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## Do adults who believe in periodic health examinations receive more clinical preventive services?

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### Abstract

**Background**—Individuals who have periodic health examinations (“checkups”) with physicians even if they feel well have higher rates of screening and other preventive services than individuals who only see physicians when ill. This study assessed whether individuals’ beliefs about the advisability of periodic health examinations contribute to the likelihood that they receive recommended clinical preventive services.

**Methods**—This study used data from a 2002–2003 telephone survey of adults in 150 rural counties in 8 states of the U.S. southeast. Weighted chi-square and logistic regression analyses were used to assess associations between attitudes towards periodic health examinations and the receipt of preventative services.

**Results**—Of the 4, 879 respondents, 37% were African American, and 43% had annual household incomes of less than \$25,000. A total of 8.5% (n=374) did not endorse periodic health examinations. Not endorsing periodic examinations was more common among subjects who were male, younger, white and had no health insurance. Compared to those who endorsed periodic examinations, persons who did not were less likely to have had a periodic examination (42% vs 80%,  $p < 0.001$ ) or mammogram (28% vs 60%,  $p < 0.001$ ) in the previous year, a Pap smear in past 3 years (74% vs 90%,  $p < 0.001$ ), a cholesterol check in the last 5 years (56% vs 81%,  $p < 0.001$ ) or to ever have had endoscopic screening (28% vs 48%,  $p < 0.001$ ). These rate differences remained after adjusting for socio-demographic characteristics.

**Conclusion**—People’s beliefs about the value of periodic health examinations are associated with the likelihood that they receive recommended preventative services. Understanding individuals’ beliefs about health, disease prevention and the role of physicians in prevention could lead to improved targeted interventions aimed at increasing uptake of preventative services.

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## Introduction

Scientific advances over the past 30 to 40 years have enabled earlier detection, treatment and sometimes prevention of disease (USPSTF 1996). Practitioners are now able to offer patients an array of clinical preventive services (CPS), such as cholesterol screening and mammography, and although use rates of CPSs have increased over the last three decades they remain suboptimal (Cooper and Clancy 1998; Woolf and Atkins 2001). System barriers to preventive services, such as costs and limited access to care, have been studied extensively as reasons why some people do not receive recommended clinical preventive services, but personal beliefs may also play an important role (Jepson, Clegg et al. 2000; Glanz 2002). Studies suggest that people vary in their attitudes towards acting to prevent disease, and, within that context, vary in their attitudes towards CPS (Puschel, Thompson et al. 2001).

Although current clinical practice guidelines recommend delivery of CPS during illness encounters (Canadian Task Force 1979; USPSTF 1996; Smith and Wender 2004), numerous studies demonstrate that individuals who undergo annual physical exams, referred to also as periodic health examinations (Han 1997), have higher rates of screening than individuals who only see physicians during illness (Kottke, Solberg et al. 1997; Sox, Dietrich et al. 1997; Flocke, Stange et al. 1998). The reasons for this are not fully known (Laine 2002), but the underlying beliefs and preferences of patients who attend periodic health examinations may be important. Individuals who endorse periodic examinations may be more oriented towards prevention in general, and thus more open to CPS (Norman 1993). Understanding patients' beliefs about prevention and the role of medical practitioners in preventing disease could lead to message tailoring and other new strategies aimed at increasing rates of CPS both inside and outside the context of the periodic health examination (Bodenheimer, Wagner et al. 2002).

Issues related to CPS are as pertinent in the rural South as anywhere: states in the southeast consistently rank in the bottom quartile on measures of primary and secondary prevention (Jencks, Cuedon et al. 2000) and providers in rural areas report lower rates of preventive care (Ewing, Selassie et al. 1999; Probst, Moore et al. 2002.) Using data from a telephone survey of adults in the rural South (Pathman, Ricketts et al. 2006), this study assessed whether having negative or ambivalent beliefs about periodic health examinations places individuals at risk for receiving fewer CPS and identified sociodemographic and other characteristics of individuals less likely to value periodic examinations. This study further assessed whether people's beliefs in periodic health examinations might explain why individuals in some sociodemographic groups are more likely to receive recommended CPS than people in other groups.

## Methods

### Dataset

The Robert Wood Johnson Foundation's Southern Regional Access Program (SRAP) (Beachler, Holloman et al. 2003) was designed to improve access to basic health care services in select rural areas of eight southern states. A random digit dialing telephone survey, described in detail elsewhere (Pathman, Ricketts et al. 2006), was conducted from mid 2002 to mid 2003 to assess adults' baseline use of healthcare services and perceived barriers in the 150 non-metropolitan counties targeted in the SRAP. Survey methods were modeled after those of the Behavioral Risk Factor Surveillance Survey of the CDC (Centers for Disease Control and Prevention 2005). Eligible adults were those age 18 years and older who had lived in the immediate area for at least 12 months and spoke English or Spanish. The participation rate was 51.0%, with a total of 4, 879 adults completing the survey and

4,682 non-respondents; telephone hang ups prior to determining eligibility were treated as eligible non-respondents, whereas numbers that were never answered were treated as ineligible (The American Association for Public Opinion Research 2004).

## Definitions

Attendance at a periodic health examination was assessed with the question “About how long has it been since you last visited any doctor or provider for a routine check-up?” (Centers for Disease Control and Prevention 2002) To clarify the meaning of a routine check-up, all subjects were told that “A routine check-up does not include emergency care, simple blood pressure check or nursing education.” Beliefs regarding the value of periodic examinations were assessed by asking participants to rate how much they agreed or disagreed with the statement: “Even if a person is feeling well, they should get a routine physical examination at least once a year”, with five Likert-scale response options. Responses were dichotomized into “endorses periodic examinations” (strongly agrees/agrees) vs. “does not endorse periodic examinations” (strongly disagrees/disagrees/no opinion). This survey question has been used in a prior study for similar purposes (Sharp, Ross et al. 1983).

Receipt of specific CPSs was assessed with the following questions: (1) “During the past 12 months, have you had a mammogram? (2) During the past three years, have you had a Pap smear? (3) During the past 5 years, have you had your cholesterol checked? (4) Have you ever had a sigmoidoscopy or colonoscopy?” Only responses from participants in the age and gender groups for whom each preventive service is recommended were analyzed (USPSTF 1996); specifically, mammograms for women age 50 and older, Pap smears for women 18 to 64, cholesterol screening for men 35 to 69 and women 45 to 69, and sigmoidoscopy or colonoscopy for participants age 50 and older.

## Statistical Analyses

Analyses were performed using Stata software (Version 8.0 Stata Corp, College Station, Texas) and were weighted to reflect county sampling probabilities and state specific racial-ethnic composition, three age strata, three income strata (<\$15K, \$15-25K, \$25K+), and gender composition to reduce potential bias due to people's lack of phone ownership and differential willingness to participate in the survey (CyBulski 2004; Thomas 2004).

Descriptive analyses were conducted for all variables. Chi-square analyses and simple regression were used to assess associations between attitudes towards periodic examinations and respondents' receipt of preventive services. Logistic regression was used to estimate a model for use of each service, adjusting for covariates selected based on association with receipt of CPS in previous studies. In order to distinguish between effects of *having had* a periodic examination itself versus the effects of *believing in the value* of periodic examinations, each model was run separately (stratified) for those who reported that they did or did not have a periodic examination in the past year.

To assess whether the associations between sociodemographic variables and the receipt of preventive services were mediated by beliefs about periodic health examinations, logistic regression was used to first estimate a model of use of each service including only sociodemographic variables. A second model was then estimated which included a variable reflecting individuals' belief in periodic well examinations, and the estimated odds ratios for each sociodemographic variable were compared between the two models that did and did not incorporate the belief variable. Interaction terms between beliefs and each of the sociodemographic variables were individually tested in the models; none were significant and were thus not included in the models we report.

To identify characteristics of individuals less likely to value periodic examinations, single variable and multivariate logistic regression analyses were conducted with sociodemographic variables as independent variables and endorsement of periodic examinations as the dependent variable.

## Results

With weighting, the mean age among study subjects was 46 years (range 18 to 94), over half were female (54%) and married (55%), most were white (63%) but over one-third were black (36%). Just over half (50.3%) reported only a high school education or less, 43% reported household incomes of less than \$25,000, and about one-third (31%) reported having had no health insurance for at least part of the past year; 26% reported themselves to be in fair or poor health. Over 91% of respondents endorsed periodic health examinations but 8.5% did not. (Table 1) Demographic characteristics of individuals who endorsed periodic examinations and individuals who did not endorse periodic examinations are also described in Table 1.

In bivariate analyses, compared to individuals who endorsed periodic examinations, those who did not were less likely to report having had a mammogram in the past year (60% versus 28%  $p<0.001$ ), a Pap smear in past 3 years (90% versus 74%  $p<0.001$ ), a cholesterol check in the past 5 years (81% versus 56%  $p<0.001$ ) and ever having had a colonoscopy or flexible sigmoidoscopy (48% versus 28%  $p<0.001$ ) (Table 2). Rate differences ranged from 16% to 32% depending on the service. After adjusting for age, gender, race, self-reported health status, insurance coverage and level of education, individuals endorsing periodic examinations still had greater odds of having received each preventive service (Table 3a): 3.7 times to the odds of having had a mammogram, 2.8 times the odds of having had a Pap smear, 2.7 times to the odds of having had their cholesterol checked and 2.1 times to the odds of having had a colonoscopy or flexible sigmoidoscopy.

Among the subgroup of individuals who reported that they had a periodic health examination within the past year, differences in likelihood of having received each CPS by belief in the value of periodic examinations diminished and were no longer significant, except in the case of having received a mammogram (Table 3b). Among individuals reporting no periodic medical examination in the past year, belief in the periodic examination remained independently and significantly associated with the receipt of each CPS (Table 3c).

Among individuals reporting no periodic health examination in the past year—the group for whom beliefs were significantly associated with receipt of services—belief in the periodic examination was the strongest correlate among variables tested for the receipt of Pap smear, colonoscopy and cholesterol screening (Table 4). Because belief in the periodic examination was significantly associated with receipt of mammogram for both those who had a periodic examination in the past year as well as those who did not, both groups were included in analyses for this service and, again, belief in the periodic health examination was the strongest correlate of receipt of mammogram. Odds ratios for each of the sociodemographic variables for the likelihood of receiving each of the preventive services did not change appreciably when the variable indicating people's beliefs in periodic examinations was added to the models. People's beliefs in periodic examinations, therefore, did not explain why, for example, cholesterol screening was more common among subjects who were older, black or reported better health status.

Participants who did not endorse periodic examinations were more likely to be younger (OR 0.87, 95% CI 0.79, 0.96), male (OR 1.64, 95% CI 1.27, 2.13) and white (OR 2.91, 95% CI

1.95, 4.35), to have at least some college education (OR 1.43, 95% CI 1.09, 1.89) and to report their health status as very good (OR 1.85, 95% CI 1.00, 3.40) or excellent (OR 2.11, 95% CI 1.15, 3.91) (Table 5). When simultaneously adjusting for all of these characteristics, the likelihood of endorsing periodic examinations remained significantly associated with age, gender and race, and became significant for those who lacked health insurance.

## Discussion

Eight and a half percent of participants in this study did not agree that people should have a periodic health examination at least annually. While this represents fewer than one in ten adults in this southern rural population, if they are representative of others nationally then this reflects tens of millions of individuals and is therefore significant from a population health perspective. These findings suggest that belief in the value of periodic health examinations is associated with the receipt of clinical preventive services: individuals who don't value or are ambivalent about periodic examinations less often get recommended mammograms, Pap smears, cholesterol checks and colon cancer screening, with an absolute difference of up to 32%, depending on the service. Rates among those who endorsed periodic examinations were similar to those from other surveys of nationally representative groups for all services except mammogram for which rates in this study were lower (60% vs 78%), potentially because this study asked about mammogram in the previous year as opposed to two years (Centers for Disease Control and Prevention 2004). Interestingly, rate differences between those who did and did not believe in the periodic exam differed across services, ranging from 16% to 32%, suggesting that beliefs might more strongly influence the probability of getting some services as opposed to others. While this study does not have the data to explore the reasons for these differences, several explanations are plausible. Differences in some cases could simply be due to differences in baseline rates of uptake. For example, use rates for Pap smears were high at baseline and could not possibly have increased as much as the other preventive services without exceeding 100%. Additionally, beliefs in the value of check-ups may interact with other factors that magnify or diminish the amount that the beliefs affect uptake of services. For example, individuals with diabetes or hypertension are more regularly seen by their doctors and more likely to have their cholesterol checked as an important modifiable cardiovascular risk factor regardless of patients' beliefs about the value of check-ups. In those cases, individuals' beliefs about the value of a periodic health examination could have less influence on the likelihood of having one's cholesterol checked than some other services, such as mammography.

Analyses stratified by whether or not individuals had a periodic health examination revealed that it is primarily for those who did not have a periodic examination in the previous year that endorsing periodic examinations is associated with receipt of CPS. Among the nearly one-in-four individuals who reported no periodic examination in the past year, those who valued periodic examinations more often received CPS, presumably during doctor visits scheduled for their acute or chronic health needs, through emergency room visits, or perhaps through community health fairs or worksite screenings. Among these groups, beliefs were consistently the strongest correlate for use of CPS compared to other sociodemographic variables examined-addition of the beliefs variable to the full model did not appreciably change the odds ratios for the other variables nor was there significant interaction between beliefs and any of the other variables. These results suggest that underlying beliefs in the value of periodic examinations do not explain why various sociodemographic groups have different rates of preventive services.

While it is encouraging that in this study those who had a periodic health examination were equally likely to receive CPS regardless of their underlying beliefs about the value of such examinations, this study identifies a group of individuals who are at high risk for not

receiving CPS—those who do not endorse periodic examinations. These individuals are both less likely to attend a periodic health examination—and therefore can't receive CPS in that context—and also less likely to receive CPS through their other medical care encounters. This last finding is particularly salient given that current recommendations for delivery of CPS emphasize opportunistic screening during encounters other than periodic examinations (Canadian Task Force 1979; USPSTF 1996; Smith and Wender 2004). In order to improve CPS rates within this group, it will be important to understand what it means to respondents not to agree with the need for a periodic examination each year and what that reveals about these individuals and their health beliefs.

The belief that one should have a periodic health examination annually may be measuring the extent to which an individual generally values prevention. This would explain why individuals who endorse periodic examinations were more likely to receive CPS even if they did not have a periodic examination. While beliefs regarding the need for specific preventive services, like mammography, are known to vary and influence uptake of those services (Norman 1993; Cooper and Clancy 1998; Puschel, Thompson et al. 2001), less is known about people's orientation towards prevention in a more general sense and how it can best be measured. There is evidence that individuals who engage in healthy behaviors are more inclined to seek referrals for medical screening and other preventive services (Macrae, Hill et al. 1984; Norman 1993; Fukunaga, Jitsunari et al. 1997; Wu 2003). It is also plausible that even if an individual has a positive orientation towards disease prevention, s/he will not always believe the medical system is effective in preventing disease. Medical skepticism—doubts about the ability of conventional medical care to alter one's health—has been found to be associated with receiving less prevention (Norman 1993; Fiscella, Franks et al. 1998).

In this study, younger individuals less often valued periodic examinations. Unfortunately, clinical preventive services, by definition, may be of most benefit for this very group (Scarinci, Slawson et al. 2001). Skepticism of medicine is associated with younger age and perceptions that one is in good health (Fiscella, Franks et al. 1998). Men were also less likely to endorse periodic examinations in this study: previous studies have identified men's reluctance to seek health services (Galdas, Cheater et al. 2005). One qualitative study of men's help seeking behavior found that few men were comfortable confiding in their primary care provider and many felt that only severe problems required a doctor's help (Richardson 2001). Presumably a periodic examination, with no severe problem to address, does not warrant a doctor visit in the eyes of some men.

## Limitations

This study is cross sectional in design, making inferences to causality uncertain. Further, measures of the receipt of CPS were by self-report and therefore may not accurately reflect actual services received.

The survey response rate of 51%, while lower than ideal, is similar to that of large nationally representative surveys. Recent response rates for the CDC's BRFSS, after which the telephone survey of this study was modeled, have also been around 50% in recent years—its state median response rate in 2001 was 51.1% (Centers for Disease Control and Prevention Quality Report 2002). A recent technical review panel has concluded that this has not affected the validity or reliability of the BRFSS data (Centers for Disease Control and Prevention 2004).

Because all four CPS measured in this study were services that use technology and test for the presence of diseases, we can be less certain about how attitudes about the value of periodic health examinations are associated with the receipt of other types of CPS, such as

counseling (for tobacco, exercise, diet), health and safety warnings (gun safety, seat belts) and risk screenings (e.g., for domestic violence, depression).

The focus of this study was on identifying individuals who may not be oriented towards prevention and not on potential external barriers, like transportation and financial burdens, which could impede use of CPS among individuals whether or not they believe in periodic examinations. Finally, the current study examines attitudes within a rural southern cohort and may not reflect the attitudes and behaviors of the general US population; studies suggest the percentage of individuals who do not endorse periodic examinations may be higher nationally (Oboler, Prochazka et al. 2002).

## Conclusions

In conclusion, individuals who do not endorse periodic health examinations are less likely to receive periodic health examinations and also recommended clinical preventive services; they tend to be younger and male. Since these individuals are less likely to see a physician for a periodic exam, interventions to help these individuals more often receive recommended preventive health services may need to be at the society or community level, through public education initiatives via lay press and television, through workplace education or requirements (e.g., employer mandates for annual checkups for all employees), or by mandates from insurers. A more clear understanding of individuals' attitudes and beliefs about periodic examinations, the role of doctors and prevention in general may reveal which approaches will be most effective in increasing receipt of clinical preventive services within this at-risk group.

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**Table 1**  
**Demographic characteristics (weighted)\* : Southern Regional Access Program 2002-2003**

Characteristics	Total Sample		Believes in Periodic examination		Does not believe in Periodic examination	
	n	Percent or Mean 46 (range 18-94)	n	Percent or Mean 46 (range 18-94)	n	Percent or Mean 42 (range 18-94)
Age, years	4830	46 (range 18-94)	4456	46 (range 18-94)	374	42 (range 18-94)
Sex						
Female	3225	54.2	3028	55.3	197	42.9
Male	1605	45.8.0	1428	44.7	177	57.1
Marital Status						
Married	2665	55.5	2446	54.1	219	55.2
Not married	2141	44.5	1988	45.9	153	44.8
Race						
White	3277	65.2	2962	61.4	315	82.2
Black	1371	36.8	1325	38.6	46	17.8
Education						
Some college	1,978	41.7	1808	41.1	170	49.0
Tech/trade school	397	8.2	361	8.1	36	8.7
High school or less	2,436	50.1	2270	50.8	166	42.3
Income						
< \$25, 000	1854	43.8	1739	44.5	115	36.2
\$25, 000	2375	56.2	2172	55.5	203	63.8
Insurance						
Uninsured part/all						
last year	1309	31.1	1197	30.7	112	34.8
Insured	3466	68.9	3217	69.3	249	65.2
Self-reported health						
Excellent	795	17.7	709	17.2	86	23.3
Very good	1,154	25.1	1058	24.7	96	29.3
Good	1,605	33.9	1480	34.1	125	31.8
Fair	817	15.0	773	15.5	44	10.2
Poor	447	8.3	419	8.5	22	5.4
Had a well-visit in last yr						

Characteristics	Total Sample		Believes in Periodic examination		Does not believe in Periodic examination	
	n	Percent or Mean	n	Percent or Mean	n	Percent or Mean
Yes	3772	76.8	3612	79.9	160	42.3
No	979	23.2	782	20.1	197	57.6
Endorses well-visit	4456	91.50				
Does not endorse well-visit	374	8.50	--	--	--	--

\* All percentages and means are weighted; some are calculated on slightly smaller n due to missing values

**Table 2**  
**Percent receiving recommended preventive services by attitude towards periodic health examination (unadjusted): Southern Regional Access Program 2002-2003**

<b>Preventive service received:</b>	<b>Does not endorse well-visit</b>	<b>Endorses well-visit</b>	<b>Rate difference</b>	<b>P</b>
Mammogram (n=1633)	28%	60%	32%	<0.001
Pap smear (n=2478)	74%	90%	16%	<0.001
Cholesterol (n=2570)	56%	81%	25%	<0.001
Colon screen (n=2377)	28%	48%	20%	<0.001

**Table 3**  
**Odds that a subject who endorses periodic examination reportedly received a periodic examination and each preventive service compared to subject who does not endorse periodic examination: Southern Regional Access Program 2002-2003**

<b>3a. Odds among all subjects (n=4830)</b>				
<b>Preventive service</b>	<b>Odds ratio (unadjusted)</b>	<b>95% CI</b>	<b>Odds ratio (adjusted*)</b>	<b>95%CI</b>
Periodic examination	5.41	4.10, 7.14	4.20	3.10, 5.69
Mammogram	3.91	2.14, 7.14	3.72	1.89, 7.32
Pap smear	3.09	1.98, 4.83	2.76	1.73, 4.38
Cholesterol	3.29	2.29, 4.73	2.73	1.84, 4.05
Colonoscopy	2.37	1.56, 3.58	2.11	1.35, 3.31
<b>3b. Odds among only those who had a periodic health examination in the past year (n=3803)</b>				
<b>Preventive service</b>	<b>Odds ratio (unadjusted)</b>	<b>95% CI</b>	<b>Odds ratio (adjusted*)</b>	<b>95%CI</b>
Mammogram	2.83	1.39, 5.74	2.79	1.23, 6.30
Pap smear	1.16	.53, 2.50	.99	.43, 2.29
Cholesterol	1.29	.67, 2.47	1.20	.61, 2.35
Colonoscopy	1.58	.93, 2.69	1.51	.86, 2.67
<b>3c. Odds among only those who did not have a periodic health examination in the past year (n=993)</b>				
<b>Preventive service</b>	<b>Odds ratio (unadjusted)</b>	<b>95% CI</b>	<b>Odds ratio (adjusted*)</b>	<b>95%CI</b>
Mammogram	4.21	1.39, 12.65	3.70	1.07, 12.82
Pap smear	2.31	1.26, 4.24	2.37	1.25, 4.37
Cholesterol	2.46	1.47, 4.13	2.53	1.44, 4.45
Colonoscopy	2.43	1.16, 5.12	2.48	1.04, 5.94

\* Each model adjusted for age, gender, race, self reported health status, insurance status and level of education

**Table 4**  
**Odds that an individual received preventive services by selected sociodemographic variables and belief in the periodic health examination (PHE) \* (95% Confidence Intervals): Southern Regional Access Program 2002-2003**

	Mammogram		Pap smear		Colonoscopy		Cholesterol screen	
	N=1546	N=1525**	N=457	N=451**	N=345	N=335**	N=526	N=515**
Believes in PHE								
No	--	1.0 (1.91-7.38)	--	1.0 (1.19-4.17)	--	1.0 (1.19-5.83)	--	1.0 (1.38-4.04)
Yes		3.76 (1.91-7.38)		2.23 (1.19-4.17)		2.56 (1.19-5.83)		2.36 (1.38-4.04)
Age								
	0.99 (.98-1.01)	0.99 (.98-1.01)	.98 (.96-1.00)	.98 (.96-1.00)	1.02 (.99-1.05)	1.03 (.97-1.05)	1.05 (1.02-1.08)	1.04 (1.01-1.08)
Sex								
Male	--	--	--	--	1.0 (.46-1.46)	1.0 (.39-1.26)	1.0 (.81-2.08)	1.0 (.78-2.03)
Female					.82 (.46-1.46)	.70 (.39-1.26)	1.29 (.81-2.08)	1.26 (.78-2.03)
Race								
White	1.0 (.94-1.69)	1.0 (.93-1.68)	1.0 (.70-2.32)	1.0 (.63-2.22)	1.0 (.32-1.71)	1.0 (.28-1.52)	1.0 (1.02-3.26)	1.0 (.97-3.21)
Black	1.26 (.94-1.69)	1.25 (.93-1.68)	1.28 (.70-2.32)	1.19 (.63-2.22)	.74 (.32-1.71)	.66 (.28-1.52)	1.82 (1.02-3.26)	1.76 (.97-3.21)
Insurance								
Insured	1.0 (.55-1.08)	1.0 (.57-1.13)	1.0 (.30-.84)	1.0 (.29-.88)	1.0 (.27-1.24)	1.0 (.27-1.26)	1.0 (.19-.51)	1.0 (.20-.53)
Uninsured part/all last year	0.77 (.55-1.08)	.80 (.57-1.13)	.50 (.30-.84)	.51 (.29-.88)	.59 (.27-1.24)	.58 (.27-1.26)	.32 (.19-.51)	.33 (.20-.53)
Self-reported health								
Fair or poor	1.0 (1.00-1.70)	1.0 (1.07-1.82)	1.0 (.44-1.81)	1.0 (.43-1.74)	1.0 (.25-.94)	1.0 (.27-1.05)	1.0 (.71-2.44)	1.0 (.73-2.54)
Good to Excellent	1.31 (1.00-1.70)	1.39 (1.07-1.82)	.89 (.44-1.81)	.86 (.43-1.74)	.49 (.25-.94)	.54 (.27-1.05)	1.32 (.71-2.44)	1.36 (.73-2.54)
Education								

	Mammogram		Pap smear		Colonoscopy		Cholesterol screen	
	N=1546	N=1525**	N=457	N=451**	N=345	N=335**	N=526	N=515**
High school	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
> High school	1.87 (1.45-2.42)	1.93 (1.48-2.50)	.99 (.60-1.65)	1.09 (.64-1.84)	2.43 (1.35-4.36)	2.29 (1.26-4.18)	1.17 (.75-1.82)	1.33 (.85-2.08)

\* Two multivariate models shown for each service; second model includes belief in periodic examination in addition to sociodemographic variables

\*\* Interaction between beliefs and each independent predictor variable tested in full model for each service; no significant interaction was identified.

**Table 5**  
**Demographic characteristics and their associations with not endorsing periodic health examinations (n=4568): Southern Regional Access Program 2002-2003**

Demographic Variables	Odds Ratio 95%	Confidence	Odds Ratio 95%	Confidence
	(unadjusted)	Intervals	(adjusted*)	Intervals
Age (10 year increments)	.87	.80, .95	.87	.79, .96
Sex				
Male	1.64	1.27, 2.13	1.59	1.20, 2.09
Female	1.00	---	1.00	---
Race				
White	2.91	1.95, 4.35	2.92	1.91, 4.46
Black	1.00	---	1.00	---
Insurance				
Uninsured part/all last year	1.21	.90, 1.61	1.39	1.02, 1.90
Insured	1.00	---	1.00	---
Level of education:				
Some college	1.43	1.09, 1.89	1.32	.99, 1.77
Tech/trade school	1.29	.82, 2.04	1.25	.78, 2.00
High school or less	1.00	---	1.00	---
Health Status:				
Excellent	2.11	1.15, 3.91	1.38	.71, 2.69
Very Good	1.85	1.00, 3.40	1.26	.68, 2.36
Good	1.46	.80, 2.62	1.12	.61, 2.08
Fair	1.02	.51, 2.04	.94	.47, 1.89
Poor	1.00	---	1.00	--

\* Model includes age, sex, race, insurance status, education and self-reported health status:  $F=7.18$ ,  $p<0.0001$