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Cancer Information Scanning and Seeking in the General Population

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Abstract

The amount of cancer-related information available in the media and other sources continues to increase each year. We wondered how people make use of such content in making specific health decisions. We studied both the information they actively seek ("seeking") and that which they encounter in a less purposive way ("scanning") through a nationally representative survey of adults aged 40–70 years (n=2,489) focused on information use around three prevention behaviors (dieting, fruit and vegetable consumption and exercising) and three screening test behaviors (prostate-specific antigen, colonoscopy, mammogram). Overall, respondents reported a great deal of scanning and somewhat less seeking (on average 62% versus 28% for each behavior), and used a range of sources including mass media, interpersonal conversations and the Internet, alongside physicians. Seeking was predicted by female gender; age of 55–64 vs. 40–44; higher education; Black race and Hispanic ethnicity and being married. Scanning was predicted by older age, female gender and education. Respondents were fairly consistent in their place on a typology of scanning and seeking across behaviors. Seeking was associated with all six behaviors and scanning was associated with three of six behaviors.

Keywords

Cancer; information seeking; scanning

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People make many decisions that affect their health status. They decide whether to exercise, to get a mammogram or to choose surgery over watchful waiting for prostate cancer, for example. In part, those decisions are affected by their interactions with doctors and the medical system. The decisions may also be affected by their interaction with non-medical sources of information, both mediated and interpersonal. This is not a new argument. However, most research on information use focuses on only part of people's engagement with information sources: that involving deliberate information seeking (Bright et al., 2005; Muha, Smith, Baum, Ter Maat & Ward, 1998). In our current program of research we propose that this focus should be expanded. People's health behavior may be affected by information they actively seek, but also by information they come across in their routine use of media and their interactions with others. This form of information engagement is called scanning (see also Slater, 1997).

We report data here from the first national sample study intending to show how both forms of engagement with information sources (seeking and scanning) affect health decision-making. The program of research includes studies with cancer patients making decisions about treatment, and with the general population considering prevention behaviors and screening tests. The research includes small sample, in-depth interviews, and large sample, multiple-round surveys. Overall, our goal is to describe the nature of seeking and scanning behavior around the focus health decisions, understand what accounts for variation in those behaviors, and examine whether they have effects on the relevant decisions. Previously, we published a study of in-depth interviews with a general population sample about prevention and screening behavior (Niederdeppe et al., 2007). The results led to the development of the closed-ended questionnaire and the hypotheses presented in this paper. A separate paper (Kelly, Niederdeppe & Hornik, in press) presents evidence supporting the validity of our new measures of scanning; there and elsewhere (Hornik & Niederdeppe, 2008; Shim, Kelly & Hornik, 2006) we have elaborated on this concept. The current paper has two primary purposes: (a) to describe the extent of both seeking and scanning from mediated and interpersonal sources, and (b) to examine the association of scanning and seeking behavior with variables that are hypothesized to account for variation in it. In addition, it provides some preliminary evidence for the association of scanning and seeking behavior with the target health behaviors.

Research on information seeking

There has been much evaluation of how Internet information and other sources affect cancer decisions. However, much of the research has been specific to cancer patients (Czaja, Manfredi & Price, 2003; Dolinsky, Wei, Hampshire & Metz, 2006; Mayer et al., 2006; Rees & Bath, 2001; Talosig-Garcia & Davis, 2005; Zanchetta, Perreault, Kaszap & Viens, 2006), or has focused on active searching about a particular topic, such as clinical trials (Dolinsky et al., 2006).

Others have focused on one particular source, such as the Cancer Information Service (Bright et al., 2005; Muha et al., 1998); a web-based decision support system (Markman et al., 2006); or the Internet more generally (Walji, Sagaram, Meric-Bernstam, Johnson & Bernstam, 2005).

It is logical that cancer patients will search for cancer-related topics. This is an issue highly salient to them and inherently there will be questions about which they need information. Less clear is how much cancer-related seeking and scanning occurs among the general population. Their questions are probably fewer and less frequent, as they are not faced with the issue every day. As a result, it is probable that the cancer information they do collect is

less driven by active searching. The information acquired by non-patients may more likely be that they encounter incidentally.

Research on more passive information gathering

While the large majority of studies to date have investigated active searching, some authors have addressed the prevalence and consequence of less active efforts. Such information gathering has been called “non-strategic information acquisition,” (Berger, 2002), among other terms (e.g., Atkin, 1973; Berger, 2002; Bornstein, Leone & Galley, 1987; Case, 2002; Griffin, Dunwoody & Newirth, 1999; Krugman & Hartley, 1970; Slater, 1997; Tewksbury, Weaver, & Maddex, 2001; Zukin & Snyder, 1984). For a review, see Kelly, Niederdeppe & Hornik (in press).

We have used the term “information scanning” elsewhere and define it as, “information acquisition that occurs within routine patterns of exposure to mediated and interpersonal sources that can be recalled with a minimal prompt” (Niederdeppe et al., 2007, p. 5). We have also argued there is a need to study scanned information exposure, both for its determinants and its consequences (Shim, Kelly & Hornik, 2006).

We argue in a separate paper that existing measures of passive information exposure are insufficient (Kelly, Niederdeppe & Hornik, in press). One way these ideas have typically been captured is through assessment of general media exposure or attention. While habitual patterns of media use certainly influence the likelihood of exposure to information about a particular topic (e.g., Eveland & Dunwoody, 2002; Johnson, 1997; Price & Czilli, 1996; Tewksbury, Weaver, & Maddex, 2001), there will be much variance among individuals in the degree to which information is paid attention to, encoded, and made available for subsequent retrieval. As a result, merely measuring exposure overestimates the amount of information that is actually absorbed.

Measures of “attention,” may underestimate information acquisition resulting from scanning as they can imply some element of motivation, involvement or interest (Donohew, Lorch, & Palmgreen, 1998; Salmon, 1986). It is feasible that a person may learn about health information via scanning without realizing that they paid attention to a particular topic. However, it is also important to note that attention may play an important role in scanning. Those who notice a headline and choose to attend to the article, will be more likely to report having scanned the information.

An essential idea in our construct of scanning is that it does a careful balancing act between seeking and completely passive exposure. We ask people to recall their exposure to a topic, so they must have paid enough attention to remember that they saw or heard something relevant. On the other hand they are cautioned not to include exposures when they were actively looking for particular information. It is also important to consider a wider variety of sources than many previous studies have done. The communication landscape is complex, involving not just the Internet, but also television, radio and newspaper content, including advertising, media coverage and entertainment programming (Viswanath, 2005). Someone might see advertisements for a local cancer center on television, read a news story about a drug trial, or have a conversation with a co-worker who received a high PSA test result.

Many of the studies which have attempted to describe the effects of exposure to media on cancer outcomes have focused on advertising campaigns (e.g., Broadwater, Heins, Hoelscher, Mangon &, Rozanas, 2004; Loss, Eichhorn & Nagel, 2006; Vanderpool & Coyne, 2006) or on effects of media coverage (e.g., Casey et al., 2003; Cram et al., 2003; Pierce & Gilpin, 2001; Stryker, 2003; Yanovitzky & Stryker, 2001). While both are

informative, we are interested in the cumulative effects of information scanned and sought from *multiple* sources.

Interpersonal communication must also be considered. Others have acknowledged the role of family and friends as potential sources of cancer-related information that may be consequential for behavior (Jones, Denham & Springston, 2006; Nivens, Herman, Weinrich & Weinrich, 2001; Ramirez et al., 1999; Soskolne, Marie & Manor, 2006). In order to achieve a comprehensive understanding of this complex communication environment, one must consider all the information that might be obtained from media and interpersonal sources, related to several different cancers and cancer-related behaviors, whether acquired through active searching or in a less purposive manner.

In this paper we will address five research questions:

1. How much seeking and how much scanning do people report for each of the three prevention and the three screening behaviors?

   We hypothesize that scanning will be even more prevalent than seeking, particularly for prevention behaviors=.

2. What mediated and interpersonal sources do they report using for their seeking and their scanning?

   The focus on sources has multiple purposes: We intend to describe what sources people rely upon, and whether they are different for seeking and scanning. There are many claims that the availability of the Internet has transformed how people get health information. By comparing it with other sources, we may be able to get a more balanced perspective on its role in the information environment.

3. What accounts for variation in seeking and in scanning?

   It is not our purpose in this paper to develop a general theory of seeking or scanning; instead we seek to set a foundation for further work. Part of that foundation involves establishing whether seeking and scanning is associated with the conventional demographic variables, thus we consider whether the usual demographic variables are associated with scanning and seeking behavior. We expect that women seek and scan more than men, and that better educated people seek and scan more than less educated people because the literature shows women and those with more education tend to have more interest in health and do more seeking (Marcus, Woodworth, & Strickland, 1993; Muha, Smith, Baum, Ter Maat, & Ward, 1998; Rakowski et al., 1990). The literature provides less guidance about whether race-ethnic groups or people with different marital statuses will show differing patterns of engagement..

4. Is seeking and/or scanning for one health behavior associated with scanning and seeking behavior for other behaviors?

   The one exception to our reluctance to put forward a theory of seeking and scanning is our interest in whether or not seeking and scanning is a trait or is only specific to a given health issue. Is there is a style that is maintained across health behaviors? Do people who report heavy seeking and/or scanning for one issue also tend to report that for other behaviors? Or, is each behavior distinct, and the scanning and seeking behavior around it largely determined by interest in that topic?

5. Is scanning and seeking behavior associated with focus behaviors?

Our interest in seeking and scanning is contingent on an assumption that both are related to adoption of behavior. There is evidence that information available in the public environment is substantially favorable towards each of the focus behaviors, even though there is some doubting comment (cf. Niederdeppe, 2006; Kelly, Niederdeppe & Hornik, in press.) We assume that consistent exposure to such favorable information will lead to more positive intentions to engage in such behavior. This may be because the content provides new information about the benefits of a behavior, or self-efficacy information – providing guidance about how to perform a behavior, or descriptive norm information suggesting that a behavior is common (cf. Fishbein and Ajzen, 2009.).

Methods

Participants

Participants were adults ages 40 to 70, for whom screening for the three cancers is most relevant. The sample was a list-assisted, national random digit dial-recruited panel, selected by an on-line survey company called Knowledge Networks. The sampling frame is the entire United States land-line telephone population. The RDD method is used to select households and one adult is selected for a panel which receives surveys periodically. If respondents did not have a computer or Internet access, both were provided.

A sample was selected from the Knowledge Networks panel and a web survey was delivered via e-mail. Data collection began in October 2005, with weekly samples of 50 cases. Panel recruitment response rates averaged 22% across all months. The survey completion rate was 73%. The final sample was 2,489. Weights to match the sample with Current Population Survey estimates were applied for all analyses.

Measures

Sought and scanned information exposure about six behaviors—Respondents were asked about their sought and scanned information exposure about three prevention and three screening behaviors, including exercise, fruit and vegetable consumption, weight-loss attempts, colonoscopy, the PSA test (men only), and mammography (women only). Sought exposure was assessed first, using two questions for each topic.[1] The section began with the statement, “Some people are actively looking for information about [colonoscopy], while other people just happen to hear or come across such information. Some people don’t come across information about colonoscopy at all. Thinking about the past 12 months, did you actively look for information about [colonoscopy] from doctors, from other people, or from the media?” Response options included “yes,” “no,” or “don’t recall.” Respondents who answered “yes” received the follow-up question, “Were you actively looking for information about [colonoscopy] in the past 12 months from any of the following sources (check all that apply): (1) doctors or other medical professionals; (2) family, friends or co-workers; (3) television or radio; (4) newspapers, magazines or newsletters; (5) the Internet; (6) other sources?” The two questions were combined to form dichotomous measures of whether or not a respondent sought information from each source.

Questions about scanned exposure were asked immediately after the seeking questions for each behavior: “Thinking about the past 12 months, did you hear or come across information about [colonoscopy] from doctors, from other people, or from the media even when you were not actively looking for it?” Those who answered “yes,” received: “How many times did you hear or come across information about [colonoscopy] from each of the following sources when you were not actively looking for it (for each of the sources described under seeking). Response options included “not at all,” “one or two7 times,” “three times or

more," and "I don't recall." The two questions were combined to form dichotomous measures of whether or not a respondent scanned information once or more from each source.

For both scanning and seeking, we were interested in use of non-medical sources, so responses to the medical source sub-question were excluded from the scale. The source-specific measures were then summed to form indexes (range 0–5) of sought exposure and of scanned exposure specific to each of the six behaviors. We also created overall sought and scanned exposure measures by summing the behavior-specific sought exposure indices. This resulted in overall indexes for sought and scanned information exposure, each with a range of 0 to 25 (up to five sources for up to five behaviors per gender).

Screening and prevention behaviors are described in appendix A.

Analytic approach

The amount of scanning and seeking for each behavior (RQ1) was determined by calculating the percentage of respondents who reported any seeking or scanning from any of the five sources. The distributions were non-normal, particularly for seeking, for which only a minority of people did any. Adjusted Wald tests were conducted to determine whether the percentage for scanning was significantly higher than for seeking.

To examine the number of topics sought or scanned about from each source (RQ2) we computed means and standard errors. T-tests were calculated.

To explore demographic predictors (RQ3), we used scanning and seeking as dependent variables in two separate OLS regression models, predicted by the demographic variables. To determine whether there is a style of seeking and scanning (RQ4), we first developed a two-by-two typology of scanning by seeking (i.e., no scan/no seek; scan/no seek, etc.) for each of the six behaviors. We then conducted pairwise kappas for each of the pairs of topics. These were averaged to compute mean kappa scores for three categories—prevention behaviors, screening behaviors, cross prevention/screening—and for the overall agreement score.

Cross-sectional associations with behavior (RQ5) were investigated by predicting each behavior using logistic regression models, with demographics entered in the first block, seeking and scanning in the second, and terms for their interactions in the third. For this analysis, samples are restricted to those for whom the behavior is relevant: those ages 50 or older for colonoscopy, men for PSA and women for mammogram, only people reporting BMIs of 25 or greater for diet behavior.

Almost all analyses were performed with STATA Version 9.0, with estimates and standard errors adjusted for weights.

Results

The sample has been described elsewhere (Kelly, Niederdeppe & Hornik, in press).

The analyses reported in Table 1 focus on the use of non-medical sources of information, both mediated and interpersonal. Reports of seeking and scanning from medical sources was often quite high [68% scanned from the doctor and 53% sought], but our interest here is on what else people do, and whether that matters for their behaviors.

Table 1 presents the percentage of respondents who claimed that they sought or scanned from at least one source for each behavior. It also sums across all five topics to permit more

efficient comparison. As had been hypothesized, many respondents reported both seeking and scanning for each topic, with more reporting scanning for each of them (see Table 1). All adjusted Wald tests comparing the percentage of people scanning versus seeking were significant at the p<.001 level. On average, people sought from 1.47 topics (SE=.04) and scanned from 3.15 topics (SE=.04) out of five per gender (t-test=38.49, p<.001).

Table 1 establishes that scanning was common and more so than seeking across each of the topics. Table 2 uses the same information but organizes it by source. An individual could report seeking or scanning for each source set for each topic. Thus an individual could have reported as many as five uses of each category of sources, and 25 uses of sources across all five topics.

The mean number of behavioral topics sought about ranged from.55 for other source (SE=.04) to 1.25 for family and friends (SE=.03) (see Table 2). The mean number of topics scanned about ranged from .86 for other source (SE=.04) to 2.69 for television/radio (SE=.04). T-tests comparing scanning to seeking ranged from 12.54 for “other source” to 46.50 for television/radio. All p-values were significant at less than .001 (see Table 2).

Of those who did any scanning, the mean number of non-medical sources used ranged from 2.93 (SE=.15) for PSA to 3.63 (SE=.04) for diet. Of those who sought, the number of sources used ranged from 2.28 for colonoscopy (SE=.08) to 3.44 for diet (SE=.05) (see Table 3). All t-tests comparing the number of sources used for scanning and seeking for each behavior were significant at p<.001 (see Table 3).

Scanning was significantly predicted by female gender, age, with the two middle age categories doing more scanning than 40–44 year olds, and education, with all other education levels having lower rates of scanning than those with a bachelor’s degree or higher. Neither marital status nor race and ethnicity were significant predictors of scanning (see Table 4).

Seeking was predicted by female gender, age, but only the 55–64 year-old age group did more seeking than the 40–44 year olds, and education, with all education levels lower than the bachelor’s degree doing less. African-Americans and those of Hispanic ethnicity were both more likely to seek than whites. Married people were also more likely to seek than non-married ones.

The style analysis begins with the classification of each person’s seeking and scanning behavior for each topic on a fourfold typology: those in the first category neither seek nor scan; in the second and third, they *either* seek or scan but not both; and in the fourth, they seek and scan. For all behaviors, the no scan/seek condition has the fewest people. The other categories are not as consistent (see Table 5). PSA shows a low level of both (nearly two thirds of men report no seeking or scanning), likely because many of the men did not know what a PSA was and were screened out of the question.

Table 6 captures the consistency in position across the six behaviors. It examines the same question through a variety of lenses: it assesses overall agreement, agreement within the three prevention topics and the screening topics (2 per person), and then for each pair of topics. Each of these statistics captures the tendency for someone in any one of the four categories (e.g., seeker and scanner) on one behavior to be in the same category on another. The table reports absolute agreement, but then, showing that chance agreement is non-trivial given the observed marginal distributions, provides the kappa statistic which captures the tendency for the agreement to happen beyond the level of chance. In terms of style consistency (RQ4), the kappa across all five topics was .35. (See Table 6).

All six seeking measures were significantly positively associated with their respective behaviors, after controls for demographics, with odds ratios ranging from 1.99 (95% CI=1.60–2.49) for fruit and vegetable consumption to 13.86 (95% CI=7.07–27.17) for PSA (See Table 7). Five out of six scanning measures (not mammography) were associated with behavior in uncontrolled analyses. However, when demographics and seeking were controlled three remained significant with odds ratios ranging from 1.42 (95% CI=1.09–1.83) for fruit and vegetable consumption to 1.69 (95% CI=1.29–2.22) for colonoscopy. The three measures which were not significantly associated with behavior were exercise, diet and mammography. There were no significant interaction effects for scanning and seeking.

Discussion

We found substantial support for the claim that the majority of people are scanning while a minority are seeking information about each of these cancer-relevant behaviors. This underscores the need to measure scanning in health communication research. While often general news media use is assessed in health surveys, a previous study found empirical evidence to differentiate new media use from scanning measures about each of the six behaviors measured here. In that study, general media use and each of the scanning constructs were correlated at only .23 (95% CI−.22–.25) on average (Kelly, Niederdeppe & Hornik, in press). Measuring only general media use and active seeking is likely to miss important data about how health information is acquired.

There is also clear evidence that people recall exposure to all of the categories of sources, although the Internet plays perhaps a less central role than other sources. Respondents report scanning heavily from mass media and interpersonal sources, but less so from the Internet; this is perhaps unsurprising–unplanned exposure to information happens easily with those sources, while the Internet, by its nature, often requires active seeking..

A more surprising picture emerges from the seeking data. Respondents report seeking from each of the categories, even those which are traditionally considered to be more passive, such as radio and television. Both mass media sources are comparable to the Internet in their frequency of use for seeking. Sixty-two percent% of people had sought from a mass media source for at least one topic. It is possible that people intentionally watch a health segment of the news with the hope of learning something about cancer prevention. Others may seek diet tips from reality series such as, “The Biggest Loser” or look to a storyline on a drama series to find out how a character copes with cancer. Interestingly, respondents do significantly more scanning than seeking from all sources, even those traditionally considered to be more active sources, such as the Internet.

We recognize that we must be careful in undertaking this comparison. While it is clear that many people are not using the Internet to the extent that they use other sources for these behaviors, the comparison does have two possibly unfair elements: Not everyone in the sample is a regular Internet user; 84% reported some use of the Internet other than for e-mail.[2] In addition, all of the other source groupings include more than one channel (e.g., television and radio, newspapers and magazines). Effectively the Internet is being compared to multiple channel categories.

We find that people vary a good deal in how much they scan and seek information; the amount is affected by the topic (i.e., colonoscopy more than PSA), by demographic characteristics of individuals and by their information style.

In terms of demographics, gender, age, and education predicted scanning and seeking, similar to what has been found in previous studies (Buckingham, 2000; Glenn, 1994; Mayer et al., 2007; Muha et al., 1998; Rakowski et al., 1990; Rutten, Squiers & Hesse, 2006; Shim

et al., 2006). We can only speculate about why race, ethnicity and marital status also predicted seeking. Both Blacks and Hispanics have been shown to have more distrust in the medical system (Armstrong, Ravenell, McMurphy & Putt, 2007; Armstrong et al., 2009) and thus may be more likely to seek out sources that can help verify information from their doctors. Those who are married are more likely to engage in healthy behaviors. They may be simply more engaged in their own health behavior and thus more likely to seek health-related information (Lewis et al, 2006; Wallner, 2008). In the case of colonoscopy and the three preventive behaviors, they may also be seeking the information *on behalf* of a spouse, rather than for their own benefit.

The moderate agreement (48%) and kappa (.35) found in the analyses of seeking and scanning style supports the hypothesis of a tendency for people to engage with information in a consistent way across behaviors. The fact that the agreement is only moderate also supports the complementary hypothesis–that style is only one influence; the intrinsic nature of each behavior affects individual information engagement as well. For example, the screening test for a more prevalent cancer or one which receives more media attention will logically result in more scanning, simply because there is more information about it in the media environment. A screening test which is more controversial may provoke more seeking as people struggle with a decision about having it.

Both scanning and seeking are associated with the target behaviors. Both are significant in most cases even when the other is entered in a prediction equation: seeking and scanning have independent associations with behavior. This supports a claim that seeking and scanning are distinct ways of engaging with information, which have different relationships with health behaviors. The fact that there are no interactions between seeking and scanning reinforces this idea. The coefficients for seeking are always larger than those for scanning..

Interpretation of the coefficients reveals that each unit of seeking matters more than scanning in almost every case. However, scanning is still important for three of the behaviors. And while the effects of each act of seeking appear to be stronger, scanning is much more common—its influence is a function of both how likely someone is to be exposed and how influential each unit of exposure is. For example, with colonoscopy: 56% report scanning, but only 18% report seeking. Even if the effect of each individual act of scanning is less than seeking (OR of 1.69 versus 2.06), the effects of scanning altogether may be greater, since population effects are the product of the number exposed by the effect of the exposure. In other words, on a population level, scanning may have a larger impact.

Limitations

There are clear limitations to this study. The data are cross-sectional, so while there are some interesting associations between scanning and seeking and behavior, no causal direction can be determined..

It is possible that the observed associations are the result of an un-included confounder which is associated with both non-medical seeking and scanning, as well as with the behaviors of interest. For example, contact with medical sources may be associated with both of those variables. We are unable to control for such contact.

The scanned exposure measures were limited in quantity. Due to time and space constraints on the survey we were only able to ask about the three screening behaviors and three prevention activities. Additional limitations of the scanning measures are described elsewhere (Kelly, Niederdeppe & Hornik, in press).

Our measures require people to remember and summarize complex patterns of behavior up to one year after they have occurred. This could add bias—people who remember their scanning and seeking behavior may also remember their health behavior better. It may also be easier to remember a topic about which you actively engaged in a search, than one about which you came across information incidentally. The active search was likely predicated by some occurrence or interest in the topic which led to the need or desire for additional information.

In addition, the response rate is not ideal, even though the cooperation rate for those recruited for this particular study is good (73%). The effective response rate multiplies that cooperation rate by the low recruitment rate to the panel (22%), resulting in an overall response rate of just 16%. Another limitation of this sample is that the initial sampling frame misses cell-phone only households, now estimated to be about 18% of households (Dennis & DiSogra, 2009). Still, compared to other studies which use convenience samples, the random digit dial selection process and the random recruitment to participate do add to the legitimacy of the claims.

We should note one particular potential bias: All of this sample is connected to the Internet. As a result we would expect that Internet use claims might be higher in this sample than in samples interviewed over the telephone or in face-to-face interviews. One of the findings we emphasize is that Internet use is lower than use of other sources—in actuality, use may be even lower than what we report.

Conclusions

These results provide the beginnings of support for the role for seeking and scanning behavior in cancer-relevant decisions. The results establish that people recall such information engagement and that the two types of engagement are usefully differentiated—in their extent, predictors, and possible effects.

The next question is whether such engagement with information *results in* cancer-relevant behavior, and is not merely *associated* with it. We have followed up with this sample of interviewees one year after they were first surveyed. If scanning and seeking behavior matters, we expect that people who reported more seeking or scanning at baseline will be more likely to change their behavior between interview waves. It may lead to an additional step, drawing out implications of these results for policy and interventions that promise to affect behavior.

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Appendix A. Prevention and screening behavior measures

Colonoscopy, PSA and Mammogram.	Each screening behavior was assessed using a series of yes or no questions, as follows: “Have you ever had a [colonoscopy] (all respondents); [PSA test] (men only); [mammogram] (women only)?” Only respondents who had previously indicated they had heard of colonoscopy and PSA were asked the respective yes or no questions. Respondents who said, “yes” were asked, “When did you have your most recent [colonoscopy; PSA test; mammogram] to check for [colon; prostate; breast] cancer?” Response categories for colonoscopy included, “a year ago or less; more than 1, but not more than 5 years ago; more than 5, but not more than 10 years ago; over 10 years ago” Response categories for PSA and mammography included, “a year ago or less; more than 1 but not more than 2 years ago; more than 2 but not more than 5 years ago; over 5 years ago.” Questions about each screening test were combined into dichotomous measures indicating whether or not an individual had the test within the recommended period of time (colonoscopy within the past 10 years, USPSTF, 2002b; PSA test within the past 2 years, AUA, 2000; Smith, Cokkinides, & Eyre, 2004; mammography within the past two years, USPSTF, 2002a). Seventy-one percent of women answered that they had received a mammogram in the past year; 38% of men reported having had a PSA in the last two years, and 38% of men and women had received a colonoscopy in the last 10 years.
Diet for weight loss.	Respondents were asked, “During the past 30 days, have you controlled your diet to lose weight?” (yes, no). Thirty-eight percent of respondents had attempted weight loss in the last 30 days.
Exercise.	Respondents were asked, “During an average week are you able to exercise at least once per week?” (yes, no). Those who said yes were asked, “During an average week, how many days do you exercise?” Fifty-two percent of the sample exercised three or more days during an average week.
Fruit and vegetable consumption.	Respondents were asked, in separate questions, “In the past week, on average, how many servings of fruit did you eat or drink per day? Please include 100% fruit juice, and fresh, frozen or canned fruits” and “In the past week, on average, how many servings of vegetables did you eat or drink per day, not counting potatoes? Please include green salad, 100% vegetable juice, and fresh, frozen or

	canned vegetables." Response categories for both items included, "less than one serving per day; one serving per day; two servings per day; three servings per day; four servings per day; and five or more servings per day. One-third of respondents ate five or more servings of fruits and vegetables per day in the past week.

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Table 1

Percent reporting seeking and scanning by topic

	% reporting seeking for topic		**% reporting scanning for topic**		***Adjusted Wald test***	***N***
Exercise	*43%*		*75%*		*539.77***	*2,341*
Fruit & vegetable consumption	*34%*		*69%*		*717.69***	*2,363*
Dieting	*42%*		*70%*		*397.33***	*2,326*
Colonoscopy	*18%*		*54%*		*723.71***	*2,347*
Mammogram (women only)	*21%*		*68%*		*629.11***	*1,176*
PSA test (men only)	*11%*		*33%*		*197.26***	*1,158*
Total (from at least one topic)	*65%*		*90%*		*422.18***	*2,009*
	Seeking		*Scanning*			
	Mean # topics	*SE*	*Mean*	*SE*	*T-test*	*Total N*
Overall across 5 topics	1.47	.04	3.15	.04	38.49, p<.001	2,009

Note.

* denotes coefficients significantly different than zero (p<0.05);

** denotes p<0.01;

*** denotes p<0.001

Table 2

Mean number of topics sought and scanned about from each source

Source	Seeking		Scanning		Comparison	
	Mean # topics	SE	Mean	SE	t-test	N
Doctor	1.14	.03	1.81	.04	20.37, p<.001	2,324
Family or friends	1.25	.03	2.62	.04	36.11, p<.001	2,328
Internet	.93	.03	1.31	.04	12.60, p<.001	2,268
TV or radio	.93	.03	2.69	.04	46.50, p<.001	2,302
Newspapers or magazines	1.11	.03	2.47	.04	36.03, p<.001	2,298
Other sources	.55	.04	.86	.04	12.54, p<.001	2,141

Note: The range for individual sources is 0–5. The doctor is included here for the sake of comparison with the other sources. However, since we were more interested in the influence of other sources on prevention and lifestyle behavior, it has been excluded from indices computed by adding the other sources together in some subsequent analyses.

Table 3

Mean number of sources used for each of six behaviors for seeking and scanning

	Scanning			Seeking			Comparison	
	% using any source for scanning	Mean number of sources used among scanners of any source	SE	% using any source for seeking	Mean number of sources used among seekers of any source	SE	t-test, p<.001	N
Exercise	75%	3.54	.04	43%	3.31	.05	6.65, p<.001	897
F&V	69%	3.60	.05	34%	3.41	.05	5.37, p<.001	694
Dieting	70%	3.63	.04	42%	3.44	.05	5.13, p<.001	853
Colonoscopy	54%	2.98	.08	18%	2.28	.08	9.43, p<.001	341
Mammogram	68%	3.09	.09	21%	2.42	.10	8.25, p<.001	223
PSA	33%	2.93	.15	11%	2.32	.14	5.30, p<.001	98

Table 4

Scanned information exposure and sought information exposure regressed (OLS) on demographic characteristics

	Scanned Information Exposure			Sought Information Exposure		
Demographics	**B**	**SE of B**	**β**	**B**	**SE of B**	**β**
Age 45–54 (vs. 40–44)	1.52	0.44	.12**	0.16	0.09	0.06
Age 55–64 (vs. 40–44)	1.70	0.46	.12***	.22	.09	.07*
Age 65–74 (vs. 40–44)	.87	0.57	.04	.11	0.12	0.03
Male	−2.62	.31	−.20***	−.66	.06	−.23***
Less than high school	−4.02	.61	−.20***	−.69	0.12	−0.16***
High school	−2.46	.38	−.18***	−.53	.08	−.17***
Some college	−1.27	.42	−.09**	−.21	.09	−.06*
Black (vs. White)	0.08	0.53	0.00	.41	0.12	0.09***
Other race (vs. White)	−1.62	1.08	−0.05	−0.31	0.20	−0.05
Hispanic (vs. non- Hispanic)	0.30	0.66	0.01	.41	0.14	0.09**
Marital status	0.10	0.33	0.01	0.14	0.07	0.05*
R squared		0.08			0.09	
Non-missing observations		2,136			2,260	

Note.

* denotes coefficients significantly different than zero (p<0.05);

** denotes p<0.01;

*** denotes p<0.001. These regression models use the weighted data.

Table 5

Seeking and scanning typology across 6 behaviors

5a: Exercise				
		Seeker		
		No	Yes	Total
Scanner	No	20%	6%	26%
	Yes	36%	38%	74%
	Total	56%	44%	100%

5b: Fruit and vegetable				
		Seeker		
		No	Yes	Total
Scanner	No	27%	4%	31%
	Yes	40%	29%	69%
	Total	67%	33%	100%

5cb: Diet				
		Seeker		
		No	Yes	Total
Scanner	No	23%	6%	30%
	Yes	34%	37%	70%
	Total	57%	42%	100%

5d: colonoscopy				
		Seeker		
		No	Yes	Total
Scanner	No	41%	4%	40%
	Yes	41%	15%	60%
	Total	82%	19%	100%

5e: mammograms				
		Seeker		
		No	Yes	total
Scanner	No	28%	3%	32%
	Yes	50%	19%	68%
	Total	79%	22%	100%

5f: PSA test				
		Seeker		
		No	Yes	Total
Scanner	No	62%	3%	67%
	Yes	27%	9%	33%

5f: PSA test				
		Seeker		
		No	Yes	Total
	Total	89%	12%	100%

* non-missing=2,341

* non-missing=2,363

* non-missing=2,326

* non-missing=2,347

* non-missing=1,176

* non-missing=1,158

Table 6

Consistency of information seeking and scanning behavior across decisions

Decision class	Observed agreement (SE)	Chance agreement	Kappa (SE)	N
Overall (across 5 topics)	.48	.33	.35	2,371
By decision group				
Prevention	.57	.28	.37	2,382
Screening	.55	.37	.28	1,155
Cross prevention/screening	.44	.30	.20	1,105
By pairs of topics				
Colonoscopy and mammogram	.52	.35	.25	1,127
Colonoscopy and PSA	.57	.39	.31	1,112
Exercise and diet	.58	.32	.38	2,227
Exercise and fruit and veg	.55	.32	.35	2,261
Fruit and veg and diet	.57	.31	.38	2,253
Colonoscopy and exercise	.42	.29	.19	2,238
Mammogram and exercise	.43	.30	.19	1,129
PSA and exercise	.39	.28	.15	1,111
Colonoscopy and fruit and veg	.47	.31	.22	2,255
Mammogram and fruit and veg	.47	.32	.23	1,132
PSA and fruit and veg	.49	.33	.25	1,112
Colonoscopy and diet	.42	.29	.18	2,215
Mammogram and diet	.42	.28	.20	1,103
PSA and diet	.46	.31	.21	1,106

Note:

* denotes kappas significantly different than zero ($p<0.05$);

** denotes $p<0.01$;

*** denotes $p<0.001$. Standard errors are likely underestimated as Stata does not allow for kappas to be run with weights, so we could not adjust appropriately.

Table 7

Results of logistic regression models predicting behaviors from scanning and seeking and their interaction terms

Behavior	Scanning	Seeking	Interaction	Model	N
	OR, 95%CI	OR, 95%CI	OR, 95%CI	Pseudo R^2	
Exercise	.99 (.78–1.25)	2.29 (1.86–2.83)	NS	.05	2,333
Fruit & Veg	1.42(1.09–1.83)	1.99(1.60–2.49)	NS	.07	2,337
Diet	1.27(.93–1.74)	3.91 (2.98–5.12)	NS	.10	1,572
Colonoscopy	1.69(1.29–2.22)	2.06(1.46–2.89)	NS	.05	1,389
Mammogram	1.00(.72–1.39)	2.85(1.82–4.47)	NS	.09	1,171
PSA	1.67(1.17–2.39)	13.40(6.85–26.18)	NS	.30	1,158

Results are for 6 independent logistic regression models (one for each behavior).

Analyses for colonoscopy are restricted to those over age 50. Those for diet are restricted to individuals with a BMI of 25 or greater. All analyses control for age, gender, education, race, ethnicity and marital status.