

Letters

RESEARCH LETTER

Outcomes From a Minority-Based Lung Cancer Screening Program vs the National Lung Screening Trial

The National Lung Screening Trial (NLST) showed a 20% reduction in lung cancer (LC) mortality by detection of LC at an early stage with low-dose computed tomography (LDCT) scanning vs chest radiography for individuals who are at high-risk for LC based largely on age and smoking history.¹ A total of 90.9% of the NLST participants were white, and only 4.5% were African American. Yet, although the overall incidence and mortality from LC have been declining in the United States, African Americans have the highest LC mortality rate compared with other races. The magnitude of this racial disparity has increased over the past 4 decades.² Screening programs tailored to high-risk patients of minority races/ethnicities could help to reduce this health disparity and save even more lives.³ The goal of this study was to assess the demographic characteristics, baseline LDCT scan findings (lung reporting and data system, Lung-RADS⁴), and detected LCs in an inner city, minority-based population at the University of Illinois at Chicago (UIC) that included federally qualified health centers vs that of the NLST.

Methods | We performed a retrospective analysis of the first 500 baseline LDCT screens at UIC and evaluated these data against the NLST LDCT (26 722 baseline screens) arm. The study was conducted from September 4, 2015, to December

Table 1. Baseline Demographic Factors and Smoking Status of Participants Included in the UIC's Lung Cancer Screening Program and the LDCT Arm of the National Lung Screening Trial¹

Characteristic	No. (%)		P Value
	UIC (n = 500)	NLST (n = 26 722) ^a	
Age, mean (SD)	62.8 (5.69)	61.4 (5.03)	<.001
Sex			
Male	262 (52.4)	15 770 (59.0)	.01
Female	238 (47.6)	10 952 (41.0)	
Race			
White	144 (28.8)	24 289 (90.9)	<.001
African American	348 (69.6)	1195 (4.5)	
Asian	7 (1.4)	559 (2.1)	
Other/>1	1 (0.2)	516 (1.9)	
Missing	0	163 (0.6)	
Ethnicity			
Hispanic or Latino	53 (10.6)	479 (1.8)	<.001
Neither Hispanic nor Latino	447 (89.4)	26 079 (97.6)	
Missing	0	164 (0.6)	
Smoking status			
Current	364 (72.8)	12 860 (48.1)	<.001
Former	136 (27.2)	13 862 (51.9)	

Abbreviations: LDCT, low-dose computed tomography; NLST, National Lung Screening Trial; UIC, University of Illinois at Chicago.

^a Table adapted from Aberle et al,¹ adjusted with UIC results and data provided from the NLST data set at the National Cancer Institute.

Table 2. Lung-RADS Classification From the UIC Cohort and the LDCT Arm of the NLST^{a,b}

Lung-RADS Classification ^{a,b}	UIC, No. (%) ^c	UIC With Cancer, No./No. (%)	NLST, No. (%) ^d	NLST With Cancer, No./No. (%) ^d
1	136 (27.2)	0/136	14 709 (55.6)	15/14 709 (0.1)
2	241 (48.2)	0/241	8145 (30.8)	29/8145 (0.4)
3	77 (15.4)	0/77	1697 (6.4)	21/1697 (1.2)
3, 4A ^e	0	0/0	97 (0.4)	0/97
3, 4A, 4B ^e	0	0/0	193 (0.7)	22/193 (11.4)
4A	33 (6.6)	4/33 (12.1)	1107 (4.2)	78/1107 (7.0)
4B	10 (2.0)	6/10 (60.0)	358 (1.4)	124/358 (34.6)
4X	3 (0.6)	3/3 (100)	149 (0.6)	3/149 (2.0)
All	500 (100)	13/500 (2.6)	26 455 (100)	292/26 455 (1.1)

Abbreviations: LDCT, low-dose computed tomography; NLST, National Lung Screening Trial; UIC, University of Illinois at Chicago.

^a Adapted from Pinsky et al⁴ to compare NLST and UIC data.

^b Lung-RADS category descriptor: 0 (incomplete scan), 1 (negative: no nodules and definitely benign nodules), 2 (benign-appearing nodules with low likelihood of becoming cancer owing to size or lack of growth), 3 (probably benign and short-term follow-up is suggested), 4 (suspicious; additional diagnostic testing and/or tissue sampling is recommended; subcategories 4A,

4B, and 4X indicate nodules with additional features increasing the degree of suspicion of malignancy).

^c The distributions of Lung-RADS categories were significantly different between UIC and NLST cohorts ($P < .001$).

^d Percentages may not sum to 100 due to rounding.

^e These classifications were consistent with more than 1 Lung-RADS category in the NLST.

28, 2017. Inclusion criteria for the UIC cohort were the same as in the NLST study.¹ We compared UIC LDCT findings with those of the NLST using Lung-RADS criteria that were established by the American College of Radiology in 2015 and retrospectively applied to the NLST in a secondary analysis (26 455 evaluable).⁴ Lung-RADS is now in common use as a system for risk stratifying and standardizing LDCT findings on a scale of 0 to 4 primarily based on the presence and/or characteristics of lung nodules. Demographic data, Lung-RADS scores of baseline LDCT scans, and diagnosed LC cases were collected and evaluated vs data of the NLST LDCT arm. Summary statistics and statistical tests (2-tailed, unpaired *t* tests for continuous variables and χ^2 tests for categorical variables) were applied to compare the UIC cohort with the NLST LDCT arm. The study was approved by the UIC Institutional Review Board. Statistical analysis was performed using SAS, version 9.4 (SAS Institute Inc).

Results | Demographic characteristics of the UIC cohort did not resemble those of the NLST LDCT arm (Table 1). The UIC cohort had a different racial and ethnic composition than the NLST LDCT arm ($P < .001$) of African American (UIC, 69.6% [348 of 500] vs NLST, 4.5% [1195 of 26 722]) and Hispanic or Latino (UIC, 10.6% [53 of 500] vs NLST, 1.8% [479 of 26 722]) individuals. The UIC cohort had a higher percentage of current smokers than the NLST LDCT arm (72.8% [364 of 500] vs 48.1% [12 860 of 26 722], respectively). The outcome distribution of Lung-RADS categories in the UIC sample was different from that in the NLST LDCT arm sample ($P < .001$). Proportion of positive (Lung-RADS class 3 or 4) LDCT screens in the UIC cohort (24.6% [123 of 500]) was nearly double that in the NLST LDCT arm (13.7% [3601 of 26 455]) (Table 2). The UIC cohort had a higher LC detection rate (2.6% [13 of 500]) than the NLST LDCT (1.1% [292 of 26 455]) arm ($P = .002$). Consistent with the goal of screening, both cohorts had greater than 50% of LC cases detected at an early (stage I) curable stage (UIC [7 of 13] and NLST [155 of 266]).

Discussion | The UIC cohort had a higher percentage of African American individuals, positive LDCT scans, and percentage of diagnosed LC cases. These real-world differences are in accordance with a secondary analysis from NLST that showed that reduction in LC mortality was greatest among African American participants.⁵ This report provides experiential evidence that is consistent with the notion that a more-detailed assessment of individual risk of LC may be more effective than focusing only on age and smoking status criteria.⁶ The magnitude of the disparity in LC mortality between African American and white individuals has been widening.² Screening that is skewed toward the white population could paradoxically increase racial disparities in LC outcomes.³ Refining risk-based guidelines would improve the beneficial results of LDCT screening.⁶

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