Screening Men for Prostate and Colorectal Cancer in the United States Does Practice Reflect the Evidence?

Brenda E. Sirovich, MD, MS
Lisa M. Schwartz, MD, MS
Steven Woloshin, MD, MS

The prostate-specific antigen (PSA) test has been the subject of great hope and controversy since it was first approved for use in 1986 by the US Food and Drug Administration.1 Although some believe that screening with PSA carries the promise of reducing deaths due to the second most lethal cancer among men, others are concerned that the overall effect of widespread PSA screening will be more prostate cancer diagnoses and potentially harmful therapy without any improvement in outcomes.2-8 To our knowledge, there is no valid evidence from randomized controlled trials to help settle this debate,9-13 and professional societies are sharply divided in their recommendations.14-17

Colorectal cancer screening, on the other hand, is advocated for adults 50 years or older by all major professional medical societies and guideline-issuing organizations.18-22 This unanimity is based on the results of several randomized controlled trials, all of which have shown substantial reductions in colorectal cancer mortality among individuals invited to periodic screening with the fecal occult blood test (FOBT).23-25 Flexible sigmoidoscopy and colonoscopy, as yet unproven in randomized trials, are believed to confer a greater mortality benefit than FOBT, based on results of well-conducted case-control trials.26,27

Population-based estimates of colorectal cancer screening rates have been widely reported.28 However, although surveys suggest that ordering PSA

Context The debate about the efficacy of prostate-specific antigen (PSA) screening for prostate cancer has received substantial attention in the medical literature and the media, but the extent to which men are actually screened is unknown. If practice were evidence-based, PSA screening would be less common among men than colorectal cancer screening, a preventive service of broad acceptance and proven efficacy.

Objective To compare the prevalences of PSA and colorectal cancer screening among US men.

Design, Setting, and Population The 2001 Behavioral Risk Factor Surveillance System, an annual population-based telephone survey of US adults conducted by the Centers for Disease Control and Prevention, was used to gather data on a representative sample of men aged 40 years or older from all 50 states and the District of Columbia (n=49315).

Main Outcome Measures Proportions of men ever screened and up to date on screening for prostate cancer (with PSA testing) and colorectal cancer (with fecal occult blood testing, flexible sigmoidoscopy, or colonoscopy).

Results Overall, men are more likely to report having ever been screened for prostate cancer than for colorectal cancer; 75% of those aged 50 years or older have had a PSA test vs 63% for any colorectal cancer test (risk ratio [RR], 1.20; 95% confidence interval [CI], 1.18-1.21). Up-to-date PSA screening is also more common than colorectal cancer screening for men of all ages. Among men aged 50 to 69 years (those for whom there is the greatest consensus in favor of screening), 54% reported an up-to-date PSA screen, while 45% reported up-to-date testing for colorectal cancer (RR, 1.19; 95% CI, 1.16-1.21). In state-level analyses of this age group, men were significantly more likely to be up to date on prostate cancer screening compared with colorectal cancer screening in 27 states, while up-to-date colorectal cancer screening was more common in only 1 state.

Conclusion Among men in the United States, prostate cancer screening is more common than colorectal cancer screening. Physicians should ensure that men who choose to be screened for cancer are aware of the known mortality benefit of colorectal cancer screening and the uncertain benefits of screening for prostate cancer.
Box. Survey Questions From the 2001 Behavioral Risk Factor Surveillance System of the Centers for Disease Control and Prevention

**Prostate Cancer Screening**
1. A prostate-specific antigen test, also called a PSA test, is a blood test used to check men for prostate cancer. Have you ever had a PSA test?
   - Yes
   - No
   - Don’t know/not sure
   - Refused
2. How long has it been since you had your last PSA test?
   - Within the past year (anytime <12 months ago)
   - Within the past 2 years (≥1 year but <2 years)
   - Within the past 3 years (≥2 years but <3 years)
   - Within the past 5 years (≥3 years but <5 years)
   - 5 or more years ago
   - Don’t know/not sure
   - Refused
3. A digital rectal examination is an examination in which a doctor, nurse, or other health professional places a gloved finger into the rectum to feel the size, shape, and hardness of the prostate gland. Have you ever had a digital rectal examination?
   - Yes
   - No
   - Don’t know/not sure
   - Refused
4. How long has it been since your last digital rectal examination?
   - Within the past year (anytime <12 months ago)
   - Within the past 2 years (≥1 year but <2 years)
   - Within the past 3 years (≥2 years but <3 years)
   - Within the past 5 years (≥3 years but <5 years)
   - 5 or more years ago
   - Don’t know/not sure
   - Refused
5. Have you ever been told by a doctor, nurse, or other health professional that you had prostate cancer?
   - Yes
   - No
   - Don’t know/not sure
   - Refused

**Colorectal Cancer Screening**
1. 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?
   - Yes
   - No
   - Don’t know/not sure
   - Refused
2. How long has it been since you had your last blood stool test using a home kit?
   - Within the past year (anytime <12 months ago)
   - Within the past 2 years (≥1 year but <2 years)
   - Within the past 5 years (≥2 years but <5 years)
   - 5 or more years ago
   - Don’t know/not sure
   - Refused
3. Sigmoidoscopy and colonoscopy are examinations in which a tube is inserted in the rectum to view the bowel for signs of cancer or other health problems. Have you ever had either of these examinations?
   - Yes
   - No
   - Don’t know/not sure
   - Refused
4. How long has it been since you had your last sigmoidoscopy or colonoscopy?
   - Within the past year (anytime <12 months ago)
   - Within the past 2 years (≥1 year but <2 years)
   - Within the past 5 years (≥2 years but <5 years)
   - Within the past 10 years (≥5 years but <10 years ago)
   - 10 or more years ago
   - Don’t know/not sure
   - Refused

Methods

Data Source
We used data from the 2001 Behavioral Risk Factor Surveillance System (BRFSS), an annual cross-sectional, population-based, random-digit-dialed telephone survey conducted by the Centers for Disease Control and Prevention. The BRFSS collects data on health care use, risk behaviors, and demographics from a representative sample of civilian noninstitutionalized adults (≥18 years) in each of the 50 states and the District of Columbia.32

Study Population
In 2001, for the first time, every state included questions about prostate and colorectal cancer screening in the BRFSS survey. We included 49315 men aged...
Table 1. Proportion of Men Undergoing Screening for 2 Cancers, According to Decade of Age

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*Number of respondents in each age group is lower for questions on up-to-date screening than for those on ever having been tested because respondents with a history of prostate cancer have been excluded. Weighted percentages refer to the US male population, not the interviewed sample of 49 315 men. Men aged 40 to 49 years were not asked about colorectal cancer screening.

†Screening prostate specific antigen tests only. Men with known prostate cancer are excluded from the analysis of up-to-date screening.

‡Screening colorectal cancer tests; we were unable to distinguish screening examinations from those performed for known disease (eg, cancer) or the evaluation of symptoms; colorectal cancer screening data are likely overestimates of screening.

Figure 1. Proportion of US Men Who Are Up to Date on Prostate-Specific Antigen (PSA) and Colorectal Cancer Screening, According to Decade of Age

Outcomes

Prostate Cancer Screening. All men aged 40 years or older were asked whether they had ever had a PSA test (Box). Those men who responded yes were asked about the timing of the most recent test. Men were also asked whether they had ever been told they had prostate cancer. We report the proportion of men ever tested for prostate cancer (those who reported at least 1 lifetime PSA test) and the proportion up to date on screening. To be up to date, a man had to report a PSA test within the previous year. We considered men with known prostate cancer ineligible for screening and excluded them from the analysis of up-to-date screening (for both prostate and colorectal cancers).

Colorectal Cancer Screening. For colorectal cancer screening, respondents aged 50 years or older were asked whether and how recently they had had colorectal cancer testing questions. For colorectal cancer screening using Fisher exact test to calculate 95% confidence intervals (CIs). All analyses were performed using STATA version 7.0 (Stata Corp, College Station, Tex). All reported P values are based on 2-sided tests; P<.05 is considered significant.

RESULTS

In the 50 states and the District of Columbia, 75% of men aged 50 years or
older had undergone PSA testing at least once. The likelihood of ever having been tested increased with age until 80 years (Table 1). Eighty-six percent of men aged 70 to 79 years had had at least 1 PSA test. Prostate-specific antigen testing was not uncommon among younger men: 34% of men aged 40 to 49 years had been tested at least once. Up-to-date PSA screening was also common. Fifty-seven percent of men aged 50 years or older had undergone PSA testing at least once. The likelihood of ever having been tested increased with age until 80 years (Table 1). Eighty-six percent of men aged 70 to 79 years had an up-to-date PSA. Although rates declined modestly after 80 years, PSA screening remained common with 56% of men 80 years or older reporting an up-to-date screening test.

In contrast with PSA testing, 63% of men aged 50 years or older had undergone colorectal cancer screening using either FOBT or lower endoscopy. As was the case for prostate cancer screening, rates of ever having been tested and of up-to-date screening increased with age until 80 years (Table 1). Lower endoscopy was more common than FOBT as a means of up-to-date colorectal cancer screening among men of all ages.

More men aged 50 years or older had ever been tested for prostate than for colorectal cancer (75% vs 63%; RR, 1.20; 95% CI, 1.18-1.21). Men were also more likely to be up to date on prostate cancer screening than colorectal cancer screening (57% vs 48%; RR, 1.19; 95% CI, 1.17-1.21). Among men aged 50 to 69 years, the age group for which there is the greatest consensus in favor of screening for both cancers,14-22 54% of men were up to date on PSA screening compared with 45% for colorectal cancer testing (RR, 1.20; 95% CI, 1.16-1.21). Figure I demonstrates the comparison between rates of up-to-date PSA and colorectal cancer screening according to decade of age. Men aged 50 to 59 years were 20% more likely to be up to date on PSA than colorectal cancer screening (RR, 1.20; 95% CI, 1.17-1.24). Up-to-date prostate cancer screening was also significantly more likely to be up to date on prostate than colorectal cancer screening (57% vs 48%; RR, 1.20; 95% CI, 1.18-1.21). Up-to-date colorectal cancer screening among men of ages up to 69 years, the age group for which colorectal cancer screening is recommended, was 47% (RR, 1.19; 95% CI, 1.17-1.21). Among men aged 70 to 79 years, the age group for which there is the greatest consensus in favor of screening.

**Table 2. Prostate and Colorectal Cancer Screening in the 50 US States and the District of Columbia, 2001**

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Figure 2. Relationship Between Up-to-Date Prostate-Specific Antigen (PSA) and Colorectal Cancer Screening Among Men Aged 50 to 69 Years by State

Prostate-specific antigen (PSA) screening is more common than colorectal cancer screening in the portion of the graph above the dotted line. The color of the state abbreviation shows the statistical relationship between the state’s PSA and colorectal cancer screening rates.

more common among men aged 60 to 69 years (RR, 1.17; 95% CI, 1.14-1.20), 70 to 79 years (RR, 1.15; 95% CI, 1.12-1.18), and 80 years or older (RR, 1.08; 95% CI, 1.02-1.14).

In 47 states, men were significantly more likely to have ever had a PSA test than to have ever been tested for colorectal cancer. In Hawaii, Maine, Minnesota, and Vermont, the proportions were similar (Table 2). Rates of up-to-date testing also favored PSA screening. Among men aged 50 to 69 years, for whom consensus in favor of screening is greatest, the median percentage with an up-to-date PSA screen was 53% (range, 45%-61%) compared with 45% (range, 32%-62%) for an up-to-date colorectal cancer test. Figure 2 demonstrates the relationship between rates of up-to-date PSA and colorectal cancer screening within each state. Up-to-date PSA screening was significantly more common than colorectal cancer testing in 27 states. Colorectal cancer testing was more common only in Minnesota; in the remainder, there was no significant difference (Table 2).

COMMENT

We found that PSA testing was common in the United States: 75% of men aged 50 years or older had had a PSA test and 57% were up to date on screening. Prostate-specific antigen screening was particularly common among elderly men, with 69% of men aged 70 to 79 years and 56% of men 80 years or older reporting PSA screening in the past year. If practice were in accordance with evidence of screening-related benefits, colorectal cancer screening would be more common than prostate cancer screening among US men. However, we found this to be the case in only 1 state. Nationally, men in each age group from 50 to 79 years were 15% to 20% more likely to be up to date on PSA screening than colorectal cancer screening.

Although prostate and colorectal cancers are responsible for comparable numbers of deaths among US men each year (in 2002, an estimated 30200 deaths from prostate cancer and 27800 from colorectal cancer), colorectal cancer is responsible for the large majority of premature deaths among the 2 malignancies (accounting for 2 ½ times as many years of potential life lost before age 75 years as prostate cancer). Furthermore, evidence for a benefit from screening is vastly different for the 2 cancers. Deaths from colorectal cancer were decreased by 14% to 33% in the screening (FOBT) groups of 3 randomized controlled trials involving 250000 participants in 3 countries. In contrast, no valid randomized controlled trial evidence exists regarding the efficacy of prostate cancer screening. In accordance with the evidence, professional societies are divided regarding PSA screening recommendations but uniformly endorse colorectal cancer screening, most commonly FOBT and flexible sigmoidoscopy, for adults aged 50 years or older.

There are several possible explanations for our findings that screening practices among US men are discordant with evidence about screening benefits. First, men may be more accepting of a simple blood test (PSA) than the more inconvenient or invasive testing involved in colorectal cancer screening. Second, although media messages have promoted colorectal cancer screening in recent years, these messages have been eclipsed by those of the PSA screening movement, with messages to men to “Get the [PSA] test” from sources as varied as the media,
Data from another national survey, however, enable us to predict that if we were able to count a single lifetime colonoscopy as an up-to-date screen, our estimate of the proportion of men with an up-to-date colorectal cancer screening test would increase by 3%. 

Third, because it is a less widely agreed on screening modality, we did not include digital rectal examination as a prostate cancer screening test in our analyses. Including digital rectal examination, which was about as common as PSA screening among men of all ages, would have resulted in a larger disparity favoring prostate cancer screening over colorectal cancer screening. Sixty-six percent of men 50 years or older were up to date on prostate cancer screening based on a PSA test or digital rectal examination within 1 year (compared with 57% with PSA alone).

Lastly, our estimates are based on patient self-reports. Although self-reports of screening behavior have consistently been found to overestimate the extent of actual screening by 20% to 50%, recent evidence suggests lower rates of inaccuracy (10%-30%) for recall of PSA testing and colorectal cancer testing. Moreover, because men are more likely to be aware of and recall having had a do-it-yourself (FOBT) or invasive (lower endoscopy) examination compared with a simple blood test (PSA), the use of self-reported data would be expected to overstate the extent of colorectal cancer screening relative to screening for prostate cancer. Our results may further overstate the extent of colorectal cancer screening, because although we were able to distinguish between screening and surveillance PSA tests in men with known prostate cancer, we were not able to do so for colorectal cancer tests and therefore considered each test a screening test. Another limitation imposed by reliance on self-reported data is that the proportion of men reporting screening may be higher in our study than in actual practice, if those not responding to the survey are less likely to be screened. Thus, we may have overestimated both PSA and colorectal cancer screening rates.

Our study suggests that, despite widespread efforts to improve adherence to colorectal cancer screening guidelines, such screening is still considerably less common among US men than prostate cancer screening, for which benefits have never been demonstrated. We recommend that physicians ensure that men who choose to be screened for cancer are aware of the known mortality benefit of colorectal cancer screening and the uncertainty about screening for prostate cancer. In addition, given the high rates of PSA screening among elderly men, physicians should ensure that elderly men (those who are least likely to benefit and who may well be harmed by screening) make a well-informed decision about PSA screening.

REFERENCES


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