



# Lung Screening: Race & Gender Disparities

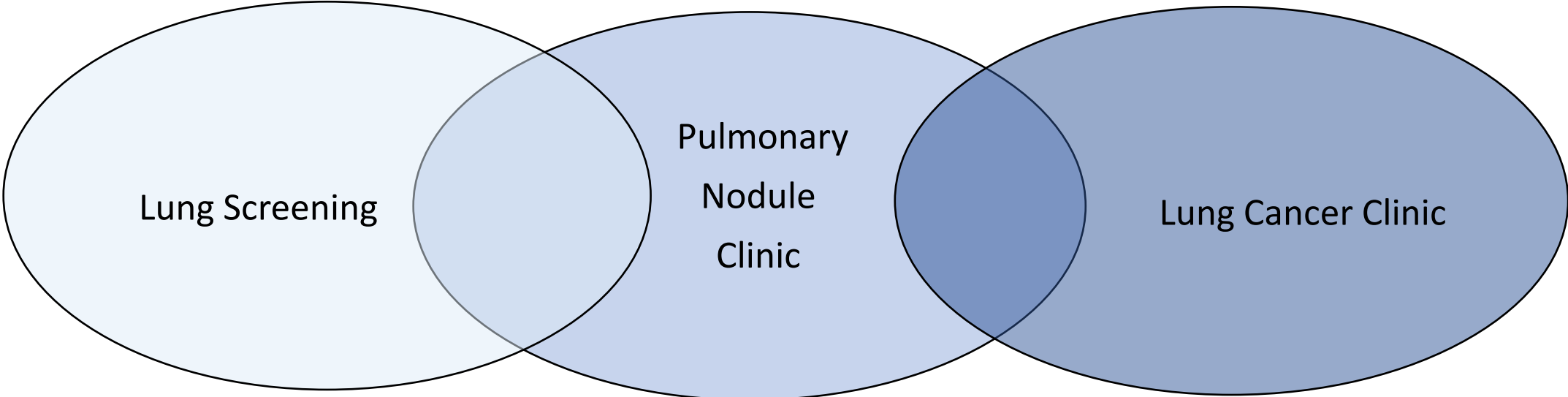
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No Disclosures

# From Screening Through Cancer Survivorship



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

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.<sup>1</sup> 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.<sup>2</sup> Screening programs tailored to high-risk patients of minority races/ethnicities could help to reduce this health disparity and save even more lives.<sup>3</sup> The goal of this study was to assess the demographic characteristics, baseline LDCT scan findings (lung reporting and data system, Lung-RADS<sup>4</sup>), 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 (26722 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 Trial<sup>a</sup>**

Characteristic	No. (%)		P Value
	UIC (n = 500)	NLST (n = 26 722) <sup>b</sup>	
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 <sup>c</sup> /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, University of Illinois at Chicago.

<sup>a</sup> Table adapted from Aberle et al,<sup>1</sup> 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<sup>a,b</sup>**

Lung-RADS Classification <sup>a,b</sup>	UIC, No. (%) <sup>c</sup>	UIC With Cancer, No./No. (%)	NLST, No. (%) <sup>c</sup>	NLST With Cancer, No./No. (%) <sup>d</sup>
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 <sup>e</sup>	0	0/0	97 (0.4)	0/97
3, 4A, 4B <sup>e</sup>	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, University of Illinois at Chicago.

<sup>a</sup> Adapted from Pinsky et al<sup>4</sup> to compare NLST and UIC data.

<sup>b</sup> 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).

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

<sup>d</sup> Percentages may not sum to 100 due to rounding.

<sup>e</sup> These classifications were consistent with more than 1 Lung-RADS category in the NLST.

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- **Race:**
- African American = 70% vs. 4.5%
- **Smoking Status**
- Current Smokers: 73% vs 48%
- **Diagnosed Lung Cancer Cases**
- 2.6% vs. 1.1%

# Chicago Race/Gender Eligibility for Screening Cohort (CREST)



Hokusai. Under the Wave off Kanagawa. 1826-1836. The Art Institute of Chicago.



# Chicago Race/Gender Eligibility for Screening Cohort (CREST)



*Design:* Retrospective study of lung cancer cases with a history of smoking , 2010-2019, University of Illinois at Chicago, N=883

*Aim:* To compare USPSTF criteria vs the PLCOm2012 risk prediction model for sensitivity in identifying lung cancer and removing disparities in lung screening eligibility criteria

# Chicago Race/Gender Eligibility for Screening Cohort (CREST)



## PLCOm2012 Risk Prediction Model (6/yr risk)

### 11 variables:

- Age
- Race
- Smoking status – Current/Former
- Smoking Duration – cigs/day x years
- Years quit
- Highest level of education
- COPD, emphysema
- Personal hx of cancer
- Family hx of lung cancer
- BMI

**\*The PLCOm2012 does not have an age, smoking pack-year, or quit time limit**

# Risk Prediction Model Versus United States Preventive Services Task Force Lung Cancer Screening Eligibility Criteria: Reducing Race Disparities

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# Chicago Race Eligibility for Screening Cohort (CREST) - Population Characteristics

**N = 883**

**African American = 56%**

**White = 29%**

Characteristic	Race and Ethnicity			Total	p Value <sup>a</sup>
	African American Non-Hispanic	White, Non-Hispanic	Other (Includes Hispanic, Asian, Unknown)		
Pack-years, Mean (SD)	37.3 (23.5)	48.2 (28.5)	37.0 (27.1)	40.4 (26.0)	<0.001
Pack-years, PKYR, n (%)					
≥30	→ 293 (61.4)	194 (81.2)	71 (61.7)	558 (67.1)	
20-<30	95 (19.9)	21 (8.8)	8 (7.0)	124 (14.9)	<0.001
10-<20	61 (12.8)	19 (7.9)	19 (16.5)	99 (11.9)	
<10	28 (5.9)	5 (2.1)	17 (14.8)	50 (6.0)	
Smoking status, n (%)					<0.001
Former	171 (34.4)	111 (43.0)	70 (54.7)	352 (39.9)	
Current	→ 326 (65.6)	147 (57.0)	58 (45.3)	531 (60.1)	
Quit time (former smokers), mean (SD)	12.8 (11.3)	12.3 (11.3)	18.8 (13.3)	13.80 (11.9)	0.003
Quit time (former smokers), y, n (%)					0.003
<15	88 (68.2)	68 (72.3)	24 (45.3)	180 (65.2)	
≥15	41 (31.8)	26 (27.7)	29 (54.7)	96 (34.8)	



# Chicago Race Eligibility for Screening Cohort (CREST)

Sensitivity (%) USPSTF2013 Criteria Vs PLCOm2012 at a 1.7% 6/yr risk

**Table 2. Sensitivity (%) of the USPSTF Criteria Versus the PLCOm2012 Risk Prediction Model With Varying Thresholds for Positivity Stratified by Race (N<sub>All</sub> = 883, N<sub>white</sub> = 258, N<sub>African American</sub> = 497)**

Sample	USPSTF 2013		PLCOm2012, Threshold $\geq$ 1.70%	p Value
All	52.3		66.1	<0.0001
White	62.4	<	66.0	0.203
African American	50.3		71.3	<0.0001

# Proposed USPSTF 2020 Draft Recommendations

## Recommendation Summary

Population	Recommendation	Grade
Adults ages <u>50</u> to 80 years who have a <u>20</u> pack-year smoking history, currently smoke, or have quit within the <u>past 15 years</u>	The USPSTF recommends annual screening for lung cancer with low-dose computed tomography (LDCT) in adults ages 50 to 80 years who have a 20 pack-year smoking history and currently smoke or have quit within the past 15 years. Screening should be discontinued once a person has not smoked for 15 years or develops a health problem that substantially limits life expectancy or the ability or willingness to have curative lung surgery.	<b>B</b>

Screening for lung cancer in persons with lighter smoking histories (20 pack-years) and at an earlier age (50 years) may also help partially ameliorate racial disparities in screening eligibility.

# Chicago Race/Gender Eligibility for Screening Cohort (CREST)



## Reanalysis

USPSTF2013 vs PLCOm2012 at a  $\geq 1.7\%$  6/yr risk threshold

USPSTF2020 vs PLCOm2012 at a  $\geq 1\%$  6/yr risk threshold

$\geq 1.7\%$  and  $\geq 1.0\%/6\text{yr}$  risk threshold was used as it was identified as the threshold that selects for a similar number of eligible individuals as the USPSTF2013 and the USPSTF2020 draft guideline respectively

# Thank You

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