

The Impact of the USPSTF Statement on Shared Decision Making Between Primary Care Physicians and Men Considering Prostate Cancer Screening

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Abstract

Objective: To determine if the USPSTF statement has altered the rates at which men are recommended to undergo PSA screening or have a PSA drawn.

Participants and Methods: This cross-sectional study utilized the 2012 and 2014 Behavioral Risk Factor Surveillance System (BRFSS) surveys. Primary outcomes studied were PSA screening and having had a PSA level drawn. PSA screening was operationalized as binary using a respondent's answer to a specific question about whether a Health Care Provider (HCP) recommended that he have a PSA level drawn or not. Education level, income, insurance status and number of primary physicians served as confounders in logistic regression analysis using STATA v13.4.

Results: Among 260,799 men, the majority (84%) identified as "White, Non-Hispanic" (WNH). Controlling for confounders, "Black/African-American, Non-Hispanic" (BNH) respondents had 1.05 and 1.09 times the risk of being recommended to have their PSA levels checked compared to WNH men in 2012 and 2014, respectively. BNH men were also slightly more likely to have had a PSA drawn than WNH men each year.

Conclusions: BNH men were more likely to receive recommendation to have a PSA level checked by their HCP and to undergo PSA testing compared to men of other races. While this may suggest "high-risk" populations continue to be more stringently counseled despite the USPSTF recommendations, further investigation is warranted to elicit the reasons behind physician variation in offering PSA screening across races.

Keywords: Cancer; Race/Ethnicity; PSA; Prostate; Screening

Introduction

Over the last decade, prostate cancer screening has become a topic of significant discussion and controversy [1-4]. A 2012 report by the United States Preventive Services Task Force (USPSTF) offered a Grade D Recommendation against routine prostate-specific antigen (PSA) based screening among healthy men [5]. The authors of the report cite a small decrease in prostate cancer mortality following PSA-based screening in contrast to an unacceptably high risk for complications related to the screening process and definitive local treatment modalities as reasons to discourage this screening technique [3,5].

Data reviewed by the American Urologic Association (AUA) and presented by the European Randomized Study of Screening for Prostate Cancer (ERSPC), however, demonstrate a decline in prostate cancer mortality of approximately 20% following more widespread adoption of PSA directed screening. Perhaps as important, if not more so, than the decline in prostate cancer specific mortality is the reduction in the number of patients presenting with locally advanced or metastatic disease by approximately 75% over that same time period [1,2,6]. Viewed from a public health perspective, the Task Force's recommendations, therefore, raise questions as to how the burden of prostate cancer on society will evolve if patients are not identified earlier in the disease course and instead present to with more advanced stages of disease.

A concern associated with the publication of the USPSTF statement is that general practitioners may decrease the frequency with which they recommend that a male patient have his PSA checked without appreciating that certain men are at higher risk of not only having prostate cancer, but also of dying from the disease. One factor associated with an increased prevalence and risk of prostate cancer mortality is patient race, specifically for men of African American descent [1,2,7]. 2008 American Cancer Society data revealed an incidence of 255.5 cases of prostate cancer detected per 100,000 African American men compared to 161.4 per 100,000 White men [8]. Surveillance, Epidemiology, and End Results (SEER) data revealed a lifetime risk of prostate cancer diagnosis of 18.15% among Black men compared to 13.15% among White men [9]. Prostate cancer specific mortality also occurs at higher rates in African American men diagnosed with prostate cancer as evidenced by a mortality rate of 463 per 100,000 in comparison to 19.8 per 100,000 White men using SEER data.

Based on such differences in rates, and malignant potential, of prostate cancer between African American/Black men and White men, it becomes apparent that uniform acceptance of USPSTF recommendation against PSA-based screening practices could harm men in high-risk sub-populations by delaying diagnosis and initiation of appropriate therapy. A recent study by Sammon and colleagues demonstrated that young, African-American men included in the 2012 Behavioral Risk Factor Surveillance System (BRFSS) survey were more likely to undergo PSA screening than Non-Hispanic, White men [10]. Our work seeks to determine if the 2012 USPSTF statement against PSA screening has altered the rate at which men are recommended to undergo PSA testing or the rate at which men report having had a PSA level checked by comparing 2012 and 2014 BRFSS survey data across categories of race and ethnicity.

Participants and Methods

Data for this study were collected from the 2012 and 2014 BRFSS survey databases, which are cross-sectional telephone surveys administered by individual state health departments using landline telephones and cellular phones and utilizing a standardized questionnaire.

Our study's exposure of interest was operationalized using respondents' self-identified race and their response to whether or not they identified themselves as Hispanic or Latino. Primary outcomes studied were PSA screening and having had a PSA level drawn. PSA screening was operationalized as binary using a respondent's answer to a specific question about whether a Health Care Provider (HCP) recommended that he have a PSA level drawn or not. While this surrogate does not fully encompass the multifaceted definition of prostate cancer screening, PSA testing is perhaps the most familiar to the general public due to it being commonly referenced in advertisements and national press [11-13].

Education level, annual income, health insurance coverage and number of "personal physicians" were evaluated as potential confounders across categories of race/ethnicity. Similar to previous works, we hypothesized that subjects with higher levels of education/income, or who reported having a "personal physician", might have more engaged relationships with their physician, perhaps resulting in more open communication and increased discussions about screening [14-17].

Statistical analysis was performed using STATA v13.4 [18] accounting for weighting and complex survey design. Demographic information and potential confounders were compared by PSA advisement status using chi-square tests for categorical variables. Multivariate, generalized linear modeling was performed to evaluate the association between race/ethnicity and having been recommended to have a PSA drawn or having had a PSA drawn while accounting for potential confounding from the other covariates in the model. Because the outcome was not rare, we ran regression models using the binomial distribution with a log link to obtain risk ratios. We considered $p < .05$ (two tailed) to be statistically significant.

Results

The study population consisted of 940,351 individuals who took part in the 2012 and 2014 BRFSS. Of those 940,351 persons, 679,552 were excluded after quality-control filtering (555,638 because of female gender and 123,914 because they were missing valid data with respect to the outcomes, exposures or covariates in our analysis), producing an analytic sample of 260,799 subjects. Demographic and clinical findings, categorized by race and ethnicity, may be found in Table 1. A similar percentage of "White, Non-Hispanic" (WNH) and "Black/African-American, Non-Hispanic" (BNH) men were advised to have their PSA drawn (55-56%) in 2012 and 2014, respectively, while only 38% of men identifying themselves as Asian, Non-Hispanic (ANH) ($p < 0.01$) were given the same counselling in each of the two years included in this study.

	2012					2014				
	White N (%)	Black N (%)	Asian N (%)	Hawaii n/ Indian N (%)	Hispanic N (%)	White N (%)	Black N (%)	Asian N (%)	Hawaiian/ Indian N (%)	Hispanic N (%)
Advised to Have PSA Checked										
Yes	65,539 (56%)	5,380 (55%)	859 (38%)	1,022 (45%)	3,842 (42%)	65,230	4,944	747	984	3,790
						-55%	-56%	-38%	-30%	-41%
Had PSA Drawn										
Yes	68,786 (60%)	5,431 (58%)	908 (40%)	981 (47%)	3,743 (44%)	69,178	5,017	771	996	3,802
						-59%	-58%	-40%	-34%	-42%
Highest Level of Education										
Didn't Graduate HS	6870 (10%)	1,541 (20%)	68 (4.9%)	419 (22%)	2,289 (43%)	5,824	1,189	299	120	2,273
						-9%	-20%	-25%	-7%	-46%
Graduated HS	31,316 (30%)	3,038 (31%)	381 (13%)	861 (39%)	2,126 (23%)	29,722	2,738	638	519	2,117
						-29%	-32%	-34%	-17%	-24%
Attended/Graduated College	71,384 (60%)	4,365 (49%)	1,773 (82%)	1,018 (39%)	3,207 (34%)	73,766	4,271	881	1,963	3,37
						-62%	-48%	-41%	-76%	-31%
Income Level										
<\$25,000	20,692 (18%)	3,506 (37%)	328 (12%)	951 (37%)	3,363 (44%)	18,167	2,912	780	493	3,253
						-17%	-35%	-42%	-17%	-45%
\$25,000-\$50,000	26,168 (23%)	2,123 (24%)	469 (18%)	547 (24%)	1,808 (25%)	24,689	1,866	393	550	1,873
						-21%	-22%	-19%	-17%	-24%
\$50,000	53,029 (51%)	2,437 (31%)	1,245 (59%)	601 (29%)	1,805 (24%)	56,090	2,546	475	1,347	1,933
						-53%	-34%	-30%	-55%	-23%
Missing	9,836 (8.7%)	903 (8.2%)	194 (10%)	203 (9.3%)	672 (7.0%)	10,570 (9%)	903 (10%)	176 (9%)	223 (10%)	690 (8%)

Insurance Coverage										
Yes	100,611 (90%)	7,544 (81%)	1,977 (88%)	1,967 (84%)	5,899 (68%)	103,609	7,323	1,644	2,381	6,290
						-93%	-86%	-86%	-90%	-74%
Personal MD										
Yes	87,112 (79%)	6,671 (72%)	1,692 (77%)	1,395 (70%)	5,175 (61%)	87,211	6,135	1,076	1,887	5,109
						-79%	-74%	-64%	-77%	-61%
More than One	8,997 (8%)	824 (8%)	208 (5.7%)	277 (8.2%)	523 (7%)	8,489	785	211	306	656
						-8%	-8%	-10%	-5%	-7%
No	13,358 (13%)	1,451 (20%)	313 (17%)	604 (22%)	1,919 (32%)	13,438	1,266	522	405	1946
						-14%	-18%	-26%	-18%	-31%
PSA: Prostate Specific Antigen; BRFSS: Behavior Risk Factor Surveillance System; HS: High School; MD: Medical Doctor										

Table 1: Description of Men Over 40 yrs. for Whom PSA Module Was Asked, by Ethnicity: 2012 & 2014 BRFSS

ANH men were most likely to have attended or graduated from college in 2012 (82%) while Hispanic and “Hawaiian/American Indian, Non-Hispanic” (HNI) men were least likely to have reached that educational level ($p < 0.01$). In 2014, however, fewer ANH reached higher levels of education (41% v. 82%). Fifty-nine percent of ANH men reported income in excess of \$50,000 in 2012, however that percentage decreased to 30% in 2014. HNI and Hispanic subjects were least likely to report making more than \$50,000 in 2012 (29% and 24%, respectively) ($p < 0.01$), but that changed in 2014 when 55% of HNI men earned \$50,000 or more.

WNI men reported having health insurance more commonly than men of any other race/ethnicity ($p < 0.01$) in 2012 and 2014. More than two-thirds of men in almost every racial/ethnic category in 2012 reported having a single “personal physician” except for Hispanic men, of whom only 61% reported having a single personal doctor ($p < 0.01$).

In adjusted modeling, controlling for age, level of education, income, health insurance status and number of reported primary physicians, WNI men in 2012 and 2014 were significantly more likely to have been recommended to have their PSA checked compared to ANH men (RR: 1.05 and RR 1.09, respectively) (Table 2). ANH men in 2012 were least likely to have been recommended to have their PSA levels checked compared to WNI men in the adjusted model (RR 0.68, 95% CI: 0.60-0.76) while that distinction was true of HNI men in 2014 (RR .59, 95% CI: 0.49-0.63). Similar modeling was performed evaluating the relative risk of men having a PSA checked in 2012 or 2014 (Table 3). Once again controlling for the confounding

variables mentioned previously, all racial categories except BNH were statistically less likely than the WNH referent men to have had a PSA drawn in 2012 and in 2014.

	2012		2014	
Characteristic	Adjusted RR (95% CI)	P	Adjusted RR (95% CI)	P
Ethnicity				
White	1.00 (Ref)		1.00 (Ref)	
Black/African American	1.05 (1.0-1.1)	0.01	1.09 (1.0-1.1)	<0.01
Asian	.675 (.60-.76)	<0.01	.834 (.74-.94)	<0.01
Hawaiian/ American Indian	.885 (.80-.97)	<0.01	.558 (.49-.63)	<0.01
Hispanic	.923 (.88-.97)	<0.01	.940 (.90-.98)	<0.01
<p>*Adjusted for Income Level, Education Level and Insurance Status and Number of Personal Physicians; PSA: Prostate Specific Antigen; BRFSS: Behavior Risk Factor Surveillance System; RR: Relative Risk; CI: Confidence Interval; Ref: Referent</p>				

Table 2: Adjusted* Relative Risk of Healthcare Provider Recommending PSA Testing to Adult Males over Age 40, 2012 v. 2014 BRFSS.

	2012		2014	
Characteristic	Adjusted RR (95% CI)	P	Adjusted RR (95% CI)	P
Ethnicity				

White	1.00 (Ref)		1.00 (Ref)	
Black/African American	1.03 (1.0-1.1)	0.08	1.04 (1.0-1.1)	0.02
Asian	.674 (.60-.76)	<0.01	.820 (.73-.92)	<0.01
Hawaiian/ American Indian	.853 (.78-.94)	<0.01	.587 (.52-.67)	<0.01
Hispanic	.906 (.86-.95)	<0.01	.912 (.87-.95)	. <0.01
*Adjusted for Income Level, Education Level and Insurance Status and Number of Personal Physicians; PSA: Prostate Specific Antigen; BRFSS: Behavior Risk Factor Surveillance System; RR: Relative Risk; CI: Confidence Interval; Ref: Referant				

Table 3: Crude and Adjusted* Relative Risk of Having Had a PSA Checked among Adult Males over Age 40, 2012 v. 2014 BRFSS.

Relative Risk of Being Advised to Have One's PSA Checked in 2014 Compared to 2012		
	Relative Risk	p-value
White, Non-Hispanic Men	0.98	0.09
Black, Non-Hispanic Men	1.02	0.47
Hispanic Men	0.96	0.31
All Men	0.98	0.01
Relative Risk of Having Had a PSA Checked in 2014 Compared to 2012		
	Relative Risk	p-value
White, Non-Hispanic Men	0.98	<0.01
Black, Non-Hispanic Men	0.99	0.68
Hispanic Men	0.96	0.25
All Men	0.97	<0.01
PSA: Prostate Specific Antigen		

Table 4: Relative Risk of Having Been Advised to Have One's PSA Checked or Having a PSA Drawn in 2014 Relative to 2012 by Racial/Ethnic Category.

Among WNH, BNH and “Hispanic” men, the three most common race/ethnicities represented in the surveys, we calculated the relative risk of having been recommended to have one’s PSA checked and of having had a PSA level drawn in 2014 compared to 2012 for men in each of those three categories (Table 4). In 2014, BNH men were more likely to have been recommended to have PSA testing than in 2012 (RR: 1.02; p=0.47) but were slightly less likely to have undergone PSA testing (RR: 0.99; p=0.68).

After incorporating sample weights, we calculated the predicted number of men who would have been recommended to have a PSA checked or had an actual PSA in both 2012 and 2014 if the two BRFSS were generalized to the entire United States population. Using that information, we extrapolated the absolute percent difference in the number of men who had each outcome in 2014 relative to 2012 across the country. Among BNH men in the United States in 2014, 1% more men were advised to have their PSA checked but 0.6% fewer BNH had their PSA drawn than had in 2012.

Discussion

This cross-sectional evaluation using the 2012 and 2014 BRFSS demonstrates that BNH men were more likely to have received recommendation to undergo PSA testing and more likely to report having had the test relative to WNH men in each of the two years of analysis. ANH, HNH and “Hispanic” men were all significantly less likely to report having been recommended to have a PSA drawn or having actual serum testing than WNH men.

Our findings corroborate the work of Sammon et al, who reported an increased rate of PSA screening in black men between age 45 and 60 relative to non-Hispanic, white men using the 2012 BRFSS [10]. While the confirmatory results observed based on the 2012 data are reassuring, we believe that specific information is somewhat limited in discussion regarding the true impact of the USPSTF statement over time. Although it had been suggested that widespread media coverage of the task force statement against prostate cancer screening rapidly disseminated its message and resulted in early adoption into clinical practice [19], we believe the 2012 BRFSS (for which responses were collected during 2012 and early 2013) more directly reflect practice patterns in use prior to the guideline release rather than those that resulted in response to the report. For that reason, we believe it is more encouraging to have found that BNH men were more likely to have been recommended to have their PSA level checked using the 2014 BRFSS. Responses in that survey were collected in 2014 and early 2015 and therefore more likely reflect practice patterns that were influenced for at least two by the Task Force’s statement. The higher rate of PSA screening among BNH men compared to WNH men suggest that these patients’ HCPs understand, and provide screening recommendations based upon, published literature describing racial/ethnic variations in the incidence and malignant potential of prostate cancer despite the USPSTF statement against PSA screening [7,9,20-23].

It is not entirely clear why “Hispanic”, HNH and ANH men were less likely than WNH men to be recommended to have their PSA drawn because the BRFSS is limited in its ability to provide information about clinical decision-making. The rates at which men in each

racial/ethnic category were recommended to have a PSA drawn relative to WNH men do, however, appear to mirror the relative life time incidence of prostate cancer according to race/ethnicity reported in SEER data from 2008 to 2012. Men of Hispanic decent have a 13% lifetime incidence of prostate cancer diagnosis compared to incidence rates of 9.4% and 6.5% among men who were Asian/Pacific Islanders and American Indians, respectively [9].

While BNH men in 2012 and 2014 were more likely than WNH to have been recommended to have a PSA checked and to have ultimately had a PSA drawn, BNH men in 2014 were less likely to have had the blood test than BNH in 2012. WNH and “Hispanic” men in 2014 were both less likely to have received a recommendation for PSA testing or undergo PSA testing than men of the same race/ethnicity in 2012. Using sample weighting, we extrapolated that a total of 1.5% fewer men in the United States had their PSA level checked in 2014 compared to 2012. Recent studies examining multiple years of the National Health Interview Survey (NHIS) similarly revealed that screening rates, defined by having actually had a PSA drawn, significantly declined between 2010 and 2013, except among men between age 45 and 49 [19,24]. Based, however, on the proximity of the 2013 NHIS release to the publication and distribution of the final USPSTF statement, it is unclear whether those declines were related to the statement or if they represented a paradigm shift that had already been in motion before the report was released. While it may be impossible to adequately answer that question, we believe our findings support the conclusion that PSA testing is occurring less frequently and submit that 1.5% fewer American men having this test compared to the year in which the USPSTF report was published represents a clinical important change.

It has been suggested that decreased recommendations to undergo PSA testing and subsequent reductions in PSA levels being drawn will result in fewer biopsies and fewer prostate cancer diagnoses [19]. Additionally, there is fear that a decrease in the number of prostate biopsies being performed will translate into a greater proportion of men being diagnosed with intermediate or higher risk prostate cancer. A 3% increase per year in diagnosis of those two risk groups has been demonstrated between 2011 and 2013 using data from the National Oncology Data Alliance (NODA). This was extrapolated to predict that 14,000 men per year would shift to higher risk disease [25]. To ensure that a dangerous shift towards more aggressive and higher risk prostate cancers does not ensue, continued vigilant examination of trends and patterns of PSA testing is paramount.

This study does have some important limitations. The 2012 and 2014 BRFSS data are both subject to recall bias inherent to the phone-call based nature of the surveys’ design. It is possible that respondents did not correctly remember whether a physician had recommended having a PSA drawn and possible that a respondent misclassified his having had an actual PSA test, particularly if the PSA was collected as part of other, routine lab work. Sampling bias may have been introduced if the respondents included in the BRFSS surveys were inherently different than individuals who were not included or refused participation, thereby limiting generalizability of our findings. Finally, our study may be limited based on how race/ethnicity was operationalized. For the purpose of this analysis, “Non-Hispanic” men of various races and “Hispanic” men were separated into two distinct categories. As such, the experience of “Hispanic” men within each racial category may not be adequately accounted for in the study

findings.

The ultimate challenge for both urologists and primary-care physicians with regard to prostate cancer screening is to find a way to accurately predict whether a patient has prostate cancer that will remain indolent, asymptomatic and not require treatment or has prostate cancer that will be associated with significant morbidity and mortality [1]. The 2012 USPSTF statement denounces the routine practice of PSA-based screening without clear reference to inherent risk differences among populations across racial and ethnic categories [5]. Widespread adoption of this recommendation could place certain populations, such as African Americans, at risk for worse oncologic outcomes by delaying disease diagnosis. While our data demonstrate that the rate of being recommend PSA testing or having a PSA drawn has decreased for most men, it is reassuring to see that, as of 2014, this trend has not presented itself among the BNH population relative to other races and ethnicities.

Conclusions

Among respondents to the 2012 and 2014 BRFSS, African American, Non-Hispanic men were most likely to receive recommendation to have a PSA level checked by their HCP and more likely to undergo PSA testing compared to men of other races. This finding suggests that, despite the 2012 USPSTF statement against routine PSA testing, this population known to be at higher risk of developing and suffering morbidity/mortality from prostate cancer was more stringently counseled and screened than other populations of men without the same risk profile. Further investigation is warranted to elicit more specific reasons behind physician variation in recommending PSA checks across difference races, ethnicities and demographic characteristics and follow-up analysis of future BRFSS data will provide important appraisal of practice pattern changes following the USPSTF policy statement release.

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