Racial Differences in Smoking-Related Disease Risk Perceptions Among Adults Completing Lung Cancer Screening: Follow-up Results from the ACRIN/NLST Ancillary Study

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Abstract

Previous work suggests that, compared to white adults, black adults have lower perceived risk for smoking-related diseases (SRDs), which may influence cessation behavior and health outcomes; however, racial differences in SRD risk perceptions among high-risk patients (i.e., i.e., a group that exhibits elevated risk for SRDs) following lung screening remain unknown. This paper thus examined differences in risk perceptions for lung cancer and other SRDs among black and white National Lung Screening Trial (NLST) participants. We administered a 10-item measure of perceived lifetime risk of lung cancer and other SRD (Smoking Risk Perceptions Scale; SRPS) to NLST participants at one year following lung screening to 1) establish the internal consistency of the SRPS for both black and white participants, 2) compare smoking-related disease risk perceptions between black and white participants, and 3) identify predictors of risk perceptions for black and white participants using multivariable linear regression models. We determined the SRPS items loaded onto two factors (personal and comparative risk; Cronbach's alpha=0.93 and

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0.95 for 1743 white and 194 black participants, respectively), thus demonstrating high internal consistency for both black and white adults. Compared to white participants, black adults demonstrated lower SRD risk perceptions (SRPS range=10–50, mean difference=2.55, SE=0.50, p<0.001), even after adjusting for smoking status and sociodemographics. Younger age, female gender, higher education, white race and current smoking status were independently associated with high risk perceptions. Sociodemographic factors associated with lower risk perceptions resemble factors related to continued smoking. Findings suggest current and former black smokers are at risk of having lower risk perceptions for lung cancer and SRDs than white adults following lung cancer screening; these differences may explain observed racial differences in cessation outcomes. Although similar factors influence black and white adults' beliefs, risk perceptions may differentially impact smoking behavior among these groups. Behavior change models that guide tobacco treatment approaches, particularly for high-risk black smokers, should consider the influence of cultural factors on risk perceptions and cessation efforts.

Keywords

smoking cessation; racial disparities; lung cancer; screening

Lung cancer has been well studied in the context of exploring racial disparities in cancer care [1–6]. Although we have seen overall improvement in survival rates, lung cancer remains the leading cause of cancer-related deaths across all races. Blacks, however, carry a disproportionate burden of disease, demonstrating a higher incidence and mortality rate compared to their white counterparts [7]. While several factors may contribute to these inequities, including poor access to health care services, advanced staging at diagnosis, and patient-provider miscommunication [8], continued smoking has been posited to drive blacks' risk for cancer and other smoking-related diseases.

The majority (87%) of lung cancer deaths can be attributed to smoking [9]. While smoking rates among black adults are comparable to those reported for whites, there are important racial differences in smoking cessation outcomes and risk for smoking-related disease that render blacks a high-risk population (i.e., a group that exhibits elevated risk for smoking-related disease). Specifically, compared with white smokers, black smokers are less likely to receive quit advice, initiate and comply with tobacco treatment, utilize pharmacological agents to aid cessation efforts, and maintain abstinence after quitting [10–16]. Racial differences in risk beliefs, particularly perceived risk for smoking-related disease, may partially explain these findings. However, few studies have examined these issues among high-risk current and former smokers. Previous work suggests that black adults consider their risks of smoking-related illness to be low. One small study with 144 smokers found that black smokers were more likely than whites to perceive their risk for lung cancer to be low relative to their non-smoking peers; additionally, they were less likely to believe that quitting would reduce their risk [17]. Relatedly, data from the 2005 Health Information National Trends (HINTS) survey of 1872 adults revealed that, in a community sample of smokers and nonsmokers, both black and white participants did not perceive their risk for lung cancer to be high; however, black participants were less likely to attribute lifestyle behavior to cancer

risk [18]. These findings highlight the potential link between black adults' risk beliefs and their continued smoking behavior.

The advent of lung screening by low-dose computed tomography (LDCT) offers current and former smokers at high risk for SRD the opportunity to reduce their risk of lung cancer mortality by detecting disease at an early stage [19]; as such, the United States Preventive Services Task Force issued a grade B recommendation for annual lung cancer screening for adults aged 55 to 80 who have a 30 pack-year smoking history and are currently smoking or have quit sometime in the past 15 years [20]. Lung screening offers the opportunity to introduce smoking cessation treatment to high-risk patients during a "teachable moment," [21] since patients may be more motivated and receptive to cessation support; yet, it is possible that racial differences in perceived risk for lung cancer and other SRD may influence lung cancer screening decision-making and cessation behavior. To date, little is known about how high-risk black and white patients differ in their perceived risk for cancer and SRD following lung screening. Work led by Park and colleagues conducted with 572 National Lung Screening Trial (NLST) participants at study enrollment suggests that black patients have lower perceived risk for lung cancer and other SRD than their white counterparts [22–24]. The current study proposes to extend these findings by establishing the internal consistency, and thus reliability, of the Smoking Risk Perceptions Scale for both black and white NLST participants and using it to examine potential racial differences in perceived risk for lung cancer and other SRD among a larger cohort of high-risk black and white NLST participants at one-year following lung screening. Establishing the reliability of this scale is critical given evidence suggesting racial differences may exist in the consistency of smoking-related information self-reported in national surveys; specifically, factors such as response bias, which can vary by racial/ethnic background, may impact data quality [25–27]. Further, this study examines factors associated with risk perceptions among black and white NLST participants.

Methods

Study design

The current report is a cross-sectional analysis of a subset of black and white, former and current smokers enrolled in the NLST who were one-year post-lung cancer screening. The NLST is a collaborative effort between the American College of Radiology Imaging Network (ACRIN) and the National Cancer Institute Lung Screening Study. Patients were eligible for recruitment into the NLST if they were 55–74 years old, were either current or former (quit within 15 years) smokers with a minimum history of 30-pack years, and had no prior history of lung cancer. These criteria are in line with the US Preventive Service Task Force's recommendations regarding screening for high-risk patients. Complete details on NLST design, recruitment and data collection procedures are described elsewhere [28].

Cohort and data collection

In brief, permission was obtained from the ACRIN/NLST executive committee to administer the smoking risk perceptions scale as a sub-study within the ACRIN arm of the trial. A total of eight ACRIN/NLST sites participated in the smoking risk perceptions sub-study. From

12/03–2/04, each of the participants at the 8 sites were offered the opportunity to complete the risk perception sub-study questionnaire at one year post-lung screening. We restricted our analyses to the sites whose surveyed participants were at least 4% black in efforts to make our sample of white and black participants more comparable. Four sites met this criterion: The Cancer Institute of New Jersey, New Brunswick, New Jersey; St. Elizabeth Health Center, Youngstown, Ohio; Jewish Hospital Heart and Lung Institute, Louisville, Kentucky; and Johns Hopkins University, Baltimore, Maryland.

Sociodemographic, medical and smoking history variables

Participants completed a questionnaire upon NLST enrollment that assessed a number of sociodemographic (e.g., age, gender, education, marital status), medical history (familial history of lung cancer, personal history of cancer or SRDs), and smoking history factors (e.g., smoking status, number of years smoked, number of years quit, and nicotine dependence utilizing the Fagerstrom Test for Nicotine Dependence; FTND) [23,28]. Lung screening results were categorized hierarchically as 1) positive, defined as showing a nodule or other abnormality suspicious for lung cancer, 2) positive for significant abnormalities not suspicious for lung cancer, or 3) negative, defined as having no major abnormalities.

Smoking status at one year post-lung screening

Information on smoking status was collected at one year post-lung screening by self-report with one question: "Do you now smoke cigarettes [one or more cigarettes per week]?"

Smoking-Related Disease Risk Perceptions and Behavior Change Constructs

Details of the 25-item questionnaire have been previously published [23]. This questionnaire is comprised of ten risk perception items and fifteen items that tapped into theoretically-based cognitive and emotional behavior change constructs.

Smoking Risk Perceptions Scale (SRPS).—This is a 10-item self-report scale that measures an individual's perceived personal (individual risk) and comparative lifetime risk (risk related to others) for lung cancer and other SRDs. For perceived personal risk, four questions assessed the likelihood ('very unlikely' to 'very likely' on a 5-point Likert scale) and danger ('strongly disagree' to 'strongly agree' on a 5-point Likert scale) of developing lung cancer or SRD. Given the influence of different comparison groups on perceived risk [23], perceived comparative risk was assessed with six questions rated on a 5-point Likert scale using the referent groups *average person*, *others of the same age and sex*, and *other former/current smokers*. Specifically, participants were asked if they were in danger of developing lung cancer and other SRDs, compared to the *average person* (strongly agree to strongly disagree). Participants were also asked about their chances of developing lung cancer and a SRD, compared to *others of the same age and sex* and compared to *other former/current smokers* (much lower to much higher). The 10 items of the smoking risk perception scale were summed to create a composite score, with higher scores indicating higher perceived risk for lung cancer and other SRDs [range=10 (low) to 50 (high)].

Cognitive and emotional constructs of smoking risk.—Fifteen items capture theoretically-based cognitive and emotional behavior change constructs given their potential

influence on perceived risk. *Self-efficacy* was measured with one question about confidence to quit smoking/remain quit (5-point Likert scale, 'not at all' to 'extremely'). *Perceived benefits of quitting smoking/staying quit* was measured with 3 questions about the benefits of quitting in terms of decreasing risk for lung cancer, other SRDs, and increasing life expectancy (4-point Likert scale, 'not at all' to 'very much'); these items were combined to create a composite score (range = 3–12; alpha=0.89) [23]. *Perceived benefits* of lung screening were assessed by five questions about the curability and benefits of lung cancer detected by screening (4-point Likert scale 'very few' to 'most,' range 1–4; and 5-point Likert scale 'not at all' to 'extremely'). *Perceived severity* was assessed with four questions about the health consequences and severity of lung cancer and other SRDs (5-point Likert scale, 'not at all' to 'extremely'); these items were combined to create a composite score (range 4–20; alpha=0.85) [23]. *Worry* about lung cancer and other SRDs was assessed with 4 questions about intensity (4-point Likert scale, 'not at all' to 'extremely') and frequency of worry (4-point Likert scale, 'not at all' to 'all of the time'); items were combined to create a composite score (range = 4–16; alpha=0.89) [23]. *Knowledge of smoking risks* was assessed with three questions which asked participants to estimate the percentage of smokers who would get lung cancer ("Among 100 smokers, how many will get lung cancer because they smoke?") and the average number of years of life lost due to smoking ("On average, smokers die nearly ___ years earlier than nonsmokers?"). In addition, participants were asked to quantify a smoker's risk of developing lung cancer ("A smoker who smokes one pack of cigarettes a day is at how many times risk of developing lung cancer, compared to a non-smoker?").

Statistical Analyses

All statistical analyses were conducted using SAS software, Version 9.4 of the SAS System for Linux. *Copyright © [2002–2012] SAS Institute Inc.* SAS and all other SAS Institute Inc. product or service names are registered trademarks or trademarks of SAS Institute Inc., Cary, NC, USA. Baseline differences in sociodemographic, clinical, and smoking-related variables by race were assessed using Chi Square test/Fisher's Exact tests for categorical variables, and two sample t-tests/Wilcoxon rank-sum tests for continuous variables. Cronbach's alpha was used to assess the internal consistency of the total smoking risk perception scale and the subscales, separately for black and white participants. Linear regression models were used to examine the effect of race on risk perceptions, for lung cancer and SRDs at 12 months; unadjusted and adjusted analyses (adjusting for common confounders such as age, gender, income, education, and controlling for smoking status) as well as cognitive constructs (worry, anxiety, perceived benefits of screening/quitting) were conducted. Interactions between race and potential confounders were examined in the combined model. Interactions with p-values (two-sided) less than 0.05 were considered statistically significant. Models were also fit *separately* for white and black participants to calculate the significance level of the confounders in the subsets.

Results

Participant Characteristics

There were 1743 white participants and 194 black participants who completed the risk perception questionnaire at one of the four study sites one-year following lung screening (Table 1). White participants were more likely to be older (mean age=61.4 vs. 59.1; p<.0001), male (59.2% vs. 53.1%; p<.001) and married (65.4% vs. 29.4%; p>.0001). They were more likely to have completed more years of education (62.9% vs. 44.9%; p<.0001) and to have a higher household income. White participants were also more likely to have a history of emphysema (9.6% vs. 3.1%; p=.003), while black participants were more likely to have a history of asthma (12.4% vs. 7.4%, p=.01). There were no differences in lung screening results for white and black participants; the majority of the sample received a negative screening result (82.3% vs. 81.4%; p=.56).

Smoking Risk Perceptions Scale (SRPS)

The SRPS demonstrated high internal consistency. Cronbach's alpha for the total 10-item questionnaire was 0.93 and 0.95 for white and black participants, respectively. For each, the ten risk items loaded onto two factors. Among black participants, Cronbach's alpha was .87 for personal and .95 for comparative risk; among white participants, Cronbach's alpha was .84 and .92 for personal and comparative risk, respectively. Compared to white patients (mean=35.52, SD=7.50), black patients had lower risk perceptions (mean=32.36, SD=9.32; p<.0001; Table 2). This difference remained significant when controlling for important demographic, smoking behavior, and cognitive and emotional determinants of smoking (see Table 3).

Cognitive and Emotional Constructs of Perceived Risk

There were no significant differences between white and black participants in terms of lung cancer and SRD worry, perceived benefits of screening and of quitting, or perceived severity of having a diagnosis of lung cancer or an SRD. Knowledge of smoking risks was also similar across white and black participants. Both white and black participants overestimated the risk of lung cancer among smokers; on average, participants estimated that a little over 40% of smokers would get lung cancer (Table 2). However, white participants were more likely to underestimate the risks of smoking on mortality, with 9% of white and 18% of black participants accurately reporting that smokers die more than 10 years earlier than nonsmokers (p<.0001). A little over one third of black and white participants also accurately identified the tenfold risk for lung cancer that exists for smokers (p=.01).

Multivariate predictors of risk perception at one year

We built a linear regression model to determine if smoking status, race, age, gender, education level, marital status (binary), and screening arm could be used to predict risk perception among NLST participants (Table 3). Younger age (p=.01), white race (p<.0001), and fewer perceived benefits of quitting (p<.0001) were all significant predictors of higher smoking-related disease risk perception at one year. Additionally, higher education (some college compared to < high school, p=.01 and college degree or more compared to <high

school, p<.0001), current smoking status (p<.0001), smoking addiction (p<.0001), greater perceived severity of diagnosis (p=.01), and more cancer worry (p<.0001) were also significant predictors of greater risk perceptions.

We built separate linear regression models for black and white participants to examine potential differences in predictors of risk perceptions. Factors independently associated with higher risk perceptions among white participants included younger age (β=−.08, SE=.03, p=.01), higher education (some college vs. < high school; β=.96, SE=.35, p=.005; college degree or more vs. <high school; β=2.40, SE=.37, p<.0001), current smoking status (β=1.32, SE=.32, p<.0001), more nicotine dependence (β=.28, SE=.07, p=.0002), few perceived benefits of quitting (β=−.45, SE=.08, p<.0001), and greater worry about lung cancer and smoking-related disease (β=1.51, SE=.06, p<.0001). Factors independently associated with higher risk perceptions among black participants included higher education (college degree or more versus <high school; β=3.05, SE=1.40, p=.03), current smoking status (β=2.42, SE=1.17, p=.04), nicotine dependence (β=.61, SE=.26, p=.02), fewer perceived benefits of quitting (β=−.88, SE=.27, p=.0009) and greater worry (β=1.56, SE=.17, p<.0001) were significant predictors of higher risk perceptions.

Discussion

The purpose of this study was to establish the internal consistency of a smoking risk perception scale (SRPS) for high-risk black and white patients undergoing lung screening to help examine questions related to potential differences in and predictors of risk perceptions.

We found that the SRPS is a helpful tool that can be used to reliably assess perceived smoking-related risk for lung cancer and other SRD among high-risk black and white adults. The internal consistency for the total scale and for the two scale factors was excellent and comparable with that reported in the original validation of this scale [23], suggesting the scale effectively assesses black and white smoker's perceptions of their personal and comparative risk for lung and SRDs. Using this risk perception scale, we confirmed existing reports documenting significant racial differences in beliefs about the harms of smoking [23;29–31]. Specifically, black adults held lower risk perceptions for smoking-related disease relative to white adults, even after adjusting for sociodemographic factors, smoking status and other important cognitive and emotional determinants of smoking. Importantly, our study highlights the strong and independent influence that race has on smoking risk beliefs, further underscoring the need to support cessation efforts using more targeted approaches.

Much of the existing research attributes low smoking risk beliefs among smokers to the presence of an "optimistic bias," which is the tendency for individuals to underestimate their own personal health risks of smoking. However, several patterns emerged in our data that run counter to these theories. First, compared to whites, our sample of black adults was more likely to demonstrate accurate knowledge regarding the risks of being diagnosed with and dying from a smoking-related disease. Although knowledge items were not examined in our regression model due to data missingness across both black and white participants, lacking knowledge about the hazards of smoking has been associated with unrealistic optimism [30].

Moreover, black participants also endorsed lower confidence in their ability to quit smoking, which conflicts with work suggesting a potential link between lower quit self-efficacy and higher perceived risk [24,31]. Additionally, although age emerged as a factor associated with risk perceptions in our white sample, we did not see the same relationship with age amongst black participants. This is important, as older age has historically been linked to increased likelihood of having an "optimistic" outlook [31]. Together, our results suggest that factors beyond misplaced optimism may underlie black participants' smoking risk beliefs. It could be that among current and former black smokers, emotional factors may have a stronger impact on perceptions of smoking risk.

Of note, our analyses found little to no differences in our models for black and white patients with respect to predictors of smoking risk perceptions. These findings question the applicability of traditional risk belief models for current and former black smokers and support the need to account for other variables when considering drivers of risk beliefs for this vulnerable group. For instance, culturally-salient factors such as wishful thinking, fatalistic beliefs, and medical mistrust have been posited to contribute to lower cancer risk perceptions in black communities [18, 30, 32]. Cultural models, such as the PEN-3, offer a useful framework for understanding how these and other variables may come together to influence risk beliefs [33–36]. Likewise, misconceptions about the hazards of light or nondaily smoking may also influence risk attributions [37]. Specifically, our previous NLST findings show that black participants averaged fewer daily cigarettes relative to white patients [38]. These smoking patterns may lead current and former black smokers to consider their risk for smoking-related disease to be lower. Future studies may benefit from identifying these smoking misconceptions and examining the role they may have on shaping risk perceptions in this population.

Risk beliefs are a fundamental part of many health behavior models. Some of the most widely-used theoretical frameworks, such as the Health Behavior Model [39] and the Precaution Adoption Model [40], maintain that individuals must judge their personal risk for illness to be high for behavior change to occur. However, given the pattern in our findings, we believe that important racial differences exist in the risk-behavior connection. Specifically, despite having comparably lower risk beliefs, evidence from our earlier work in this sample indicates black smokers have high intentions to quit and are more likely than white smokers to make 24-hour and 7-day quit attempts; however, they appear to have difficulty maintaining abstinence [38]. These patterns suggest that smoking risk beliefs may differentially affect smoking behavior for black smokers, and these subtle differences may not be adequately captured by existing health behavior models [32]. Moreover, we found additional differences in several determinants of behavior change that further question the validity of these models for black patients. White and black patients alike believed the consequences of smoking are severe, and they shared modest levels of worry about lung cancer and smoking-related diseases. Yet, black patients reported lower confidence to quit. These beliefs did not appear to interfere with their efforts to quit, but instead they may have interfered with black patients' ability to remain abstinent. In truth, Orom et al noted that in situations wherein risk for a health threat is seen as high and control as low, vulnerable groups may engage a set of attributions to manage their fear [32]. One implication of this is that efforts to improve cessation rates at the time of lung screening may necessitate

interventions that de-emphasize risk (and subsequently, potentially illness worry) and instead focus on improving smokers' confidence and skills to convert quit attempts to sustained abstinence.

The information obtained in this study is helpful in light of the ongoing discussion on lung cancer screening in the US; however, there are important limitations worth considering. As we alluded to earlier, this sample consists of a select group of current and former smokers who have sufficient motivation and means with which to pursue lung screening. Risk perceptions and associated smoking cessation factors may be variable among a more general, under-resourced population of current and former black smokers. Our findings may thus not generalize to other black adults, particularly those who may avoid screening, were not eligible for screening or who may have a more prominent personal or familial history of smoking-related disease. Additionally, our measure for current smoking status (i.e., do you now smoke cigarettes [one or more cigarettes per week]?") differs from measures used in some population-based observational studies (i.e., based on two items: ever smoke 100 cigarettes [former smoker] and current smoking "do you now smoke cigarettes"). This is because the NLST participants were either heavy former or current smokers, so a former smoker was categorized by a minimum of 15 years of smoking, not greater than 100 cigarettes. Although this may contribute to slight differences in smoking rates when compared to other studies [41–43], categorizing adults as smokers based on any cigarette use in the past week is per the recommendation of the Society for Research on Nicotine and Tobacco (SRNT), is used nationally in randomized clinical trials, and is consistent with the national tobacco organization's (SRNT) characterization of current smoker. Importantly, we were unable to capture important knowledge items, such as awareness of the harms of light smoking, that may clarify the potential misconceptions current and former black smokers may have. Further, our small sample size and the small rates of having a positive screening result in our sample precluded our ability to compare and contrast differences in predictors of risk perceptions among this higher-risk group. Relatedly, given the differences in sample size for our black and white patients, certain variables that are statistically significant in our linear model for white participants may not be significant in our linear model for black patients; however, the point estimates could be comparable. With that said, the numbers of black participants included in this subset of NLST are reflective proportions of black participants in the overall NLST and in the US in general. Lastly, data missingness for our knowledge scale, which was comparable across race, precluded our ability to examine the impact of knowledge on smoking-related disease risk perceptions. It would be important to understand if and how this information would impact perceived risk for smoking-related disease.

Smoking cessation is an important part of any discussion during lung cancer screening, and acknowledging that there are differences in risk perceptions, which could engender disparities in smoking outcomes, might allow for more focused cessation efforts. The results of our study support previous observations by Park and colleagues [10, 22–24] and Lathan et al. [3, 4, 18] which document black smokers as having less perceived risk for lung cancer and other smoking-related illnesses. Yet, black smokers remain highly motivated to quit and are more likely to make quit efforts, more often exhibiting struggles remaining abstinent [38]. Existing risk belief and behavior change models are missing key cultural variables that

may explain these conflicting patterns and the modest connection between risk, intentions and behavior. Elevating risk perceptions has the potential to increase worry and learned helplessness among current and former black smokers, diminishing their capacity to quit or stay quit. Interventions delivered during the time of lung screening should optimize black adults' interest and willingness to quit by framing abstinence information in a way that empowers black individuals to sustain quits. Moreover, to dispel lingering misconceptions, efforts may also be better placed on developing their understanding of how and why quitting can contribute to health gains regardless of the number of cigarettes consumed. Programs that focus on providing cessation medications to counter nicotine dependence in addition to culturally-tailored information and skills to maximize their confidence and ability to convert quit attempts to sustained quits may be useful in achieving equitable cessation outcomes among this vulnerable group.

Acknowledgements:

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Table 1

Sociodemographic, smoking, and medical characteristics of participants

	White (N=1743)	Black (N=194)	p-value
Sociodemographic characteristics			
Age, mean (SD)	61.43 (4.93)	59.14 (4.05)	<.0001
Gender, N (%)			<.0001
Male	1032 (59.21)	91 (46.91)	
Female	711 (40.79)	103 (53.09)	
Education, N (%)			<.0001
High School or less	613 (35.17)	102 (52.58)	
Post high school training, some college	595 (34.14)	55 (28.35)	
> College degree or higher	500 (28.69)	32 (16.49)	
Other/Unknown	35 (2.01)	5 (2.58)	
Household Income, N (%)			<.0001
< $15,000	169 (9.70)	63 (32.47)	
$15,000–34,999	406 (23.29)	52 (26.80)	
35,000–64,999	493 (28.28)	28 (14.43)	
$65,000 and above	434 (24.90)	20 (10.31)	
Unknown	241 (13.83)	31 (15.98)	
Marital Status, N (%)			<.0001
Married/Living as Married	1140 (65.40)	57 (29.38)	
Never Married/Widowed/Divorced/Separated	599 (34.37)	134 (69.07)	
Unknown	4 (0.23)	3 (1.55)	
Center, N (%)			<.0001
Jewish Hospital Louisville, KY	985 (56.51)	33 (17.01)	
Johns Hopkins, Baltimore, MD	649 (37.23)	156 (80.41)	
Cancer Inst of NJ, New Brunswick, NJ	64 (3.67)	3 (1.55)	
St. Elizabeth, Youngstown, OH	45 (2.58)	2 (1.03)	
Insurance Status, N (%)			<.0001
Private Insurance	1116 (64.03)	96 (49.48)	
Medicare	164 (9.41)	31 (15.98)	
Medicare and Private Insurance	287 (16.47)	19 (9.79)	
Medicaid	6 (0.34)	1 (0.52)	
Medicare and Medicaid	11 (0.63)	4 (2.06)	
Military or Veteran Administration	52 (2.98)	9 (4.64)	
Self Pay	37 (2.12)	3 (1.55)	
No Means of payment	53 (3.04)	29 (14.95)	
Other	5 (0.29)	0 (0.00)	
Unknown/Decline to answer	12 (0.69)	2 (1.03)	
Smoking Characteristics			
Smoking Status at One Year, N (%)			<.001

	White (N=1743)	Black (N=194)	p-value
Former smoker	901 (51.69)	60 (30.93)	
Current smoker	821 (47.10)	132 (68.04)	
Not reported	21 (1.20)	2 (1.03)	
Smoking Characteristics, Mean (SD)			
Pack Years	59.10 (25.84)	47.82 (19.94)	<.0001
# Years Quit (Count current smokers as 0)	3.45 (4.92)	1.50 (3.50)	<.0001
Fagerstrom test for nicotine dependence	5.64 (2.32)	5.22 (2.30)	0.02
Medical Characteristics			
Personal History of, N (%)			
Asthma	129 (7.40)	24 (12.37)	0.01
Chronic Bronchitis	230 (13.20)	22 (11.34)	0.47
Emphysema	168 (9.64)	6 (3.09)	0.003
Heart Disease/Heart Attack	263 (15.09)	24 (12.37)	0.31
Stroke	52 (2.98)	7 (3.61)	0.63
Cancer	177 (10.15)	13 (6.70)	0.13
SRD	493 (28.28)	39 (20.10)	0.02
Family history of lung cancer, N (%)	425 (24.38)	45 (23.20)	0.71
Baseline screening result, N (%)			0.56
Negative	1435 (82.32)	158 (81.44)	
Significant for non-lung cancer abnormalities	113 (6.48)	10 (5.15)	
Positive	191 (10.96)	26 (13.40)	
Unknown	5 (0.29)	0 (0.00)	

Table 2

Smoking Risk Perceptions and Cognitive-Emotional Constructs

	White (N=1743)	Black (N=194)	P Value
Risk Perceptions, mean (SD)			
Risk perceptions for lung cancer and SRDs	35.52 (7.50)	32.36 (9.32)	<.0001
Cognitive and emotional constructs, Mean (SD)			
Perceived benefits of screening (White=1700, Black=187)	4.86 (1.38)	4.84 (1.47)	0.94
Perceived severity of lung cancer and SRDs (White=1648, Black=177)	18.24 (1.90)	18.12 (2.60)	0.32
Worry about lung cancer and SRDs (White=1667, Black=186)	9.55 (2.80)	9.76 (3.35)	0.30
Perceived benefits of quitting (White=1702, Black=188)	9.47 (2.10)	9.83 (2.07)	0.02
Confidence/Self-Efficacy to quit (White=1658, Black=181)	3.69 (1.35)	3.54 (1.4)	0.005
Knowledge of smoking risks			
% smokers who will get lung cancer, mean (SD) (White=1680, Black =182)	40.25 (22.66)	46.54 (22.85)	0.0005
Average years decreased life for smokers, N (%)			<.0001
0–5	426 (24.44)	49 (25.26)	
6–10	813 (46.64)	62 (31.96)	
11+	150 (8.61)	34 (17.53)	
Not Answered	354 (20.31)	49 (25.26)	
One pack/day smoker's risk of developing lung cancer, N (%)			0.01
0–2× risk	483 (27.71)	55 (28.35)	
5× risk	641 (36.78)	52 (26.80)	
10–20× risk	588 (33.73)	80 (41.24)	
Not Answered	31 (1.78)	7(3.61)	

Table 3

Multivariate Linear Regression model: factors associated with risk perceptions of lung cancer and smoking-related diseases (SRDs) at one-year among NLST participants (N=1651)

	B	SE	P-value
Age (years)	−0.08	0.03	0.01
Female	0.39	0.30	0.22
Spiral CT (ref. x-ray)	0.09	0.28	0.75
Education (ref. <High School)			
Some college	0.84	0.33	0.01
College degree or more	2.43	0.36	<.0001
Married	−0.05	0.31	0.88
Black (ref. white)	−2.55	0.50	<.0001
Current Smoker at 1 year (ref. Former)	1.40	0.31	<.0001
Total Pack Years	0.01	0.01	0.24
FTND score	0.30	0.07	<.0001
Cognitive and Emotional Constructs			
Perceived benefit of screening	0.03	0.10	0.78
Perceived benefit of quitting	−0.49	0.07	<.0001
Perceived severity of lung cancer and SRDs	0.19	0.08	0.01
Worry About Lung Cancer and SRDs	1.53	0.05	<.0001

Table 4

Multivariate Linear Regression Model: factors associated with risk perceptions of lung cancer and smoking-related diseases (SRDs) at one-year among white participants (N=1495)

	B	SE	P-value
Age (years)	−0.08	0.03	0.01
Female	0.49	0.31	0.12
Spiral CT (ref. x-ray)	0.09	0.29	0.76
Education (ref. <High School)			
Some college	0.96	0.35	0.005
College degree or more	2.40	0.37	<0.0001
Married	−0.14	0.32	0.65
Current Smoker at 1 year (ref. Former)	1.32	0.32	<0.0001
Total Pack Years	0.01	0.01	0.09
FTND score	0.28	0.07	0.0002
Cognitive and Emotional Constructs			
Perceived benefit of screening	0.02	0.11	0.85
Perceived benefit of quitting	−0.45	0.08	<0.0001
Perceived severity of lung cancer and SRDs	0.15	0.08	0.08
Worry About Lung Cancer and SRDs	1.51	0.06	<0.0001

Table 5

Multivariate Linear Regression Model: factors associated with risk perceptions of lung cancer and smoking-related diseases (SRDs) at one-year among black participants (N=156)

	B	SE	P-value
Age (years)	0.003	0.13	0.98
Female	−0.70	1.04	0.50
Spiral CT (ref. x-ray)	−0.04	1.00	0.97
Education (ref. <High School)			
Some college	−0.13	1.15	0.91
College degree or more	3.05	1.40	0.03
Married	0.95	1.12	0.40
Current Smoker at 1 year (ref. Former)	2.42	1.17	0.04
Total Pack Years	−0.03	0.03	0.25
FTND score	0.61	0.26	0.02
Cognitive and Emotional Constructs			
Perceived benefit of screening	0.02	0.37	0.95
Perceived benefit of quitting	−0.88	0.27	0.0009
Perceived severity of lung cancer and SRDs	0.42	0.22	0.06
Worry About Lung Cancer and SRDs	1.56	0.17	<.0001