

**ORIGINAL RESEARCH**

Routine checkups don't ensure that seniors get preventive services

Less than half of those 65 years or older are “up to date” with minimal preventive services despite regular checkups.

Abstract

Background ▶ A small number of preventive services are recommended for all adults ages 65 years and older. It is well established that the combined delivery or being “up to date” on these measures is low. However, the effect of routine checkups on being up to date is not known. We examined the association between routine checkups and the delivery of a group of recommended clinical preventive services for US adults ages 65 and older.

Methods ▶ In 2006 the Behavioral Risk Factor Surveillance System conducted telephone surveys. Participants ages 65 years and older were randomly selected in 50 states and the District of Columbia. Sample sizes were 32,243 male respondents and 58,762 female respondents. A composite measure was used that includes screening for colorectal, cervical, and breast cancers, and vaccinations against influenza and pneumococcal disease. The measure quantifies the percentage of adults who are up to date according to recommended schedules.

Results ▶ Most adults ages 65 and older were fully insured, had a personal health care provider, reported no cost barrier to seeing a doctor in the past year, and had recently received a routine checkup. Associations between high health care access and checkups and the increased likelihood of being up to date on clinical preventive services were statistically significant. Although a large percent-

age of the population had high access to care and reported having a recent checkup, the percentage of all those who were up to date was low, and it was only slightly greater for those with high access or a recent checkup (42.6%, 45.1%, and 44.8%, respectively, for men; 35.2%, 37.0%, and 36.8%, respectively for women). For both sexes, the results varied by education, race/ethnicity, marriage, insurance, health, and state.

Conclusions ▶ Our study indicates that increasing the use of routine medical checkups will have a negligible impact on the delivery of preventive services.

Just because elderly patients are having regular checkups does not necessarily mean they are receiving needed preventive services. For individuals who are ages 65 and older, such services include vaccinations against influenza and pneumonia, screenings for hypertension and hypercholesterolemia, and screenings for breast, cervical, and colorectal cancers.¹

Recently analyzed state and national data for a cluster of 5 of these services indicate that fewer than 41% of men and 32.5% of women ages 65 and older were up to date.² Time constraints on health care providers and a lack of knowledge about guidelines are perhaps 2 of the biggest barriers to widespread provision of disease prevention services. In

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➤ **Being up to date was more likely for men and women who were older, married, better educated, had high access to health care, and had a routine checkup in the past 2 years.**

this study we extended an earlier analysis and examined, for individuals 65 years of age and older, the association between having a recent checkup and being up to date on a cluster of recommended preventive services. We also propose steps that will likely be needed to increase receipt of preventive services.

Methods

Data source

The Behavioral Risk Factor Surveillance System (BRFSS), coordinated by the Centers for Disease Control and Prevention (CDC), conducts annual state-based telephone surveys of noninstitutionalized US adults ages 18 years or older concerning health practices.³ We used data from 2006 BRFSS participants ages 65 years or older at the time they participated (32,243 male respondents and 58,762 female respondents). All results were based on weighted data that accounted for different probabilities of selection and were adjusted to reflect the population distribution in each state by age and sex, or by age, race, and sex.

Respondents queried about preventive services

We analyzed responses to BRFSS questions about the receipt of clinical preventive services recommended by the US Preventive Services Task Force (USPSTF) or by the Advisory Committee on Immunization Practices for all adults ages 65 or older.* Services included colorectal cancer screening, influenza immunization, pneumococcal immunization, and, for women, mammography and the Papanicolaou (Pap) test. The USPSTF grades these measures* as A or B, meaning it finds “good” or at least “fair” evidence that a service improves important health outcomes and concludes that benefits substantially outweigh harms.⁴ Questions about these services were asked in all 50 states in 2006.

Cardiovascular services excluded.

The BRFSS has not asked questions about hypertension screening since 1999, when more than 95% of older adults reported they had their blood pressure checked in the past 2 years.⁵ Questions about cholesterol screening were not asked in all states in 2006 and were not incorporated into the composite

measure. However, analysis from a prior study suggests that including cholesterol screening levels in such a composite measure would not have made a large difference in the percentage of older Americans up to date on all services.²

Were scheduled intervals for services met? Adults could meet the recommendation for colorectal cancer screening by either having a fecal occult blood test (FOBT) within 1 year or colonoscopy or sigmoidoscopy within 10 years. The USPSTF and other national guidelines recommend a 5-year interval for sigmoidoscopy and a 10-year interval for colonoscopy.^{6,7} However, no direct evidence has determined the optimal interval for either test,⁸ and the BRFSS question did not distinguish between the 2 interventions. Because either FOBT or endoscopy satisfies screening recommendations, we did not exclude respondents with missing values for 1 test if they had the other test within the recommended interval.

Other services and recommended intervals were pneumococcal vaccination (ever), influenza vaccination (in past year), and, for women, mammogram (within 2 years) and Pap test (within 3 years).

Assigning Yes or No to responses. If respondents had never received a particular preventive service or had received it outside the interval recommended by the USPSTF,⁴ we included them in the group answering No. We eliminated 3324 men and 6295 women with missing values for 1 or more measures.

Final determination of being “up to date.” After noting how many of the recommended services each individual had received according to age and sex, we dichotomized the sample according to whether all recommendations had been met—3 clinical preventive services for men 65 years and older (colorectal cancer screening, influenza, and pneumonia vaccination) and 5 for women (adding mammography and Pap test), with a single exception. Because Pap testing is often reported only for women with an intact cervix,⁹ we excused the lack of a Pap test for women who had undergone hysterectomy (47% of all women ages 65+, or 27,243). We required only that they meet 4 clinical preventive services to be considered up to date. A prior study revealed

*The recommendations and grading systems discussed here reflect those that were in place in 2006. There have been changes to both since this study was conducted.

that excluding the Pap test entirely from the up-to-date measure for women 65 years and older had a minimal effect on up-to-date rates (34.2% when excluding the Pap test vs 32.5% including the Pap test).¹⁰

One of the strengths of the up-to-date measure is that it assesses the proportion of those fully up to date and thus allows for variability within subgroups, such as women who have had hysterectomies, without eliminating them arbitrarily from the sample.

Additional participant characteristics. We divided respondents into 4 racial/ethnic categories based on responses to BRFSS questions: White (non-Hispanic); Black (non-Hispanic); Hispanic of any race; or "Other" (American Indians, Asians, Pacific Islanders, and individuals of other or multiple race categories). Age categories were 65 to 69 years, 70 to 74 years, 75 to 79 years, or ≥ 80 years. Education categories: less than high school, high school graduate or general equivalency diploma recipient, some college, or college graduate. We further dichotomized the sample according to marital status, having 1 or more personal health care providers (vs none), and health status (fair/poor or good/very good/excellent). Given the amount of missing data (20%), household income was not included in the analysis.

Quantifying health care access. We created a measure of health care access using 3 factors:

- health insurance ("Do you have any kind of health care coverage, including health insurance, prepaid plans such as HMOs, or government plans such as Medicare?")
- one or more personal health care providers (see above)
- no cost barrier to seeing a doctor ("Was there a time in the past 12 months when you needed to see a doctor but could not because of cost?").

To measure relative health care access, we scored each of the above items 1 for affirmative or 0 for negative. The sum (0, 1, 2, or 3) represented level of access. Lower numbers indicated more barriers and higher numbers represented greater access. Because only 48 older men and 59 older women had total scores of 0, the lower 2 levels were combined

and the resulting 3 levels were termed "low" (0 & 1), "medium" (2) and "high" (3) access. Two of the measures used for health care access were also used to define 3 mutually exclusive health insurance categories: uninsured, fully insured, and underinsured (insured but reporting a cost barrier).²

We determined whether a routine checkup had occurred in the past 2 years by asking, "About how long has it been since you last visited a doctor for a routine checkup? A routine checkup is a general physical exam, not an exam for a specific injury, illness, or condition."

Statistical analysis

We conducted statistical analysis using Stata, version 9.0 (Stata Corp; College Station, Tex). We used Pearson chi-square tests to determine whether selected demographic factors were associated with being up to date on all recommended services. We also used Stata in a logistic regression analysis to control simultaneously for age, education, race/ethnicity, marital status, insurance coverage, health care access, having one or more personal health care providers, having a routine checkup within 2 years, current smoking, and health status. We computed odds ratios and 95% confidence intervals for each variable in the model.

Results

Most adults ages 65 years and older were fully insured, had a personal health care provider, and reported no cost barrier to seeing a doctor in the past year (TABLE 1). Breaking out these measures into 3 levels of relative health care access, 88.6% of men and 90.2% of women were at the highest level. More than 90% of respondents reported having a routine checkup in the past 2 years. More than 60% reported receiving each of the separate immunizations and cancer screenings recommended for their age and sex, and almost all had received at least 1 service.

TABLE 2 shows the prevalence of being up to date by demographic group. Only 42.6% of all older men and 35.2% of all older women were up to date, with rates marginally better for those with high access to care (45.1% for



Although most adults ages 65 and older had high access to health care and recent routine checkups, only about 45% of men and 37% of women were up to date with recommended preventive services.

TABLE 1
Characteristics of US adults ≥65 years,
2006 Behavioral Risk Factor Surveillance System

	Men		Women	
	Percent	n	Percent	n
Total	100	32,243	100	58,762
Age (y)				
65-69	30.7	10,286	27.1	16,184
70-74	25.8	8410	21.2	14,005
75-79	22.9	6685	24.6	12,562
≥80	20.7	6862	27.1	16,011
Race/ethnicity				
White	81.7	27,720	81.5	50,270
Black	7.3	1631	8.0	3656
Hispanic	6.0	931	6.4	1824
Other*	5.0	1423	4.2	2218
Education				
< High school	15.0	5010	17.6	9931
High school	29.3	9905	39.0	22,978
Some college	20.9	6552	23.6	14,372
College grad	34.9	10,664	19.7	11,226
Married	74.0	20,593	44.5	20,551
Insurance				
Fully insured	94.2	30,147	94.0	55,066
Underinsured†	3.5	1173	4.3	2385
Not insured	2.3	754	1.7	993
Has a personal health care provider	93.1	29,657	95.3	55,586
No cost barrier	96.2	30,838	95.4	56,021
Health care access‡				
Low	1.4	450	0.9	561
Medium	10.0	3521	8.8	5271
High	88.6	27,996	90.2	52,430
Fair/poor health	27.6	8957	29.7	16,727
Clinical preventive services				
Flu shot past year	68.3	21,725	67.0	39,205
Pneumococcal polysaccharide vaccine	63.6	19,531	66.7	38,442

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	Men		Women	
	Percent	n	Percent	n
Clinical preventive services (continued)				
Colon cancer screen	71.3	21,395	67.9	37,112
Pap test in 3 years (women with cervix)			70.8	19,700
Pap test in 3 years (credit for hysterectomy)			84.8	46,943
Mammogram in 2 years			79.1	43,874
Number of health care services received				
0	9.6	2993	3.0	1615
1	19.3	5335	5.0	2659
2	28.5	8085	10.9	5679
3 [§]	42.6	12,506	19.2	10,108
4			26.8	13,935
5 [§]			35.2	18,471
Total	100	28,919	100.0	52,467
Routine checkup[¶]	91.5	28,845	93.1	53,037

*Includes American Indian, Asian, Pacific Islander, and individuals of other or multiple race categories.

[†]Underinsurance includes individuals with coverage who indicated there was a time in the past year when they needed to see a doctor but could not due to cost (cost barrier).

[‡]Determined from 3 measures: having health insurance, having a personal health care provider, and *not* reporting a cost barrier. Levels 0 and 1 were combined. Resulting levels were low, medium, and high.

[§]To be up to date, men required colon cancer screening (fecal occult blood test in past year or endoscopy within 10 years), a flu shot in the past year, and a pneumonia vaccination ever. Women required those same services plus a mammogram within 2 years and Pap test within 3 years (unless prior hysterectomy).

^{||}Total n excludes 3324 men and 6295 women with missing values for one or more tests.

[¶]Respondents who indicated they had a routine “checkup” in the past 2 years.

men, 37% for women) or those reporting a recent routine checkup (44.8% for men, 36.8% for women). Low access to care yielded dramatically worse up-to-date rates (14.8% for men, 9.1% for women). Similarly, those reporting no recent routine checkup had poor up-to-date rates (20.5% for men, 15.4% for women). The highest rates of being up to date belonged to those with a college degree (49% for men, 42.1% for women). Higher rates were also found among the oldest age groups.

Results of the logistic regression analysis are shown in TABLE 3. Among men and women, being up to date was more likely for those who were older, married, better edu-

cated, had high access to health care, and had had a routine checkup in the past 2 years. The latter 2 groups had the highest odds ratios of all groups in the model. Less likely to be up to date were those who were Black, Hispanic, or of a race other than white, those who smoked cigarettes, and (for men) those who were in good or better health. For women, health status had no effect on being up to date.

Discussion

The key finding in this study is that, although most adults ages 65 and older had high access to health care and recent routine checkups, their rates of being up to date with a recom-

➤ Improved delivery of preventive services may require reliance on other health personnel, use of electronic medical record prompts, and prioritizing preventive services for a routine checkup.

TABLE 2

Prevalence of being up to date* by demographic characteristics, US adults ≥65 years, 2006 Behavioral Risk Factor Surveillance System

	Men		Women	
	Percent	95% CI	Percent	95% CI
Total	42.6	41.6-43.7	35.2	34.4-36.0
Age (y)				
65-69	32.0	30.3-33.7	29.8	28.4-31.3
70-74	44.9	42.7-47.2	39.1	37.5-40.8
75-79	48.7	46.2-51.2	40.2	38.5-41.9
≥80	48.9	46.5-51.2	32.9	31.4-34.5
<i>P</i> value	<.0001		<.0001	
Race/ethnicity				
White	46.2	45.1-47.3	37.9	37.1-38.7
Black	27.8	23.7-32.3	22.4	19.7-25.4
Hispanic	20.8	15.7-27.0	22.1	17.7-27.2
Other†	31.0	25.7-36.9	24.1	19.7-29.0
<i>P</i> value	<.0001		<.0001	
Married				
Yes	44.3	43.0-45.7	39.3	38.1-40.6
No	37.7	35.9-39.5	31.7	30.7-32.7
<i>P</i> value	<.0001		<.0001	
Education				
< High school	30.9	28.2-33.8	25.0	23.1-26.9
High school	39.5	37.7-41.4	34.2	33.0-35.4
Some college	44.3	41.9-46.8	38.2	36.6-39.7
College grad	49.0	47.2-50.9	42.1	40.2-44.1
<i>P</i> value	<.0001		<.0001	
Insurance				
Not insured	19.9	15.1-25.8	17.9	13.2-23.9
Underinsured	29.3	25.0-34.0	24.3	20.7-28.2
Fully insured	43.7	42.5-44.8	36.0	35.2-36.8
<i>P</i> value	<.0001		<.0001	
Personal health care provider				
Has 1 or more	44.4	43.3-45.5	36.3	35.5-37.1

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	Men		Women	
	Percent	95% CI	Percent	95% CI
Personal health care provider (continued)				
None	18.8	16.1-21.9	11.4	9.3-14.0
<i>P</i> value	<.0001		<.0001	
Health status				
Fair/poor health	44.3	42.1-46.5	33.2	31.7-34.8
Ex/v good health	41.9	40.7-43.2	36.0	35.1-37.0
<i>P</i> value	.066		.002	
Health access[†]				
"Low"	14.8	9.1-23.1	9.1	5.9-13.7
"Medium"	24.7	22.2-27.4	19.3	17.1-21.8
"High"	45.1	43.9-46.3	37.0	36.2-37.9
<i>P</i> value	<.0001		<.0001	
Routine checkup[§]				
Yes	44.8	43.6-45.9	36.8	35.9-37.6
No	20.5	17.6-23.7	15.4	12.9-18.4
<i>P</i> value	<.0001		<.0001	

CI, confidence interval.

*To be up to date, men required colon cancer screening (fecal occult blood test in past year or endoscopy within 10 years), a flu shot in the past year, and a pneumonia vaccination ever. Women required those same services plus a mammogram within 2 years and Pap test within 3 years (unless prior hysterectomy).

[†]Other race includes American Indian, Asian, Pacific Islander, and individuals of other or multiple race categories.

[‡]Determined from 3 measures: having health insurance, having a personal health care provider, and *not* reporting a cost barrier. Levels 0 and 1 were combined. Resulting levels were low, medium, and high.

[§]Respondents who indicated they had a routine "checkup" in the past 2 years.

mended cluster of preventive services were only about 45% for men and 37% for women.

More than 91% of men and 93% of women reported they had a routine checkup during this timeframe, and 88.6% of men and 90.2% of women also reported they had high access to health care—ie, they had health insurance, at least 1 personal health care provider, and no cost barrier to seeing a doctor. Improving access to health care or increasing the use of routine medical checkups—even to 100%—would likely have a negligible impact on the delivery of recommended services. Despite the very modest composite delivery rates of recommended preventive services in this group, the rates were still 2 to 4 times

higher than those of adults with low health care access or no recent routine checkup.

We also found that being up to date generally improves with age. Granted, there is uncertainty as to the appropriate age at which to stop specific screenings. And very elderly Americans may be receiving some services no longer of benefit. But the significance of our finding is that composite delivery rates were lowest among adults at the age for which broad consensus says services are beneficial. For example, the up-to-date rates for men and women ages 65 to 69 were 32% and 29.8%, respectively, compared with 48.7% and 40.2% for adults ages 75 to 79 (TABLE 2).

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Our hope is that adopting the composite measure of adult preventive services used in this analysis will prove as helpful as tracking children's vaccination levels.

TABLE 3

Results of multiple logistic regression modeling* for being up to date[†] for cancer screening and adult immunization, by sex and demographic characteristics: 2006 Behavioral Risk Factor Surveillance System, adults ≥65 years

	Men			Women		
	OR	95% CI	P value	OR	95% CI	P value
Age 65-69 y (referent)						
70-74	1.74	1.54-1.97	<.001	1.54	1.39-1.70	<.0001
75-79	2.04	1.79-2.32	<.001	1.56	1.40-1.74	<.0001
≥80	1.96	1.72-2.23	<.001	1.19	1.06-1.32	.002
White (referent)						
Black	0.52	0.41-0.66	<.001	0.55	0.46-0.66	<.0001
Hispanic	0.37	0.26-0.53	<.001	0.56	0.42-0.76	<.0001
Other	0.53	0.40-0.71	<.001	0.55	0.43-0.72	<.0001
Not married (referent)						
Married	1.23	1.12-1.37	<.001	1.28	1.18-1.38	<.0001
<High school (referent)						
High school	1.28	1.10-1.50	.002	1.28	1.14-1.44	<.0001
Some college	1.54	1.30-1.83	<.001	1.50	1.32-1.69	<.0001
College grad	1.82	1.55-2.13	<.001	1.79	1.57-2.05	<.0001
Health access[‡] ("Low" is referent)						
Medium	1.32	0.71-2.45	.378	1.72	1.03-2.87	.038
High	2.41	1.32-4.41	.004	3.08	1.88-5.05	<.0001
No checkup[§] (referent)						
Checkup 2 yr	2.53	2.07-3.10	<.001	2.72	2.18-3.40	<.0001
Fair/poor health (referent)						
Ex/v good health	0.76	0.68-0.85	<.001	0.94	0.87-1.03	.167
Nonsmoker (referent)						
Current smoker	0.59	0.48-0.72	<.001	0.68	0.58-0.79	<.0001

CI, confidence interval; OR, odds ratio.

*N=27,632 for men and 50,024 for women. Includes 50 states plus the District of Columbia and excludes 3324 male respondents and 6295 female respondents with missing values for one or more measures. There were 2 separate models, one for men and one for women.

[†]To be up to date, men required colon cancer screening (fecal occult blood test in past year or endoscopy within 10 years), a flu shot in the past year, and a pneumonia vaccination ever. Women required those same services plus a mammogram within 2 years and Pap test within 3 years (unless prior hysterectomy).

[‡]Determined from 3 measures: having health insurance, having a personal health care provider, and *not* reporting a cost barrier. Levels 0 and 1 were combined. Resulting levels were low, medium, and high.

Our findings are consistent with research documenting inadequate time to incorporate preventive services into the typical office visit.^{11,12} Similar barriers have been identified by general practitioners in the United Kingdom.^{13,14} The time constraint is particularly consequential in high-volume primary care practices.¹⁵ Some investigations have calculated the actual or necessary time needed to deliver multiple recommended prevention and health promotion services and have found the requirement to be unrealistically high.¹⁶⁻²⁰ Our study suggests that increased access to and use of health care services is a necessary but insufficient condition for achieving high up-to-date levels.

■ To improve up-to-date rates, likely actions will include more efficient use of office time, increased reliance on nonphysician clinicians, greater use of electronic medical records, and prioritizing services for a routine checkup. External policy changes, such as pay-for-performance, may also enhance preventive service delivery rates. We hope that, in time, the composite measure used in this analysis will be adopted by both primary care clinicians and public health practitioners in the same way that tracking composite children's vaccination levels are helpful to family practitioners, pediatricians, and local health departments. However, there is probably no easy answer; even the prompts enabled by electronic medical records are useless when ignored by providers.²¹ Improving delivery of preventive services in office settings will require multiple strategies sustained over many years.²²

■ Community-based efforts. There is a strong rationale for a more determined policy to expand community-based access. Many community-based approaches to individual preventive services have been developed over the last 10 years.²³ For example, the CDC's National Breast and Cervical Cancer Early Detection Program represents one model of a state-based program that can make local assistance available for uninsured women.²⁴ In addition, an evidence-based model developed by the nonprofit agency SPARC (Sickness Prevention Achieved through Regional Collaboration) suggests ways of creating community-based points of access for multiple preventive services.²⁵⁻²⁷

■ Questions still unanswered. Although BRFSS data suggest older adults are regularly receiving "routine checkups," it is not clear what kind of intervention this refers to beyond its nonacute nature. What characterizes routine checkups in patients' minds, and how might such visits be limited as venues for providing preventive services? Furthermore, what are the characteristics of providers associated with different types of checkup services? How do primary care providers differ from subspecialists in the kinds of preventive services they provide? Answers to these questions have important implications for physician training and for targeted outreach to subspecialty groups. From a community standpoint, it would be helpful to know if there are specific untapped opportunities for delivering preventive services, particularly in underserved and minority communities where coverage rates are very low.

■ This study's limitations. Because the BRFSS relies on self-reports, our findings are subject to various biases, including "telescoping,"²⁸ the tendency of people to remember events as having occurred more recently than they actually did.²⁹ Moreover, because BRFSS surveys exclude people in households without telephones (who are more likely to be poor and thus also less likely to have access to health care and preventive services), our estimates may be slightly higher than the true rates.³⁰ People with cell phone service only were not sampled; however, this had little impact on estimates for older adults, since just an estimated 2.2% use cell phones exclusively.³¹ People in institutions, such as nursing homes, which account for 3% to 4% of adults 65 and older were also excluded.³²

■ The strength of this study is that, based on a large sample of randomly selected respondents, it is the first report on the adoption of clinical preventive services in all states in relation to the use of routine checkups and a composite measure. However, as noted in the methods, although the interviewer provided a definition for the term *routine checkup*, the description may have been interpreted differently by survey respondents.

The provider's office and medical home should remain at the center of a national



We need more determined and strategic collaborations between medicine and public health that will facilitate access to, and use of, preventive services for all Americans.

strategy to increase the delivery of these services, but expanding these efforts to include community access is critical to improving overall rates of preventive services. We need more determined and strategic collaborations between medicine and public health

that will facilitate access to, and use of, preventive services for all Americans. **JFP**

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