Impact of Current Smoking Status on Uptake of Lung Cancer Screening in a Cohort of Racially Diverse Patients

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Abstract

In 2013, the US Preventive Services Task Force (USPSTF) recommended lung cancer screening by low-dose computed tomography (LDCT) for individuals ages 55-80 with a smoking history of 30 pack-years or more. Factors that affect uptake of screening recommendations are of utmost importance, particularly in marginalized groups, in order to prevent the disparity typically seen with new screening regimens. In this study, we assess factors that may affect the uptake of a referral to lung cancer screening after a physician referral at Henry Ford Health System. Particularly of interest were race and smoking at the time of the first screening recommendation. Using a cohort of patients referred for lung cancer screening between March 1, 2015 and February 28, 2018 (N=4,097), we used multivariable logistic regression to determine whether race or smoking status were associated with completion of an initial lung screening exam. Data were captured using the health system's electronic medical record. Of all patients referred for screening, 932 (22.7%) were black and 2,747 (67.0%) were white. Current smokers represented 60.7%, 57.3%, and 70.2% of all, white, and black patients, respectively. Overall, 2,791 (68.1%) patients completed an initial LDCT screen. Of these, 614 (22.0%) were black and 1,902 (68.1%) were white. In multivariable analyses, race was not associated with completion of LDCT screen. Former smokers were more likely to complete a screening exam than current smokers (aOR 1.170, 95% CI 1.01-1.36). However, this finding differed by racial group; among whites, the adjusted odds ratio for lung cancer screening uptake comparing former smokers to current smokers was 1.32 (95% CI 1.10-1.59). Among blacks, being a former smoker was non-significantly associated with a lower likelihood of screening (aOR 0.84 [95% CI 0.60-1.16]). These findings have implications for promoting uptake of lung screening among diverse patient populations.

Introduction and Purpose

- The National Lung Screening Trial reported a 20% reduction in lung cancer mortality with low-dose computed tomography (LDCT) and three annual screening exams.

- In 2015, the Centers for Medicare & Medicaid Services (CMS) added lung cancer screening by LDCT as a preventive service benefit for patients aged 55-77 with a 30 pack-year history or more of smoking and less than 15 years quit-time for former smokers.[1]

- New screening tests often fail to reach minorities or those with low socioeconomic status, increasing disparities during initial implementation of the test.

- The purpose of this study is to assess factors that may affect the uptake of lung cancer screening (baseline exam) at Henry Ford Health System.

- Particularly of interest were race and smoking status at the time of the first screening recommendation.

Methods

- Included in this study are patients who received a referral for lung cancer screening between March 1, 2015 and February 28, 2018.

- Patients were considered current smokers if they had "current" listed in the Social History section of their EMR on the order date or had been identified as a current smoker using the LDCT order template (effective 9/8/2016).

- Self-identified patient race was captured through the EMR.

- Multivariable logistic regression was used to determine whether race or smoking status were associated with completion of a baseline lung screening exam.

- Covariates include age, gender, race, health insurance, marital status, comorbidity index, median income (quartiles), prior smoking cessation medication and/or referral for cessation counseling in the prior 24 months.

Results

Table 1: Selected demographics and covariates for patients referred to lung screening.

Variables	ALL (n=4,097)	Not completed (n=1,306)	Completed (n=2,791)	p-value
Age at initial order	64.2 ± 6.7	63.6 ± 8.0	64.5 ± 6.0	<0.0001
Charlson comorbidity score	1.9 ± 2.1	1.8 ± 2.1	1.9 ± 2.1	0.019
Median income	$59,219 ($43,036-74,632)	$57,794 ($42,334-73,788)	$60,552 ($43,750-75,795)	0.001
Female	1942 (47.4%)	632 (48.4%)	1310 (46.9%)	0.38
Race				
Black	932 (22.7%)	318 (24.3%)	614 (22.0%)	0.25
White	2,747 (67.0%)	845 (64.7%)	1,902 (68.1%)	
Multiracial	21 (0.5%)	8 (0.6%)	13 (0.5%)	
Other	89 (2.2%)	33 (2.5%)	56 (2.0%)	
Unknown	308 (7.5%)	102 (7.8%)	206 (7.4%)	
Hispanic or Latino	40 (1.0%)	16 (1.2%)	24 (0.9%)	0.45
Smoking Status				
Current	2,488 (60.7%)	836 (64.0%)	1652 (59.2%)	<0.0001
Former/Quit	1,431 (34.9%)	403 (30.9%)	1,028 (36.8%)	
Never	41 (1.0%)	30 (2.3%)	11 (0.4%)	
Unknown	137 (3.3%)	37 (2.8%)	100 (3.6%)	
Payer				
Commercial	933 (22.8%)	342 (26.2%)	591 (21.2%)	<0.0001
HAP	586 (14.3%)	147 (11.3%)	439 (15.7%)	
Medicaid	290 (7.1%)	107 (8.2%)	183 (6.6%)	
Medicare	1,630 (39.8%)	521 (39.9%)	1,109 (39.7%)	
Unknown	658 (16.1%)	189 (14.5%)	469 (16.8%)	
Marital Status				
Married	2,330 (56.9%)	676 (51.8%)	1,654 (59.3%)	<0.0001
Single	1,649 (40.2%)	578 (44.3%)	1,071 (38.4%)	
Other/Unknown	118 (2.9%)	52 (4.0%)	66 (2.4%)	
Smoking Cessation Counseling	218 (5.3%)	64 (4.9%)	154 (5.5%)	0.41
Smoking Cessation Prescription	692 (16.9%)	213 (16.3%)	479 (17.2%)	0.50

Figure 1: Forest plot of adjusted odds ratios of screening uptake between race and sex categories.
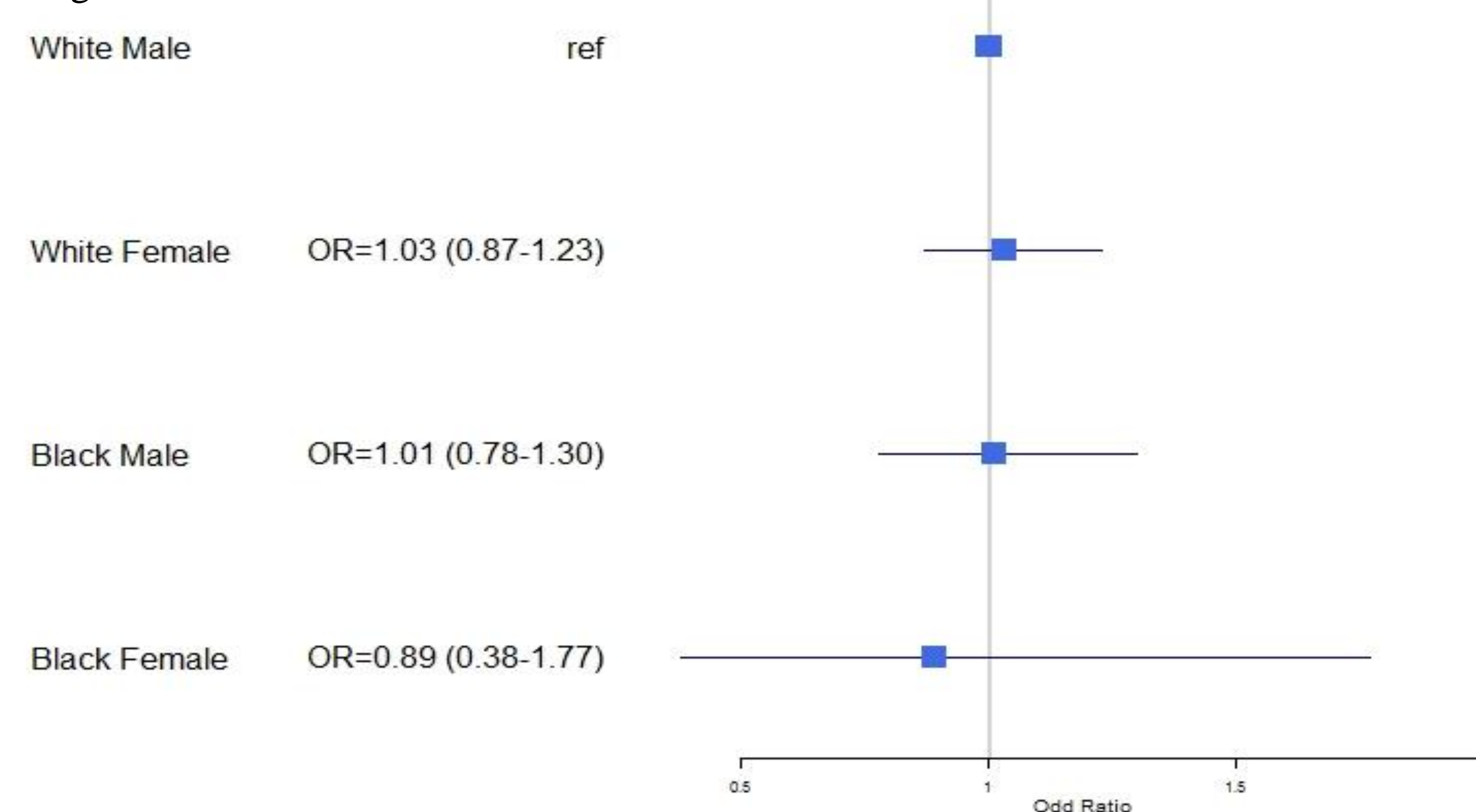
Results (cont.)

Figure 2: Forest plot and table of adjusted odds ratios of screening uptake between current and former smokers.
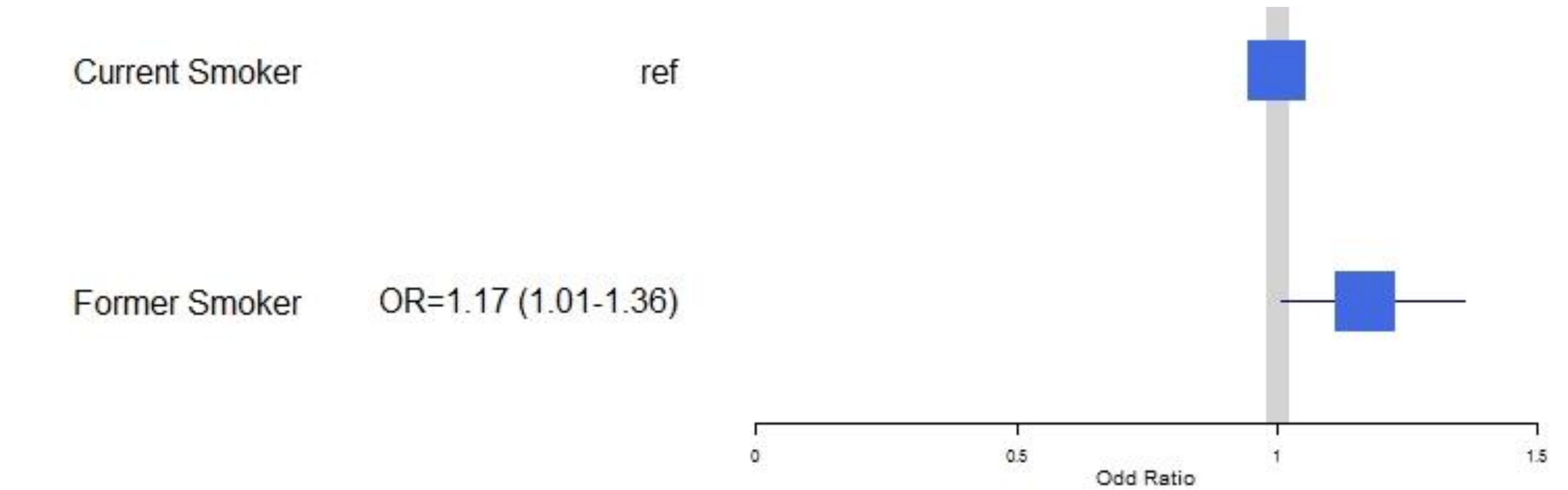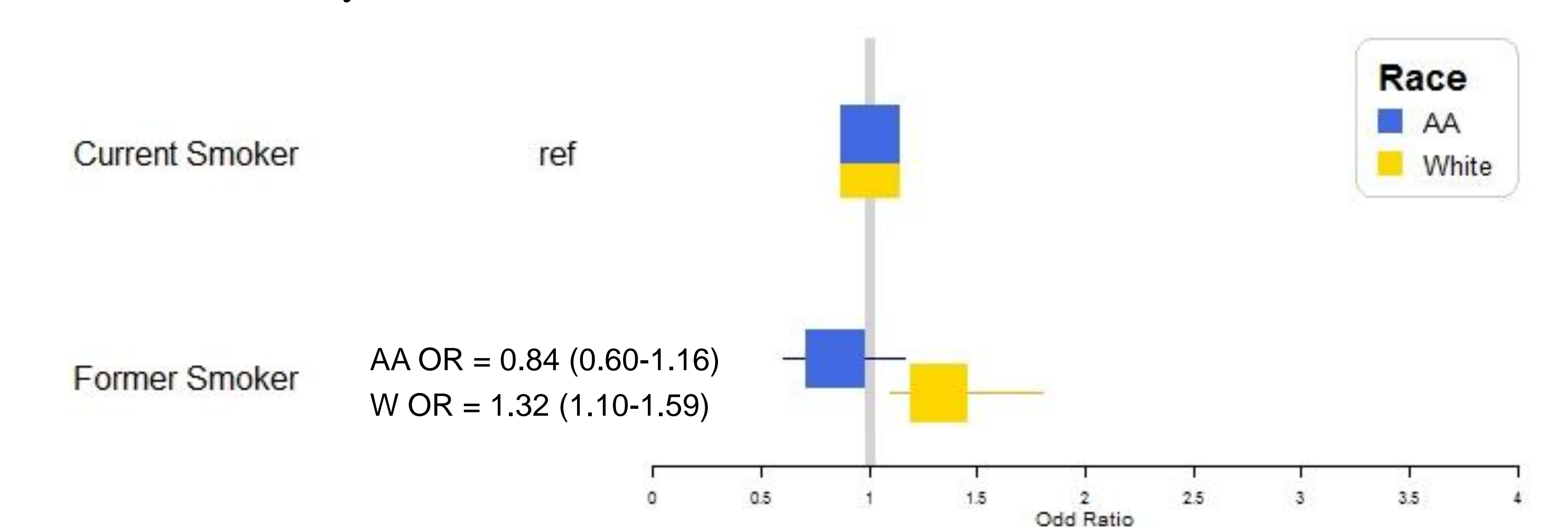

Figure 3: Forest plot of adjusted odds ratios of screening uptake between current and former smokers by race.

Conclusions and Clinical Implications

- At the present time, race (Black) does not appear to be significantly associated with uptake of lung screening. However, black females were less likely (non-significant) to complete screening.

- Smoking status may play a role in white patients' decision to complete a baseline screening exam.

- These findings have implications for patient-provider shared decision making in lung screening among diverse patient populations.

- Future studies are planned to further examine LDCT referral differences by race as well as adherence to annual exams and treatment patterns for those diagnosed with lung cancer.

References

1. National Lung Screening Trial Research, T., et al. (2011). "Reduced lung-cancer mortality with low-dose computed tomographic screening." N Engl J Med 365(5): 395-409.

2. Decision Memo for Screening for Lung Cancer with Low Dose Computed Tomography (LDCT) (CAG-00439N). Centers for Medicare & Medicaid Services. February 2015. https://www.cms.gov/medicare-coverage-database/details/nca-decision-memo.aspx?NCAId=274#Top