

Are we doing enough to screen for colorectal cancer? Findings from the 1999 Behavioral Risk Factor Surveillance System

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KEY POINTS FOR CLINICIANS

- Strong scientific evidence shows that regular colorectal cancer (CRC) screening effectively reduces CRC incidence and mortality.
- Despite this evidence, use of CRC screening tests remains low.
- Clinicians can use available physician-education tools (www.cdc.gov/cancer/colorctl/calltoaction) to review current screening tests and guidelines and should begin offering regular CRC screening tests to their patients, if they are not already doing so.

■ **OBJECTIVES** To estimate current rates of use of fecal occult blood testing (FOBT) and sigmoidoscopy or colonoscopy; to determine whether test use varies by demographic factors; and to compare 1999 rates of use with 1997 rates.

■ **STUDY DESIGN** The Behavioral Risk Factor Surveillance System is an ongoing, state-based random-digit-dialed telephone survey of the US population that collects various health behavior information, including the use of colorectal cancer (CRC) screening tests.

■ **POPULATION** In 1999, 63,555 persons 50 years of age or older responded to questions regarding FOBT and sigmoidoscopy or colonoscopy.

■ **OUTCOMES MEASURED** The proportion of survey respondents reporting having had FOBT and sigmoidoscopy/colonoscopy at any time; and the proportion reporting having had FOBT and sigmoidoscopy/colonoscopy within recommended time intervals. Data were recorded for the years 1997 and 1999, and analyzed according to various demographic factors.

■ **RESULTS** In 1999, 40.3% of respondents reported having had an FOBT at some time, and 43.8% reported having had a sigmoidoscopy or colonoscopy. Regarding recent test use, 20.6% of respondents reported having had an FOBT within

the year, and 33.6% reported having had a sigmoidoscopy or colonoscopy within the past 5 years. Some demographic variation was noted. In 1997, 19.6% reported having had an FOBT within the year, and 30.3% reported having had a sigmoidoscopy or proctoscopy within the past 5 years.

■ **CONCLUSIONS** Use of CRC screening tests increased only slightly from 1997 to 1999. Usage remains low, despite consensus that screening for CRC reduces mortality from the disease. Efforts to promote awareness of, and screening for, CRC must intensify.

■ **KEY WORDS** Colorectal neoplasms, mass screening, occult blood, sigmoidoscopy, colonoscopy. (*J Fam Pract* 2002; 51:761-766)

Colorectal cancer (CRC) is the second leading cause of cancer-related deaths in the United States for men and women combined; for women alone, it follows lung and breast cancers, and for men, it follows lung and prostate cancers.¹ Strong scientific evidence indicates that regular screening is effective in reducing CRC incidence and mortality.²⁻⁸ Randomized controlled trials have demonstrated a reduction in CRC incidence and mortality with annual and biennial fecal occult blood testing (FOBT), and case-control studies have shown a reduction in CRC mortality associated with the use of sigmoidoscopy. Based on this evidence, 3 sets of national guidelines were developed recommending that average-risk persons undergo regular CRC screening with 1 or more of the following tests: FOBT annually, sigmoidoscopy periodically (usually every 5 years), colonoscopy every 10 years, or double-contrast barium enema every 5-10 years.⁹⁻¹¹

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To estimate current use of CRC screening tests, to evaluate variation in test use by demographic factors, and to compare current test use with previously published rates of use,¹² we analyzed data from the 1999 Behavioral Risk Factor Surveillance System (BRFSS) on the use of a home blood stool test (FOBT) and on having had sigmoidoscopy or colonoscopy. Results from the 1999 survey were compared with results from the 1997 survey.

METHODS

In 1999, 50 states, the District of Columbia, and Puerto Rico participated in the BRFSS, a state-based, random-digit-dialed telephone survey of the US non-institutionalized, adult (aged 18 years or older) civilian population. The BRFSS collects a wide variety of health behavior information, including the use of CRC screening tests.

During the survey, 63,555 respondents aged 50 years or older were asked 4 questions regarding their use of the FOBT and their having undergone sigmoidoscopy or colonoscopy (Table 1). Variables not measured in this dataset include use of sigmoidoscopy separately from colonoscopy, test indication, or physician specialty. We analyzed CRC tests used at any time and used recently (FOBT within the past year and sigmoidoscopy or colonoscopy within the past five years).

Aggregated rates, standard errors, and 95% confidence intervals were calculated using SAS¹³ and SUDAAN software.¹⁴ Respondents who refused to answer or did not know the answer to a question were excluded from analysis of the specific question. The total number of respondent refusals or unknowns was 1007 (1.6%) for the FOBT questions and 1217 (1.9%) for the sigmoidoscopy questions. Data were weighted, using intercensal estimates, to the sex, racial, ethnic, and age distribution of each state's adult population, and were age-standardized to the 1999 BRFSS population. To compare 1997 and

1999 estimates, the 1997 data were also age-standardized to the 1999 BRFSS population. The median state response rate for the entire survey was 56.7%, calculated using the cooperation rate formula.¹⁵

The 1999 BRFSS questions regarding use of sigmoidoscopy were modified from previous questionnaires. As the scientific evidence supporting CRC screening tests has grown, BRFSS CRC survey questions have changed. The 1997 survey, described previously,¹² was the first survey to collect information regarding the use of home-administered FOBT and sigmoidoscopy from all 50 states, the District of Columbia, and Puerto Rico. In 1997, respondents were asked if they had received a sigmoidoscopy or proctoscopy. Proctoscopy, performed with a shorter instrument than a sigmoidoscope, is not recommended as a CRC screening test. In 1999, the term "sigmoidoscopy/proctoscopy" was replaced with "sigmoidoscopy/colonoscopy." Colonoscopy evaluates the entire colon and is recommended once every 10 years in some guidelines.^{10, 11} For this report, the terms "sigmoidoscopy/proctoscopy" and "sigmoidoscopy/colonoscopy" will each be referred to as "sigmoidoscopy" unless otherwise specified.

RESULTS

The age-adjusted proportion of overall respondents who reported ever receiving CRC screening tests in 1999 was 40.3% for FOBT and 43.8% for sigmoidoscopy (data not shown).

The 1999 age-adjusted CRC screening test rates are presented by demographic subgroups for reported use within recommended time intervals: FOBT within the year preceding the survey, sigmoidoscopy within the past five years, or at least one of the two tests (Table 2). Less than half of the population surveyed reported having either FOBT or sigmoidoscopy within the recommended time interval. In 1999, 20.6% of respondents reported having had FOBT within the previous year; 33.6% reported having had a sigmoidoscopy within the previous 5 years; 44.0% reported having had either FOBT within the previous year or a sigmoidoscopy within the previous 5 years. There was little difference in test use between blacks and whites. Rates of use by Asian/Pacific Islanders and American Indian/Alaska Natives were calculated from small respondent samples and should be interpreted cautiously. Respondents of Spanish or Hispanic origin reported lower rates of FOBT and sigmoidoscopy than respondents who were not of Hispanic origin. Reported test use rose with increasing age of the respondents, up to age 70–79, and then declined for those over 80 years of age. Reported test use increased with education and with annual house-

TABLE 1

Questions used in the 1999 Behavioral Risk Factor Surveillance System to assess usage of colorectal cancer screening tests

- A sigmoidoscopy or colonoscopy is when a tube is inserted in the rectum to view the bowel for signs of cancer and other health problems. Have you ever had this exam?
- When did you have your last sigmoidoscopy or colonoscopy?
- A blood stool test is a test that may use a special kit at home to determine whether the stool contains blood. Have you ever had this test using a home kit?
- When did you have your last blood stool test using a home kit?

TABLE 2

Respondents aged 50 years or older who reported colorectal cancer screening tests within recommended time intervals, by demographic variables¹

	Fecal occult blood test within previous year			Sigmoidoscopy/colonoscopy within previous 5 years			Either test within recommended time interval		
	n ²	%	(95% CI) ³	n	%	(95% CI)	n	%	(95% CI)
Total	61,952	20.6	(20.1–21.2)	61,953	33.6	(33.0–34.2)	61,537	44.0	(43.3–44.6)
Gender									
Male	23,919	19.1	(18.2–19.9)	23,850	37.9	(36.8–38.9)	23,724	45.9	(44.9–47.0)
Female	38,033	22.0	(21.3–22.7)	38,103	30.4	(29.6–31.1)	37,813	42.6	(41.7–43.4)
Race⁴									
White	55,139	21.0	(20.5–21.6)	55,170	33.6	(33.0–34.3)	54,804	44.2	(43.5–44.9)
Black	4,075	20.7	(18.8–22.6)	4,046	32.6	(30.3–34.9)	4,020	43.3	(40.9–45.7)
Asian/Pacific Islander	739	10.3	(6.9–13.6)	739	35.4	(28.4–42.5)	735	40.1	(33.3–46.9)
American Indian/ Alaska Native	725	18.2	(12.7–23.7)	725	36.0	(29.4–42.5)	723	43.0	(36.5–49.6)
Spanish or Hispanic origin									
Yes	3,664	11.2	(9.4–12.9)	3,667	28.6	(25.6–31.5)	3,635	33.9	(30.9–37.0)
No	57,993	21.4	(20.9–21.9)	57,999	34.0	(33.4–34.6)	57,620	44.8	(44.1–45.5)
Age (group)									
50–59 years	23,758	15.5	(14.7–16.2)	23,803	26.1	(25.1–27.0)	23,667	34.7	(33.7–35.7)
60–69 years	17,680	23.0	(22.0–24.0)	17,651	36.9	(35.7–38.1)	17,574	48.1	(46.9–49.3)
70–79 years	14,427	25.8	(24.6–27.0)	14,412	40.7	(39.3–42.1)	14,306	52.7	(51.4–54.1)
≥80 years	6,087	21.6	(19.8–23.4)	6,087	36.1	(34.0–38.2)	5,990	46.9	(44.7–49.1)
Education									
< 12 years	11,928	15.0	(13.8–16.1)	11,889	27.5	(25.9–29.1)	11,756	35.6	(33.9–37.3)
High school graduate	21,183	19.7	(18.8–20.6)	21,176	30.6	(29.6–31.6)	21,049	41.2	(40.1–42.3)
Some college/ technical school	14,167	23.5	(22.3–24.7)	14,162	35.9	(34.6–37.3)	14,102	47.9	(46.5–49.2)
College graduate	14,503	24.3	(23.2–25.5)	14,560	41.1	(39.8–42.5)	14,466	51.4	(50.1–52.7)
Income (annual household)									
< \$20,000	15,204	15.3	(14.3–16.3)	15,154	29.1	(27.7–30.5)	15,029	37.0	(35.5–38.4)
\$20,000–34,999	14,354	20.8	(19.7–21.9)	14,362	32.5	(31.2–33.8)	14,288	43.0	(41.7–44.4)
\$35,000–49,999	7,721	23.3	(21.6–24.9)	7,718	37.0	(35.1–39.0)	7,703	48.2	(46.3–50.1)
≥\$50,000	11,967	24.2	(22.7–25.6)	12,002	41.7	(39.9–43.4)	11,949	51.7	(50.0–53.5)
Health care coverage									
Yes	57,551	21.3	(20.8–21.9)	57,561	34.7	(34.1–35.4)	57,169	45.4	(44.7–46.1)
No	4,331	12.1	(9.8–14.5)	4,326	18.7	(15.6–21.7)	4,304	25.7	(22.2–29.2)

¹From the Behavioral Risk Factor Surveillance System (BRFSS), 1999; estimates are age-adjusted.

²Sample size for each question; sample sizes may not sum to totals because of missing data.

³Confidence interval.

⁴Sample sizes for racial categories do not add up to column totals. "Other" racial category not presented here.

hold income. Respondents who had health care coverage were almost twice as likely to have had CRC screening tests as respondents without health care coverage.

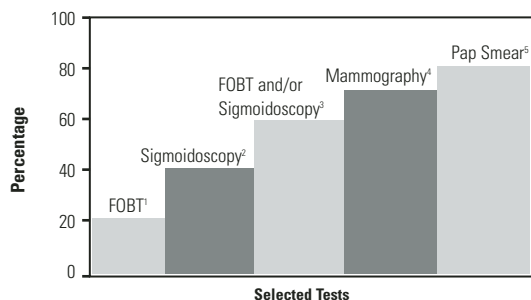
CRC screening test rates increased slightly from 1997 to 1999. In 1997, 19.6% of respondents reported having had an FOBT within the previous year and 30.3% reported having had a sigmoidoscopy

within the previous 5 years.

We compared 1999 BRFSS usage rates for FOBT and sigmoidoscopy or colonoscopy with those for mammography and Papanicolaou (Pap) smear (Figure). These are not direct comparisons but, rather, comparisons of the rates of testing within recommended time intervals among appropriate demographic groups. The proportion of persons who

FIGURE

Comparison of use of colorectal cancer screening tests with other screening tests, BRFSS 1999



¹Use within past year among men and women ≥ 50 years of age.

²Use within past five years among men and women ≥ 50 years of age.

³FOBT use within past year and/or sigmoidoscopy use within past 5 years among men and women ≥ 50 years of age.

⁴Use within past 2 years among women ≥ 40 years of age.

⁵Use within past 3 years among women ≥ 18 years of age.

used CRC screening tests within recommended time intervals was lower than those for other cancer screening tests.

DISCUSSION

Currently, 4 widely accepted tests are available for CRC screening, and several new tests are under investigation.^{16,17} Not enough evidence exists to determine which of the available tests is most appropriate when efficacy, cost-effectiveness, availability, patient acceptability, and safety are taken into consideration. The 1999 BRFSS monitored the use of 3 of these tests: FOBT and sigmoidoscopy or colonoscopy. Our results show that less than half of the US population aged 50 years and older is being screened for CRC with these methods. Persons with health care coverage and with higher education and income levels were more likely to have had CRC tests. Since 1997, the proportion of the U.S. population being screened for CRC has increased slightly, but it remains low and lags far behind the use of other recommended cancer screening tests (Figure). While use of barium enema, one of the recommended colorectal cancer screening tests, is not monitored in the 1999 BRFSS, data from a recent national primary care physician survey suggest that barium enemas are infrequently recommended for colorectal cancer screening (Carrie Klabunde, National Cancer Institute, personal/written communication, 2002).

The 1999 BRFSS was the first BRFSS survey to collect data on the use of colonoscopy. Because BRFSS

colonoscopy data have not previously been collected, we do not know whether the reported increase in the use of endoscopy from 1997 to 1999 represents a true increase in sigmoidoscopy usage or previously unmeasured colonoscopy usage. Furthermore, it is likely that some of the tests reported as sigmoidoscopies or proctoscopies in the 1997 BRFSS survey were actually colonoscopies, since some respondents may be unable to clearly distinguish between the endoscopic tests.

Both patient-related and physician-related factors likely contribute to continued underuse of these tests. Patient-related factors include lack of awareness of screening guidelines, embarrassment, and lack of physician recommendation.^{7,18-20} Physician-related factors include lack of knowledge of the effectiveness of screening, lack of skills in endoscopy, and low reimbursement rates for screening tests.^{7, 18-21}

Several factors limit the interpretation of this analysis. First, as this is a telephone survey, only people who have access to telephones are represented in this analysis. However, approximately 95% of households in the United States have telephones.²² Second, 43.3% of the eligible respondents who were successfully contacted did not complete the telephone interview. Third, responses are self-reported and not validated through medical record review. However, a comparison of self-report and record review has found good concordance between results.²³ Fourth, in the 1999 BRFSS, sigmoidoscopy use cannot be measured separately from colonoscopy, and screening tests cannot be distinguished from diagnostic tests. The results reported here may therefore be overestimates of use of these tests for screening. Lastly, the specialty of the physicians ordering the tests is unknown, limiting the ability to target interventions towards specific physician specialists. Despite these limitations, the BRFSS provides an excellent data source for routine surveillance of CRC testing.

CONCLUSION

This report demonstrates that CRC screening tests remain underused, despite their recognized efficacy in reducing CRC incidence and mortality.²⁻⁸ Coordinated efforts by clinicians and policy makers to raise awareness about this important disease and promote use of available screening tests must continue.

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CORRECTIONS

On page 673 of the August issue, the section *Outcomes Measured* was inadvertently omitted from the POEM, "Erythromycin-resistant group A streptococci on the rise in schoolchildren." The complete POEM may be found at www.jfponline.com.

Abstracts of original research articles in the August issue missing page numbers appear in their completed form at www.jfponline.com.