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Is health care system distrust a barrier to breast and cervical cancer screening? Evidence from Philadelphia

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Abstract

Objectives—This study investigates whether health care system distrust is a barrier to breast and cervical cancer screening and whether different dimensions of distrust – values and competence – have different impacts on cancer screening.

Methods—We utilize data on 5,268 women 18 and older living in Philadelphia and analyze their use of screening services via logistic and multinomial logistic regression.

Results—High levels of health care system distrust are associated with lower utilization of breast and cervical cancer screening services. The associations differ by dimensions of distrust. Specifically, high competence distrust is associated with a reduced likelihood of having Pap smear tests, and women with high values distrust are less likely to have breast examinations within the recommended time period. Independent of other covariates, individual health care resources and health status are associated with utilization of cancer screening.

Conclusions—Health care system distrust is a barrier to breast and cervical cancer screening even after controlling for demographic and socioeconomic determinants. Rebuilding confidence in the health care system may improve personal and public health by increasing the utilization of preventive health services.

Introduction

Cancer is a leading cause of death in the United States. Approximately 1.5 million Americans are diagnosed with cancer per annum and one in four deaths are due to cancer.[1] Among women, an estimated 192,000 breast and 11,000 cervical cancer cases are detected each year and over 40,000 women die from breast cancer and approximately 4,000 from cervical cancer.[1] To be effective in reducing the morbidity and mortality resulting from breast and cervical cancer, efforts need to be made to increase the proportion of women who comply with screening recommendations;[2] according to a recent report a third of women are not in compliance with screening guidelines for breast cancer and over a fifth for cervical cancer.[3] The goal of this study is to investigate whether health care system distrust (hereafter referred to as distrust) is a barrier to breast and cervical cancer screening.

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The late-Twentieth century saw many changes in the theoretical underpinnings of research on health in general, and women's health in particular. The prevailing biomedical model was criticized for ignoring social determinants of health, such as social class, gender roles, and poverty,[4] and health determinants models that incorporated multiple social, economic and demographic dimensions were embraced.[5–7] While the multiple determinants of health perspective emphasizes the relationships between socioeconomic factors and health outcomes,[4] the role of psychological factors (i.e. depression and distrust) in cancer screening has only recently been recognized.[8–11] Relatively little is known about whether distrust affects health outcomes, and specifically whether it influences cancer screening behaviors among women.[11]

Americans' overall confidence in their health care system has declined markedly in recent decades. In 2010 only 34 percent of adults reported "a great deal" of confidence in the health system, down from over 70 percent in 1966.[12] More than 80 percent of the Americans, however, held high levels of trust in their personal physicians or providers;[13] a paradox that has been widely documented in the literature.[14–17] Previous studies suggest trust in physicians is associated with seeking timely medical care, maintaining appropriate health care, and adhering to medical advice[18–20] but it is unclear whether trust or its converse distrust affects the adoption of preventive health services among women.[11]

Of relevance to this study, the emerging distrust research in health care shows that distrust is a multidimensional concept.[21–23] For example, Shea et al. used focus groups, pilot testing, and a telephone survey to develop a highly reliable 9-item distrust scale that includes 2 subscales: competence distrust and values distrust.[22] Competence distrust is expected to be high when the quality of service fails to meet patient expectations and does not improve health. Values distrust is expected to be high when the integrity of the health care system is questioned (e.g., ethical issues, financial priorities, transparency of care). While it is possible that dimensions of distrust may influence the use of preventive health services in different ways, little research has addressed this issue explicitly.

A range of individual characteristics have been found to be associated with the use of breast and cervical cancer screening, including age,[5, 24] race/ethnicity,[11, 25] socioeconomic factors,[5, 24] marital status,[5, 11, 24] and availability and utilization of health care resources.[11, 24] Access to insurance and health care providers is associated with higher likelihood of interaction with the health care system, and has been hypothesized to be related to levels of distrust and to individuals' health-related behaviors.[26] Personal health status has been found to be related to levels of distrust,[27] although the underlying causal mechanisms have not been well-documented. Evidence concerning the association of health status with use of preventive health services is inconclusive.[11] An important contribution of our study is the investigation of the association of distinct aspects of distrust-- values distrust and competence distrust--with receipt of two preventive health services for adult women: the Papanicolaou (Pap) test for cervical cancer and clinical breast examination to screen for breast cancer. We test the following two hypotheses: after controlling for individual socioeconomic and demographic characteristics, *(1) high levels of distrust are associated with low utilization of cancer screening services; and (2) the negative relationship between distrust and cancer screening utilization holds for both the values and competence dimensions of distrust.*

Data and Methods

Data Source

This study is based on data collected on all women aged 18 and older (n = 5,268) in the Philadelphia Health Management Corporation's (PHMC) 2008 Southeastern Pennsylvania

Household Health Survey; a survey covering five counties in southeastern Pennsylvania, Bucks, Chester, Delaware, Montgomery, and Philadelphia counties. The interviews were conducted between June and October 2008 via computerized telephone random digit dialing based on a stratified sampling frame to ensure representation from the 5 counties.[28] The response rate for the PHMC 2008 was 25% based on criterion #3 of the American Association for Public Opinion Research.[29] While the response rate appears low it is important to note that this in and of itself is not an indicator of survey quality. Recent research finds no significant biases as a result of response rate.[30, 31] Moreover, the PHMC 2008 sample closely matches the demographic and socioeconomic structure of the study counties as reported in the U.S. Census Bureau in their 3-year 2006–2008 release of the American Community Survey (ACS)[32] and health screening rates in the PHMC 2008 mirror those in the BRFSS 2008 data for Philadelphia. For example, 81 percent of women aged 50+ have had a mammogram within the past year according to the BRFSS and 82 percent in PHMC.[33] A balancing weight is used in the statistical analysis.

Measures

We are interested in three outcomes. The first is whether a woman had a Pap smear test within the past 2 years (coded 1 = Yes, 0 = No). The PHMC asked women "How long has it been since your last Pap test?" and the response categories were "one year or less," "1–2 years," "2–5 years," "5–10 years," "more than 10 years," and "never." At the time of the study, the American College of Obstetricians (ACOG) and Gynecologists recommended Pap testing every 2–3 years.[34] Since the 2–5 year interval choice would include many women who were not screened within the recommended interval, we chose to code only those reporting "one year or less" or "1–2 years" as having received recommended screening. The second outcome of interest is whether a woman had a breast examination by a doctor or health professional within the past year as recommended (coded 1 = Yes, 0 = No).[34] The correlation between Pap testing and breast examination in the PHMC sample is 0.45 ($p<0.001$). The third outcome included in the analyses is a trichotomized variable measuring whether a woman had "both tests" (coded 2), "had only one of the two tests" (coded 1), or "no test" (coded 0, reference group) according to the recommended schedule. These three outcomes allow us to construct a more complete picture of cancer screening behaviors among women and the role, if any, of health care system distrust.

We have five groups of independent variables. The primary predictor of interest is distrust, which is measured by a 9-item scale developed by Shea et al.[22] The nine questions are rated on a 5-level Likert scale (strongly disagree, disagree, neither agree/disagree, agree, or strongly agree) producing a possible distrust score range between 9 and 45. The reliability of the distrust scale and subscales has been tested and reported elsewhere.[22] Using the 2008 PHMC data and factor analysis with the varimax rotation method, we generated two standardized factor scores based on the regression method capturing two different dimensions of distrust of health care system: *values distrust* and *competence distrust* (the eigenvalues were 3.86 and 1.10 respectively and the total variance explained was 55%). The regression method applies factor weights to create the distrust scores centered on zero with a standard deviation of 1 (see Table 1). We categorized each item into one of the two dimensions when the factor loading for that assigned dimension was 0.5 or higher and the other factor loading was lower than 0.5. Table 1 includes the nine questions and their factor loadings on each sub-scale, as well as the distributions of the factor scores. Factor analysis not only takes into account the interdependency among the questions, but also gives weights to each question to yield scales based on the empirical data. Our grouping is similar to the original paper.[22] We imputed missing values based on an EM algorithm for continuous variables[35] and the imputed scores were rounded to the nearest whole number to reflect the Likert scales.

A second group of variables are demographic predictors. Age was reported by the women and treated as a continuous variable. Race/ethnicity is based on four categories (three dummy variables in analysis): White (reference group), Black, Hispanic, and other race/ethnicity. Marital status is based on three categories (two dummy variables): single (reference group), married or cohabiting, and widowed, divorced, or separated.

Socioeconomic status (SES) factors form our third group of variables. Poverty status was based on the 2008 federal poverty guideline where those women in households with incomes below the poverty line are classified as poor (coded 1) and others (coded 0). Employment status was trichotomized into employed, unemployed, and others (i.e. disabled or retired; reference group). Educational attainment is measured by four dummy variables based on a five-category variable: did not graduate high school (reference group), high school diploma, some college, an associate/bachelor degree, and post college degree.

The fourth group of predictors relate to health care resources and insurance status. The women were asked about their primary source of care grouped into: no regular health care provider, private doctor's office, public and community health center, and other source of care (e.g., outpatient clinic). Three dummy variables were created with no regular health care provider serving as the reference group. Health insurance status was dichotomized into insured (coded 1) and uninsured (coded 0).

The final group of variables concerns the woman's health status. Self-rated health is based on a question with four choices: excellent (reference group), good, fair, or poor. We also include self-rated stress; in the PHMC this is a single scale from 1 to 10 to assess the experience of day-to-day stress, where 1 indicated "no stress" and 10 "extreme amount of stress." This measure has been used in the absence of a complete inventory of stressful events.[36, 37] Including these measures in the analyses captures aspects of both mental and physical health.

Analytical strategy

Our analysis is based on the use of both logistic and multinomial logistic regression models. For the binary dependent variables (whether the women had a Pap smear, whether the women had a clinical breast exam), we model the likelihood that the response is equal to 1 given a set of explanatory covariates. For the trichomized dependent variable (the women had both tests, one test, or no test), we use a multinomial logistic regression, comparing those women who report both tests or just one test with the comparison category (no test), respectively.

Results

Eighty percent of PHMC women 18 and older had a Pap test within two years and more than 70 percent had a breast examination by a doctor or health professional within a year (results not shown). Table 2 presents descriptive statistics for all variables used in this study by the number of screening services used (for dummy variables the proportions can be interpreted as percentages). We provide data on the mean value of each variable for the overall sample and we compare mean values between three subsamples: those women who had neither the Pap test nor breast examination within the recommended time, those women who had one screening test, and those women who had both. The comparisons of means between samples are shown in the last column of Table 2. Several patterns are worth noting. First, both values and competence distrust scores are lower among women with greater utilization of screening services. Specifically, the values distrust of the women who reported having one or both tests is significantly lower than the group of women who did not have either a Pap test or a breast examination (Both −0.083 vs. One −0.020 vs. Neither 0.103). Second, higher SES

women utilize preventive health services more than other women. For example, almost 17 percent of women who reported having both a Pap test and a breast examination had a post college degree compared to 9 percent of women who had no screening test, a difference that is statistically significant. Third, respondents whose usual source of care was a private physician's office were more likely to have both Pap and breast cancer screening tests than those with other types of sources of care. Finally, women with less stress or better self-rated health also reported more utilization of cancer screening tests.

Table 3 presents the logistic regression results for utilization of Pap tests and clinical breast examination. Competence distrust was associated with the odds of having a Pap test. Specifically, a unit increase in competence distrust was associated with an 8 percent decrease in the likelihood of having a Pap test (OR=0.916; 95% CI= 0.851, 0.986). The odds of having a Pap test also was related to age, race/ethnicity, marital status, employment status, education, health care resources, and personal health. For instance, having a regular source of care (regardless of type) was associated with a 68~77 percent increase in the odds of having a Pap test. Controlling for other covariates, each 10-year increase in age was related to a 24 percent decrease in the odds of having a Pap test in the recommended time interval (0.973^10= 0.761).

With respect to breast cancer screening, only higher levels of values distrust are associated with lower odds of receiving a clinical breast examination. Other things equal, the odds of having a breast cancer screening decreased by roughly 8 percent with each one unit increase in values distrust (OR=0.923; 95% CI= 0.864, 0.986). The determinants of having a clinical breast examination are similar to those of having a cervical cancer test, i.e., demographic features and health care resources. One of the potentially modifiable factors is insurance status. The odds of having a breast examination among insured women were almost triple those of women without insurance (OR=2.757; 95% CI= 2.179, 3.489).

Next, we used multinomial logistic regression to investigate whether distrust was related to the number of preventive screening tests (Table 4). Compared to women without any screening tests, values distrust was related to the likelihood of having one of these two tests, and both values and competence distrust scores were negatively associated with the odds of receiving both services. Specifically, one unit increase in values distrust would result in a 12.5 percent decrease (OR=0.875; 95% CI= 0.790, 0.970) in the likelihood of having only one of the two preventive tests. This association remained when comparing women with both tests (OR= 0.875; 95% CI= 0.800, 0.958). An association for competence distrust was found among those utilizing both services; specifically, the odds of taking two tests would be reduced by almost 10 percent (OR=0.914; 95% CI= 0.838, 0.997) if competence distrust increased by one unit.

There are several noteworthy additional findings. Economic factors and health status do not appear to be associated with differences between having no screening test and having one; i.e., poverty, employment status, educational attainment, self-rated health, and stress were not significant. Marital status, race/ethnicity, health insurance and source of care, however, were associated with the difference between having no test and one test. When comparing those women having both tests with those with none, we find that socioeconomic and health conditions were important. Employed women and those with a college degree were more likely to have had both recent breast and cervical cancer screenings. Self-rated health was also associated with having both tests. Women who rated their health as fair or poor were about 35 to 40 percent less likely to receive breast and cervical cancer screening. Moreover, employment status, having at least a college education, and reporting fair/poor health are the main factors that account for the differences between the two models in Table 4.

Discussion

Our findings support the first hypothesis that high levels of health care system distrust among women are associated with low utilization of cancer screening services, specifically Pap smears and clinical breast examinations. However, our second hypothesis that both the values and competence distrust scores were negative associated with cancer screening utilization was not fully supported. Results suggest that different dimensions of distrust play a unique role in understanding cancer screening usage; that is, high competence distrust was associated with low odds of receiving Pap test screening and values distrust was negatively associated with the likelihood of receiving a clinical breast examination. This difference is intriguing, and warrants further investigation. Since women can be screened for breast cancer by both clinical breast exam and mammogram, it could be the case that those who distrust their health care providers' integrity or ethics are more likely to opt to rely on the objective screening provided by mammography. On the other hand, women who have doubts about the technical competence of their health care provider may be reluctant to submit to an office-based laboratory test like a Pap smear.

Independent of other covariates, health care resources and personal health were associated with women's utilization of cancer screening. If women have a regular source of care they are more likely to receive and act on the recommendation to have a regular Pap test and clinical breast examination.[38] Women with a regular source of care may have frequent interactions with the health care system (i.e. insurance company and health providers) and these interactions may promote the trustworthiness of health care environment and hence lessen competence distrust.[26]

As mentioned above, the differences between the two models in Table 4 indicate that employment status, education and self-rated health are important factors associated with the utilization of cancer screening. Consistent with other research we find that higher educational attainment is associated with the dissemination and adoption of information on the importance of preventive health services;[39, 40] respondents with at least college education are more likely to receive both, rather than one of, cervical and breast cancer screenings than their counterparts. Similarly, perhaps women with fair/poor self-rated health may not seek screening because of concerns about the discovery of cancers.

This study of Philadelphia women documents a significant association between distrust and utilization of breast and cervical cancer screening tests, net of other factors. While employing different measures of distrust, this study corroborates a recent paper that concluded that different dimensions of trust in the health care system had unique relationships with the use of preventive health services among older black and white adults in Pittsburgh.[11] Our findings are consistent with studies exploring determinants of cancer screening. For example, we found that Black women were 1.5 to 2 times and 50 percent more likely than White women to have Pap tests or breast examinations. Hispanic women were also 50 percent more likely to have a Pap test (Table 3) than White. These findings echo those of a recent study.[25] Being married or living with a partner facilitated the use of cancer screening services. Again, similar findings have been documented elsewhere.[5, 11, 41, 42]

This study has several limitations. First, the survey data come from women in the Philadelphia metropolitan area and the findings may not be generalizable to women in other areas, although the findings are in line with research conducted in similar settings. Second, the PHMC does not provide specific information on levels of respondents' trust in their primary health providers and thus the intertwined association between trust in physicians and health care system distrust cannot be separated. Third, as noted earlier, the wording and

classification of time intervals for the Pap test question does not permit a direct comparison with recommended screening guidelines. Fourth, this study is cross-sectional, which precludes looking at cause and effect relationships over time. Fifth, while the balancing weights were constructed accounting for phone type and sociodemographic features,[43] non-response bias is another possible source of errors. Finally, the data are self-report and therefore subject to recall bias and other measurement errors.[44, 45]

Several policy implications emerge from this study. As distrust plays an important role in the utilization of cancer screening tests, rebuilding levels of trust in the health care system among the American public should be a priority. The values and competence distrust in the health care system has been a barrier to public health research.[46] Maintaining a high level of service quality and responsiveness (i.e. reducing medical errors, providing transparency to patients) may reduce both competence and values distrust[47] and in turn may increase the utilization of cancer screening tests. This could be an example of how macro-level changes can influence individual behaviors.

As found in this study, having a regular source of care, regardless of type, may increase the opportunity for advice and compliance with cancer screening test recommendations. Even though there is an increased vulnerability to cancer with age, older women are less likely to receive screening tests. Promoting earlier and regular screening can lead to early detection and will reduce cancer morbidity and mortality within American women.

This study used a recently developed health care system distrust scale to investigate the effects of different dimensions of distrust on breast and cervical cancer screening. The results indicate that competence and values distrust are associated with the likelihood of recommended use of screening tests, even after controlling for other competing covariates. Health care system distrust was found to be a barrier in the utilization of preventive health services. In addition to traditional demographic and socioeconomic determinants, future research should include measures of distrust so as to better understand patterns and determinants of cancer screening.

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Table 1

Factor loadings with Varimax rotation.

Actual Questions	Component	
	Competence	Values
a. Health Care System makes patients' health better[#]	**.733**	.190
b. Health Care System covers up its mistakes	.027	**.698**
c. Patients receive high quality care from Health Care System[#]	**.799**	.204
d. Health Care System makes too many mistakes	.295	**.634**
e. Health Care System puts making money above patients' needs	.297	**.693**
f. Health Care System gives excellent medical care[#]	**.796**	.201
g. Patients get same medical treatment regardless of race[#]	**.564**	.283
h. Health Care System lies to make money	.294	**.712**
i. Health Care System experiments on patients without them knowing	.241	**.636**

Components	Minimum	Maximum	Mean	Standard Deviation
Competence Distrust Factor Scores	−4.316	3.154	0.000	1.000
Values Distrust Factor Scores	−3.180	3.800	0.000	1.000

[#]Item is reverse coded

Table 2

Descriptive statistics overall and by number of screening services obtained in recommended time interval[†]

Variables	Overall Sample (N=5,268)	Neither Screening (N=694)	One Screening (N=1,062)	Both Screenings (N=3,512)	Comparisons Between Groups
	Mean/percent[#]	Mean/percent[#]	Mean/percent[#]	Mean/percent[#]	
Health Care System Distrust					
Values	0.000	0.103	−0.020	−0.083	*a,b*
Competence	0.000	0.039	−0.005	−0.011	
Demographics					
Age	48.441	52.215	50.157	46.756	*a,b,c*
White (ref.)	0.671	0.722	0.629	0.676	*a,b,c*
Black	0.220	0.152	0.235	0.227	*a,b*
Hispanics	0.062	0.066	0.077	0.055	*c*
Others	0.047	0.059	0.058	0.041	
Marital Status					
Married/cohabiting	0.584	0.466	0.522	0.631	*a,b,c*
Widowed/divorced/separate	0.188	0.274	0.218	0.155	*a,b,c*
Single (ref.)	0.228	0.260	0.260	0.213	*b,c*
Socioeconomic Status					
Poverty	0.129	0.162	0.158	0.111	*b,c*
Non-poor (ref.)	0.871	0.838	0.842	0.889	*b,c*
Employment Status					
Employed	0.587	0.480	0.492	0.650	*b,c*
Unemployed	0.067	0.085	0.098	0.054	*b,c*
Others (ref.)	0.346	0.435	0.410	0.297	*b,c*
Education					
Not High School Graduate (ref)	0.080	0.115	0.110	0.063	*b,c*
High School Diploma	0.322	0.396	0.368	0.289	*b,c*
Some college	0.206	0.212	0.212	0.202	
College	0.248	0.184	0.195	0.281	*b,c*
Post College	0.144	0.092	0.115	0.166	*b,c*

Variables	Overall Sample (N=5,268)	Neither Screening (N=694)	One Screening (N=1,062)	Both Screenings (N=3,512)	Comparisons Between Groups
Health Care Resources					
Insured	0.928	0.840	0.905	0.955	*a,b,c*
Not insured (ref.)	0.072	0.160	0.095	0.045	*a,b,c*
Regular source of care					
No regular health care (ref.)	0.086	0.147	0.085	0.073	*a,b*
Private doctor office	0.793	0.723	0.778	0.815	*a,b,c*
Public health center	0.061	0.067	0.068	0.057	
Others	0.059	0.064	0.068	0.055	
Personal Health					
Self-rated Health					
Excellent Health (ref.)	0.330	0.273	0.260	0.368	*b,c*
Good Health	0.467	0.433	0.479	0.469	
Fair	0.158	0.220	0.204	0.128	*b,c*
Poor	0.045	0.074	0.057	0.035	*b,c*
Stress	5.643	5.758	5.631	5.635	

† The comparisons between groups already accounted for standard deviation so we did not report standard deviation.

For binary variables, mean values can be interpreted as the proportions of those coded 1.

a significant difference between neither and one screening at least at .05 level.

b significant difference between neither and two screenings at least at .05 level.

c significant difference between one and two screenings at least at .05 level.

Table 3

Logistic regression results modeling receipt of pap smear screening test and clinical breast examination within the recommended time interval, N=5,268

Variables	Pap smear screening test			Clinical breast examination		
	Odds Ratio	95% CI	P-value	Odds Ratio	95% CI	P-value
Health Care System Distrust						
Values	0.928	(.860, 1.000)		0.923	(.864, .986)	*
Competence	0.916	(.851, .986)	*	0.959	(.899, 1.023)	
Demographics						
Age	0.973	(.967, .978)	***	0.998	(.993, 1.003)	
White (ref.)	1.000			1.000		
Black	2.094	(1.692, 2.592)	***	1.597	(1.334, 1.910)	***
Hispanics	1.569	(1.109, 2.219)	*	0.911	(.694, 1.196)	
Others	1.088	(.770, 1.535)		0.886	(.661, 1.187)	
Marital Status						
Married/cohabiting	1.806	(1.483, 2.199)	***	1.404	(1.188, 1.659)	***
Widowed/divorced/separate	1.214	(.960, 1.536)		1.060	(.857, 1.312)	
Single (ref.)	1.000			1.000		
Socioeconomic Status						
Poverty (ref.= non-poor)	1.122	(.886, 1.419)		0.955	(.779, 1.171)	
Employment Status						
Employed	1.449	(1.215, 1.728)	***	1.141	(.977, 1.333)	
Unemployed	1.054	(.777, 1.430)		0.665	(.513, .861)	**
Others (ref.)	1.000			1.000		
Education						
Not High School Graduate (ref)	1.000			1.000		
High School Diploma	1.044	(.795, 1.371)		1.026	(.802, 1.312)	
Some college	1.174	(.873, 1.577)		1.178	(.903, 1.535)	
College	1.600	(1.173, 2.183)	***	1.414	(1.075, 1.860)	*
Post College	1.835	(1.296, 2.597)	***	1.537	(1.136, 2.078)	**
Health Care Resources						
Insured (ref.= not insured)	3.152	(2.425, 4.098)	***	2.757	(2.179, 3.489)	***

Variables	Pap smear screening test			Clinical breast examination		
	Odds Ratio	**95% CI**	**P-value**	**Odds Ratio**	**95% CI**	**P-value**
Regular source of care						
No regular health care (ref.)	1.000			1.000		
Private doctor office	1.678	(1.304, 2.159)	***	1.631	(1.311, 2.028)	***
Public health center	1.697	(1.159, 2.483)	**	1.885	(1.353, 2.627)	***
Others	1.768	(1.202, 2.601)	**	1.385	(1.004, 1.911)	*
Personal Health						
Self-rated Health						
Excellent Health (ref.)	1.000			1.000		
Good Health	1.005	(.841, 1.201)		0.829	(.713, .965)	*
Fair	0.737	(.585, .928)	**	0.639	(.522, .784)	***
Poor	0.638	(.454, .896)	**	0.677	(.492, .932)	*
Stress	1.006	(.977, 1.036)		0.986	(.961, 1.011)	
AIC		4,694.727			5901.623	
Pseudo-R^2		0.155			0.086	

* p< .05;

** p< .01;

*** p< .001.

Table 4

Multinomial regression results modeling the number of receipt of screening tests in the recommended time interval versus none, N=5,268

Variables	One (n=1,062) v.s. None (n=694)			Two (n=3512) v.s. None (n=694)		
	Odds Ratio	95% CI	P-value	Odds Ratio	95% CI	P-value
Health Care System Distrust						
Values	0.875	(.790, .970)	*	0.875	(.800, .958)	**
Competence	0.955	(.864, 1.054)		0.914	(.838, .99)	*
Demographics						
Age	0.993	(.985, 1.000)		0.982	(.976, .989)	***
White (ref.)	1.000			1.000		
Black	2.291	(1.712, 3.065)	***	2.671	(2.053, 3.475)	***
Hispanics	1.710	(1.112, 2.628)	*	1.406	(.950, 2.079)	
Others	1.429	(.921, 2.218)		1.047	(.703, 1.560)	
Marital Status						
Married/cohabiting	1.303	(1.005, 1.690)	*	1.835	(1.459, 2.307)	***
Widowed/divorced/separate	0.977	(.713, 1.339)		1.122	(.849, 1.483)	
Single (ref.)	1.000			1.000		
Socioeconomic Status						
Poverty (ref.= non-poor)	0.941	(.693, 1.277)		1.002	(.761, 1.320)	
Employment Status						
Employed	0.945	(.743, 1.203)		1.292	(1.047, 1.595)	*
Unemployed	1.220	(.830, 1.795)		0.836	(.584, 1.197)	
Others (ref.)	1.000			1.000		
Education						
Not High School Graduate (ref)	1.000			1.000		
High School Diploma	1.043	(.730, 1.490)		1.060	(.767, 1.465)	
Some college	1.136	(.769, 1.677)		1.278	(.900, 1.816)	
College	1.143	(.757, 1.725)		1.668	(1.156, 2.408)	**
Post College	1.362	(.854, 2.171)		1.994	(1.318, 3.016)	**
Health Care Resources						
Insured (ref.= not insured)	1.983	(1.429, 2.753)	***	4.198	(3.115, 5.657)	***

Variables	One (n=1,062) v.s. None (n=694)			Two (n=3512) v.s. None (n=694)		
	Odds Ratio	**95% CI**	**P-value**	**Odds Ratio**	**95% CI**	**P-value**
Regular source of care						
No regular health care (ref.)	1.000			1.000		
Private doctor office	1.862	(1.342, 2.583)	***	2.096	(1.586, 2.771)	***
Public health center	1.526	(.930, 2.505)		2.127	(1.372, 3.299)	***
Others	1.600	(.980, 2.615)		1.772	(1.150, 2.731)	**
Personal Health						
Self-rated Health						
Excellent Health (ref.)	1.000			1.000		
Good Health	1.236	(.969, 1.577)		0.963	(.781, 1.187)	
Fair	1.077	(.791, 1.468)		0.663	(.505, .870)	**
Poor	0.955	(.605, 1.506)		0.609	(.407, .912)	*
Stress	0.989	(.951, 1.028)		0.994	(.960, 1.029)	
AIC	8,511.314					
Pseudo-R^2	0.118					

* p< .05;

** p< .01;

*** p< .001.

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