

# IMPLEMENTATION OF LUNG CANCER SCREENING AT TWO KP REGIONS

## Initial Outcomes from the PROSPR Lung Cancer Screening Research Center

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### Background

The enormous public health burden of lung cancer deaths in the U.S. and within KP underscore the potentially large impact of optimizing the lung cancer screening (LCS) process. **Kaiser Permanente Colorado (KPCO)** and **Kaiser Permanent Hawaii (KPHI)** are part of a national consortium with the primary goal of optimizing the effectiveness, precision, and delivery of lung cancer screening (LCS) with a focus on addressing health disparities.

### LCS Implementation

In 2013, the National Lung Cancer Screening Trial (NLST) reported screening with low-dose computed tomography (LDCT) reduced lung cancer mortality by 20% in people at increased risk.

Early experience suggests the outcomes of LCS in community settings may differ from NLST outcomes, due to differences in:

- uptake of LCS
- characteristics and comorbidities of people screened
- interpretation of LDCT findings
- rates of lung biopsy and complications

### KPCO & KPHI LCS Implementation:

KPCO and KPHI implemented LCS programs in May 2014 and January 2015, respectively. Variation exists over time and between regions in implementation strategies used, but little is known about LCS outcomes:

- number of patients screened
- underlying characteristics of the patients screened
- distribution of baseline findings (*classified by Lung-RADS standardized reporting tool*)
- proportion of positive screens
- proportion of lung cancers diagnosed

### Methods

#### Study Design:

Retrospective cohort analysis

#### Eligibility:

Patients who received a baseline LDCT scan for LCS at KPCO & KPHI between Feb 1, 2015 and Dec. 31, 2016.

Patients were followed from baseline LDCT to lung cancer diagnosis, their next LDCT, death, disenrollment from KP, or 12 months (Dec. 31, 2017), whichever came first.

### Primary outcomes:

- Demographic and clinical characteristics of patients receiving a baseline LDCT scan
- Distribution of Lung-RADS
- Proportion of patients who had positive screen results based on the Lung-RADS LCS assignment of 3 or 4
- Variation in KPCO and KPHI patient demographic and clinical characteristics and outcomes relative to NLST

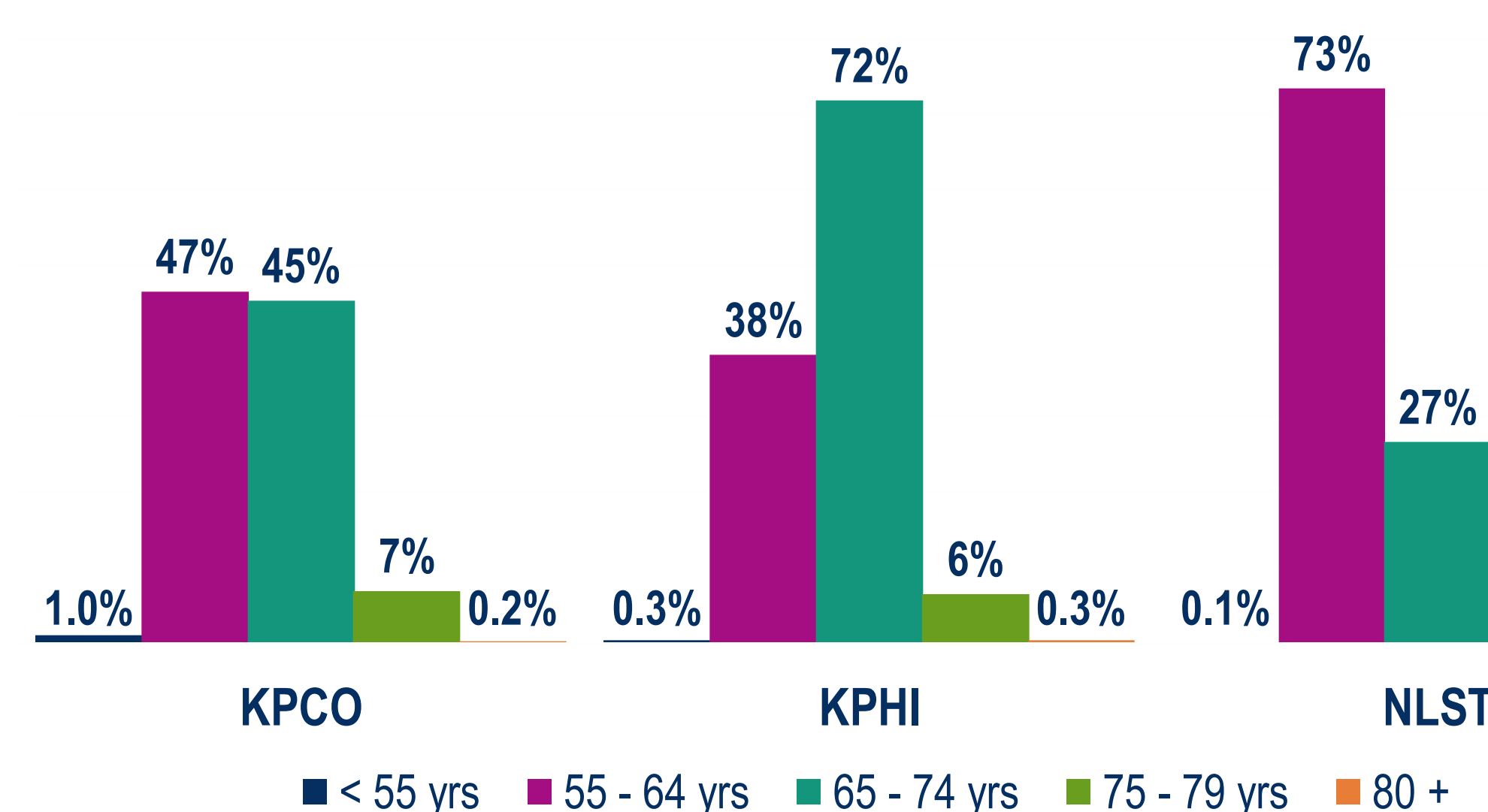
### Results

During the observation period, **2,173 KPCO** and **470 KPHI** patients underwent LCS with LDCT.

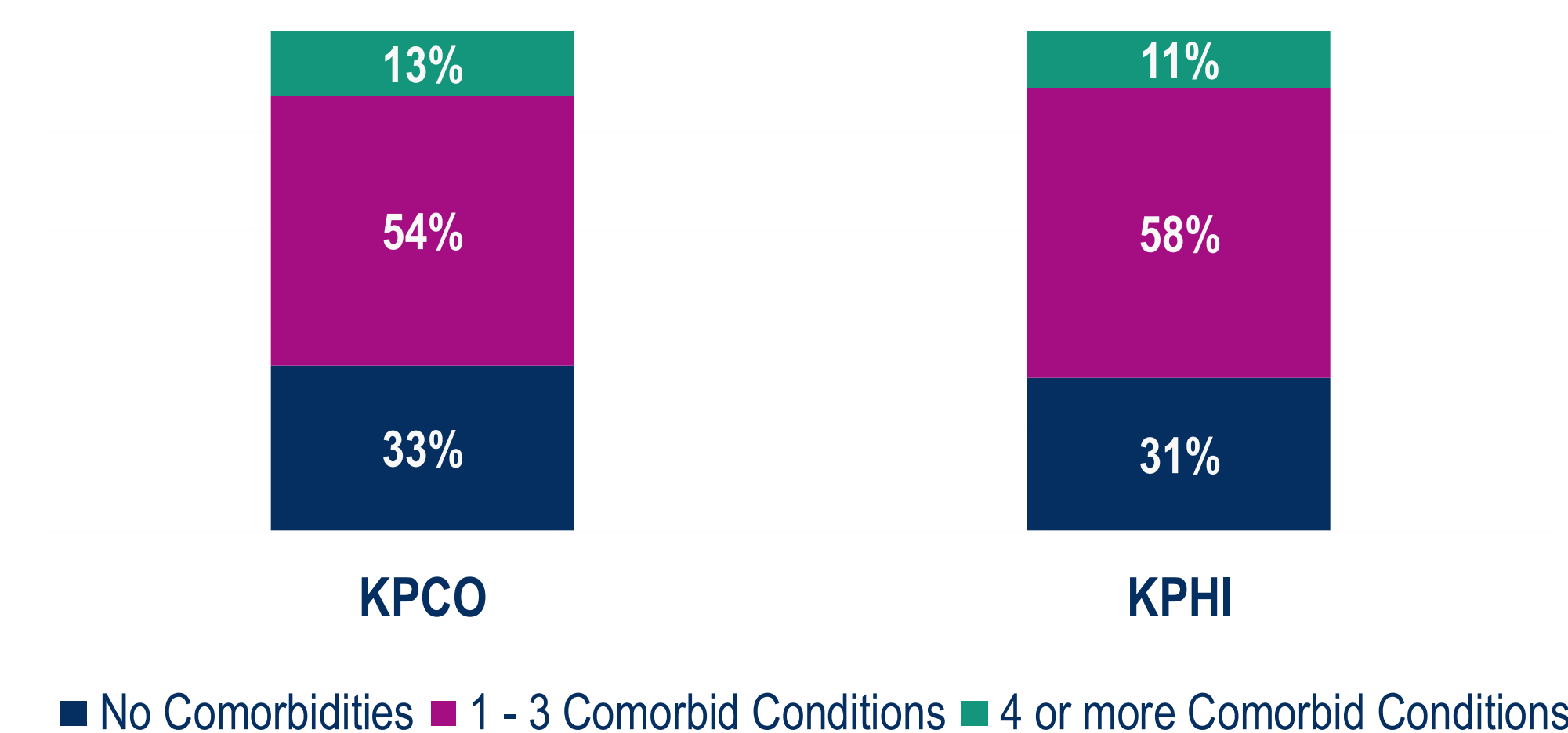
**Table 1: Demographics of Patients Receiving a Baseline LDCT Screen**

	KPCO	KPHI	TOTAL	p-value	NLST <sup>1,2</sup>
Mean Age at Baseline Screen (std)				< .0001	
	65 (6)	66 (6)	65 (6)		60 (8)
Gender, N (%)					
Male	1879 (56)	398 (63)	2277 (57)	<.001	15537 (59)
Race, N (%)				< .0001	
Asian	62 (2)	233 (37)	295 (7)		546 (2)
Black	144 (4)	6 (1)	150 (4)		1167 (4)
Hawaiian/Pacific Islander	3 (0.1)	138 (22)	141 (4)		
Other (Other/AmIndain)	157 (5)	9 (1)	166 (4)		499 (2)
Unknown/Missing	222 (7)	24 (4)	246 (6)		96 (0.4)
White	2787 (83)	222 (35)	3009 (75)		24002 (91)
Ethnicity, N (%)					
Hispanic or Latino	348 (10)	23 (4)	371 (9)	< .0001	464 (2)
Charlson Comorbidity Index, N (%)				0.13	
0 (good health)	1121 (33)	193 (31)	1314 (33)		NA
1-3 (average health)	1814 (54)	367 (58)	2181 (54)		NA
4 or more (poor health)	440 (13)	72 (11)	512 (13)		NA

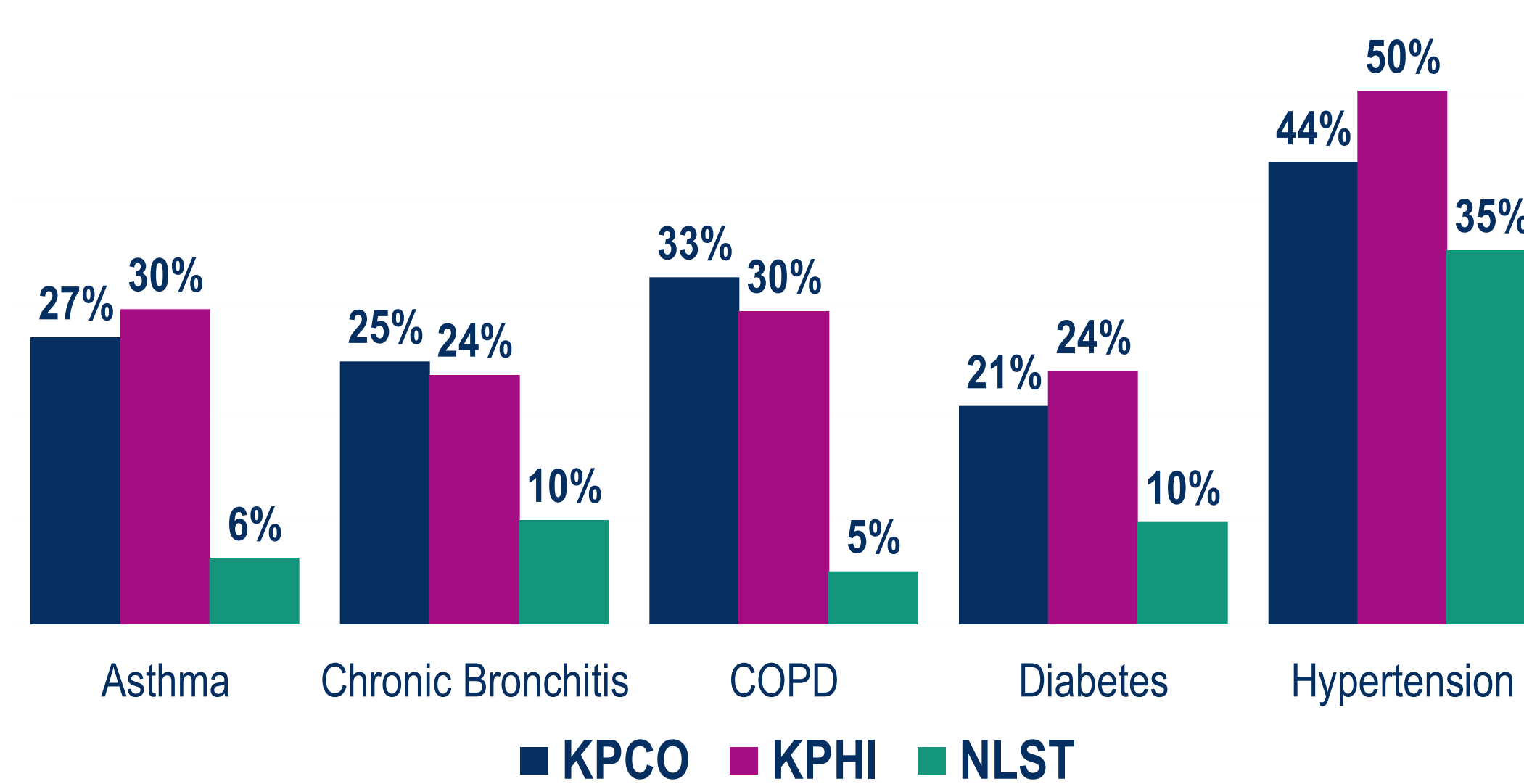
**Figure 1: Age Distribution at Baseline Screen**



**Figure 2: Comorbidity Burden at Baseline Screen By Region**



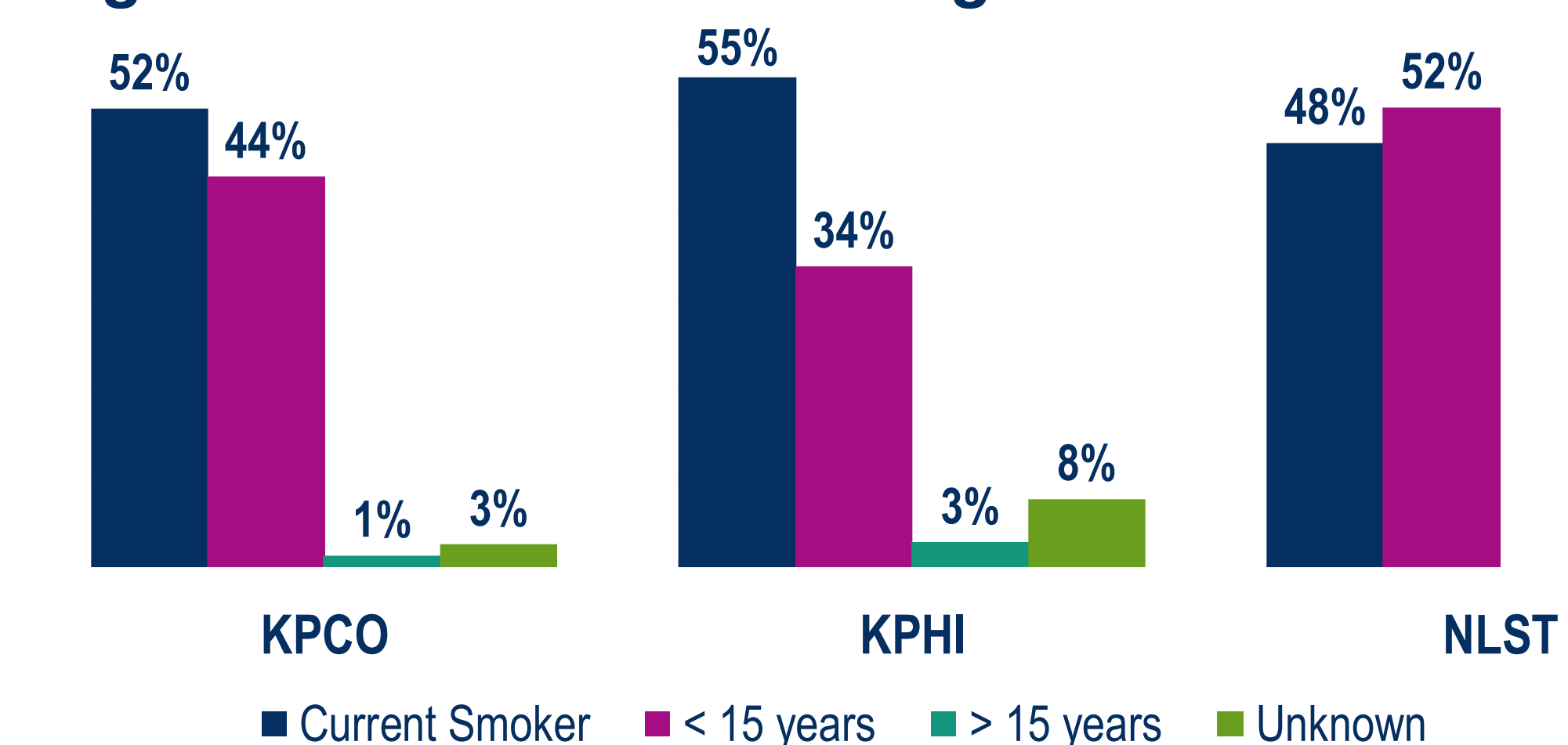
**Figure 3: Comorbid Conditions at Baseline Screen**



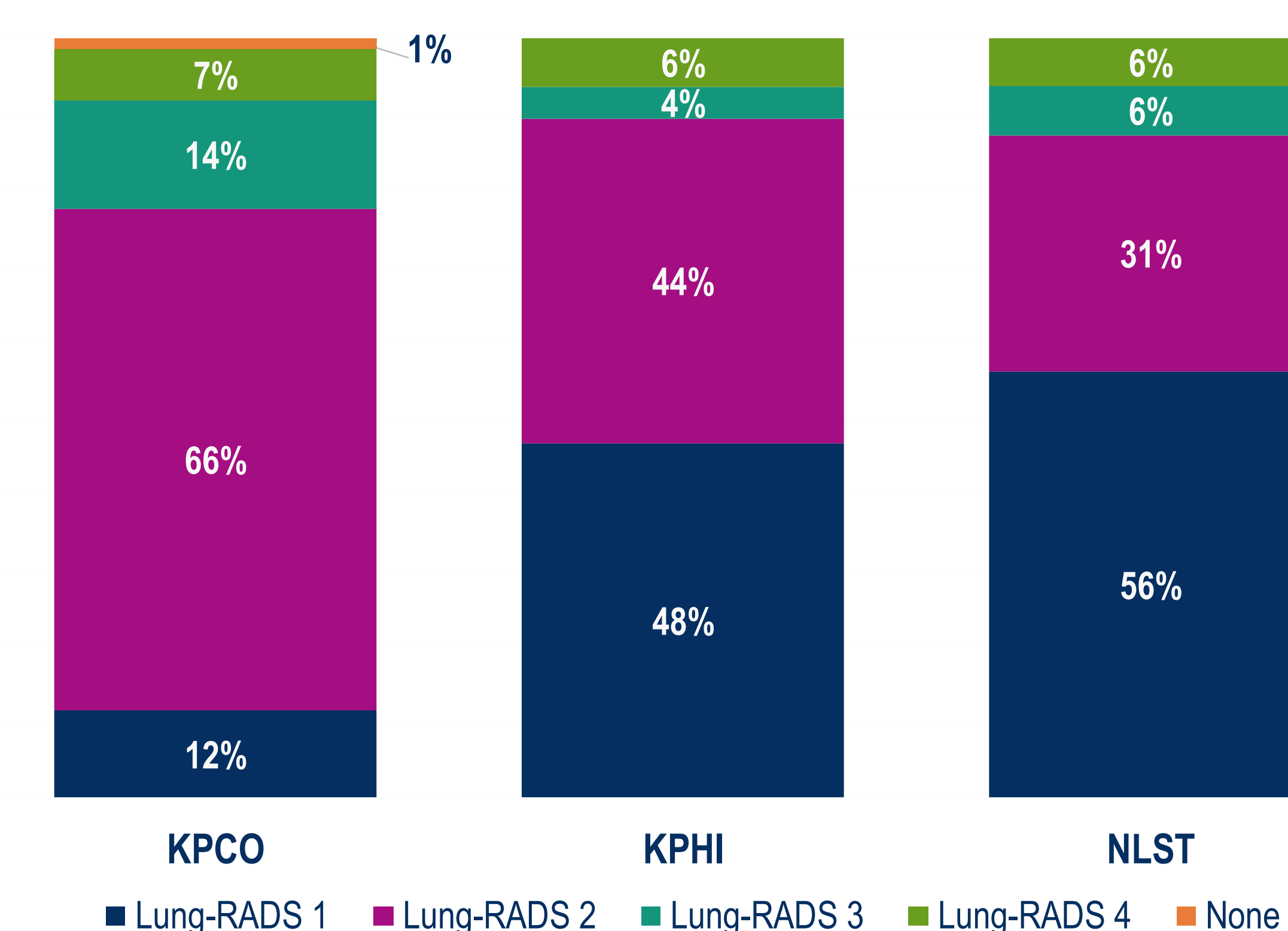
**Table 2: Smoking Status of Patients Receiving a Baseline LDCT Screen**

	KPCO	KPHI	TOTAL	p-value	NLST <sup>1,2</sup>
Smoking Status at Baseline Screen, N (%)				0.39	
Current	1751 (52)	350 (55)	2101 (52)		12642 (48)
Quit/Former	1601 (47)	280 (44)	1881 (47)		13668 (52)
Never	16 (1)	2 (0.3)	18 (0.4)		0
Missing	7 (0.2)	0 (0)	7 (0.2)		0
Pack Year History, N (%)				< .0001	
< 30 pack-years	79 (2)	46 (7)	125 (3)		6 (< .01)
≥ 30 pack-years	3184 (94)	472 (75)	3656 (91)		26303 (100)
Unknown	112 (3)	114 (18)	226 (6)		0

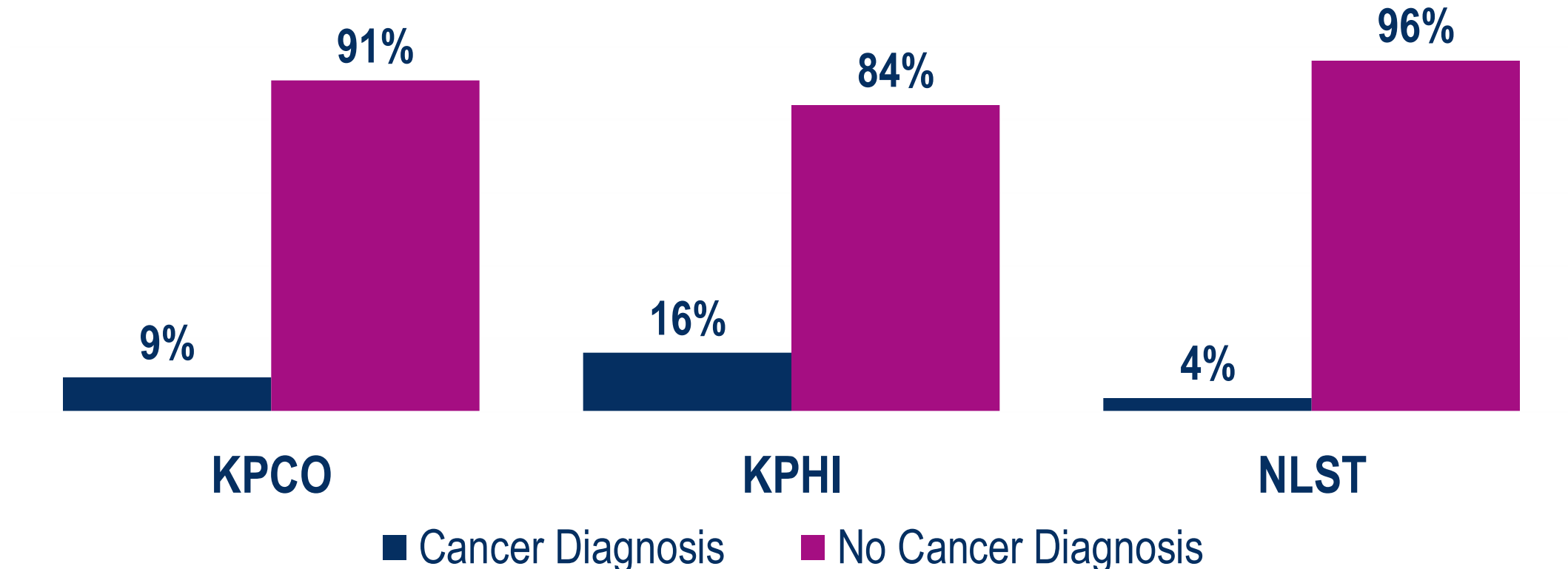
**Figure 4: Years Since Quitting at Baseline Screen**



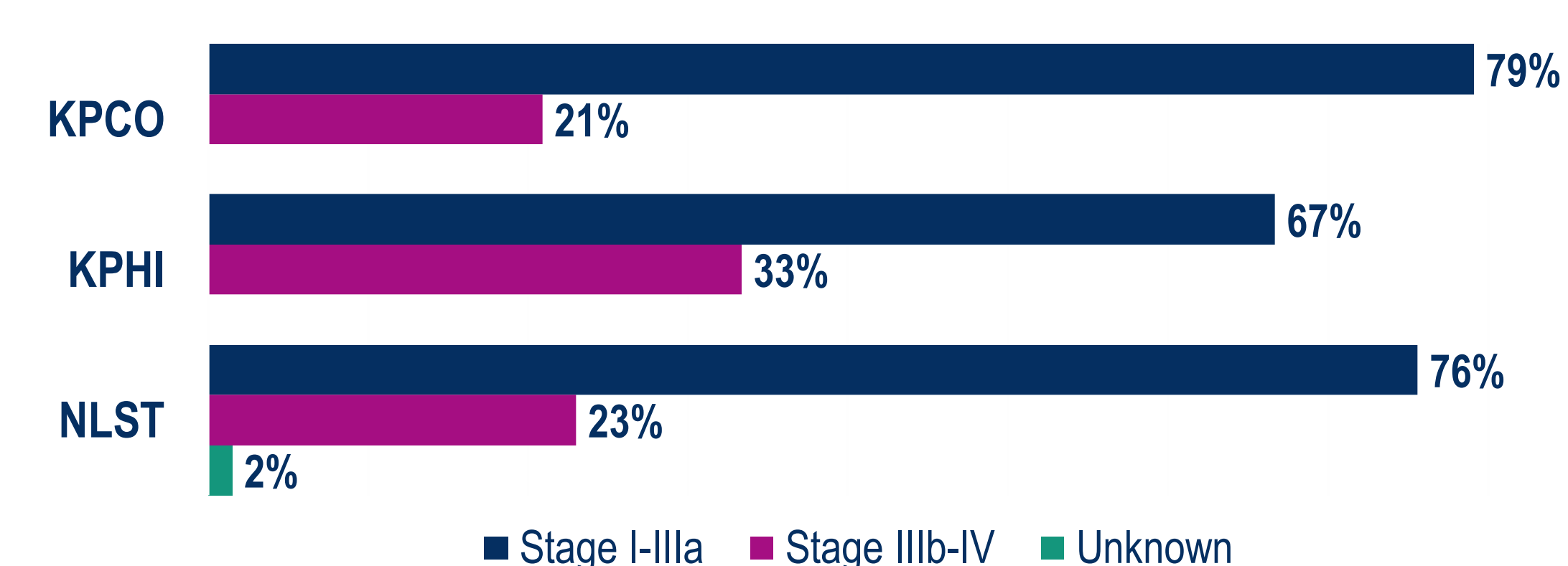
**Figure 5: Distribution of Lung-RADS at Baseline Screen<sup>4</sup>**



**Figure 6: Cancer Diagnosis within 1 year Among Patients with a Positive Baseline Screen<sup>3</sup>**



**Figure 7: Stage Distribution at Cancer Diagnosis<sup>3</sup>**



### Conclusions

- Demographic & clinical differences were found for patients undergoing LCS between KP regions & relative to NLST.
- KPCO Lung-RADS distributed to higher categories than KPHI and NLST, yet the proportion of screened patients with a lung cancer diagnosis was significantly lower at KPCO (vs KPHI).
- More research needed on:**
  - identifying smoking status in underlying population
  - uptake of LCS within community settings
  - criteria for Lung-RADS assignment
  - use of follow-up diagnostic tests and procedures