	(0.08)	(ref)	(0.25)		
Income						
<$49,999	(ref)	(0.99)	(ref)	(0.93)	(ref)	(0.14)
$49,000–$74,999	0.33 (4.06)	−8.73, 9.16	1.33 (4.14)	−7.79, 10.45	0.784 (0.48)	0.31, 2.02
$75,000 or more	0.50 (3.54)	−7.30, 8.30	0.51 (4.52)	−9.44, 10.45	2.00 ((0.81)	0.41, 9.74
Education						
HS or less	(ref)	(0.02)	(ref)	(0.01)	(ref)	
Some college+	11.56 (4.08)	2.58, 20.53*	8.29 (2.54)	2.70, 13.88	1.64 (0.68)	0.43, 6.25
Marital Status						
Married/living as married	−1.37 (2.46)	−6.80, 4.05	−0.70 (2.60)	−6.42, 5.03	NA	
Other	(ref)	(0.59)	(ref)	(0.79)	NA	
Family History						
Yes	−1.09 (2.79)	−7.23, 5.06	−0.39 (3.07)	−7.15, 6.37	0.61 (0.75)	0.14, 2.67
No	(ref)	(0.70)	(ref)	(0.90)		(0.51)
Risk Perception						
High/Medium	0.767 (1.94)	−3.50, 5.03	−2.86 (2.04)	−7.35, 1.64	2.56 (0.56)	0.85, 7.76
Low	(ref)	(0.70)	(ref)	(0.19)	(ref)	(0.10)

Characteristic	Knowledge		Self-efficacy		Decisional consistency	
	Coefficent (SE)	(overall p-value†) 95% CI	Coefficient (SE)	(overall p-value†) 95% CI	OR (SE of logOR)	(overall p-value††) 95% CI
Control Preferences						
Active	12.94 (2.85)	6.67, 19.21**	5.30 (4.80)	−5.26, 15.85	NA	
Collaborative	9.32 (3.09)	2.52, 16.12**	2.87 (5.06)	−8.27, 14.01	NA	
Passive	(ref)	(0.03)	(ref)	0.42	NA	
Subjective Norms						
Positive	0.33 (2.86)	−5.97, 6.36	−0.74 (2.29)	−5.78, 4.31	1.92 (0.57)	0.62, 5.90
Negative	(ref)	(0.91)	(ref)	(0.75)		(0.26)
Social Norms						
All/most	−4.82 (4.67)	−15.09, 5.45	−2.22 (2.87)	−8.53, 4.09	1.71 (0.75)	0.29, 7.48
More than half	−1.71 (4.04)	−10.61, 7.20	−5.81 (3.72)	−13.99, 2.37	1.78 (0.82)	0.35, 8.93
Less than half	(ref)	(0.22)	(ref)	(0.40)	(ref)	(0.56)
Don't know	−6.46 (3.81)	−14.85, 1.94	−1.28 (3.42)	−8.80, 6.24	1.16 (0.85)	0.22, 6.09
Physician Discussion						
Yes	3.98 (1.49)	0.69, 7.26*	5.18 (1.86)	1.09, 9.28*	2.58 (0.50)	0.96, 6.91
No	(ref)	(0.02)	(ref)	(0.02)		(0.06)

*p<0.05

**p<0.01

***p<0.001

†Knowledge and self-efficacy results are from multivariable linear regression models including all of the characteristics in one model. Overall p-values are Wald F-tests for variables with more than two categories.

††Due to small number of men who were not consistent, consistency results are from univariate logistic regression models with each of the characteristics.

NA=Results not available due to small cell counts.

Table 5

Summary of regression results for men who had NOT had a previous PSA test – predictors of knowledge, self-efficacy, and decisional consistency.

Characteristic	Knowledge		Self-efficacy		Decisional consistency	
	Coefficent (SE)	(overall p-value‡) 95% CI	Coefficient (SE)	(overall p-value‡) 95% CI	OR (SE of logOR)	(overall p-value‡‡) 95% CI
Age						
45–49	(ref)	(0.37)	(ref)	(0.11)	(ref)	(0.19)
50–54	−5.20 (4.13)	−14.29, 3.89	−9.56 (4.15)	−18.70, −0.43*	1.10 (0.32)	0.59, 2.05
55 or older	−6.23 (5.11)	−17.49, 5.02	−6.57 (4.61)	−16.71, 3.57	3.35 (0.66)	0.91, 12.26
Race/ethnicity						
White, non-Hsipanic	1.09 (8.40)	−17.40, 19.57	1.39 (3.30)	−5.88, 8.65	1.04 (0.39)	0.49, 2.23
Other	(ref)	(0.90)	(ref)	(0.68)	(ref)	(0.91)
Income						
<$49,999	(ref)	(0.77)	(ref)	(0.16)	(ref)	(0.11)
$49,000–$74,999	0.21 (4.36)	−9.39, 9.80	10.92 (5.41)	−1.01, 22.84	2.35 (0.64)	0.67, 8.25
$75,000 or more	1.79 (4.02)	−7.06, 10.64	3.67 (6.85)	−11.41, 18.74	0.95 (0.38)	0.45, 1.98
Education						
HS or less	(ref)	(0.54)	(ref)	(0.06)	(ref)	(0.17)
Some college for more	2.61 (4.13)	−6.49, 11.71	10.09 (4.74)	−0.35, 10.53	0.47 (0.55)	0.16, 1.39
Marital Status						
Married/living as married	−0.09 (5.50)	−12.20, 12.01	2.50 (4.90)	−8.29, 13.27	0.94 (0.36)	0.49, 1.82
Other	(ref)	(0.99)	(ref)	(0.62)	(ref)	0.86
Family History of CaP						
Yes	−3.77 (6.00)	−16.98, 9.45	3.35 (3.77)	−4.95, 11.65	NA	
No	(ref)	(0.54)	(ref)	(0.39)	NA	
Risk Perception						
High/Medium	−5.35 (3.93)	−14.00, 3.30	−7.53 (4.30)	−16.99, 1.93	2.079 (0.41)	0.94, 4.62
Low	(ref)	(0.21)	(re)	(0.11)	(ref)	(0.07)

Characteristic	Knowledge		Self-efficacy		Decisional consistency	
	Coefficent (SE)	(overall p-value‡) 95% CI	Coefficient (SE)	(overall p-value‡) 95% CI	OR (SE of logOR)	(overall p-value‡‡) 95% CI
Control Preferences						
Active	12.05 (6.96)	−3.28, 27.37	−0.78 (5.83)	−13.60, 12.05	1.21 (0.42)	0.53, 2.76
Collaborative	3.79 (4.68)	−6.52, 14.09	−5.77 (5.74)	−18.40, 6.86	1.11 (0.54)	0.398, 3.23
Passive	(ref)	(0.19)	(ref)	(0.45)	(ref)	(0.89)
Subjective Norms						
Positive	0.07 (3.26)	−7.10, 7.23	4.04 (3.53)	−3.72, 11.79	3.02 (0.43)	1.29, 7.05
Negative	(ref)	(0.98)	(ref)	(0.28)	(ref)	(0.01)
Social Norms						
All/most	−5.13 (6.40)	−19.29, 8.94	−2.02 (5.18)	−13.42, 9.38	1.26 (0.81)	0.26, 6.23
More than half	−6.65 (4.54)	−16.63, 3.34	10.74 (5.05)	−0.38, 21.86	1.26 (0.97)	0.19, 8.50
Less than half	(ref)	(0.10)	(ref)	(0.10)	(ref)	(0.74)
Don't know	−8.06 (3.09)	−14.87, −1.26*	−1.58 (5.63)	−13.98, 10.82	0.86 (0.48)	0.34, 2.18
Physician Discussion						
Yes	−4.15 (6.81)	−19.14, 10.83	6.57 (3.38)	−0.87, 14.00	2.31 (0.40)	1.06, 5.03
No	(ref)	(0.55)	(ref)			(0.04)

*p<0.05

**p<0.01

***p<0.001

‡Knowledge and self-efficacy results are from multivariable linear regression models including all of the characteristics in one model. Overall p-values are Wald F-tests for variables with more than two categories.

‡‡Due to small number of men who were not consistent, consistency results are from univariate logistic regression models with each of the characteristics.

NA=Results not available due to small cell counts.