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Sources of Health Information Related to Preventive Health Behaviors in a National Study

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Abstract

Objective—Current literature suggests that certain sources of information are used in varying degrees among different socioeconomic and demographic groups; therefore, it is important to determine if specific classes of health information sources are more effective than others in promoting health behaviors.

Purpose—To determine if interpersonal versus mass media sources of health information are associated with meeting recommendations for health behaviors (nonsmoking, fruit/vegetable intake, and exercise) and cancer screening.

Methods—Multivariable logistic regression models were used to examine the relationship of health information sources (mass media sources including print, TV, Internet; and interpersonal sources including friends and family, community organizations, and healthcare providers); with meeting recommendations for healthy behaviors and cancer screening in the 2005 and 2007 Health Information National Trends Surveys (HINTS). Analyses were conducted in 2009.

Results—In the 2005 HINTS, participants reporting use of print media and community organizations as sources of health information over the past year were mostly likely to meet recommendations for health behaviors. In the 2007 HINTS, utilization of healthcare providers for health information was associated with meeting recommendations for health behaviors, particularly cancer screening.

Conclusions—Use of print media and interpersonal sources of health information are most consistently associated with self-reported health behaviors. Additional research should explore the relationship of health information sources to clinical outcomes. Social network interventions to promote adoption of health behaviors should be further developed.

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Introduction

Health communication is an approach to convey information with the goal of improving health outcomes by encouraging behavior modification and social change through the continuum of knowledge, beliefs and attitudes, and behaviors.^{1,2} Health communication strategies utilizing mass media (e.g., TV, print, and Internet) have been associated with health beliefs and behaviors.^{3–7} More recently, the influence of social networks (i.e., the web of social relationships that surround an individual tied by a type of interdependency, such as friendship, kinship, or vocation/interests) on various aspects of health has been studied.^{8,9} These interpersonal relationships, either those made through social ties such as friends/family or community organizations^{10–14} or those with healthcare providers¹⁵ may also be sources of health information, and have been associated with health beliefs and possibly behaviors.^{11,16}

Few studies have compared the strengths of association of classes of health information sources (i.e., mass media versus interpersonal) with disease prevention and screening behaviors.^{5,12} Because certain sources of information are used in varying degrees among different socioeconomic and demographic groups,^{5,17–23} it is important to determine if specific classes of health information sources are more effective than others in promoting health behaviors. The goal of this study was to examine and compare the associations of mass media (print, TV, Internet) and interpersonal (healthcare providers and nonprofessional social networks consisting of friends/family and community organizations) sources of health information with healthy behaviors in a nationally representative sample of adults participating in the Health Information National Trends Surveys (HINTS). The study was designed to determine which avenues for disseminating health information, including both lay and health professional interpersonal sources, are most broadly associated with health behaviors. It was hypothesized that interpersonal sources, including both lay social networks (friends and family and community organizations) and healthcare providers, would be more strongly associated with desired health behaviors due to their potential to provide not only information but also social support.^{10,13,14,16}

Methods

Survey and Population Studied

The HINTS are biennial, nationally representative cross-sectional surveys of civilian, non-institutionalized adults (aged ≥ 18 years) in the U.S., sponsored by the National Cancer Institute (NCI). Surveys were designed to assess use of cancer-related health information, general health status, cancer screening practices, and lifestyle behaviors.²⁴ This study used data from the 2005 and 2007 surveys. The 2005 HINTS queried respondents' use of health information sources *within the past 12 months* including lay interpersonal sources (community organizations, and friends and family), and mass media sources (Internet, print, and TV).²⁵ The 2005 HINTS did not assess use of health providers as a source of information.

The 2007 HINTS asked respondents about sources of health and medical information used *during their most recent search*.²⁶ Although reference to this shorter time period may reduce recall error, use of health information sources over the past 12 months may be more representative of habitual use. The 2007 HINTS also assessed use of healthcare providers as a source of health information but did not ask about the same types of community organizations as the 2005 survey. Lastly, the surveys differed on the criteria (i.e., age and cancer history) determining which respondents were eligible to be asked about cancer screening practices (Table 1). Due to these differences, the 2005 survey is analyzed and presented in its entirety because it provides the most recent data about habitual use of information sources.

In secondary analyses, the 2007 survey was examined to determine the potential association of using healthcare providers as a recent source of health information with meeting recommendations for healthy behaviors. Detailed descriptions of data collection methods and response rates for the 2005 and 2007 HINTS have been previously described.^{25,26} The study protocol was approved by the Partners Healthcare IRB Human Subjects Committee.

Study Variables

Detailed examples of each survey item are included in Appendixes A–C (available online at www.ajpm-online.net). For the primary outcome, eligibility criteria defined by HINTS was incorporated with national guidelines to develop indicators for lifestyle behaviors (appropriate fruit and vegetable intake, regular exercise, and smoking cessation) and cancer screening (routine mammography, Paps, and colon cancer screening).^{27–29} Eligibility criteria and definitions for disease prevention behaviors are presented in Table 1. Respondents reporting the lifestyle behavior were classified as “meeting recommendations”, and all other participants were classified as not achieving recommendations. Similarly, respondents were classified as having a particular cancer screening test if they answered “yes” to questions related to that test. Analyses were limited to respondents aged ≥ 40 years for mammography and aged ≥ 50 years for colonoscopy to be consistent with clinical guidelines at the time of the survey for those outcomes.^{30,31} Those reporting “don’t know”, “refused”, or with missing responses for an outcome were excluded.

The primary independent variables were utilization of health information from sources within two categories: (1) *mass media*, which includes Internet, TV, print media (i.e., newspapers and magazines); and (2) *interpersonal* sources, which includes healthcare providers and non–health professional social networks. Community organizations and friends and family were the two types of non–health professional social networks available in the HINTS data. For both surveys, “users” were participants who reported “yes” to utilizing a particular source of health information with any frequency. Those answering “don’t know” or “refused” as well as missing responses were classified as “non-users”.

Sociodemographic and clinical characteristics that may modify or confound the relationship of health information use and behavior adoption were identified. Demographic characteristics were assessed by self-report including gender, age (18–34, 35–49, 50–64, 65–74, 75+ years, missing/refused), race and ethnicity (Hispanic, non-Hispanic black, non-Hispanic white, non-Hispanic Other, missing/refused), education (high school or less, some college or more, refused/missing), income ($< \$50,000$, $\geq \$50,000$, missing/refused), overall health (excellent, very good, good, fair, poor), and history of any type of cancer (yes versus no). Because some covariates (e.g., income) had large numbers of respondents with missing data, “missing” was included as a value to preserve the sample size in regression modeling procedures.

Statistical Analysis

To evaluate whether exposure to a particular health information source was associated with a specific health behavior outcome, separate logistic regression models were fit for each behavior including each source of information as the sole predictor. These models were then adjusted for the other information sources, accounting for the possibility of a subject using multiple sources, as well as sociodemographic and clinical characteristics. For the 2007 HINTS data, a variable for survey mode (phone or mail) also was included to account for the dual mode sampling design.²⁶ Binomial logistic regression was used to examine the association of each health information source with the composite outcome of meeting recommendations for preventive behaviors,³² which represented the total number of reported cancer screening and/or lifestyle behaviors meeting recommendations, of the total number of eligible behaviors. For example, a male nonsmoker aged 55 years who reported receiving a colonoscopy and did not

meet recommendations for fruit/vegetable intake or exercise would have a composite outcome with two successes (nonsmoking and colonoscopy) and four eligible behaviors (diet, exercise, nonsmoking, colonoscopy). The OR reflects the odds of any given outcome (e.g., 2 of 4, 1 of 6) when comparing users to non-users of a health information source among subjects eligible for varying numbers of behaviors.

Additionally, for the 2005 HINTS, the cumulative impact of multiple information sources on meeting recommendations for health behaviors was explored. A principal components analysis was performed to cluster health information sources into categorical variables “mass media” (including print, TV, and Internet) or “social network” (including community organizations and friends/family) to indicate the number of sources used within each group. These variables were analyzed separately in bivariable and then together in multivariable regression models. All sample sizes are reported as unweighted and all percentages are reported as weighted. AORs and 95% CIs of meeting recommendations are reported for each health behavior, with a p value <0.05 considered significant. To account for the complex sampling design of HINTS, all data were analyzed with the survey procedures in SAS® version 9.2 (SAS Institute) utilizing the sampling weights provided with the data set. These analyses were conducted in 2009.

Results

2005 HINTS Descriptive Statistics

Of the 5586 total respondents in the 2005 HINTS, 5367 had complete outcome data and were eligible for analysis. They represent approximately 208 million adults, of whom 52% were women and 69% were Non-Hispanic white, with about 42% reporting incomes more than \$50,000 and 55% with more than a high school education (Table 2). Friends and family were the most frequent sources of health information and community organizations the least frequent (Figure 1). Only about 11% of the survey respondents met recommendations for diet, 58% met recommendations for exercise, and 78% were nonsmokers (Figure 2). Among eligible respondents, 93% reported receiving a screening Pap, 84% reported receiving a mammogram, and 49% reported receiving colonoscopy or sigmoidoscopy (Figure 2).

Health Information Source and Health Behaviors in HINTS 2005

HINTS 2005 respondents who reported print media and community organizations as information sources had increased odds of meeting recommendations for fruit and vegetable intake in unadjusted models (print OR=1.57 [95%CI: 1.22, 2.01]; organizations 1.52 [1.15, 2.01]); however, only users of community organizations had increased odds in adjusted models (1.44 [1.01, 1.78]). Use of print media, community organizations, or friends and family were associated with increased odds of being a nonsmoker in adjusted models (print 1.21 [1.03, 1.44]; organizations 1.91 [1.41, 2.59]; friends/family 1.38 [1.05, 1.81]). None of the health information sources were associated with meeting recommendations for exercise (Tables 3 and 4). Among respondents eligible for mammography screening, TV and Internet users had higher adjusted odds of reporting ever receiving a mammography (TV 1.61 [1.11, 2.33]; Internet 1.42 [1.02, 1.98]). None of the health information sources were associated with increased adjusted odds of reporting ever receiving a Pap (Tables 3 and 4). All health information sources, except TV, were associated with increased adjusted odds of reporting colonoscopy or sigmoidoscopy screening (print 1.41 [1.44, 1.92]; Internet 1.53 [1.21, 1.92]; organizations 1.48 [1.20, 1.83]; friends/family 1.57 [1.16, 2.11]). Overall, use of print and community organizations were associated with increased odds of meeting recommendations for any of the outcomes in the binomial regression analyses (print 1.13 [1.04, 1.21]; organizations 1.17 [1.08, 1.26]).

2007 HINTS and use of healthcare providers for health information

The 2007 HINTS had a total of 7674 respondents, with 5001 respondents (representing approximately 289 million adults) eligible for analysis. The 2007 survey was similar to 2005 with regard to gender (50% women) and race/ethnicity (70% Non-Hispanic white), but with slightly more respondents in higher socioeconomic categories (64% \geq high school education, 49% \geq \$50,000 income). Among the interpersonal sources, healthcare providers were reported as sources of health and medical information used *during their most recent search* almost twice as often as friends and family (27% vs 15%). Only Internet was reported to be used more frequently (56%), with print (12%) and TV (0.6%) used the least. About 39% of the survey respondents met recommendations for diet, 23% met recommendations for exercise, and 80% were non smokers. Among eligible respondents, 93% reported receiving a screening Pap and 54% reported receiving colonoscopy or sigmoidoscopy; respondents were not queried about mammograms in 2007.

In adjusted models, respondents who reported recent use of healthcare providers had increased odds of meeting recommendations for fruit and vegetable intake (1.32 [1.11, 1.57]) compared to non-users. Use of healthcare providers for health information was not associated with increased odds of meeting recommendations for exercise (0.81 [0.65, 1.01]) or being a nonsmoker (0.90 [0.69, 1.17]). Among the cancer screening behaviors, use of healthcare providers as the most recent source of health information was associated with increased odds of reporting ever receiving a colonoscopy or sigmoidoscopy (1.36 [1.06, 1.74] for both tests), but there was no increased odds of reporting receiving a Pap. In adjusted binomial regression models, there was no significant difference in the outcome among respondents using healthcare providers for health information compared to non-users (1.03 [0.96, 1.10]).

Cumulative Use of Health Information Sources and Adoption of Health Behaviors

The associations of cumulative sources of health information with meeting recommendations for health behaviors in 2005, adjusted for sociodemographic and clinical features, are shown in Table 5. There were no significant increases in adjusted odds of meeting dietary or exercise recommendations with the cumulative use of social networks or mass media. The adjusted odds of being a nonsmoker or obtaining a colonoscopy/sigmoidoscopy increased as the number of social networks utilized for health information increased. Utilization of more mass media sources increased the odds of obtaining mammography and colonoscopy/sigmoidoscopy. In binomial regression models, the odds of meeting recommendations for any of the outcomes increased with number of social networks or mass media sources for health information.

Discussion

To our knowledge, this is the first study of nationally representative cohorts to show the independent associations of two classes of health information (interpersonal sources and mass media) with meeting recommendations for ongoing health behaviors and cancer screening. This study also addresses limitations of prior research by examining the association of cumulative sources of health information with health behaviors.

In the 2005 HINTS, participants most likely to report meeting recommendations for health behaviors were those utilizing print media and community organizations as sources of health information over the past year. In the 2007 HINTS, utilization of healthcare providers during the most recent search for health information was often associated with meeting recommendations, particularly for fruit and vegetable intake and colon cancer screening.

One previous study examined the relationship of self-reported adoption of disease prevention behaviors with types of health information sources.³³ Use of friends and family, print, and

Internet media were associated with increased self-reported preventive behaviors comprised in a summary score including fruit and vegetable intake, daily exercise, and smoking abstinence. However, this study did not control for concomitant use of other health information sources, and did not assess cancer screening behaviors. This HINTS study not only explored a composite measure of health behavior, but also determined if associations among classes of health information were limited to specific types of health behaviors.

Although levels of smoking and cancer screening in the data presented here were similar to those found in other large nationally representative surveys, HINTS respondents had different levels of fruit and vegetable intake and regular exercise.^{34,35} For example, respondents meeting current recommendations for fruit and vegetable intake represented about 11% and 44% in the 2005 and 2007 HINTS cohorts, respectively, compared to 23%–24% of adults who reported consuming five or more fruits per day in the 2005 and 2007 Behavioral Risk Factor Surveillance System Surveys (BRFSS).³⁴ Similarly, approximately 58% and 35% of the 2005 and 2007 HINTS respondents, respectively, met recommendations for exercise, compared to almost 49% of 2005 and 2007 BRFSS respondents. Methodologic issues such as inaccuracy of subject reporting, differences between HINTS survey years and BRFSS in question wording, and the smaller sampling frame for HINTS may all contribute to these observed differences.

Although no health information sources were associated with achieving recommended levels of daily exercise in the 2005 HINTS, utilization of community organizations were associated with meeting dietary recommendations for fruit and vegetable intake and nonsmoking. A recent review noted that social support was strongly associated with adult fruit and vegetable intake.³⁶ In HINTS, there was a very low prevalence of meeting dietary recommendations, decreasing the power to detect significant associations in the current study.

Cancer screening behaviors also showed variability in their relationships with specific health information sources. Use of TV for health information was associated with increased odds of receiving mammography whereas use of print, Internet, and social networks (i.e., community organizations and friends/family) for health information were associated with increased odds of colonoscopy. The results presented here differ from prior reports of increased colonoscopy screening following TV coverage of colon cancer screening.³⁷ However, this report was broadcast in March 2000, so it is possible that the observed rise in colonoscopy screening dissipated without sustained attention.

Based on the composite outcome score in the 2005 HINTS cohort, print media and community organizations were the health information sources associated with increased odds of achieving recommendations for health behaviors, even after adjustment for other concurrent health information sources. Furthermore, reporting some health behaviors increased as the number of sources within either social network or mass media categories increased. Data from the 2007 HINTS show that respondents who reported using healthcare providers as an information source also had higher odds of meeting recommendations for some health behaviors. This is supported by prior data showing that health information seekers rely on healthcare providers.^{11,38} The study presented here has several limitations. First, HINTS are cross-sectional surveys and thus it is not possible to establish causality between information source and behaviors. Those who adopt lifestyle behaviors and cancer screening practices may be more health conscious and thus more likely to seek health information from specific types of health information sources.^{6,33,39} Second, survey data are susceptible to responder bias as well as misclassification bias. Third, respondents with missing responses for a particular health information source were categorized as “non-users” for that source, which could have biased the current results toward the null. Fourth, although demographic, socioeconomic, and health status covariates were added to multivariable models, there may be unmeasured confounders (e.g., health literacy) that may need to be considered in future studies.⁴⁰ Last, there was no

information on whether the content area of the general health information reported (e.g., nutrition and diet information) was tailored to the specific outcomes (e.g., fruit and vegetable intake).

In these nationally representative surveys, use of print media and interpersonal sources such as friends and family, community organizations, and healthcare providers were associated with reported health behaviors even after adjusting for concurrent health information sources. Additionally, these data show that increasing the number and/or classes of health information utilized often increases the odds of reporting recommended health behaviors. Hence, efforts should focus on using multiple health communication modalities, including better utilization of social networks, to disseminate health recommendations (e.g., identifying leaders of community organizations to help formulate and disseminate health information).

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Appendix A. Health Information National Trends Surveys (HINTS) Items

Exposures: Health Information Sources^a

2005 HINTS	
Print media	<i>In the past 12 months, have you read health sections of the newspaper or of a general magazine? About how often have you read such health sections in the past 12 months? Would you say once or more per week, or less than once per week?</i>
Television	<i>Some local television news programs include special segments of their newscasts that focus on health issues. In the past 12 months, have you watched health segments on the local news? How often have you watched health segments on local news in the past 12 months?</i>
Internet	<i>Some people notice information about health on the Internet, even when they are not trying to find out about a health concern they have or someone in the family has. Have you read such health information on the Internet in the past 12 months? About how often have you read this sort of information in the past 12 months?</i>
Community organizations	<i>How many community organizations are you currently a member of? Do any of these community organization(s) provide you with information on health?</i>
Friends and family	<i>Do you have friends or family members that you talk to about your health? How frequently do you talk to these friends or family members about health?</i>
Healthcare provider	Not asked

^aHINTS 2007 used the following question stem: *The most recent time you looked for information about health or medical topics, where did you go first? Did you look or go anywhere else? Where else did you look or go?* Health information sources were presented as multiple-choice responses. The response choices of *Doctor or health care provider* and *complementary/alternative or unconventional practitioner* are the focus of this study.

Appendix B. Health Information National Trends Surveys (HINTS) Items

Outcomes: Health Behaviors

Construct	2005	2007
Fruit and vegetable intake	<i>How often do you eat fruit per day? How often do you drink fruit juice per day? How often do you eat vegetables per day? (excluding potatoes)?^a</i>	<i>Random-digit-dial mode: How many servings of fruits do you usually eat or drink each day? How many servings of vegetables do you usually eat or drink each day? Mail mode: About how many cups of fruit (including 100% pure fruit juice) do you eat or drink each day? About how many cups of vegetables (including 100% vegetable juice) do you eat or drink eat day?</i>
Exercise	<i>In a typical week, how many days do you do any physical activity or exercise of at least moderate intensity, such as brisk walking, bicycling at a regular pace, swimming at a regular pace, and heavy gardening?</i>	<i>In a typical week, how many days do you do any physical activity or exercise of at least moderate intensity, such as brisk walking, bicycling at a regular pace, swimming at a regular pace, and heavy gardening?</i>

Construct	2005	2007
Nonsmoking	<i>Have you smoked at least 100 cigarettes in your entire life? Do you now smoke cigarettes...every day, some days, not at all?</i>	<i>Have you smoked at least 100 cigarettes in your entire life? Do you now smoke cigarettes... every day, some days, not at all?</i>
Mammography	<i>A mammogram is an x-ray of each breast to look for breast cancer. Have you ever had a mammogram?</i>	Not asked
Pap test	<i>Have you ever had a Pap smear or Pap test?</i>	<i>Have you ever had a Pap smear or Pap test?</i>
Colonoscopy/sigmoidoscopy	<i>A sigmoidoscopy and a colonoscopy are both tests that examine the bowel by inserting a tube in the rectum. Have you ever had either a colonoscopy or a sigmoidoscopy?</i>	<i>When did you have your most recent colonoscopy to check for colon cancer? When did you have your most recent sigmoidoscopy to check for colon cancer?</i>

^aThese questions represent recodes within the public use data set of the following questions: *During the past 30 days, how often did you drink 100% fruit juice such as orange, apple, and grape juices? During the past 30 days, how often did you eat fruit? Include fresh, canned, or frozen fruit. During the past 30 days, how often did you eat vegetables other than potatoes? Include things like salad, cooked dried beans, corn, and broccoli.*

Appendix C. Health Information National Trends Surveys (HINTS) Items

Covariates: Asked in Both 2005 and 2007 HINTS

Demographics
<i>What is your age please?</i>
<i>Are you male or female?</i>
<i>Which one or more of the following would you say is your race? Are you Hispanic or Latino?</i>
Health status
<i>Have you ever been diagnosed as having cancer?</i>
<i>In general, would you say your health is... excellent, very good, good, fair, poor?</i>
SES
<i>What is the highest grade or level of schooling you completed?</i>
<i>What is your (combined) annual household income?</i>

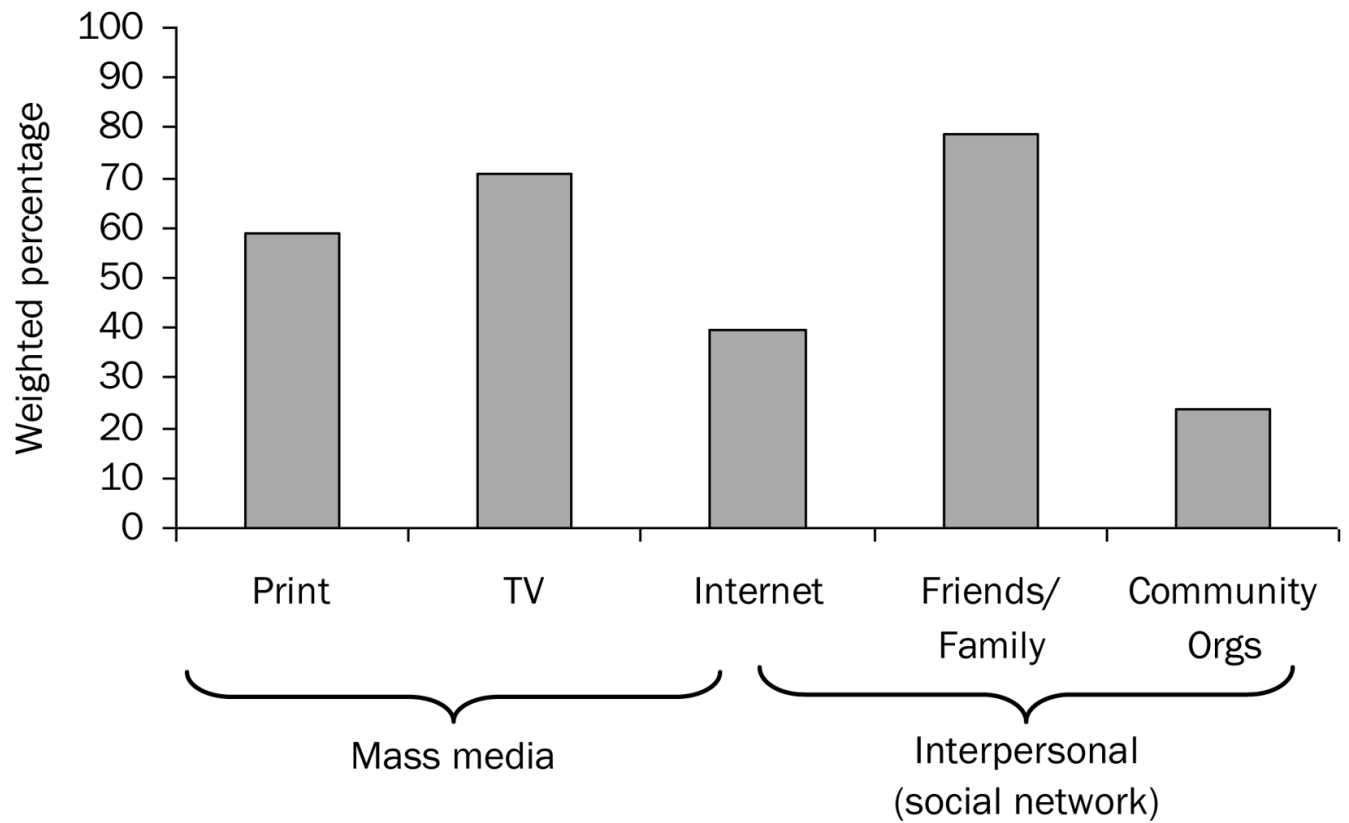


Figure 1.
Overall health information source use in HINTS 2005

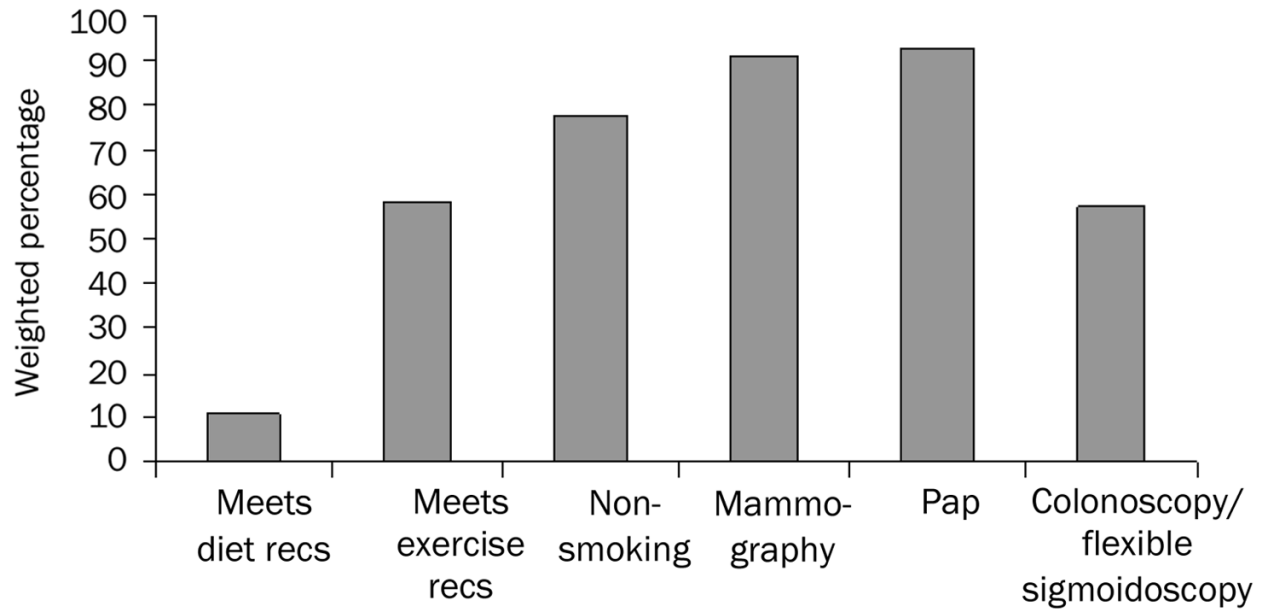


Figure 2.
Healthy behaviors in HINTS 2005; recs, recommendations

Table 1

Definitions of healthy behaviors and eligibility criteria

Behavior	Definition	Eligibility
Fruit and vegetable intake	Self-reported total of five servings of fruits, 100% fruit juice, and/or vegetables per day	All subjects
Exercise	Self-reported moderate intensity exercise at least 5 days per week	All subjects
Nonsmoking	Self-reported no current smoking	All subjects
Mammography	Response <i>yes</i> to "...ever had a mammogram?"	2005 HINTS: All women, aged ≥ 35 years, without prior history of breast cancer 2007 HINTS: not assessed
Pap	Response "yes" to "...ever had a Pap test?"	2005 HINTS: All women without history of cervical cancer 2007 HINTS: All women
Colonoscopy/Sigmoidoscopy	Response "yes" to "...ever had a colonoscopy and/or sigmoidoscopy?"	2005 HINTS: All subjects, aged ≥ 45 years, without prior history of colon cancer 2007 HINTS: All subjects, aged ≥ 45 years

HINTS,

Table 2Descriptive characteristics of 2005 and 2007 HINTS respondents^a

Demographics	2005 HINTS (weighted %)	2007 HINTS (weighted %)
Female	51.9	50.1
Age		
18–34	31.0	31.5
35–49	30.1	30.0
50–64	22.8	23.4
65–74	9.3	7.6
75+	6.7	6.3
Race/Ethnicity		
Hispanic	12.3	10.5
Non-Hispanic white	66.4	69.9
Non-Hispanic black	9.5	10.2
Other	6.8	5.7
SES		
Education		
HS grad or less	42.5	33.8
Some College or more	53.2	64.2
Income		
<\$50,000	41.4	36.4
≥\$50,000	40.3	48.7
Health status		
Prior Cancer Diagnosis		
General Health Status		
Excellent	11.3	6.8
Very good	11.5	13.4
Good	27.8	39.0
Fair	34.2	33.7
Poor	18.4	10.3
	4.4	1.7

^a Respondents with “don’t know”, “refused”, or missing responses are not indicated; percentages may not equal 100%, as a result of rounding.

HINTS,

Table 3

OR (95% CI) of adopting healthy behaviors by utilization of health information source in HINTS 2005 ^a, for ongoing behaviors

	OR (95% CI)	Meets Diet Recommendations <i>n</i> =5461		Meets Exercise Recommendations <i>n</i> =5415		Nonsmoking <i>n</i> =5492	
		Unadjusted	Adjusted ^b	Unadjusted	Adjusted ^b	Unadjusted	Adjusted ^b
Mass Media Sources	Print	1.52 (1.19, 1.94)	1.28 (0.92, 1.79)	1.00 (0.84, 1.21)	1.08 (0.87, 1.32)	1.57 (1.33, 1.85)	1.22 (1.03, 1.44)
	TV	1.20 (0.89, 1.61)	1.04 (0.76, 1.41)	0.89 (0.76, 1.04)	0.96 (0.81, 1.15)	1.15 (0.96, 1.38)	0.95 (0.77, 1.17)
	Internet	1.13 (0.93, 1.39)	0.99 (0.78, 1.26)	0.91 (0.78, 1.07)	0.85 (0.70, 1.03)	1.17 (0.97, 1.41)	1.01 (0.80, 1.29)
Interpersonal Sources (Social Networks)	Community Organizations	1.46 (1.11, 1.93)	1.34 (1.01, 1.78)	1.08 (0.90, 1.30)	1.05 (0.87, 1.28)	2.14 (1.61, 2.83)	1.92 (1.42, 2.60)
	Friends and Family	1.26 (0.86, 1.84)	1.00 (0.67, 1.50)	0.91 (0.74, 1.13)	1.01 (0.79, 1.30)	1.64 (1.28, 2.10)	1.37 (1.04, 1.80)

^aUsers of health information source versus non-users/missing (reference).

^bAdjusted for all other health information sources, gender, age, race/ethnicity, income, education, history of prior cancer diagnosis, self-reported general health status.

HINTS

Table 4

OR (95% CI) of adopting healthy behaviors by utilization of health information source in HINTS 2005^a, for Cancer Screening^b and Composite Behavior in HINTS 2005

OR (95% CI)	Mammography n=2498		Pap n=3571		Colonoscopy/Sigmoidoscopy n=2941		Composite Outcome n=5367	
	Unadjusted	Adjusted ^c	Unadjusted	Adjusted ^c	Unadjusted	Adjusted ^c	Unadjusted	Adjusted ^c
Print	1.82 (1.22, 2.71)	1.60 (0.99, 2.57)	2.50 (1.42, 4.42)	1.44 (0.78, 2.65)	1.71 (1.44, 2.04)	1.39 (1.14, 1.68)	1.51 (1.43, 1.60)	1.10 (1.03, 1.17)
Mass Media Sources	1.91 (1.37, 2.67)	1.72 (1.13, 2.61)	2.88 (1.49, 5.56)	1.97 (0.92, 4.24)	1.14 (0.88, 1.48)	1.00 (0.75, 1.35)	1.30 (1.21, 1.39)	1.01 (0.95, 1.07)
TV								
Internet	1.65 (1.06, 2.56)	1.77 (0.96, 3.24)	0.78 (0.43, 1.42)	0.64 (0.29, 1.38)	1.78 (1.45, 2.19)	1.66 (1.32, 2.09)	0.93 (0.86, 1.00)	0.99 (0.93, 1.05)
Interpersonal Sources (Social Networks)								
Community Organizations	1.44 (0.93, 2.21)	1.10 (0.69, 1.76)	0.86 (0.40, 1.83)	0.55 (0.27, 1.14)	1.51 (1.23, 1.88)	1.36 (1.07, 1.73)	1.20 (1.11, 1.29)	1.10 (1.04, 1.186)
Friends and Family	1.66 (1.22, 2.72)	1.31 (0.76, 2.25)	1.84 (0.86, 3.94)	1.45 (0.53, 3.93)	1.74 (1.32, 2.29)	1.58 (1.11, 2.24)	1.39 (1.28, 1.51)	1.108 (0.98, 1.20)

^aUsers of health information source versus non-users/missing (reference).

^bBased on subpopulation of sample eligible for screening: Mammography n=2498, Pap n=3571, Colonoscopy/flexible sigmoidoscopy n=2941

^cAdjusted for all other health information sources, gender, age, race/ethnicity, income, education, history of prior cancer diagnosis, self-reported general health status.

Table 5

AOR (95% CI) of adopting healthy behaviors by cumulative utilization of health information source, by category, in HINTS 2005^a

AOR (95% CI)	Meets Diet Recommendations	Meets Exercise Recommendations	Nonsmoking	Mammography ^b	Pap ^b	Colonoscopy ^b	Composite Outcome
<u>Social Networks</u>							
One	1.03 (0.63, 1.68)	1.03 (0.77, 1.38)	1.40 (1.06, 1.85)	1.50 (0.86, 2.62)	1.07 (0.38, 3.00)	1.71 (1.22, 2.49)	1.10 (0.97, 1.24)
Two	1.36 (0.78, 2.38)	1.08 (0.80, 1.45)	2.67 (1.80, 3.97)	1.47 (0.82, 2.65)	0.69 (0.18, 2.62)	2.19 (1.47, 3.26)	1.20 (1.06, 1.37)
<u>Mass media</u>							
One	0.94 (0.55, 1.61)	0.98 (0.71, 1.35)	0.96 (0.68, 1.38)	1.07 (0.63, 1.80)	1.84 (0.52, 6.48)	1.31 (0.87, 1.99)	1.04 (0.94, 1.15)
Two	1.26 (0.72, 2.22)	0.95 (0.72, 1.25)	1.00 (0.78, 1.30)	2.80 (1.63, 4.80)	3.19 (0.93, 10.96)	1.80 (1.26, 2.57)	1.09 (1.00, 1.20)
Three	1.19 (0.71, 1.98)	0.90 (0.65, 1.24)	1.19 (0.83, 1.71)	3.32 (1.56, 7.06)	1.99 (0.55, 7.25)	2.15 (1.45, 3.19)	1.16 (0.99, 1.23)

^aUsers of health information source versus non-users/missing (reference). Adjusted for all other health information sources, gender, age, race/ethnicity, income, education, history of prior cancer diagnosis, self-reported general health status. Sample sizes are as noted in Tables 3 and 4.

^bBased on subpopulation of sample eligible for screening: Mammography $n=2498$, Pap $n=3571$, Colonoscopy/flexible sigmoidoscopy $n=2941$.

HINTS