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“I don’t know” my cancer risk: Exploring deficits in cancer knowledge and information seeking skills to explain an often overlooked participant response

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Abstract

Background—Perceived risk is a central theoretical construct in health behavior research. Participants’ “don’t know” responses to perceived risk items (DKPR) are usually excluded from analyses. Yet those who provide such responses may have unique cancer information needs.

Objective—The hypotheses that DKPR responding may be due to cancer knowledge deficits or behavioral, skill, and attitudinal antecedents to knowledge deficits (information seeking, numeracy, and self efficacy respectively) were explored.

Methods—Data from the 2005 Health Information National Trends Survey (HINTS, N=1,789), a United States population-based survey, and an urban, minority, primary care clinic survey (N=590) were analyzed. Multivariable logistic regressions were conducted to examine knowledge deficit explanations for responding DKPR to colon cancer risk perception questions (adjusting for demographics, family colorectal cancer history).

Measures—Comparative (HINTS) and absolute verbal perceived risk of colon cancer (HINTS, clinic survey); knowledge of colon cancer risks and screening, cancer and health information seeking behavior and self efficacy (HINTS), and numeracy (clinic survey).

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Results—Greater knowledge of colon cancer prevention and screening, cancer and health information seeking, and numeracy were each associated with lower odds of providing a DKPR response.

Limitations—The study was cross-sectional, which limits the ability to infer causal direction. The use of existing datasets limited our variable choices. Other plausible hypotheses may also explain DKPR responding.

Conclusions—People who report that they don't know their colon cancer risk may have low cancer knowledge and reduced knowledge acquisition behaviors and skills. Health behavior research could benefit from including data concerning DKPR responses to risk perception questions, as individuals who respond in this way may require interventions to address potential cancer risk knowledge deficits.

Keywords

Risk perceptions; measurement; colorectal cancer knowledge; information seeking; item response

Introduction

The perception of illness risk is an important empirical precursor of many cancer prevention and control behaviors (2, 3), and is also considered a critical motivator of health behavior change in most major health behavior theories (4). It is generally measured as a perceived statistical likelihood – e.g. “How likely is it that you will develop colorectal cancer sometime in your life?” (5). The general assumption is that individuals have adequate knowledge and motivation to formulate a health risk perception, even if formulated on the spot at the time the question is posed (6), and that these risk perceptions are largely stable, as evidenced by limited responsiveness to intervention (7–9).

Although risk perception is often assumed, not knowing and/or not articulating one's perceived risk judgment appears to be quite common. Lipkus and colleagues (10) examined perceived risk for colorectal cancer in a predominantly African-American community sample of primary care patients. When presented with a verbal likelihood scale, 38% of participants endorsed a “Don't know” (DKPR) response option. Similarly, other research indicates that DKPR responses are in the 10% to 40% range for cervical cancer (11) and diabetes (12), as are general cancer risk perceptions in those undergoing cardiac stress tests (13). Our prior research confirms that DKPR responses are quite prevalent (8% to 50%), and that prevalence is much higher when a DKPR response is explicitly offered (1). Don't know responding may also be represented by responses to numerical probability scales, which often show a disproportionate number of responses of “50% risk” (14). This disproportionate response is believed to be due to participants using 50% as a numerical proxy for “don't know” (15). Across a range of health risks, up to 12.5% of “50% risk” responses are estimated to be based on DKPR answers (16). If only 8% of the population does not know their risk, as we found for colorectal cancer in a US national population representative survey where a *don't know* option was not provided (1), this translates to 19 million people in the United States (17) which is a population of sufficient size to merit interest from a public health perspective.

This demonstrated lack of knowledge about the public's uncertainty about risk is significant because risk perceptions are primary building blocks of protective behavior adoption (18, 19). Risk perceptions are a central theoretical mechanism for motivating engagement in health behaviors (4), and this perceived risk-behavior relation has received substantial empirical support (2, 18, 20–22). Recent meta-analyses of risk perception, health communication, and medical decision making interventions have supported the premise that people who perceive that they have high risk have higher intentions and engagement in health protective behaviors (2, 18, 23–25). In addition, interventions that increase risk perceptions are likely to increase intentions and engagement in health behaviors such as exercise, healthy diet, sun protection, vaccination, and sexual behaviors (25).

As key motivators of health behavior change, heightening risk appraisals is a central goal of public health messaging and health behavior interventions; thus understanding risk uncertainty will enhance health communication efforts. Given the ubiquity of risk-focused health messaging, and the significant prevalence of DKPR, there are likely important segments of the population that may require public health messaging strategies that differ from those routinely used. Understanding of how and why DKPR responses occur is a necessary starting point for understanding the nature of the phenomenon, which will subsequently allow for development of interventions to address the underlying root causes of the don't know response (26).

In our prior research (1), correlates of DKPR responding were participant characteristics generally associated with health disparities. This pattern was found across three large surveys, two of which recruited nationally representative samples. Specifically, being born outside the United States, Hispanic ethnicity, and having less than a high school education were associated with increased DKPR responding across all or most surveys examined. This is consistent with research by Bruine de Bruin and colleagues (16), who reported that excess “50% risk” responses were more likely for participants with lower educational attainment and lower numeracy levels. Taken together, these findings suggest that the highly prevalent use of 50% on percentage risk scales (0% risk to 100%) may be due, at least in part, to respondents' lack of knowledge or high uncertainty about their responses. However, it is a common practice to treat DKPR responses as missing data, dropping them from examination or analysis altogether (27–29). Since DKPR responses are prevalent and related to health disparities, yet relatively unexamined, there is a clear need to understand possible explanatory mechanisms.

One possible reason an individual—especially someone with lower education (1)—might answer DKPR in response to a question about perceived risk for cancer is that the DKPR answer reflects a lack of cancer knowledge, or a lack of specific behaviors, skills, or attitudes that are antecedent to cancer knowledge. Specifically, a person might be unfamiliar with cancer as a health issue, have limited skills or experience in applying probabilistic thinking to medical situations (numeracy), and perceive a lack of knowledge about what risk factors influence cancer risk, and/or to what degree specific risk factors influence risk. Under these circumstances, people might perceive they have insufficient information to assess personal risk and, therefore, answer DKPR. This is important because if DKPR responding is due to insufficient knowledge, and individuals who respond DKPR are

excluded from health behavior research, then health communicators might be unaware of unmet information needs of a vulnerable population subgroup. Accordingly, in the current study, we test this hypothesis using two of the three datasets used in our prior work. The focus is on DKPR responding to colorectal cancer risk perception questions because colorectal cancer is a serious public health problem for men and women, and screening via colonoscopy is significantly related to reductions in morbidity and mortality from this common cancer (30).

Several theoretical perspectives and areas of empirical literature support the hypothesis that limited knowledge of colorectal cancer risk factors and risk reduction strategies, as well as low cancer information seeking and/or inadequate skills for processing risk information, might be important drivers of DKPR responses to risk perception questions. Some health behavior theories explicitly acknowledge the possibility of a lack of a risk perception at early stages of health behavior change, such as those who are “unaware” in the Precaution Adoption Process Model (31) and “precontemplators” in the Transtheoretical Model, (32). Both models propose that there are unique barriers to change, and thus unique intervention approaches required, for individuals who truly do not know their risk.

In both the Precaution Adoption Process and Transtheoretical Models, knowledge deficits underlie lack of awareness of personal risk. As awareness of personal risk is a necessary condition for behavior change in these models, informational interventions, such as risk knowledge enhancement or consciousness raising, would be an appropriate first step for promoting health behavior change (33, 34). These interventions would address lack of cancer risk awareness, low information seeking (which could lead to lack of awareness), and lack of confidence concerning how to get risk information in the first place, as well as basic numeracy skills that would allow risk information to be accurately processed.

Knowledge Deficits and Information Seeking Skills

Several variables were extracted from two large datasets, the Health Information National Trends Survey (HINTS) and a diverse, hospital-based, primarily immigrant primary care population survey (Clinic) in order to examine four specific hypotheses related to knowledge deficits. Although neither dataset was expressly designed to study DKPR responding to risk perception items, we thoroughly examined questions asked in each dataset and identified theoretically relevant predictors to test our hypotheses. Both datasets included don't know responses to perceived risk questions and relevant predictors. Our hypotheses are designed to begin to elucidate why the problem of DKPR responses exists and to suggest routes for intervening to address it.

There is evidence that more cancer knowledge and information seeking are related to higher screening behavior (35), that high information seeking self efficacy is associated with increased information seeking behavior (36, 37), and that numeracy provides a necessary basis for comprehending health information (38) and is an important antecedent of knowledge about cancer risk factors (39). Accordingly we draw the following four hypotheses: H1) lower knowledge of colorectal cancer prevention and screening will be related to higher DKPR responding, H2) lower cancer and general health information seeking behavior will be related to higher DKPR responding, H3) lower self efficacy for

cancer information seeking will be related to higher DKPR responding, and finally, H4) low numeracy will be related to higher DKPR responding. Certainly motivation to provide thoughtful survey responses may also be an important factor in whether and how cancer knowledge is brought to bear on risk assessment (40), but we were unable to assess this in the available surveys.

We tested Hypotheses 1–3 using the HINTS dataset, and Hypothesis 4 using the clinic dataset. Evidence for one or more of these hypotheses will inform the development of strategies to address and overcome DKPR responding and to further delineate and address uncertainty regarding risk perceptions in the general population.

Methods

Data Sources and Participants

Data were obtained from two of the three sources used in our prior publication (1). The first dataset, HINTS 2005 (41), is a population-based, nationally representative survey of the civilian non-institutionalized population age 18 and older in the United States. Response rates were 34% for an initial screener questionnaire and 61% for the full survey. Because the colorectal cancer module was administered to only one-third of the overall HINTS sample, data from the 1,937 respondents reported for these analyses represents a subset of the total number of respondents to the telephone/web survey. The final HINTS sample used for these analyses included 1,789 individuals who had valid data on risk questions and all covariates; the remaining 148 had missing data on either covariates or the risk questions.

Data for the second dataset (Clinic) were collected from a diverse, primarily immigrant, hospital-based primary care population as a part of a clinic-based study of colorectal cancer risk beliefs and adherence with colorectal cancer screening. Potential participants were approached in the clinic waiting room at Queens Hospital Center (QHC) Ambulatory Care Center in Jamaica, New York. The hospital serves a local patient population that is highly multiethnic, and the hospital has a strong focus on reaching recent immigrant and other underserved communities that may be under-represented in population-based surveys. Participants completed a 40-minute questionnaire with the aid of a research assistant. The response rate was 33%; non-response did not vary by sex. Participants from the clinic sample who were between 18 and 80 years of age were included. Although screening recommendations for colorectal cancer begin at age 50 for the average risk population, being below age 50 does not mean that one does not potentially have a perception of risk for colorectal cancer. Thus, the construct is assumed to be applicable regardless of age. The final sample size was 769 from the clinic; 590 of these participants provided valid responses for all of the predictors of interest (knowledge of colorectal cancer prevention and screening, cancer/health information seeking, self efficacy, numeracy) and were included in the bivariate and multivariable analyses. The remaining 179 had missing data on covariates or risk questions.

Measures

Dependent Variables—Perceived risk of colorectal cancer. The surveys assessed different types of perceived risk and provided different response options to participants. HINTS assessed comparative risk perceptions using 3 response options: “Compared to the average [man/woman] your age, would you say that you are more likely to get colon or rectal cancer, less likely, or about as likely?” HINTS also assessed perceived absolute risk, but with a 5-point response scale: “How likely do you think it is that you will develop colon cancer in the future? Would you say your chance of getting colon cancer is (1) very low – (5) very high?” HINTS did not provide an explicit DKPR option. Instead, the category was marked only if participants proactively stated that they did not know their risk for colon cancer. In contrast, the clinic survey did provide an explicit DKPR option. Furthermore, it assessed perceived absolute risk using 3 response options that framed risk as likelihood: “Do you think you are likely to get colorectal cancer or unlikely to get it? (1) likely; (2) unlikely; (3) no idea.” The clinic also framed absolute risk as chance, using a 7- point response scale with a ‘don’t know’ option: “What is the chance you will develop colorectal cancer in the future? (1) No chance – (7) Certain to happen; (8) No idea.”

Predictor Variables—Knowledge deficits were explored in the HINTS survey. Participants were classified as knowing at least one specific behavior to prevent colon cancer if they identified at least one factor noted by the American Cancer Society (42, don’t drink alcohol, don’t smoke, eat fruits and vegetables, eat healthy/better nutrition, exercise) in response to the question, “What are some things that people can do to reduce their chances of getting colon cancer?” Similarly, they were classified as knowing at least one colon cancer screening test if they were able to name one valid test when asked, “Can you think of any tests that detect colon cancer?” Those that could not generate a test were recorded as responding “no/nothing.” Those who responded that they did not know any prevention behaviors or screening tests were dropped from analyses to eliminate potential biases toward responding “don’t know” across multiple items. Using these two items, a knowledge of prevention behaviors and screening tests summary score was created (weighted mean=0.44 [SE=0.01], range=0–1) and used as a predictor for H1.

Cancer information seeking behavior was assessed with three yes/no items in HINTS: “Have you ever looked for information about cancer from any source,” “Have you ever visited an Internet website to learn specifically about cancer,” and “In the past 12 months, have you read the health sections of a newspaper or magazine.” Using these three items, a cancer/health information seeking summary score was created (weighted mean=0.40 [SE=0.01], range=0–1) and used as a predictor for H2.

Self efficacy for seeking cancer information was assessed with the item in HINTS, “How confident are you that you could get advice or information about cancer if you needed it?” (5-point Likert-type scale, Completely confident – Not confident at all) and used as a predictor for H3. Finally, numeracy was assessed in the clinic dataset with a ten-item response scale that has been used in general population samples (43) and used as a predictor for H4. Numeracy was not assessed in HINTS.

The use of these predictors and hypotheses in primary analyses is shown in Table 2.

Statistical Analyses

Data were analyzed separately for each of the surveys and for each of the perceived risk variables, which translates to 6 tests in HINTS and two tests in the clinic dataset. For all perceived risk items in both surveys, participant responses were recoded as having responded (1) or having not responded (0) DKPR. Accordingly the coding of risk perception questions with different numbers of Likert responses (3, 5, or 8) was not pertinent to our derived dichotomous outcome variable for each risk perception question. The HINTS analyses were conducted in Stata using survey and jackknife replication weights for parameter and variance estimation to yield estimates representative of the U.S. population (44, 45). The clinic survey analyses were conducted in SPSS. Unadjusted odds ratios were used to examine whether there were bivariate relationships between any of the predictor variables and responding DKPR. Next, adjusting for demographics, separate multivariable logistic regressions were conducted to examine each test of the knowledge hypotheses in each dataset. For each regression, one perceived risk item was regressed on one of the knowledge predictor variables of interest (8 in total). Age, gender, race, Hispanic ethnicity, United States nativity, marital status, education, insurance status (HINTS only), and family history of colon cancer were included as covariates in each regression model. Expanded tables with Odds Ratios and p-values for all demographic variables are available from the Corresponding Author. Income was not included as a covariate as it had high levels of missing data in both datasets. Furthermore, in HINTS, income is highly correlated with education and moderately correlated with, age, and insurance status, all of which are included in the models.

Results

Sample characteristics are presented in Table 1. The HINTS sample is representative of the demographic composition of the United States, whereas the clinic survey is predominantly immigrant, racial/ethnic minority, and low socioeconomic status. As reported in our prior work, in the HINTS sample, which did not include explicit DKPR response options, 7.5% and 8.7% of respondents provided a spontaneous DKPR response to the comparative and absolute perceived risk items; however, in the clinic survey, which included explicit DKPR options, 49.1% and 69.3% responded DKPR to the chance and likelihood items, respectively (1).

Table 2 shows the associations between the predictor variables and the odds of responding DKPR. Of eight multivariable tests, five yielded significant results in the expected direction ($p < .05$) and the remaining three tests yielded odds ratios in the expected direction ($p < .10$). In sum, greater odds of responding DKPR were associated with lower knowledge of colon cancer prevention and screening strategies, lower cancer/health information seeking, and lower numeracy. The unadjusted odds of responding DKPR associated with each predictor yielded generally similar results as the adjusted analyses (data not shown).

Discussion

We found that the most consistent predictors of providing a DKPR response involved those factors possibly most tightly linked to the formulation of a colorectal cancer risk perception:

low knowledge of colorectal cancer prevention factors and screening tests. The predictors that did not target colorectal cancer specifically, including low cancer/health information seeking and low numeracy, also predicted DKPR. Self efficacy for cancer information seeking was not predictive of DKPR responding after adjusting for demographic factors. We found consistent patterns of DKPR responding to risk perception questions regardless of absolute versus comparative response options, but for a number of predictors, effects were larger for comparative versus absolute perceived risk items. To answer comparative perceived risk questions people must take into account not only risk factors for the illness and one's standing on those risk factors, but also risk factor base rates, making them more cognitively challenging. Comparative perceived risk items may thus be a more sensitive index of knowledge than absolute risk (46).

The survey methodology literature posits a variety of explanations and solutions to approaching "no opinion" responses (47). According to the Response Basis Framework (48), providing a DKPR response is in part attributable to lack of information availability, accessibility, and adequacy, which reduces respondents' ability to formulate a "valid" response. Krosnick and colleagues assert that most survey participants who endorse "no response" options actually have meaningful attitudes, but they lack the motivation or ability to formulate a valid response (40, 49, 50). This may be particularly true for difficult or sensitive tasks (51). From this perspective, "no response" endorsements such as DKPR responding should be discouraged (49) by not providing an explicit DKPR option. In contrast, Converse and Presser advocate for the *inclusion* of "no response" options to allow those who truly have no opinion to say so accurately rather than to be forced to choose a valid response that does not reflect their true attitude (52). Future work could explicitly examine satisficing as an explanation for DKPR responding to risk perception measures through the use of a direct measure of satisficing (53) or Need for Cognition (54). Finally, reporting "no opinion" on an attitude survey may be distinct from DKPR responding to risk perception questions.

The results of this study both draw upon and extend beyond established research on DKPR responding. In prior work, correlates of DKPR responding (1) and of use of the 50% option in percentage risk items (15, 16), as well as statistical approaches to minimize DKPR responding, have been explored (55). One recent approach to addressing the variable level of certainty associated with risk perception assessment asks participants to evaluate their level of certainty or uncertainty associated with their risk assessment. Such a question would ask participants to report to what extent they feel certain or uncertain about their risk assessment (56). This strategy would provide uncertainty information even for those participants who do not provide DKPR responses. Yet to our knowledge there has not been an in-depth, multifaceted examination of a knowledge deficit explanation for DKPR responding.

Explanations for responding "don't know" to general survey questions have been explored previously (40, 48, 49), but we explore this issue in a context that is novel to survey methodology research - perceived risk related to a common and dangerous health condition - rather than attitudes about topics unrelated to health such as employment, the environment, or politics. Furthermore, by including a large number of individuals from demographic subgroups that experience cancer disparities in addition to the population-based sample, we

can be more confident that our findings generalize, at least to some extent, to several important underserved populations. Given that African Americans and those with lower educational attainment are more likely to respond that they don't know their risk (1), and suffer greater colorectal cancer disease burden compared to Non-Hispanic Whites (57), our work advances understandings of why existing intervention approaches may be less effective in these populations. It also provides information that will direct the development of targeted interventions for individuals who are uncertain about their risk for colorectal cancer, including those more likely to bear the burden of disparities in these diseases.

Over the past several years, there has been an increased focus in health psychology and decision sciences on the processes by which people conceptualize and manage health decisions (58–61). Importantly, some elements of uncertainty in health decision making involve “irreducible ignorance,” such that the gaps in knowledge on the part of the general population, medical patients, physicians, and the research community cannot always be resolved, but must be identified and accepted as part of the reality inherent in health decision making (58, 62). Despite this, risk perception questions have not generally allowed the reporting of high uncertainty about personal health risk. Specifically, they often either do not include an explicit DKPR response option, or they treat participant assertions of “I don't know” as missing data (22, 27–29). The current research is an attempt to understand the correlates and causes of health risk uncertainty, with potential implications for measurement and intervention development in behavioral approaches to cancer prevention and control.

Limitations and Future Directions

A few limitations about this study should be noted. Other plausible hypotheses may usefully explain DKPR responding that could not be assessed here. For example, motivated defensive processing (46, 64, 65) may lead some individuals to fail to consider and process personal health risk information (66–70) via motivated avoidance of risk information, or defensive memory retrieval processes (37, 71). Study fatigue, cultural explanations, question sensitivity, and low interest or motivation to respond could contribute to DKPR responding (49). The use of verbal response categories to measure risk perception (such as “more likely”) may also encourage DKPR responding due to their inherent imprecision. Another limitation is that study non-responders may have wanted to avoid research on health; they could presumably be more likely to respond DKPR to risk perception questions, but we could not test this in our current research. Furthermore, although the use of multiple large surveys is a strength, the use of existing datasets also limited our variable choices. For example, our cancer/health information seeking scale included items that assessed both cancer and general health information seeking. Finally, the use of these multiple tests raises a possibility that the consistency of support for these hypotheses is due to chance.

Clearly further research is needed to confirm and provide additional specificity regarding the determinants of and explanations for DKPR responding. This includes clarifying how those who respond DKPR to risk perception questions respond to risk interventions, as well as developing potential solutions to identifying and resolving multiple forms of uncertainty regarding health risk perceptions. This research should utilize prospective and experimental designs and examine moderators of the influence of important predictors on DKPR

responding. Those findings could in turn illuminate whether the predictors examined here are causal determinants of DKPR or if they are indicators of other processes such as motivated information avoidance. Research should also examine whether DKPR responding is related to knowledge deficits in some people but not in others (37).

Implications

Based on these findings, we recommend routine analysis of DKPR responding when assessing risk perceptions, as well as investigation of the psychosocial predictors and behavioral outcomes associated with use of this response. Given the high proportion of DKPR responders, we recommend improved strategies to inform certain segments of the population who may be less knowledgeable about their risk, and to inform practitioners and policy makers concerning this need. Of note, more low-literacy, easily disseminable prevention and risk factor information specific to cancer type may be quite helpful in addressing knowledge deficits and corresponding DKPR responses.

This study provides important information for the health behavior and medical decision making fields, where researchers regularly exclude a DKPR response for perceived risk questions (22, 27–29). If those who respond DKPR are systematically excluded from large observational or risk communication intervention studies, a subpopulation in most dire need of such interventions may be excluded from examination. Furthermore, patients who provide a DKPR response may be communicating a need for the health care provider, or researcher, to improve access and clarity of patient education strategies and resources.

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Table 1

Demographic and Health Status Characteristics of the Two Samples

	HINTS 2005 (N=1,789)	Clinic Survey (N=590)
	Weighted % or \bar{M} (SE)	(%) or \bar{M} (SE)
Age	M=46.2 (SE=0.6)	M=55.6 (SE=0.4)
Female	52.6%	52.5%
Race		
White	80.7%	6.3%
Black	11.0%	52.2%
Asian	2.6%	15.9%
Other	5.7%	25.6%
Hispanic	7.8%	9.5%
Foreign Born	11.6%	77.8%
Years in U.S. if foreign born	M=20.3 (SE=1.58)	M=25.8 (SE=0.82)
Marital Status		
Married/cohabitating	63.7%	48.5%
Never married	20.1%	26.3%
Divorced/separated	9.8%	17.5%
Widowed	6.4%	7.8%
Education		
Less than HS	13.7%	32.9%
High school or GED	28.9%	31.7%
Some college or more	57.3%	35.4%
Household income < 29 K/<25K	24.9%	76.8%
Family history of colorectal cancer	10.3%	6.1%

Table 2

Adjusted Odds Ratios of Responding Don't Know (95% CI) Associated with Each Predictor

Predictor	Perceived Risk Item (Sample, N)	AOR (95% CI) ^a	p-value
Hypothesis 1: Knowledge of prevention behaviors and screening tests ^{b,c}	Comparative (HINTS, 1784)	3.16 (1.68, 5.96)	.00
	Absolute (HINTS, 1783)	2.57 (1.41, 4.66)	.00
Hypothesis 2: Cancer/Health information seeking ^{b,d}	Comparative (HINTS, 1787)	2.55 (1.25, 5.19)	.01
	Absolute (HINTS, 1783)	2.05 (1.01, 4.16)	.05
Hypothesis 3: Self efficacy for seeking cancer info ^b	Comparative (HINTS, 1774)	1.37 (0.99, 1.90)	.06
	Absolute (HINTS, 1770)	1.28 (0.97, 1.69)	.08
Hypothesis 4: Numeracy ^b	Likelihood (Clinic, 590)	1.58 (1.08, 2.31)	.02
	Chance (Clinic, 590)	1.35 (0.94, 1.93)	.10

^a Adjusting for age, gender, race ethnicity, United States nativity, marital status, education, insurance status (HINTS only), and family history of colon cancer.

^b Predictors are reverse coded so that higher scores are assigned to lower predictor scores (e.g., lower information seeking self efficacy);

^c This scale represents the mean (0–1) of two items: “What are some things that people can do to reduce their chances of getting colon cancer?” and “Can you think of any tests that detect colon cancer?”

^d This scale represents the mean (0–1) of three items: “Have you ever looked for information about cancer from any source?” “Have you ever visited an Internet website to learn specifically about cancer?” and, “In the past 12 months, have you read the health sections of a newspaper or magazine?”