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A randomized comparison of print and web communication on Colorectal Cancer Screening

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Abstract

Background—New methods to enhance CRC screening rates are needed. The Web offers novel possibilities to educate patients and to improve health behaviors like cancer screening. Evidence supports the efficacy of health communications that are targeted and tailored to improve uptake of recommendations.

Methods—We identified unscreened women at average risk for CRC from the scheduling databases of Obstetrics and Gynecology practices in two large health systems. Participants consented to a randomized, controlled trial that compared CRC screening uptake after receipt of CRC screening information delivered via the web or in print form. Participants could also be assigned to a control (usual care) group. Women in the interventional arms received tailored information in a form matched or mismatched with equal likelihood to their Cognitive Social Information Processing (C-SHIP) model defined attentional style. The primary outcome was CRC screening participation at 4 months.

Results—904 women were randomized to the interventional or control groups. At 4 months, CRC screening uptake was not significantly different in web (12.2%), print (12.0%) or control (12.9%) groups. Attentional style had no effect on screening uptake for any group. Some baseline participant factors were associated with greater screening including higher income ($p<.03$), stage of change ($p<.004$), and physician recommendation to screen ($p<.002$).

Conclusions—A web based educational intervention was no more effective than a print based one or control to increase CRC screening rates in average risk women. Risk messages tailored to attentional style had no effect on screening uptake. In average risk populations, use of the internet for health communication without additional enhancement is unlikely to improve screening participation.

Introduction

Colorectal cancer (CRC) is the second leading cause of cancer death in the United States.[1] Although widely advocated[2,3], less than 60% of the average risk population currently adheres to CRC screening recommendations.[4] Healthy People 2020 endorses efforts to enhance screening participation.[5] To date, the majority of educational intervention studies have utilized written materials. Although such methods are modestly effective, electronic communication capitalizing on the proliferation of web-based applications has the potential to broaden and improve message delivery. While some web-based approaches have been successful to modify health behaviors[6], many have been complex and costly, limiting

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dissemination.[7] Few electronic intervention studies focus on cancer prevention and screening.[8–10]

We conducted a prospective, randomized controlled trial comparing the impact on CRC screening of health communications delivered via web or print channels. Both interventions contained identical educational content. The study population was women at average risk for CRC not adherent with screening recommendations. Potential participants were approached at a routine obstetrics/gynecology (ob/gyn) visit. This visit represented an opportunity to link CRC risk-related attitudes and behavior with extant breast and cervical cancer risk perceptions and screening behaviors including mammogram and pap smear.

Accumulating evidence supports the efficacy of health communications targeted to group level factors, and tailored to individual factors to improve screening uptake.[11] For this project, we employed the Cognitive Social Information Processing (C-SHIP) model to develop tailored health communications.[12] According to C-SHIP, individuals are characterized by two distinct attentional styles: high monitoring (information seeking) versus low monitoring (information distracting). Each style is associated with different, but stable emotional, behavioral and cognitive reactions to stressors at cognitive-affective and decision-making levels.[13] These styles appear linked to health-related behavior with important implications for screening adherence.[11,14]

Participants randomized to the web or print arms were subsequently assigned with equal likelihood to receive communications matched or mismatched to their attentional style (measured at study entry), allowing a test of the hypothesis that concordance between attentional style and communication form would result in greater screening uptake.

Methods

Study participants for this institutional review board approved trial were drawn from the ob/gyn practices at Geisinger Health System and Emory University. Using electronic filters reflecting eligibility requirements, we searched each institution's scheduling database for routine appointments 4–6 weeks in advance. Eligibility criteria included: (a) female; (b) age ≥ 50years; (c) average risk for CRC defined as no personal history of colorectal polyps or adenocarcinoma, inflammatory bowel disease, or CRC in more than one first-degree relative; (d) non-adherence with CRC screening recommendations at the time of index appointment. Non-adherence meant all the following were true: no at home fecal occult blood test in the last 12 months; no barium enema, flexible sigmoidoscopy or colonoscopy in the last 5 years; and (e) web access at home and/or work.

We telephoned potential participants prior to their index appointment to confirm eligibility and to obtain consent. As previously described[15], all participants completed by telephone a baseline survey containing demographic items, medical history information including mammography utilization and a series of psychometric scales including one assessing C-SHIP attentional style.[12] Participants also responded to items regarding their knowledge and expectations about CRC screening, their beliefs about the risk of developing CRC and their intention to screen.

Following survey completion, participants were randomized to one of five arms: usual care (control), or an intervention arm with web or print interventions and either high or low attentional style information (four possible intervention arms). The educational content of the interventions was identical, covering essential information about CRC screening including rationale, description of available techniques (FIT/FOBT, flexible sigmoidoscopy, barium enema or colonoscopy), benefits, risk and timing of each technique and finally information about where to look for additional resources about CRC and screening (for

example, the American Cancer Society print or electronic materials). Two versions of each intervention were prepared, one tailored to high and one to low monitoring attentional style. The high monitoring version was lengthier and contained extensively detailed messages pertaining to CRC risk status. Descriptions of CRC screening methods were more substantial and the benefits of adherence to preventive behaviors emphasized. All messages were positively framed to underline the potential for gain. In contrast, the low monitoring version was briefer, less detailed and included messages that were negatively framed to highlight the costs to health if recommended behaviors were not pursued.

We described development of the web-based intervention previously.[15] Our goal was to develop a simple, visually appealing website that did not require high speed internet connections or powerful computing capabilities to load and function adequately. We pre-tested the website on 50 eligible women not enrolled in this study. Based on pre-testing, we anticipated website review would require approximately 5–7 minutes.

After completing the baseline survey, web participants received instruction how to acquire a username and password to access the study website. Study materials were placed securely on the Fox Chase Cancer Center web portal. After logging on, participants could view the website from any location as often and long as wished. Web-participants also received a follow-up letter by standard post containing a review of web use instructions as well as username/password information.

Participants were contacted to complete telephone surveys at 4 and 12 months after randomization. Up to 15 attempts were made to collect information about use of, and satisfaction with print or web materials. In addition to querying self-reported use of intervention materials, we electronically tracked web use by participants randomized to that intervention. We collected information about if, when, and how often each participant accessed the study website and how much time was spent viewing information.[15]

Uptake of CRC screening was calculated based upon electronic and hand review of participant charts. Electronic reviews were conducted first, searching for completion date of any sanctioned CRC screening test (FOBT/FIT, flexible sigmoidoscopy, barium enema or colonoscopy). If the online review was unrevealing, paper charts were then reviewed to look for additional reports not yet recorded electronically. Because of the potential delay in scheduling tests or charting test results, screening rates were calculated at 4 and 12 months relative to study entry.

A target sample size of N=1200 was selected to allow the detection of a clinically relevant 10 percentage point absolute difference between intervention groups in the proportion of subjects utilizing CRC screening (power 80%, two-sided 5% comparison-wise significance level). However, a planned, interim analysis performed by the study's data and safety monitoring board (blinded to the investigators), revealed that the impact of the study interventions was smaller than hypothesized. Further enrollment was unlikely to yield tangible benefit, so enrollment efforts were discontinued.

We employed intention-to-treat analysis using the randomized groups without adjustment for self-reported or actual use of print or web materials. Participants who missed their index appointment, had a colonoscopy prior to the index appointment (based on later chart review) or who did not have a chart review were excluded from the analyses. Baseline characteristics by randomization arms were compared using Chi-square tests.

We used Fisher's Exact Tests to compare CRC screening rates across the five study arms, separately for screening within 4 months and screening within 12 months. We also looked at screening rates by communication channel, where we combined the high monitoring and

low monitoring participants within the print and web arms and then compared print, web and control groups using Fisher's Exact Tests. We examined the influence of demographic characteristics, medical history, CRC-related knowledge, and motivational readiness on CRC screening uptake using Chi-square tests or Fisher's exact tests. Trend was assessed with the Cochran-Armitage test for predictors with ordered categories. The interaction of communication channel and baseline characteristics on CRC screening was evaluated using Chi-Square tests for the selected characteristic. Agreement of self-reported and actual web use was evaluated using McNemar's test.

Participants were identified as having high or low monitoring attentional styles from their baseline C-SHIP score. They were classified as being matched or mis-matched to the intervention attentional style based on the concordance of their attentional style and randomization arm. For example, a high monitor participant would be classified as a match if she were randomized to either the "print high monitor" or "web high monitor" arms. The effect of receiving an intervention tailored to monitoring style was assessed by comparing the screening rates for those matched v. mis-matched using Chi-square tests, within the print and web arms. Here, control arm participants were excluded.

Results

A total of 904 women were randomized to participate. For the primary endpoint of CRC screening uptake within 4 months of enrollment, 865 were included for analysis. Thirty nine women were not included, 5 because they did not present for their index visit, 10 because of colonoscopy examination within the previous 5 years, and 24 because no chart was available to determine screening status. Baseline demographic and selected medical history information is presented in Table 1. Most participants were white, age 59y or less, married and had at least some college education. For those providing an answer, the range of annual incomes was broad. Across study arms, there were no significant differences in age, race, marital status, education employment status or income. Regardless of randomization arm, participants were similar in terms of previous cancer history. Mammography use was widespread and similar across groups. Over 96% of participants reported ever having a mammogram (data not shown), with 70% reporting a mammogram within the last year.

Table 2 demonstrates that CRC screening rates at 4 months were similar across intervention arms (12.3%). Colonoscopy was the preferred screening tool with over 75% of those screened utilizing this method. However, there was no difference in screening utilization by intervention arm. We also looked at CRC screening rates at 12 months because of concern about long wait times for screening colonoscopy in some locales (Table 3). While screening was higher for the study cohort as a whole (21% at 12 months versus 12.3% at 4 months), when stratified by intervention, no differences were seen for control versus print or web, or for web versus print. High versus low monitoring style had no effect on screening outcome at either time point (Tables 2 and 3).

Because no effect was seen by intervention, we collapsed the study groups to identify if any participant factors were associated with greater screening at 4 or 12 months (Table 4). There was a significant, positive relationship between increasing income and likelihood of screening participation ($p<.03$). As in many prior studies, stage of change at baseline tended to predict subsequent actual screening participation. Those participants who stated they planned screening with the next 1 to 6 months were more likely to pursue it than participants who had no plan or were not thinking about screening ($p<.004$). Participants whose baseline knowledge about screening was greater demonstrated a strong trend towards greater screening at 4 months than those with lower knowledge scores ($p=0.054$). Finally, midway through study enrollment, we added a baseline question asking if the participant's physician

had recommended CRC screening. For the 499 participants who answered, those who said yes (53%) were 1.4× more likely to be screened (p<.002) at 4 months.

Attentional style was characterized as either high monitoring or low monitoring.[14] When dichotomized around C-SHIP score, 47.6% of participants were high monitors and 52.4% low monitors (data not shown). Regardless of score, participants were randomly assigned to one of the intervention arms or the control group. Table 5 displays screening rates stratified by monitor style match or mismatch. There was no apparent moderating interaction between attentional style and the receipt of concordant or discordant tailored information.

As previously reported, self-reported and actual utilization of the web was low in this study.[15] Of 362 women randomized to the web intervention, 17 were excluded because of missed appointment dates, prior colonoscopies or no chart available for review. Of the remaining 345, we could not contact 106 (30.7%) to complete the 4 month follow-up survey which included items about web utilization. In addition, 35 participants were excluded because of miscellaneous technical problems or an inability to access the website. Of the remaining 204 participants, 201 had screening results (Table 6). Their demographics and other characteristics were similar to the entire cohort. Based on web tracking data, 49 (24.4%) actually logged onto the website, while even fewer, n=33 (16.4%) recalled and then reported using the web intervention. These values are similar to our previous report.[15]

CRC screening in the self-report and actual use groups are displayed in Table 6. CRC screening rates at 4 months were similar between those who logged onto the web (12.2%) and those who did not (11.2%). In addition, screening rates in either group were similar to the control group. For the self-report group, screening rates were also similar regardless of reporting web use (15.2%) or not reporting it (10.7%).

Discussion

This prospective study compared the effect of tailored information, delivered through print or web-based communications, on CRC screening uptake in average risk women. At the 4 month primary endpoint, screening rates of approximately 12% in the 2 intervention arms were not significantly different from each other or from the control group. Further, no moderating effect on screening uptake was seen for participants characterized as having high vs. low monitoring attentional styles.

The internet is widely viewed as an important channel of health communication.[16] Nearly 75% of adults in the US use the internet and over 60% of this group use it to obtain health information.[17] Recent results from the National Health Information Survey found that 51% of adults (women 58%, men 43%) used the internet in the preceding 12 months alone to seek out health information.[18]

This broad diffusion of internet access suggests the possibility not only to remedy health knowledge and information gaps but also to more easily reach patients to facilitate healthy behaviors like periodic cancer screening. A recent meta-analysis of studies comparing behavioral change outcomes following web-based or non-web-based interventions concluded that knowledge improvement and clinical target outcomes tended to be greater with web-based interventions, although heterogeneity in studies precluded a precise estimate of effect size.[16]

Our report is one of the few web-based studies of cancer screening behavior change in average risk populations. Chan et al. published a feasibility study of 97 participants who received an email invitation to access a website displaying video decision aids about CRC

screening. Utilization of the website was limited based on electronic tracking and no data about effect on screening uptake were reported.[19]

The absence of effect on screening uptake is disappointing. Inexpensive, easily disseminated mechanisms to increase CRC screening are needed. Exposure to our study interventions increased knowledge about CRC and CRC screening, suggesting that the content effectively remedied knowledge gaps.[15] While all subjects willingly participated in a study exploring the impact of web-based interventions, a precondition of which was web access, only approximately 25% actually logged on. It is premature to conclude that web-based interventions are ineffective. However, it can be confidently predicted that future interventions will need to be coupled with aggressive efforts to facilitate and verify use of the website, as spontaneous uptake was limited in this average risk population.

A recent NIH State of the Science Conference on CRC screening emphasized the need to conduct research on the effectiveness of tailoring programs to meet specific needs of screening populations.[20] In our study, we examined the role of tailoring to attentional preferences for cancer risk-related information. Delivering information to participants matched or unmatched to attentional style had no effect on CRC screening uptake. Leveraging attentional preferences has proved effective in some clinical settings, particularly screening in higher risk groups such as women with BRCA mutations or individuals at risk for Lynch Syndromerelated CRC and other cancers.[21–23] However, little is known about average risk groups like those described here, or how behavior, rather than affect change can be elicited. If our results are duplicated, they suggest that attentional status is not a powerful tailoring force in all settings.

The limited rates of actual web use may provide insight into the modest effects on screening rates following exposure to print interventions. Unlike the web, the ability to objectively track attendance to, and use of, print media is not available. Print interventions have not typically resulted in substantial increases in screening rates. One explanation is that some interventions were neither targeted, nor tailored to the recipient. Our negative results suggest that an additional contributor to print ineffectiveness may simply be lack of attention to the intervention materials.

This study has several limitations. All participants were women. Although data are conflicting about whether the internet use habits of women differ from men, no conclusions can be drawn about the effect of this intervention in a male population. We specifically limited our participants to persons not adherent with standard CRC screening recommendations. Although rates are rising, a substantial component of the population remains unscreened. This intervention might prove more effective to attract persons to initiate screening than to convince those committed against screening. Finally, we opted to take a “low tech” approach by constructing a website that required only modest computing power to load quickly and completely. While this decision may have reduced inattention due to slow website function, future interventions may need to contain additional components to engage entrance to the site.

Despite its potential advantages, our results suggest that the web-based efforts to promote screening do not represent a guaranteed improvement over other methods. This large randomized trial failed to demonstrate that the channel of communication or provision of information tailored to attentional style had a significant influence on screening uptake in average risk women. While knowledge levels rose, screening rates did not, casting some doubt on the effectiveness of simple web interventions as a tool to alter screening behavior. Future efforts regardless of communication channel must combine appropriate content and appealing interfaces with new strategies to increase engagement. Passive diffusion is

unlikely to render web-based interventions any more effective than non-electronic predecessors.

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Table 1

Demographic and medical history characteristics by randomization arm

	Treatment Arm												
	All		Control		Print High		Print Low		Web High		Web Low		ChiSq
	N	%	N	%	N	%	N	%	N	%	N	%	p-val
Race Group													0.46
Non-White	29	3.4	7	4.1	9	5.2	5	2.9	5	2.9	3	1.7	
White	831	96.6	164	95.9	165	94.8	168	97.1	165	97.1	169	98.3	
Age group													0.17
50–54	519	60.1	102	59.6	117	66.9	94	54.3	101	59.1	105	60.3	
55–59	167	19.3	33	19.3	34	19.4	41	23.7	29	17.0	30	17.2	
60–64	102	11.8	22	12.9	17	9.7	25	14.5	19	11.1	19	10.9	
65–94	76	8.8	14	8.2	7	4.0	13	7.5	22	12.9	20	11.5	
Marital Status													0.17
Married/Cohab	642	74.4	121	70.8	137	77.8	131	75.7	122	71.3	131	76.2	
Single/Div/Widowed	221	25.6	50	29.2	39	22.2	42	24.3	49	28.7	41	23.8	
Education													0.44
1:<=HS	299	34.7	57	33.3	66	37.7	60	34.7	48	28.2	68	39.3	
2:Some College	242	28.1	55	32.2	49	28.0	47	27.2	49	28.8	42	24.3	
3:Coll Grad/Post College	321	37.2	59	34.5	60	34.3	66	38.2	73	42.9	63	36.4	
Employment													
1:Full Time	463	53.7	83	48.8	102	58.6	93	53.8	92	53.8	93	53.4	0.11
2:Part Time	122	14.2	21	12.4	20	11.5	27	15.6	29	17.0	25	14.4	
3:Retiree	123	14.3	21	12.4	22	12.6	20	11.6	30	17.5	30	17.2	
4:Unemployed	101	11.7	33	19.4	20	11.5	19	11	11	6.4	18	10.3	
5:Dsbld/Stdnt	53	6.1	12	7.1	10	5.7	14	8.1	9	5.3	8	4.6	
Annual HH Income													0.16
<=$15K	46	5.3	16	9.4	9	5.1	10	5.8	7	4.1	4	2.3	
$15K–$30K	104	12	24	14	14	8.0	28	16.2	16	9.4	22	12.6	
$30K–$45K	97	11.2	15	8.8	25	14.2	12	6.9	26	15.2	19	10.9	
$45K–$60K	118	13.6	25	14.6	24	13.6	24	13.9	22	12.9	23	13.2	

	Treatment Arm												
	All		Control		Print High		Print Low		Web High		Web Low		ChiSq
	N	%	N	%	N	%	N	%	N	%	N	%	p-val
$60K–$75K	78	9	14	8.2	20	11.4	15	8.7	21	12.3	8	4.6	
$75K+	195	22.5	38	22.2	37	21.0	37	21.4	35	20.5	48	27.6	
Do not wish to answer	197	22.8	34	19.9	40	22.7	43	24.9	38	22.2	42	24.1	
(missing)	30	3.5	5	2.9	7	4.0	4	2.3	6	3.5	8	4.6	
Mammogram in previous year?													0.66
Yes	628	73	130	76	124	70.5	128	75.7	122	71.3	124	71.7	
No	232	27	41	24	52	29.5	41	24.3	49	28.7	49	28.3	
Ever diagnosed with cancer?													0.75
Yes	106	12.3	22	12.9	26	14.8	18	10.4	21	12.3	19	10.9	
No	759	87.7	149	87.1	150	85.2	155	89.6	150	87.7	155	89.1	

Note: High=high monitor; Low= low monitor

Table 2

Primary Study Outcome – CRC screening within 4 months, by Intervention Arm

	Screening Within 4 months								
		Any CRC screening		At home (3 card) FOBT		Colonoscopy		Barium Enema	
	N	n	percent	n	percent	n	percent	n	percent
All	865	106	**12.3**	24	**2.8**	80	**9.3**	2	**0.2**
5 intervention arms									
Control	171	22	**12.9**	3	**1.8**	18	**10.5**	1	**0.6**
Print High	176	20	**11.4**	4	**2.3**	15	**8.5**	1	**0.6**
Print Low	173	22	**12.7**	7	**4.1**	15	**8.7**	0	**0.0**
Web High	171	21	**12.3**	6	**3.5**	15	**8.8**	0	**0.0**
Web Low	174	21	**12.1**	4	**2.3**	17	**9.8**	0	**0.0**
Fishers Exact Test		p=0.99		p=0.70		p=0.96		p=0.76	
3 intervention arms: High/low monitor status combined									
Control	171	22	**12.9**	3	**1.8**	18	**10.5**	1	**0.6**
Print	349	42	**12.0**	11	**3.2**	30	**8.6**	1	**0.3**
Web	345	42	**12.2**	10	**2.9**	32	**9.3**	0	**0.0**
Fishers Exact Test		p=0.95		p=0.72		p=0.76		p=0.52	

Note: there were no “flex sig” screenings

Table 3

CRC screening within 12 months, by intervention arm

	Screening Within 12 months								
		Any CRC screening		Multicard FOBT		Colonoscopy		Barium Enema	
	N	**n**	**percent**	**n**	**percent**	**n**	**percent**	**n**	**percent**
All	865	182	**21.0**	27	**3.1**	155	**17.9**	2	**0.2**
5 intervention arms									
Control	171	40	**23.4**	4	**2.3**	36	**21.1**	1	**0.6**
Print High	176	39	**22.2**	4	**2.3**	34	**19.3**	1	**0.6**
Print Low	173	39	**22.5**	9	**5.2**	31	**17.9**	0	**0.0**
Web High	171	29	**17.0**	6	**3.5**	23	**13.5**	0	**0.0**
Web Low	174	35	**20.1**	4	**2.3**	31	**17.8**	0	**0.0**
Fishers Exact Test		p=0.59		p=0.50		p=0.43		p=0.75	
3 treatment arms: High/low monitor status combined									
Control	171	40	**23.4**	4	**2.3**	36	**21.1**	1	**0.6**
Print	349	78	**22.4**	13	**3.7**	65	**18.6**	1	**0.3**
Web	345	64	**18.6**	10	**2.9**	54	**15.7**	0	**0.0**
Fishers Exact Test		p=0.32		p=0.74		0.29		p=0.52	

Table 4

4 month and 12 month CRC screening, by selected variables

	All	4 mo CRC screening				12 mo CRC screening			
	N	N	%	p-value	Test*	N	%	p-value	Test*
Race Group									
Non-White	29	2	6.9	0.57	FE	6	20.7	0.95	Chisq
White	831	104	12.5			176	21.2		
Age group									
50–54	519	68	13.1	0.60	Chisq	123	23.7	0.090	Chisq
55–59	167	16	9.6			26	15.6		
60–64	102	14	13.7			21	20.6		
65–94	76	8	10.5			12	15.8		
Marital Status									
Married/Cohab	642	81	12.6	0.49	Chisq	143	22.3	0.110	Chisq
Single/Div/Wi	221	24	10.9			38	17.2		
Education									
1:<=HS	299	29	9.7	0.23	Chisq	49	16.4	0.037	Chisq
2:Some Coll/Votech	242	32	13.2	0.10	C-A Trend	54	22.3	0.013	C-A Trend
3:Coll Grad/Post Coll	321	45	14.0			79	24.6		
Employment									
1:Full Time	463	62	13.4	0.28	Chisq	104	22.5	0.46	Chisq
2:Part Time	122	12	9.8			26	21.3		
3:Retiree	123	17	13.8			25	20.3		
4:Unemployed	101	13	12.9			21	20.8		
5:Dsbld/Stdnt	53	2	3.8			6	11.3		
Annual HH Income									
<=$15K	46	1	2.2	0.14	Chisq	3	6.5	0.0045	Chisq
$15K–$30K	104	9	8.7	0.028	C-A Trend	16	15.4	0.0002	C-A Trend
$30K–$45K	97	9	9.3		(omitting 'do not wish to answer')	11	11.3		(omitting 'do not wish to answer')
$45K–$60K	118	20	16.9			28	23.7		
$60K–$75K	78	11	14.1			18	23.1		

	All	4 mo CRC screening				12 mo CRC screening			
	N	N	%	p-value	Test*	N	%	p-value	Test*
$75K+	195	26	13.3			51	26.2		
Do not wish to answer	197	27	13.7			49	24.9		
Never Had Mammogram									
Did not check(indicate)	836	102	12.2	0.77	FE	176	21.1	0.96	Chisq
Checked "never had a mammogram"	29	4	13.8			6	20.7		
Mammogram in previous year?									
Yes	628	83	13.2	0.19	Chisq	141	22.5	0.13	Chisq
No	232	23	9.9			41	17.7		
Ever been diagnosed with cancer?									
Yes	106	10	9.4	0.34	Chisq	24	22.6	0.67	Chisq
No	759	96	12.6			158	20.8		
In past, have your MDs recommended CRC screen?									
Missing (before Question)	366	61	16.7	0.0018	Chisq	98	26.8	0.0018	Chisq
Yes	266	28	10.5			46	17.3		
No	233	17	7.3			38	16.3		
Stage of Change									
Up to date with screening	9	1	11.1	0.0038	Chisq	3	33.3	<0.0001	Chisq
Plan next 30 days	62	13	21.0	0.0003	C-A Trend	18	29.0	<0.0001	C-A Trend
Plan next 6 months	235	40	17.0			72	30.6		
Not sure/no plan	464	47	10.1			80	17.2		
Not thinking about it	94	5	5.3			9	9.6		
Knowledge Score (post hoc groups)									
Low 4–7	127	9	7.1	0.054	Chisq	18	14.2	0.039	Chisq
High 8–10	737	97	13.2			164	22.3		

*Tests:

Chisq = chi-square test
FE = Fisher's Exact test
C-A Trend = Cochran Armitage trend test

Table 5

CRC screening within 4 months and Attentional style match/mismatch, stratified by intervention arm

Any CRC screening with 4 months							
	Attentional Style Match			Attentional Style Mismatch			Chisq p-value
		n	percent		n	Percent	
All 4 arms	338	41	**12.1**	356	43	**12.1**	0.98
4 intervention arms							
Print High	77	8	**10.4**	99	12	**12.1**	0.72
Print Low	95	11	**11.6**	78	11	**14.1**	0.62
Web High	80	10	**12.5**	91	11	**12.1**	0.93
Web Low	86	12	**14**	88	9	**10.2**	0.45

Table 6

CRC screening by Self-reported Web Use vs Actual Web-Use

Self-reported web use and CRC screening					
	N	Any CRC screening at 4 mo		Any CRC screening at 12 mo	
		N screened	Percent	N screened	Percent
Self-reported no Web use	168	18	10.7	30	17.9
Self-reported Web use	33	5	15.2	6	18.2

Actual web use and CRC screening					
	N	Any CRC screening at 4 mo		Any CRC screening at 12 mo	
		N screened	Percent	N screened	Percent
No Web used	152	17	11.2	26	17.1
Web used	49	6	12.2	10	20.4

Fisher’s exact test: 4 month screening, p=0.46; 12 month screening, p=1.00

Fisher’s exact test: 4 month screening, p=0.80; 12 month screening, p=0.67