

Medical Checkups: Who Does Not Get Them?

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The routine medical checkup includes clinical preventive services usually delivered by primary health care clinicians to persons with no signs and symptoms of illness as part of a routine health care process. Central to the periodic health examination is the effectiveness of prevention for improving health outcomes. The US Preventive Services Task Force developed recommendations for components of a periodic health examination based on age, sex, and risk factors.¹

The purpose of this research was to determine which predisposing, enabling, and need factors; personal health behaviors; and chronic medical conditions predicted the use of medical checkups by people in Iowa. Our intention was to develop a profile at the state level of persons not having a checkup in the past 12 months so that prevention services could be targeted.

Several research projects have used the Behavioral Risk Factor Surveillance System to draw conclusions about patterns of use of clinical prevention services.²⁻⁵ Routine medical checkups were the outcome variable in several other studies as well.⁶⁻⁹ The age variable was most often associated with medical checkup use in these studies^{3,7,8} showing an increased likelihood for people older than 50 years. Another demographic factor influencing use of medical checkups was sex^{3,4,7}; men were less likely to be seen for periodic health examinations,⁴ particularly if they were poor.⁷ Compared with persons of other races/ethnicities, White persons had an increased likelihood of visiting a physician for routine health examination.⁶ Having health insurance coverage also was associated with access to medical checkups.^{3,5,7} Respondents with higher levels of health insurance were more likely to receive medical checkups, especially when their health plans covered most or some of their clinical prevention.³ Other factors determined by previous research to be associated with use of routine checkups were health risk factors such as smoking,^{3,8} drinking, and sedentary lifestyle³; residing in a rural area⁴; being hos-

Objectives. This study determined which predisposing, enabling, need, behavioral, and disease factors predict the use of medical checkups.

Methods. The Behavioral Risk Factor Surveillance System was used to obtain state estimates in Iowa.

Results. A decreased likelihood of recent checkups was noted for persons aged 25 to 44, men, and those who faced cost barriers. An increased likelihood of recent checkups was associated with married people, highest household income, health insurance, fair and poor health status, physical exercise, occasional smoking, and some chronic diseases.

Conclusions. A profile of persons not having a checkup in the past 12 months emerged from the investigation. (*Am J Public Health.* 2002;92:88-91)

pitalized³; physician practice size and physician gender⁸; and presence of a chronic disease.⁸ Collectively, these studies present a confusing picture about the correlates of medical checkups, portraying inconsistent findings.

METHODS

Data were obtained from the Iowa 1996 Behavioral Risk Factor Surveillance System. The reliability and validity of this tool were tested by special studies.¹⁰⁻¹² Health characteristics were measured for individuals older than 18 years living in a household with a telephone. Poststratification weights were used to correct for selection and nonresponse biases and for estimating risk behavior prevalence at the state-population level. The sample consisted of 3600 individuals with a response rate of 85.7%.

Time since a respondent last visited a physician for a routine checkup was coded, representing visits within the past year (recent users) compared with a longer period (lapsed users). The past-year-use cutoff point was chosen for benchmarking reasons.

A modified form of the behavioral model,¹³ frequently applied in utilization studies, was used to create 5 groups of independent variables. The predictors of clinical prevention services were grouped into predisposing characteristics, enabling resources, perceived need, personal health behaviors,¹⁴ and chronic medical conditions. Descriptive and bivariate analyses were performed.

Logistic regression analysis, using SUDAAN (Research Triangle Institute, Research Triangle Park, NC), was performed to examine the use of medical checkups. A hierarchical model approach¹⁵ was applied in the extended behavioral model. This approach allows more realistic representations of regression functions than the conventional approaches.^{16,17} Adding a second-stage model to the analysis produced gains in the accuracy of predictors and effect estimates.

RESULTS

Sixty-two percent of the participants reported having a routine medical checkup in the year before the survey, which is much lower than the nationwide figure (70%). Descriptive statistics are shown in Table 1. The population of Iowa is older, has fewer employed people, is predominantly White, and has more married couples compared with the nation.¹⁸ Although the median household income in Iowa is less than that nationwide,¹⁹ fewer people lack health coverage or could not afford a physician visit in the past year.

State estimates were obtained by using weights in the hierarchical logistic regression (Table 2). Compared with the descriptive analysis, fewer variables were significantly associated with the respondent's probability of having a periodic health examination. A reduced likelihood of having a checkup in the past 12 months was associated with being between ages 25 and 64, male, unmarried, and

TABLE 1—Descriptive Statistics of Routine Medical Checkup Use^{a,b}: Iowa 1996 Behavioral Risk Factor Surveillance System

	Sample	Percentage of Users		P
		Recent	Lapsed	
Predisposing Characteristics				
Age, y				.00
18-24	194	58.79	41.21	.42
25-34	379	53.89	46.11	.00
35-44	404	51.92	48.08	.00
45-54	333	58.89	41.11	.34
55-64	266	63.48	36.52	.33
≥65	670	76.92	23.08	.00
Sex				.00
Male	755	51.18	48.82	
Female	1491	69.83	30.17	
Race/ethnicity				.42
White	2183	61.08	38.92	
Non-White	63	56.71	43.29	
Marital status				.02
Married	1347	62.37	37.63	
Not married	899	58.12	41.88	
Education				.27
≤High school	1181	61.90	38.10	
>High school	1065	59.94	40.06	
Household size				.00
1 adult	699	65.78	34.22	.00
2 adults	1334	62.04	37.96	.12
≥3 adults	213	53.22	46.78	.00
Enabling resources				
Income, \$.03
<10 000	162	61.28	38.72	.93
10 000-15 000	202	68.13	31.87	.02
15 001-20 000	235	64.75	35.25	.18
20 001-25 000	245	58.26	41.74	.30
25 001-35 000	596	61.19	38.81	.88
35 001-50 000	383	58.30	41.70	.15
50 001-75 000	257	56.90	43.10	.09
>75 000	166	68.02	31.98	.03
Employment status				.00
Employed	1140	56.31	43.69	
Not formally employed	1106	66.92	33.08	
Health care coverage				.00
Have any health plan	2118	63.05	36.95	
Have no plan	128	40.15	59.85	
Medicare				.00
Yes	719	76.30	23.70	
No	1397	58.61	41.39	
Medical cost barriers				.00
Cannot afford to see doctor	128	45.02	54.98	
Can afford to see doctor	2118	62.24	37.76	
Perceived needs				
Health status				.00
Excellent	446	52.75	47.25	.00
Very good	805	62.59	37.41	.18

Continued

a daily smoker. People who perceived medical cost barriers also were less likely to obtain checkups. Checkups were more likely among persons with incomes greater than \$75 000; persons with health insurance; persons whose health status was rated as very good, fair, or poor rather than good or excellent; persons involved in any physical activity; and persons with chronic diseases. Compared with nonsmokers, occasional smokers and former smokers were more likely to have a checkup.

Although SUDAAN controls for collinearity by default, separate regression analyses were performed in each model with SAS (SAS Institute, Inc, Cary, NC) for statistical diagnosis.¹⁵

DISCUSSION

Several studies have investigated the use of routine medical checkups.²⁻⁹ Whereas bivariate analysis validates findings from previous studies, the hierarchical regression analysis limits the scope of variables to the strongest predictors of use. The study reported here raises research questions not addressed in previous research, enlarges the behavioral model by examining the association between personal behaviors and chronic diseases and periodic health checkups, and identifies new relations with blockwise hierarchical regression analysis.

Several limitations can be identified in this investigation. The cross-sectional nature of the study excluded testing for causal relations. In addition, findings from the study may not be generalizable to other states. Although in Iowa most households have telephones, a response bias might have occurred.

As a result of our analysis, a profile of the lapsed user of medical checkups emerged. The typical lapsed user is male; is aged 25 to 44; is unmarried; has an annual income less than \$75 000; is in excellent health (self-rated); smokes every day; does not exercise; has not been told he has diabetes, cardiovascular disease, or hypertension; and says that he cannot afford to see a physician. However, many of these single sedentary smokers report incomes that would support occasional medical visits. We are forced to conclude that these persons have other uses for their

Table 1—Continued

Good	662	60.86	39.14	.94
Fair	240	70.41	29.59	.00
Poor	93	79.07	20.93	.00
Physical health not good, d^c				.00
0	1427	57.87	42.13	.10
1-2	302	64.68	35.32	.06
3-9	234	62.25	33.75	.00
10-30	283	72.32	27.68	.00
Mental health not good, d^c				.46
0	1471	60.92	39.08	.50
1-2	281	62.58	37.42	.47
3-9	249	62.79	37.21	.16
10-30	245	57.42	42.58	.95
Limited by poor health, d^c				.00
0	781	62.40	37.60	.00
1-2	1163	58.38	41.62	.02
3-9	153	69.41	30.59	.01
10-30	149	69.55	30.45	.26
		Personal health behaviors		
Physical activity				.00
Any	1647	62.23	37.77	
None	599	57.52	42.48	
Physical activity level				.00
Inactive	599	57.52	42.48	.02
Irregular activity	704	60.50	39.50	.73
Regular activity	594	60.95	39.05	1.00
Regular and vigorous	349	68.90	31.10	.00
Smoking status				.00
Smoke every day	351	49.26	50.74	.00
Smoke some days	97	68.33	31.67	.09
Former smoker	575	66.52	33.48	.00
Never smoked	1223	62.24	37.76	.13
Weight control				.02
Trying to lose weight	809	63.87	36.13	
Not trying to lose weight	1437	59.45	40.55	
		Chronic medical conditions		
Diabetes				.00
Yes	151	87.21	12.79	
No	22	59.76	40.24	
Cardiovascular disease				.00
Yes	241	80.88	19.12	
No	52	59.32	40.68	
Hypertension				.00
Yes	661	75.00	25.00	
No	204	56.95	43.05	

^aBolded text highlights significant associations.

^bCoding scheme: having a routine medical checkup in the last year: yes = 1, no = 2; 6 age groups; male = 1, female = 2; White = 1, non-White = 2; married = 1, not married = 2; ≤ high school = 1, > high school = 2; household size: 1 adult = 1, 2 adults = 2, ≥ 3 adults = 3; employed = 1, not formally employed = 2; 8 income groups; have health plan: yes = 1, no = 2; cannot afford to see doctor: yes = 1, no = 2; health status: excellent = 1, very good = 2, good = 3, fair = 4, poor = 5; physical health not good in past year: 1-2 days = 1, 3-9 days = 2, 10-30 days = 3, 0 days = 4; mental health not good in past year: 1-2 days = 1, 3-9 days = 2, 10-30 days = 3, 0 days = 4; limited activities in past year: 1-2 days = 1, 3-9 days = 2, 10-30 days = 3, 0 days = 4; physical activity: yes = 1, no = 2; physical activity level: inactive = 1, irregular = 2, regular = 3, regular and vigorous = 4; smoking status: every day = 1, some days = 2, former = 3, never = 4; trying to lose weight: yes = 1, no = 2; body mass index (weight in kg/[height in meters]²); had myocardial infarction, coronary heart disease, stroke: yes = 1, no = 2; diabetes: yes = 1, no = 2; hypertension: yes = 1, no = 2.

^cIn past year.

money. They may not place a high priority on medical checkups.

People aged 25 to 44 years represent a majority of the active and productive population. Single men in this age group who smoke and lack physical exercise are at high risk for acute and fatal cardiovascular accidents. This risk is increased by their perception of apparent good health status, comfortable socioeconomic status, and lack of knowledge about the existence of chronic diseases. Therefore, the single sedentary male smoker may require aggressive outreach programs, or he may have to receive his screenings when seeing health professionals for other reasons.

Routine medical checkups were studied in this evaluation because they provide an opportunity to deliver clinical prevention services. The US Preventive Services Task Force does not suggest any particular periodicity for these health examinations.²⁰ Often, health insurance or managed care plans decide the periodicity of routine examinations. The findings of this study suggest that people with a chronic medical condition could receive their periodic health examination during a health maintenance visit, but a routine medical checkup should be periodically provided to men between ages 25 and 44 years regardless of health coverage. This periodicity needs to be established at the national level, following a similar protocol used for prenatal care.

It appears that the determinants of medical checkup use may vary by state. This may be a result of differences in the availability of these services among states. Therefore, similar studies are needed in each state to correct for these discrepancies. ■

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TABLE 2—Independent Variables Used in Hierarchical Logistic Regression Models of Medical Checkups^a: Iowa 1996 Behavioral Risk Factor Surveillance System

Model	ORs			95% CI
	Basic	Extended	Final	
Predisposing characteristics				
Age, ^b y				
25–34	0.69*	0.71*	0.66**	0.48, 0.90
35–44	0.57†	0.58***	0.54†	0.39, 0.74
45–54	0.75	0.72	0.63**	0.45, 0.89
55–64	0.86	0.81	0.68*	0.47, 0.99
≥65	1.54*	1.38	1.04	0.73, 1.48
Sex (male)	0.45†	0.43†	0.42†	0.36, 0.50
Marital status (married)	1.29**	1.28**	1.29**	1.07, 1.56
Enabling resources				
Income, ^b \$				
10 000–15 000	1.33	1.38	1.45	0.92, 2.28
15 001–20 000	1.36	1.36	1.44	0.92, 2.24
20 001–25 000	0.95	0.94	1.01	0.67, 1.53
25 001–35 000	1.10	1.06	1.18	0.81, 1.73
35 001–50 000	1.15	1.11	1.22	0.82, 1.82
50 001–75 000	1.09	1.00	1.13	0.74, 1.74
>75 000	1.99**	1.76*	2.02**	1.22, 3.35
Have any health insurance	1.87†	1.85†	1.73***	1.27, 2.36
Medical cost barriers	0.59***	0.62**	0.62**	0.46, 0.85
Perceived needs				
Health status ^b				
Very good	1.40**	1.48†	1.40**	1.14, 1.73
Good	1.21	1.38**	1.22	0.97, 1.54
Fair	1.67**	2.05†	1.67**	1.17, 2.40
Poor	2.63**	3.63†	2.47**	1.32, 4.64
Personal health behaviors				
Any physical activity		1.31**	1.34**	1.11, 1.61
Smoking status ^b				
Smoke every day		0.79*	0.80*	0.66, 0.99
Smoke some days		1.62*	1.61*	1.05, 2.50
Former smoker		1.31*	1.29*	1.04, 1.60
Chronic medical conditions				
Diabetes			2.83†	1.70, 4.70
Cardiovascular disease			1.78**	1.20, 2.63
Hypertension			1.67†	1.34, 2.09

Note. ORs = odds ratios; CI = confidence interval.

^aBolded text highlights significant associations.

^bThe reference groups are aged 18–24 years, income <\$10 000, excellent health status, and never smoked.

P* < .05; *P* < .01; ****P* < .001; [†]*P* < .0001.

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Contributors

D. Culica led the analysis of the data and the writing of the report. J. Rohrer assisted with study design and revisions to the text. M. Ward advised on the analysis and contributed to the writing and revising of the report. P. Hilsenrath provided input regarding the efficiency of

health services. P. Pomrehn edited the report and advised from a medical and epidemiologic perspective.

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