Conflict of Interest Disclosures: None reported.

Funding/Support: Dr Smith is supported by National Institutes of Health/National Heart, Lung, and Blood Institute training grant T32HL076139. Dr Weiss is supported by National Institutes of Health/National Heart, Lung, and Blood Institute grant K23HL119139 and a grant from the Parker B. Francis Fellowship Program. Dr Wunderink is supported in part by Centers for Disease Control and Prevention grant 1U18IP000490.

Role of the Sponsor: The sponsors had no role in the design and conduct of the study; collection, management, analysis, and interpretation of the data; preparation, review, or approval of the manuscript; and decision to submit the manuscript for publication.

Previous Presentation: A preliminary version of this work was presented as a poster at the American Thoracic Society International Conference, May 19, 2013; Philadelphia, Pennsylvania.


Contemporary Nationwide Patterns of Self-reported Prostate-Specific Antigen Screening

Routine screening for prostate cancer using prostate-specific antigen (PSA) is a widely contested practice, and recommendations have recently changed dramatically. In October 2011, the US Preventative Services Task Force recommended against screening in any age group, yet current nationwide patterns of PSA screening are largely unknown. We sought to elucidate contemporary PSA screening prevalence with a focus on heterogeneity among states and across age groups. We examine data from the 2012 Behavioral Risk Factor Surveillance System (BRFSS).

Methods | The BRFSS is the world’s largest continuously conducted health survey, a joint initiative of the Centers for Disease Control and Prevention and US states. Male respondents 50 years or older without a history of prostate cancer or prostate problem who reported PSA testing within the 12 months preceding the 2012 BRFSS survey were considered to have undergone screening. The 2012 survey was conducted between January 2, 2012, and February 12, 2013. Complex-samples logistic regression analysis incorporating age, race and/or ethnicity, education, income, residence location, insurance status, access to regular health care, and marital status was used to estimate an individual’s predicted probability of undergoing PSA screening. Individual probabilities were then normalized to the 2012 BRFSS screened population to derive state-specific estimates of screening prevalence.

Results | In 2012, 114 544 unique responses from men 50 years or older were captured by the BRFSS, a weighted estimate of 46.24 million men, of whom 17.16 million (37.1%) reported undergoing PSA screening. Access to regular health care was most strongly associated with higher rates of screening (odds ratio [OR], 3.00 [95% CI, 2.69-3.34]). Additional predictors included income greater than $75 000 (OR, 1.91 [95% CI, 1.67-2.20]), college education (OR, 1.90 [95% CI, 1.70-2.12]), health insurance (OR, 1.83 [95% CI, 1.60-2.08]), and age 70 to 74 years (OR, 2.53 [95% CI, 2.29-2.79]) (see eTable in the Supplement). After adjustment for covariates, the estimated prevalence of self-reported PSA screening was highest in Hawaii (59.4%) and lowest in New Hampshire (24.5%) (Figure 1). The prevalence of PSA screening was highest in older men aged 65 to 69 years (48.4%) and 70 to 74 years (48.5%). Men aged 50 to 54 years were the least likely to report PSA screening (25.0%) (Figure 2).

Discussion | Whereas changes in sampling methodology preclude direct comparison with prior years of the BRFSS, our data show that the effect of previous guidelines recommending against the routine screening of elderly men has been minimal at best. Prior work exploring PSA screening trends following earlier US Preventative Services Task Force recommendations against screening in men older than 75 years demonstrated no significant reduction, and yet men aged 75 to 79 years remain the third most likely age group to undergo screening in the year preceding the survey (weighted estimate, 45.7% [95% CI, 43.6%-47.9%]). Equally remarkable is the low rate of PSA screening (weighted estimate, 25.0% [95% CI, 23.8%-26.2%]) among men between 50 and 54 years old, for whom screening has previously been recommended by several professional organizations. These findings likely reflect both the considerable disagreement among experts and the conflicting recommendations. Taken together, these results suggest that national guidelines have had limited effect on clinical practice among health care providers.

The degree of heterogeneity in state-by-state PSA screening prevalence is another concerning and surprising study finding. Evidence from the colorectal and breast cancer screening literature suggests that state-by-state and regional variability is expected but not to such a pronounced extent. For example, regional variability in colorectal screening rates is only 7.5%. It is alarming that the prevalence of PSA screening can double from one state to the next. Whereas the causes of this heterogeneity may mirror those in mammography, including variability in the availability of large university hospitals, geographic density of providers, levels of insurance coverage, and income, the effect of physician preferences on the odds of screening is far more pronounced for PSA, relative to other screening tests. Limitations of our study include recall and nonresponse bias. Inaccuracies in self-reported PSA screening have been
found to reflect underreporting, when compared with medical record extraction. Also, only individuals with telephones were sampled, exerting an uncertain bias.

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Published Online: September 1, 2014. doi:10.1001/jamainternmed.2014.4117.

Author Contributions: Drs Sammon and Pucheril served as co–first authors, each with equal contribution to the manuscript. Drs Trinh and Sammon had full

Figure 1. Prevalence of Self-reported Prostate-Specific Antigen (PSA) Screening in US Men 50 Years or Older

Data from Behavioral Risk Factor Surveillance System, 2012. Data are adjusted for age (continuously coded), race and/or ethnicity, education level, income, residence location, health insurance, access to regular health care, and marital status.

Figure 2. Age-Specific Prevalence of Self-reported Prostate-Specific Antigen (PSA) Screening in US Men 50 Years or Older

Data from Behavioral Risk Factor Surveillance System, 2012. Data indicate weighted estimates, and error bars, 95% confidence intervals.
access to all of the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis.

Study concept and design: Sammon, Pucheril, Kibel, Kantoff, Menon, Trinh. Acquisition, analysis, or interpretation of data: Sammon, Pucheril, Diaz, Trinh. Drafting of the manuscript: Sammon, Pucheril, Trinh. Critical revision of the manuscript for important intellectual content: All authors. Statistical analysis: Sammon, Diaz, Trinh. Obtained funding: Menon.

Administrative, technical, or material support: Pucheril, Kantoff, Menon. Study supervision: Kibel, Trinh.

Conflict of Interest Disclosures: Dr Kibel consults for Sanofi-Aventis, Dendreon, and Myriad Genetics. No other disclosures are reported.

Funding/Support: This work is supported by the Professor Walter Morris-Hale Distinguished Chair in Urologic Oncology at Brigham and Women's Hospital.

Role of the Sponsor: The funder had no role in the design and conduct of the study; collection, management, analysis, or interpretation of the data; preparation, review, or approval of the manuscript; and decision to submit the manuscript for publication.

Additional Contributions: Akshay Sood, MD, Vattikuti Urology Institute Center for Outcomes Research, Analytics, and Evaluation, Henry Ford Health System; Simon P. Kim, MD, Department of Urology, Yale University; Jim C. Hu, MD, Department of Urology, David Geffen School of Medicine at UCLA; Paul L. Nguyen, MD, Department of Radiation Oncology, Dana-Farber Cancer Institute, Brigham and Women's Hospital, Harvard Medical School; and Maxine Sun, PhD, Cancer Prognostics and Health Outcomes Unit, University of Montory Health Center, were instrumental in creating an earlier manuscript draft of this Research Letter. They were not compensated for their contributions.


Invited Commentary
It Is Time to Stop Screening for Prostate Cancer

Prostate-specific antigen (PSA) screening has been a disappointing public health strategy. The history of the PSA test will one day serve as a reminder that, although all of us in health care want to do everything possible to reduce the mortality of cancer, the early adoption of screening techniques on the basis of insufficient evidence can lead to more harm than good.

In this issue of JAMA Internal Medicine, Sammon and colleagues¹ remind us that this day has not yet arrived. Contrary to the recommendations of the US Preventive Services Task Force (USPSTF) against routine screening, the use of prostate cancer screening continues at an alarming rate. More than one-third of men in America 80 years and older are screened, more than 40% of men aged 75 to 79 years, and nearly one-half of men between 65 and 74 years.¹ In addition, there is marked geographic variation in the rate of screening, with rates in Hawaii as high as 59.4% and in New Hampshire as low as 24.5%.² These results suggest that patient preferences are unlikely to account for our patterns of use. Although some patients in the sample may have been screened just prior to current recommendations, many others likely underwent screening afterward.

The goal of cancer screening—like that of all interventions performed on healthy people—is to improve quantity or quality of life. Prostate-specific antigen screening has never shown an overall mortality benefit in any population,² but some believe this standard to be unrealistic. Because prostate cancer accounts for just 2% to 3% of male deaths, powering a trial for overall mortality is thought to be impractical; however, only such a trial can capture counterintuitive harms that screening may have on non–prostate cancer deaths and tell us whether the intervention has net benefit. For instance, studies show that receipt of a diagnosis of prostate cancer increases cardiovascular death during the first month.³ These deaths and other unanticipated sequelae of treatment may not be captured by disease-specific mortality.

Prostate-specific antigen screening may reduce prostate cancer deaths, as was demonstrated in a large European randomized trial,⁴ but this finding was not confirmed in other studies.⁵ However, even these potential gains come at the price of substantial overdiagnosis—treating a cancer that would not otherwise cause morbidity or death. In the European study,⁴ 48 men had to be treated for prostate cancer so that 1 death could be averted. Harms to men whose tumors are overdiagnosed include morbidity but also a small increase in the risk of mortality due to complications from treatment. Rates of overdiagnosis appear more unfavorable among those of advanced age. For adults older than 80 years, overdiagnosis may affect as many as 60% to 80% of those receiving a diagnosis.⁵ For men aged 75 to 79 years, nearly 50% of tumors may be overdiagnosed.⁵

The harms of screening extend beyond overdiagnosis. False-positive test results and unnecessary biopsies occurred in 12% of men after 3 rounds of screening in the European study and 13% after 4 rounds of screening in the American Prostate, Lung, Colorectal and Ovarian Cancer Screening Trial.²

Finally, it is unclear whether the PSA test identifies cancers that require treatment. The only randomized trial to compare local therapy, prostatectomy, with observation among men with a diagnosis of prostate cancer in the PSA testing era found no difference with respect to prostate cancer mortality.⁶ To date, no randomized trial has ever compared radiation therapy with watchful waiting.² Thus, it appears that a diagnosis of prostate cancer with the PSA test may not identify a group of patients in immediate need of therapy.

These factors and others led to the USPSTF’s decision and are increasingly appreciated. However, despite these facts, clinicians and patients do not seem to be dissuaded. What are we missing?

First, there are the rebuttals. Proponents of PSA screening have faulted nearly every portion of the analysis outlined here, arguing that the evidence is unclear. This tactic is commonplace when widespread medical practices are reversed. However, no trial is perfect and any study can be criticized. It is impossible to show that a therapy or screen-
ing test does not benefit a patient under all circumstances; instead, proponents must show under what conditions it can work. If a patient is young (<60 years) and has few comorbidities; if a patient has extensive family history of prostate cancer; if a patient is African American—could a PSA test be leveraged in these populations? These are hypotheses to be tested in prospective studies, not justifications for immediate action.

Second, many clinicians continue to believe that the best course is to have a conversation with patients about PSA screening. Many guidelines, such as the recent American College of Cardiology cholesterol guidelines, do not advocate for an intervention outright but ask physicians to have a conversation with patients. It is hard to argue that we should not have more conversations, but the practical implications of this strategy are likely no different than outright endorsement. As such, it is time to move away from the PSA testing conversation. Clinicians must simply not offer the test unless prompted, and counsel our patients against undergoing it if they raise the issue.

We continue to screen for prostate cancer at too high a rate. This trend cannot and should not continue.

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Published Online: September 1, 2014. doi:10.1001/jamainternmed.2014.3078.

Conflict of Interest Disclosures: None reported.

Disclaimer: This article reflects the views of the author and not those of Johns Hopkins University.


Watch What You Eat: Action-Related Television Content Increases Food Intake

Television (TV) has generally been blamed for helping make Americans overweight owing to both its distracting influence and its encouragement of a sedentary lifestyle. Indeed, a recent correlational analysis of dinner patterns illustrated that the frequency of TV viewing during dinner was 1 of the 2 largest correlates of adult and child body mass index.

However, the focus to date has been on the medium and not the message. Granted, TV may lead distracted viewers to mindlessly eat past the point at which a person would usually stop. In this, it is not unlike other distracting activities that increase food intake, such as reading, listening to the radio, and interacting with dining companions. However, little is known about whether the content, valence, or pace of content influences how much a viewer eats while watching TV. For instance, how do objective technical characteristics, such as the frequency of visual camera cuts or the variation in sound, influence how much food is eaten?

Methods | Ninety-four undergraduate students (57 female; mean age, 19.9 years) completed this institutional review board–approved study in exchange for class credit. Participants provided written informed consent. They gathered in groups of up to 20 people and watched 20 minutes of TV programming. They were randomly assigned to 1 of 3 conditions. In 1 condition, viewers watched an excerpt from The Island, a Hollywood action movie (24.7 camera cuts/min; 24.5 sound source fluctuations/min). In a second condition, viewers watched an excerpt from Charlie Rose, an interview program (4.8 camera cuts/min; 3.2 sound source fluctuations/min) (Figure 1). In a third condition, viewers watched the same excerpt from The Island, but with no sound.

While watching the programming, participants were given generous amounts of 4 snacks (M&Ms, cookies, carrots, and grapes) and allowed to eat as much as they wished. Food was weighed before and after the programs to determine the amount eaten by each viewer.

Results | When pre-served an array of 4 different popular foods, more distracting television shows led viewers to eat significantly more food. Participants watching The Island, which includes highly stimulating and distracting programming featuring high camera cuts and high sound variation, ate 98% more food. This effect was not observed when viewing Charlie Rose or the movie excerpt.

Figure 1. Sample Camera Cuts and Sound Fluctuations in Different Television (TV) Programs

NBA indicates National Basketball Association.