

Patient Factors Related to the Odds of Receiving Prevention Services in Veterans Health Administration Medical Centers

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Abstract

Objective: To examine the association between patient characteristics and the odds of receiving 13 health promotion/disease prevention services recommended by the US Preventive Services Task Force (USPSTF) for average-risk individuals.

Methods: A mail survey was sent to a random sample of 68,422 veterans who obtained primary care from any of the 153 Veterans Health Administration facilities in 1996; 44,304 responded (adjusted response rate was 68%). Multivariate logistic regression models were used.

Results: Demographic factors, health risk behaviors, and self-reported health were associated with the odds of receiving prevention services. Current smokers, heavy alcohol drinkers, and females were less likely to receive many health promotion services, whereas regular exercisers, overweight individuals, males, those reporting poorer health, individuals reporting high or controlled blood pressure, and those reporting high or controlled cholesterol levels were more likely to receive USPSTF-recommended prevention services.

Conclusion: Substantial proportions of veterans were likely to obtain prevention services recommended by the USPSTF for average-risk individuals.

Nevertheless, veterans who reported being current smokers, heavy drinkers, or female were less likely to obtain these services. These subgroups may benefit from additional initiatives.

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Definitive studies have demonstrated the effectiveness of a variety of health promotion and disease prevention services for defined populations. The US Preventive Services Task Force (USPSTF) has summarized the current research and offered its recommendations based on the quality of the available evidence.¹ Other researchers have examined characteristics of patients and physicians associated with compliance with these USPSTF recommendations and issued a challenge to physicians to increase compliance rates.^{2,3}

The Veterans Health Administration (VHA), one of the largest managed care systems in the United States, recognizes the importance of providing its veteran population with preventive, curative, and palliative healthcare services that are comprehensive, coordinated, and cost effective.⁴ Given that VHA was responsible for almost 926,000 inpatient medical care admissions, more than 61,000 extended-care admissions, 46,000 nursing home admissions, and more than 27,500,000 outpatient medical care visits in fiscal year 1995,⁵ finding ways to promote healthy behaviors among male and female veterans has become a primary objective.^{4,6}

The Department of Veterans Affairs (VA) National Center for Health Promotion and Disease Prevention has applied the evidence-based USPSTF recommendations as the standard of care for the asymptomatic

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matic, average-risk veteran receiving primary care in VHA facilities.⁷ The 13 recommended services comprise the core health promotion and disease prevention services that all average-risk veterans can expect to receive from their primary care provider. Primary prevention services include (1) hypertension detection, (2) hyperlipidemia detection, (3) influenza immunization, (4) pneumococcal vaccination, and (5) tetanus and diphtheria immunization. Secondary prevention services include early detection and treatment of (6) cervical cancer, (7) breast cancer, and (8) colorectal cancer. Assessment and counseling, if appropriate, are recommended for (9) tobacco use, (10) problem drinking, (11) weight control and nutrition, (12) fitness and exercise, and (13) seat belt use and accident avoidance.

Compliance goals for each guideline are modeled after those described in *Healthy People 2000*,⁸ a national initiative to improve the health of all Americans through prevention. For purposes of determining compliance with national norms in this investigation, we focused on veterans enrolled in VHA primary care clinics where comprehensive and coordinated care (including prevention services) is available. We examined the extent to which individual characteristics of veterans, including demographic factors, health risk behaviors, and self-reported health, are associated with the odds that US veterans receive 13 specific health promotion/disease prevention services (hereafter referred to simply as health promotion services) recommended by the USPSTF for average-risk individuals.

...METHODS ...

Data Collection

A computerized algorithm was used to provide a complete enumeration of all veterans with at least one primary care visit at 1 of the 153 VHA facilities between January 1 and December 31, 1996. A primary care visit was defined as an appointment in the general internal medicine, women's health, geriatrics, or primary care medicine clinics. Random samples of 300 men and 150 women were drawn for each of the 153 VHA facilities during the previous year. Each individual included in the sample was sent a questionnaire accompanied by a letter explaining the survey process. A 68% adjusted response rate was achieved after 2 mailings (44,304 respondents out of 68,422 subjects sampled, minus 2984 subjects who were deceased, without a mailing address, or not living in the community).

The 51-item (10-minute) questionnaire, titled the Veterans Health Survey, was designed to obtain information about each of the 13 recommended services directly from the men and women who visit VHA primary care clinics. We asked whether each service was received, when it was last received, and where it was received (within VHA facilities or from non-VHA sources). We also asked each veteran to report the extent to which he or she smoked cigarettes, drank alcohol, exercised regularly, and wore seat belts; to provide his or her blood pressure and cholesterol status; and to give an indication of his or her weight.

Data Processing and Analysis

Data from the 44,304 respondents were optically scanned into a computer file and cleaned. Test-retest kappa reliability statistics were calculated for the 51 items on the questionnaire using data from 933 veterans who happened to complete the survey twice. Of the 51 survey questions, 24% had kappa scores greater than 0.80, an additional 41% were greater than 0.60, and an additional 29% were greater than 0.40, which exceeds the customary threshold for acceptable reliability.⁹ Of the remaining 3 questions, 2 had dispersion characteristics that rendered the kappa statistic inadequate as an indicator of reliability.

Frequencies, percentages, means, and standard deviations were reported for each independent and dependent variable used in SAS multivariate model estimations.¹⁰ Multivariate logistic regression models were estimated to examine the patient characteristics associated with the odds of receiving each of the 13 health promotion services recommended by USPSTF. Analyses were performed on the specific age and gender subgroup of veterans for whom the particular preventive service was recommended. (For example, Pap smear tests were only examined for women under age 65 years.) Patient characteristics were organized into the following domains: demographic factors, self-reported health, and lifestyle/risk factors. We also controlled for the source of medical care because prior analyses indicated that this was an important correlate of service use (L. G. B., D. R. R., R. J. S. unpublished data, June 1998). Significant odds ratios ($P < .05$) were reported for each model. Patterns in the frequency and direction of significant predictive variables were observed and reported by domain.

Measures

The measures used as independent, control, and dependent variables are listed in Table 1. Consistent

Table 1. Self-Reported Patient Characteristics from the Veterans Health Survey

Patient Characteristics	Code	Number*	Percentage
Demographics			
Gender			
Female	1	13,894	31.4
Male	0	30,410	68.6
Age, y [†]			
20–24	1	446	1.0
25–29	2	1324	3.1
30–34	3	1558	3.6
35–39	4	2268	5.3
40–44	5	3332	7.7
45–49	6	4294	10.0
50–54	7	3556	8.3
55–59	8	2761	6.4
60–64	9	4365	10.1
65–69	10	5240	12.2
70–74	11	6389	15.9
75–79	12	5031	11.7
80–84	13	1557	3.6
85–89	14	439	1.0
90 or older	15	88	0.2
Self-Reported Health			
Excellent [‡]	1	1660	3.9
Very good	2	6393	15.0
Good	3	15,170	35.6
Fair	4	14,210	33.3
Poor	5	5213	12.2
Lifestyle/Risk Factors			
Smoking status			
Current smoker	1	13,138	30.2
Not current smoker	0	30,388	69.8
Blood pressure			
Untreated high blood pressure or treated	1	17,773	40.1
Untreated low or normal blood pressure	0	26,531	59.9
Cholesterol level			
Untreated high cholesterol or treated	1	13,158	29.7
Untreated low or normal cholesterol	0	31,146	70.3
Weight			
Overweight	1	16,977	48.2
Average weight or underweight	0	18,249	51.8
Exercise [§]			
Exercises 3 or more times/wk	1	14,644	41.4
Exercises 1–2 times/wk	1	5436	15.4
Does not exercise regularly	0	15,256	43.2
Alcohol consumption ^{§,}			
Does not drink on a typical day	1	24,724	77.3
Modest drinking (1–2 drinks/day)	0	4830	15.1
Moderate alcohol use (3–4 drinks/day)	1	1460	4.6
Heavy alcohol use (5 or more drinks/day)	1	973	3.0
Alcohol drinking has been a problem			
Yes	1	6071	19.2
No	0	25,469	80.8
Seat belt use			
Almost always wears seat belt	1	23,082	52.1
Does not always wear a seat belt	0	21,222	47.9
Control Variable: Self-Reported Source of Care			
90% or more of healthcare received at VHA facilities	1	24,279	54.8
Otherwise	0	20,025	45.2

VHA = Veterans Health Administration.

*Numbers in each section may be less than 44,304 due to missing data for that variable.

[†]The mean age was 55–59 years (mean age code = 8.38; SD = 3.11); this was used as a continuous variable in the analyses.

[‡]“Excellent” was the omitted or reference category in the analyses.

[§]Dummy variables were created for each of the categories with the zero code as the reference category.

^{||}Those who reported drinking modestly were used as the reference category in light of published literature demonstrating better health outcomes for these modest drinkers relative to either nondrinkers or heavy drinkers.^{11–14}

with our prior work,^{15,16} only those self-reporting that they received the specific health promotion service during the USPSTF-recommended interval were coded with the dependent variable in each regression model (value = 1). Thirteen separate dichotomous (0, 1) dependent variables were used in this analysis.

Sample Characteristics

As shown in Table 1, over two thirds of the sample was male (68.6%), the mean age was 55-59 years of age, and the vast majority reported "good" or "fair" health (almost 70% self-reported being in one

of these 2 categories). A substantial proportion of the sample population self-reported that they currently smoked (over 30%), either had high or treated blood pressure (over 40%), either had high or treated cholesterol (almost 30%), were overweight (over 48%), and did not exercise regularly (over 43%). More than 77% of survey respondents reported that they did not drink at all on a typical day, with fewer than 10% of respondents stating that they drank moderately (3 or 4 drinks a day) or heavily (5 or more drinks a day). More than 19% of study respondents reported that alcohol drinking had

Table 2. Odds of Receiving 13 Health Promotion/Disease Prevention Services

Patient Characteristic*	Primary Prevention					
	Blood Pressure Check	Males: Cholesterol Check: 35-65 y	Females: Cholesterol Check: 45-65 y	Influenza Vaccine: 65+ y	Pneumococcal Vaccine: 65+ y	Tetanus Shot
Demographics						
Female		NA	NA	0.74	1.29	0.90
Age	1.02	1.18	1.21	1.20	1.13	0.87
Self-Reported Health						
Very good				1.39		1.23
Good				1.57		
Fair				1.58		
Poor				1.66	1.72	
Lifestyle/Risk Factors						
Current smoker	1.13	0.63	0.74	0.75	0.78	
High blood pressure or treated	NA	1.94	1.79	1.12		
High cholesterol or treated	1.18	NA	NA	1.23	1.21	
Overweight		1.60		1.27	1.15	1.08
Exercises 3+ times/wk		1.17		1.15	1.18	1.29
Exercises 1-2 times/wk	1.16	1.26				1.18
Does not drink on a typical day	1.14					0.93
Moderate alcohol use (3-4 drinks/day)						
Heavy alcohol use (5 or more drinks/day)				0.65	0.65	
Has had a problem with alcohol						
Almost always wears seat belt				1.40	1.32	1.18
Model chi-square (df)	52.65 (18)	371.81 (17)	50.92 (17)	248.88 (19)	263.32 (19)	1074.59 (19)
P Value	0.0001	0.000	0.000	0.000	0.001	0.001

NA = not applicable.

*The source of care was included in all models as a control variable.

been a problem for them. The final lifestyle/risk factor variable indicated that over 50% of the sample reported “almost always” wearing seat belts.

item (ie, primary prevention, secondary prevention, assessment and counseling).

Demographic factors were associated with the odds of receiving most of these health promotion services. In general, being female was negatively associated with the odds of receiving the USPSTF services. In 6 of 8 categories with significant differences, females were between 0.74 and 0.91 times as likely as males to receive each service. In the remaining 2 cases (the receipt of a pneumococcal vaccine at least once for those over age 65 years and tobacco counseling this year for current smokers),

...RESULTS ...

Significant odds ratios (ORs) for the likelihood of reporting the receipt of 13 USPSTF-recommended services for average-risk individuals are shown in Table 2. Results are reported by domain (for independent variables) and by category of prevention

Secondary Prevention			Assessment and Counseling Services				
Females: Pap Smear Test < 65 y	Females: Mammogram: 50–69 y	Colorectal Cancer Screening 50+ y	Smokers: Tobacco Use Counseling	Alcohol Counseling	Weight and Nutrition Counseling	Exercise Counseling	Seat Belt and Accident Avoidance Counseling
NA	NA	0.82	1.46	0.82	0.82	0.91	
0.83		1.09	1.03	0.95		1.01	1.04
						1.37	
						1.39	
	0.36					1.45	
	0.34			1.29	1.80	2.05	
	0.67	0.89	NA	1.41		0.89	
		1.09	1.45	1.20	1.42	1.36	1.13
1.58	1.90	1.15	1.49	1.26	1.33	1.71	
		0.93		1.13	3.99	2.03	
1.48		1.16		1.24	1.24	1.70	1.46
		1.32		1.40	1.42	1.96	1.85
				0.47			
				1.38			0.75
		0.76		2.33		0.78	
			1.47	1.72	1.11		
		1.10		0.59	0.76	0.87	NA
115.90 (18)	51.36 (18)	273.59 (19)	277.69 (18)	2666.27 (19)	3553.79 (19)	2080.01 (19)	258.26 (18)
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

females were 1.29 to 1.46 times more likely than males to report receiving the services.

Age was positively associated with the odds of reporting the receipt of most health promotion services. In 9 of the 12 significant comparisons, increased age was positively associated with the odds of receiving the services; ORs ranged from 1.02 to 1.20 with each increased age category. In the remaining 3 cases (the receipt of a tetanus shot within the past 10 years, the receipt of a Pap test within the past 3 years for females under the age of 65 years, and alcohol counseling within the past year), age was negatively associated with the odds of receiving health promotion services; ORs ranged from 0.83 to 0.95 with each increased age category.

Self-reported health was significantly associated with the odds of receiving 7 of the 13 services. In 6 of these cases, reporting being in poorer health was positively associated with the odds of receiving health promotion services. The one exception was for mammograms every 2 years for females aged 50-64 years. For this one item, those females reporting fair or poor health were only 0.36 or 0.34 (respectively) as likely as those reporting excellent health to obtain this secondary prevention item.

The majority of the lifestyle/risk factors were important correlates of the odds of reporting the receipt of specific health promotion services, although the pattern across items was not always straightforward. In general, reporting being a current smoker was negatively associated with the odds of receiving recommended health promotion services. In 7 of the 9 categories with significant differences, those reporting being a current smoker had reduced odds of receiving the recommended health promotion service; ORs ranged from 0.63 to 0.89 relative to those of nonsmokers (for whom the OR = 1.0). For the remaining 2 items (blood pressure checks within the past 2 years and alcohol counseling this year), there were increased odds of receiving each preventive service if the individual was a current smoker, with ORs ranging from 1.13 to 1.41 relative to those who were not current smokers.

Significant differences in the odds of reporting the receipt of health promotion services according to self-reported blood pressure status were observed in 9 logistic regression models. In all 9, having treated or high blood pressure was positively associated with the odds of receiving services; ORs ranged from 1.09 to 1.94.

Reporting treated or high cholesterol also was associated with increased odds of receiving health promotion services in 10 of the 10 signifi-

cant logistic regression analyses. Odds ratios ranged from 1.15 to 1.90.

Reporting being overweight increased the odds of receiving 7 of 8 services, with ORs being fairly large in magnitude relative to those for nonoverweight individuals (from 1.08 [nonoverweight] to almost 4.00 when individuals described themselves as overweight). The one exception to this pattern was the reported receipt of colon cancer screening in those age 50 years and over; for this one secondary prevention item, those self-reporting being overweight were slightly less likely than nonoverweight individuals to receive this service (OR = 0.93).

Reporting regular exercise was positively associated with the receipt of 11 health promotion services. Although the subgroup reporting regular exercise 3 or more times a week and the subgroup reporting regular exercise 1 or 2 times a week both had increased odds of obtaining services relative to the sedentary (reference) category, ORs generally were larger for the subgroup that exercised 1 or 2 times a week compared with the subgroup that exercised 3 or more times a week. The one exception to this general pattern was for the reported receipt of a tetanus booster every 10 years. For this one primary prevention item, those exercising 3 or more times a week were slightly more likely to receive this service than those exercising 1 or 2 times a week (OR = 1.29 vs 1.18).

Use of alcohol had an important association with the odds of receiving health promotion services. In general, those reporting either not drinking on a typical day, drinking moderately (3 or 4 drinks a day), or drinking heavily (5 or more drinks a day) had reduced odds of receiving health promotion services relative to those reporting drinking mildly (1 or 2 drinks a day). In particular, heavy drinkers were substantially less likely than mild drinkers to receive 4 of 5 health promotion services; ORs ranged from 0.65 to 0.78 for heavy alcohol drinkers. Those who reported drinking heavily were more likely than those who reported drinking mildly to receive alcohol counseling (OR = 2.33).

Those who reported that they had had a problem with alcohol were relatively more likely to obtain 3 assessment and counseling services (tobacco use counseling among smokers, alcohol counseling, and weight and nutrition counseling). Self-reporting a problem with alcohol was not significantly associated with the odds of receiving any primary or secondary preventive service.

Finally, reporting almost always wearing seat belts was positively associated with the odds of

reporting the receipt of 4 of the 8 primary and secondary prevention services (ORs from 1.10 to 1.40). However, it was negatively associated with the odds of receiving 3 of the 4 relevant counseling and assessment services (ORs ranged from 0.59 to 0.87).

...DISCUSSION...

We used the 1997 Veterans Health Survey to examine the relationship between patient characteristics and the likelihood of receiving 13 health promotion/disease prevention services recommended by USPSTF for average-risk individuals. Several patterns were observed. In 6 of 8 significant comparisons, females reported receiving fewer of the recommended services than males after controlling for other important patient factors. Further research is needed to better understand why females are not receiving preventive services to the same extent as their male counterparts.

Increased age generally was associated with increased odds of obtaining USPSTF-recommended services. The general exception to this pattern was for services that are age targeted (eg, Pap smear tests, which are only recommended for women under age 65 years), or services for conditions that might be perceived as having prevalences that decline with age (eg, tetanus, which might be considered to be more prevalent among younger, more physically active adults, and alcohol counseling, which might be considered to be less likely to be problematic among older adults). Still, because all but Pap smear tests have been recommended for individuals in all age categories, tetanus boosters and alcohol counseling need to be promoted more widely to older veterans.

In general, poorer self-reported health was associated with increased odds of reporting receipt of health promotion services. Managed care physicians may consider self-perceived poorer health to be a signal alerting them to engage in more aggressive preventive strategies to improve the health and functioning of the veterans they serve. Another interpretation could be that those in poorer self-perceived health present more often to physicians for care. Hence, physicians have more opportunities to provide preventive services.

Reporting current smoking was negatively associated with the odds of obtaining most USPSTF-recommended services. With the exception of blood pressure checks every 2 years and exercise counseling, smokers generally had only 63% to 89% the odds of

receiving health promotion services relative to their nonsmoking counterparts. One reason for this finding may be that healthcare providers judge that the person needs to control the major problem—smoking—before devoting efforts to other health promotion services. More research is needed to clarify why smoking is negatively associated with the odds of receiving health promotion services in the VHA system.

Reporting both treated and high blood pressure and treated and high cholesterol levels were positively associated with the odds of receiving health promotion services. These findings suggest that the VHA managed care physicians both recognize these risk factors and have taken them into account when delivering preventive services to their patients. Being overweight also was positively associated with the odds of obtaining most services. The one exception was for the reported receipt of colon cancer screening in those age 50 years and older.

Reporting regular exercise consistently was positively associated with the odds of receiving prevention services. Perhaps engaging in this type of self-care behavior is perceived by VHA physicians to be an important positive step in enabling veterans to maintain good health and functioning. For this reason, VHA physicians may be relatively more likely to encourage their more active patients to engage in additional health-promoting behaviors. It also might be that these more active patients are more assertive in pursuing additional health promotion/disease prevention services.

Reporting drinking alcohol had an important association with the odds of receiving health promotion services. Those drinking either moderately or heavily were *less* likely to obtain recommended services (relative to veteran counterparts drinking modestly), but those stating that they had a problem with alcohol were *more* likely to receive many health promotion services. Perhaps physicians are more willing to work aggressively on the behalf of individual patients when they perceive that the patients have recognized that they have a problem with alcohol consumption. Alternatively, VHA physicians may be unwilling to be proactive in recommending preventive medical services until their patients acknowledge their alcohol problems.

Reporting almost always wearing seat belts was positively associated with the odds of receiving primary and secondary prevention services, but also was negatively associated with the odds of receiving assessment and counseling services. Perhaps those veterans who regularly wear seat belts are thought to be less at risk of needing tobacco, alcohol, nutrition, and exercise counseling com-

pared with veteran counterparts not engaging in this important self-protective behavior.

...CONCLUSION ...

In summary, results from this analysis indicated that some high-risk characteristics (eg, poorer self-reported health, high blood pressure, high cholesterol levels, reporting being overweight) are positively associated with the odds of reporting receipt of USPSTF-recommended health promotion/disease prevention services in a managed care organization. Physicians may take these symptoms seriously and act proactively to encourage their patients to receive all health promotion services recommended for their age and sex profiles. Of primary concern, however, is the fact that females, reported current smokers, and reported heavy alcohol drinkers are relatively less likely to receive many of the health promotion services recommended for them. Although it cannot be determined from these data why these subgroups appear to be particularly disadvantaged, additional attention should be given by providers both inside and outside the VHA to encourage these individuals to obtain recommended prevention services and to comply more fully with US *Healthy People 2000* goals.

Acknowledgments

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