

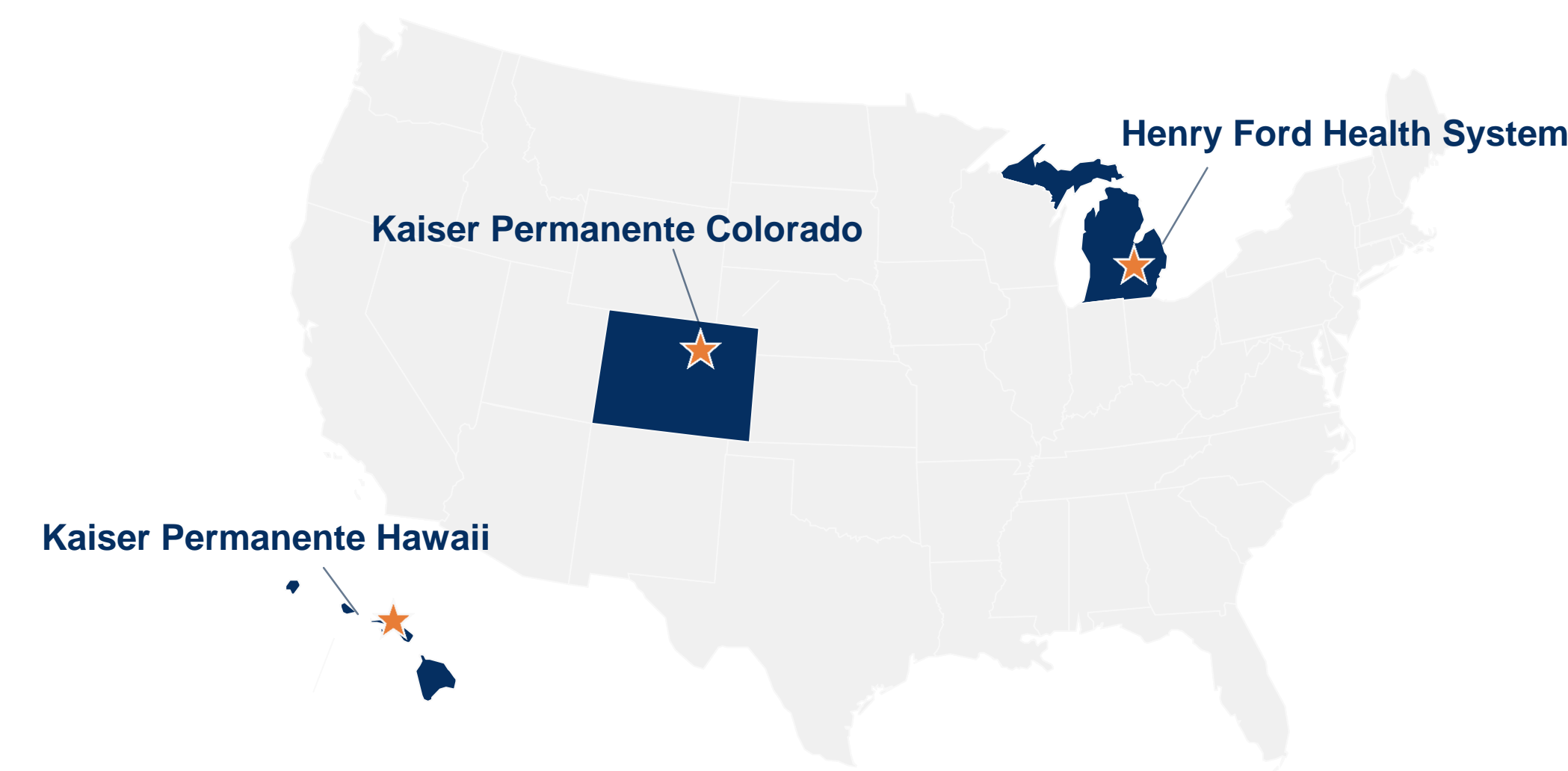
VARIATION IN LUNG-RADS ASSIGNMENT BETWEEN PATIENTS RECEIVING LUNG CANCER SCREENING

Results from the Population-Based Research to Optimize the Screening Process (PROSPR) Consortium

Authors: Andrea N. Burnett Hartman, PhD, MPH ¹; Nikki M. Carroll, MS ¹; Stacey A. A. Honda, MD, PhD ²; Christine Neslund-Dudas, PhD³; Oluwatosin Olaiya, MBChB, MSc⁴; Katharine A. Rendle, PhD, MSW, MPH⁵; Debra P. Ritzwoller, PhD ¹; Anil Vachani, MD, MS⁵

Background

The Lung-RADS classification system was developed to standardize reporting of findings and follow-up recommendations from lung cancer screening (LCS) low-dose computed tomography (LDCT). However, prior studies have reported wide variation in Lung-RADS assignment between different healthcare systems. Our objective is to compare the distribution of Lung-RADS assignment across three healthcare systems and describe patient factors associated with variation in the distribution of Lung-RADS assignment.



Methods

Eligibility:

Patients who received a baseline LDCT scan for LCS at Henry Ford Health System (HFHS), Kaiser Permanente Colorado (KPCO) & Kaiser Permanente Hawaii (KPHI) from 5/1/14 through 12/31/17.

Data Analysis

Patient Characteristics from Electronic Health Record:

- Age, Sex, Race/Ethnicity, Smoking History, Year of LCS with LDCT, Chronic Obstructive Pulmonary Disease (COPD) Diagnosis

LCS LDCT Findings Categorized by Lung-RADS

- Negative (1)
- Benign (2)
- Probably Benign (3)
- Suspicious (4)

Primary outcome:

- Distribution of Lung-RADS

Unadjusted chi-square tests were used to compare the distribution of Lung-RADS assignment between healthcare systems and between groups of patients, according to the characteristics above.

Results

- From 5/1/14 through 12/31/17, **6,588 patients** underwent baseline LCS with LDCT
- This population was:
 - 55% men
 - 71% non-Hispanic White, 10% non-Hispanic Black, 7% Asian or Native Hawaiian / Other Pacific Islander, 6% Hispanic
 - 54% current smokers
 - Mean age of 65 years (Table 1)
- There was significant variation in the distribution of Lung-RADS assignment by healthcare system and by patient characteristics (Figures 2-7)

Table 1: Characteristics of patients undergoing LDCT scan at KPCO, KPHI, and HFHS

	HFHS	KPCO	KPHI	TOTAL	p-value
TOTAL number of patients	N (%)	N (%)	N (%)	N (%)	
	2,332 (35)	3,629 (55)	627 (10)	6,588	
Age at Baseline Screen, Mean (SD)					< .0001
	65 (6)	66 (6)	66 (6)	65 (6)	
Race/Ethnicity					< .0001
Asian/Hawaiian/Pacific Islander	24 (1)	60 (2)	362 (58)	446 (7)	
Non-Hispanic Black	517 (22)	151 (4)	5 (1)	673 (10)	
Hispanic	22 (1)	369 (10)	22 (4)	413 (6)	
Other/Unknown	176 (8)	183 (5)	24 (4)	383 (6)	
Non-Hispanic White	1,593 (68)	2,866 (79)	214 (34)	4,673 (71)	
COPD Diagnosis within 12 months Prior to Baseline Screen					< .0001
Yes	496 (21)	991 (27)	168 (27)	1,655 (25)	
No	1,836 (79)	2,638 (73)	459 (73)	4,933 (75)	
Smoking Status at Baseline Screen					< .0001
Current	1,293 (55)	1,888 (52)	349 (56)	3,530 (54)	
Former	881 (38)	1,734 (48)	276 (44)	2,891 (44)	
Missing	145 (6)	4 (<1)	0 (0)	149 (2)	
Never	13 (<1)	3 (<1)	2 (<1)	18 (<1)	

Figure 1: Lung-RADS Distribution (N = 6,588)

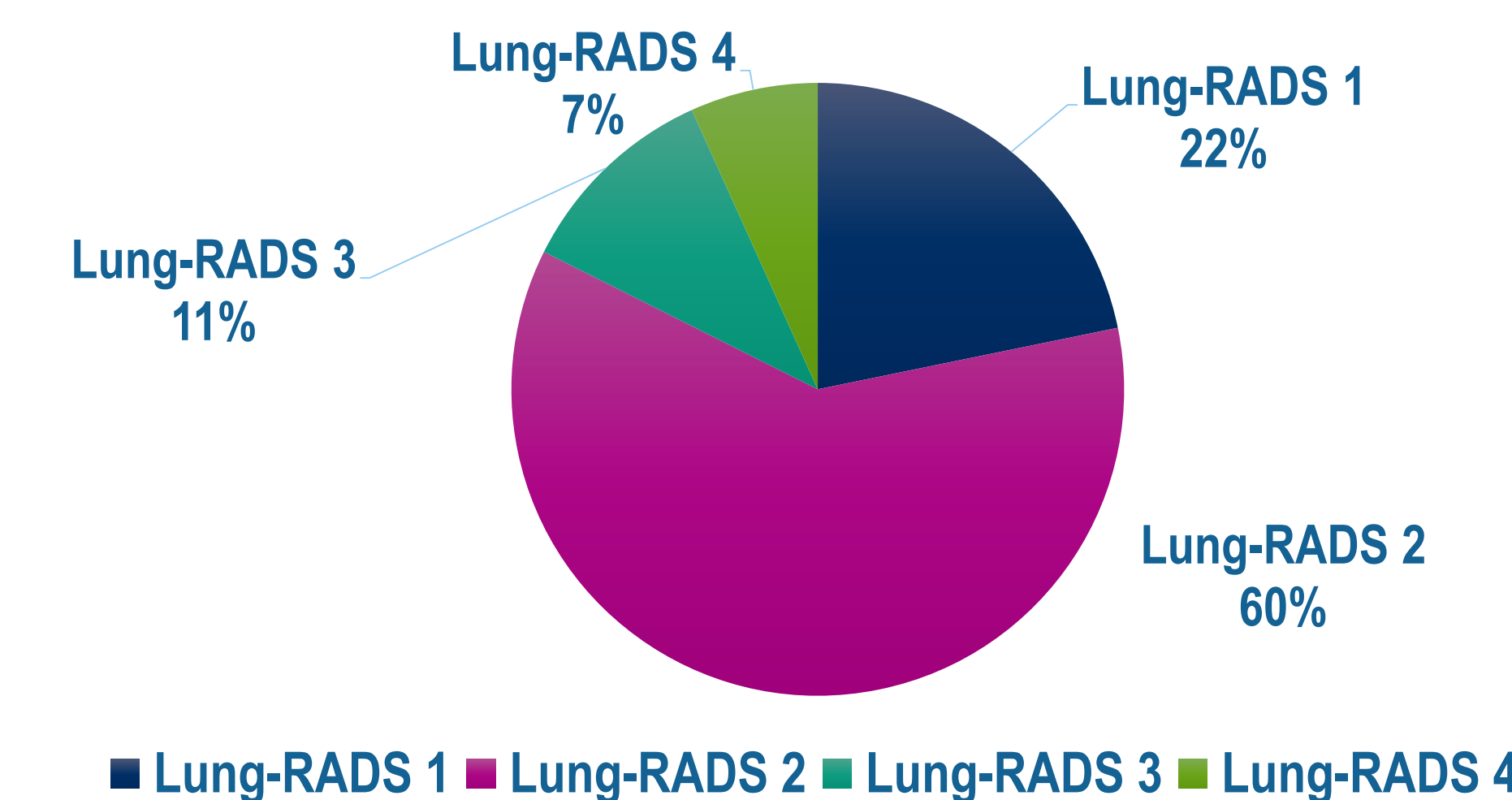


Figure 2: Lung-RADS Distribution by Healthcare System p-value: < .0001

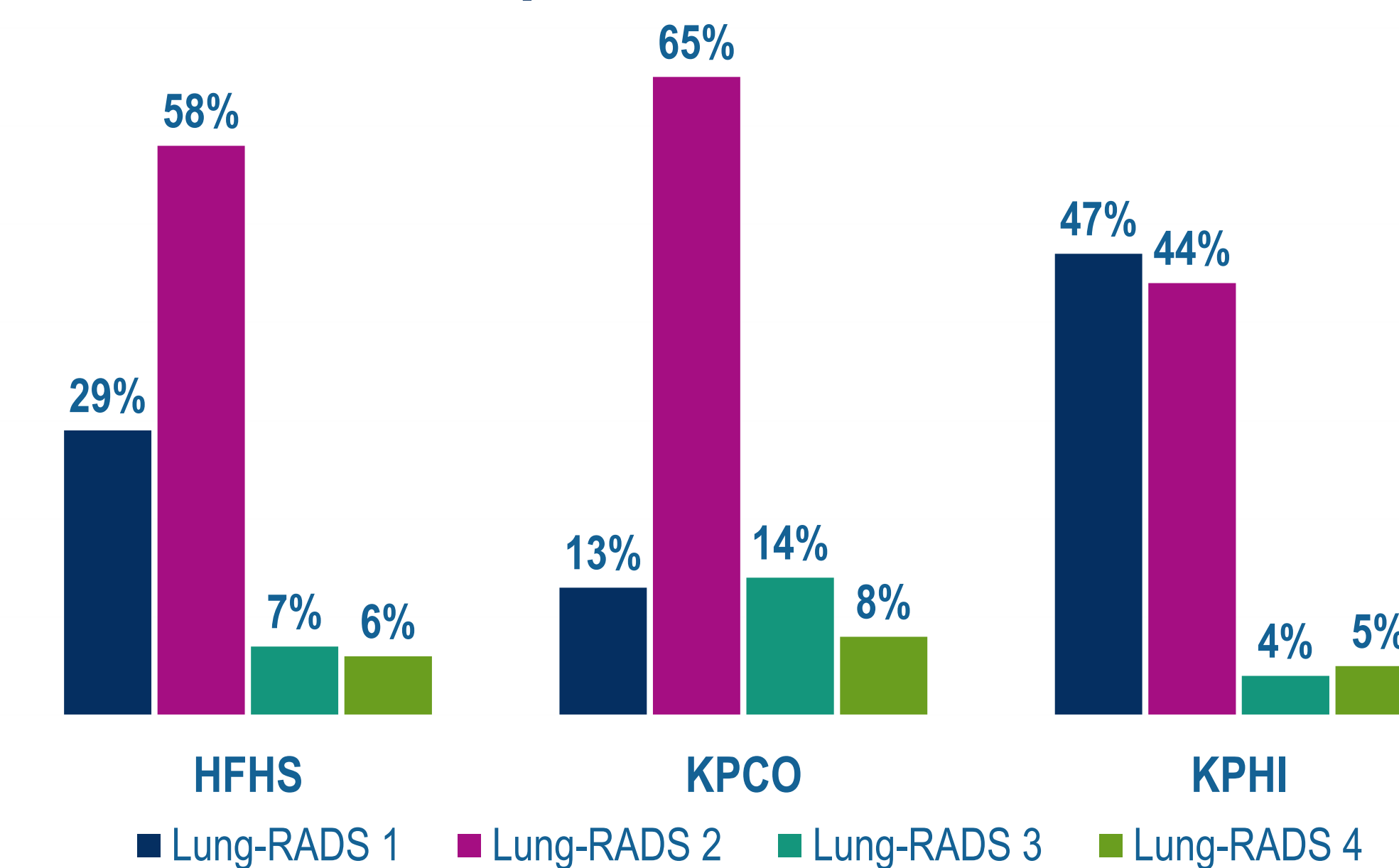


Figure 3: Lung-RADS Distribution by Race/Ethnicity p-value: < .0001

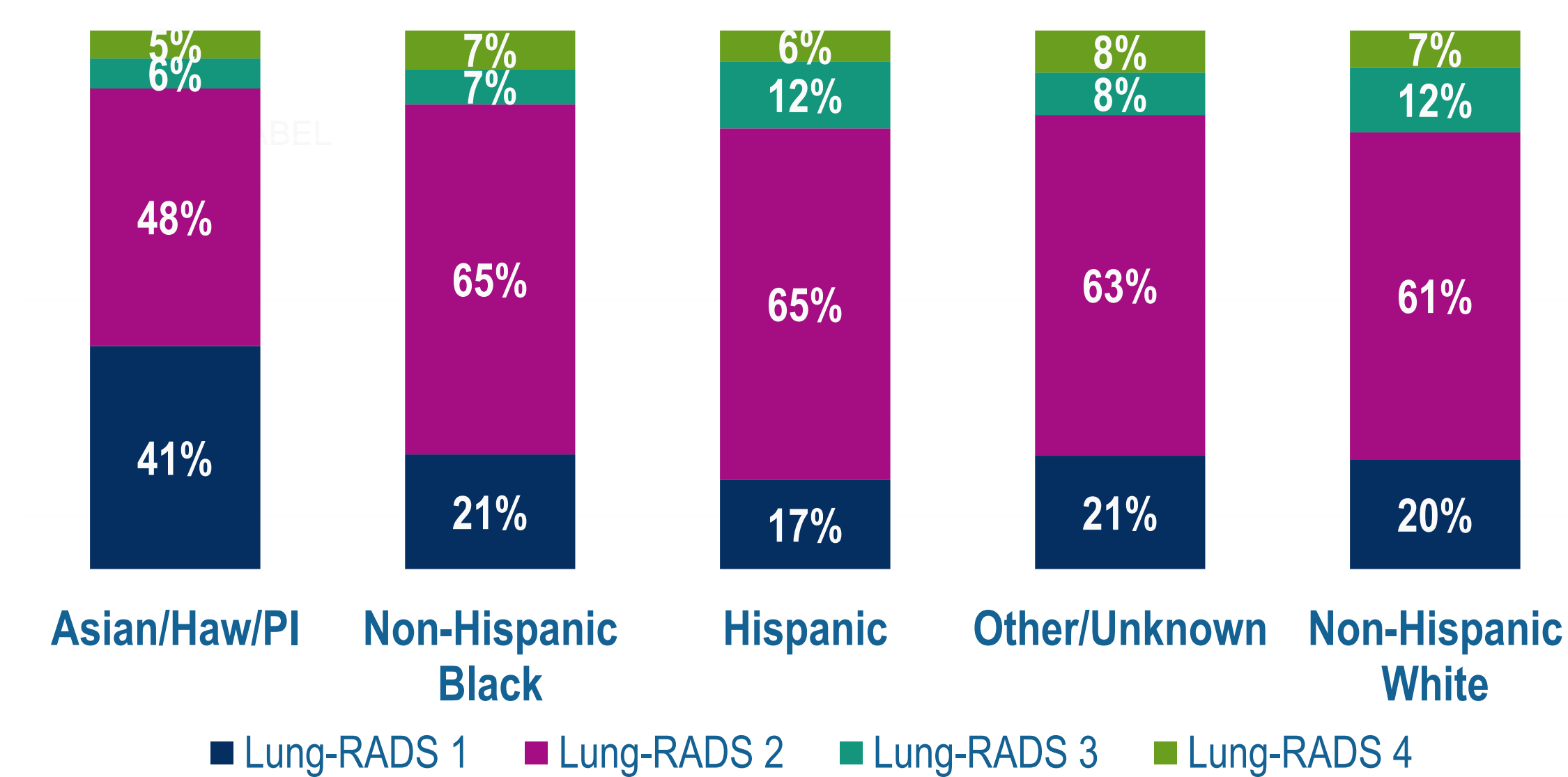


Figure 4: Lung-RADS Distribution by Scan Year p-value: < .0001

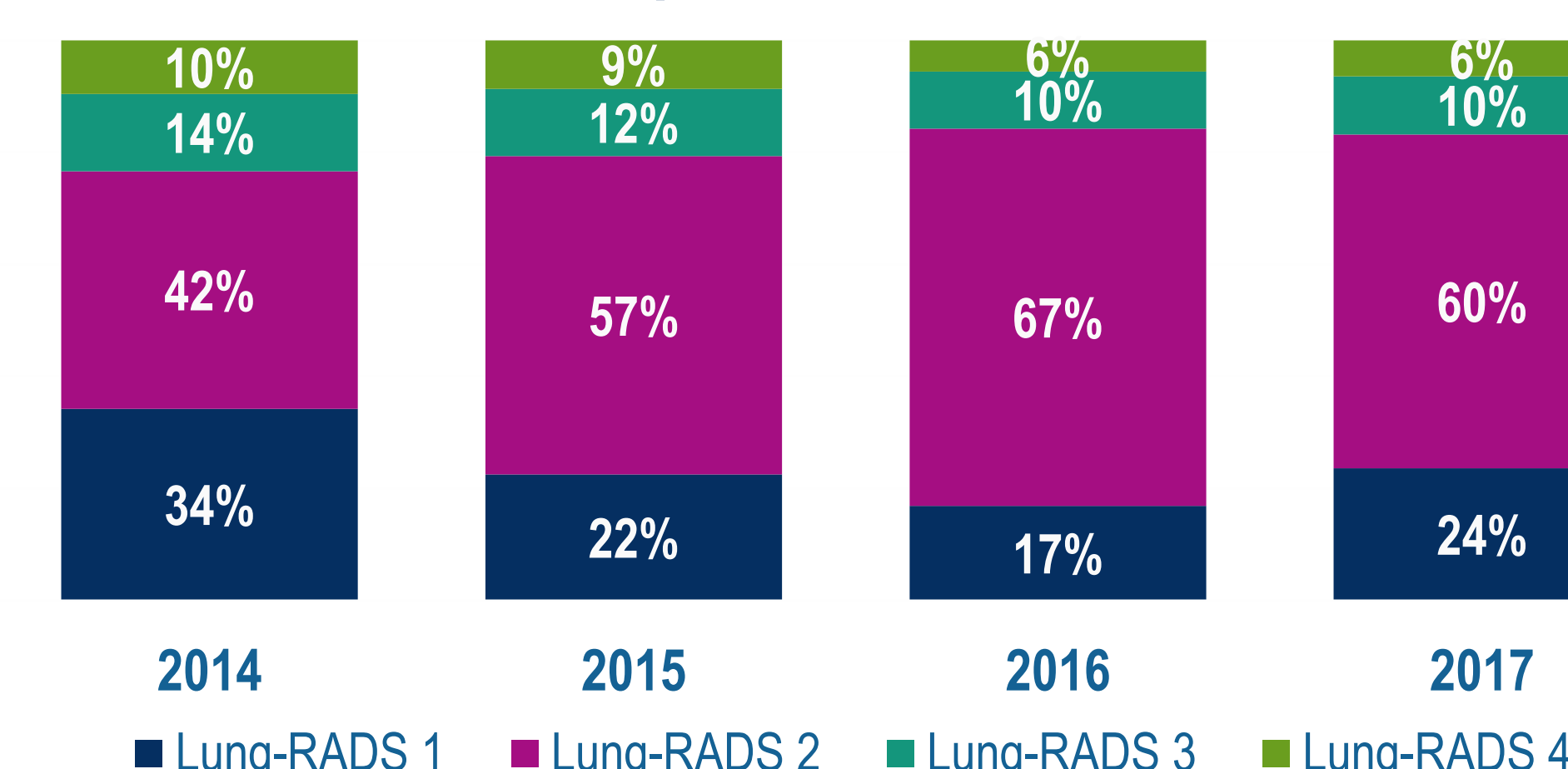


Figure 5: Lung-RADS Distribution by COPD Diagnosis Within 12 Months Prior to Scan p-value: < .0001

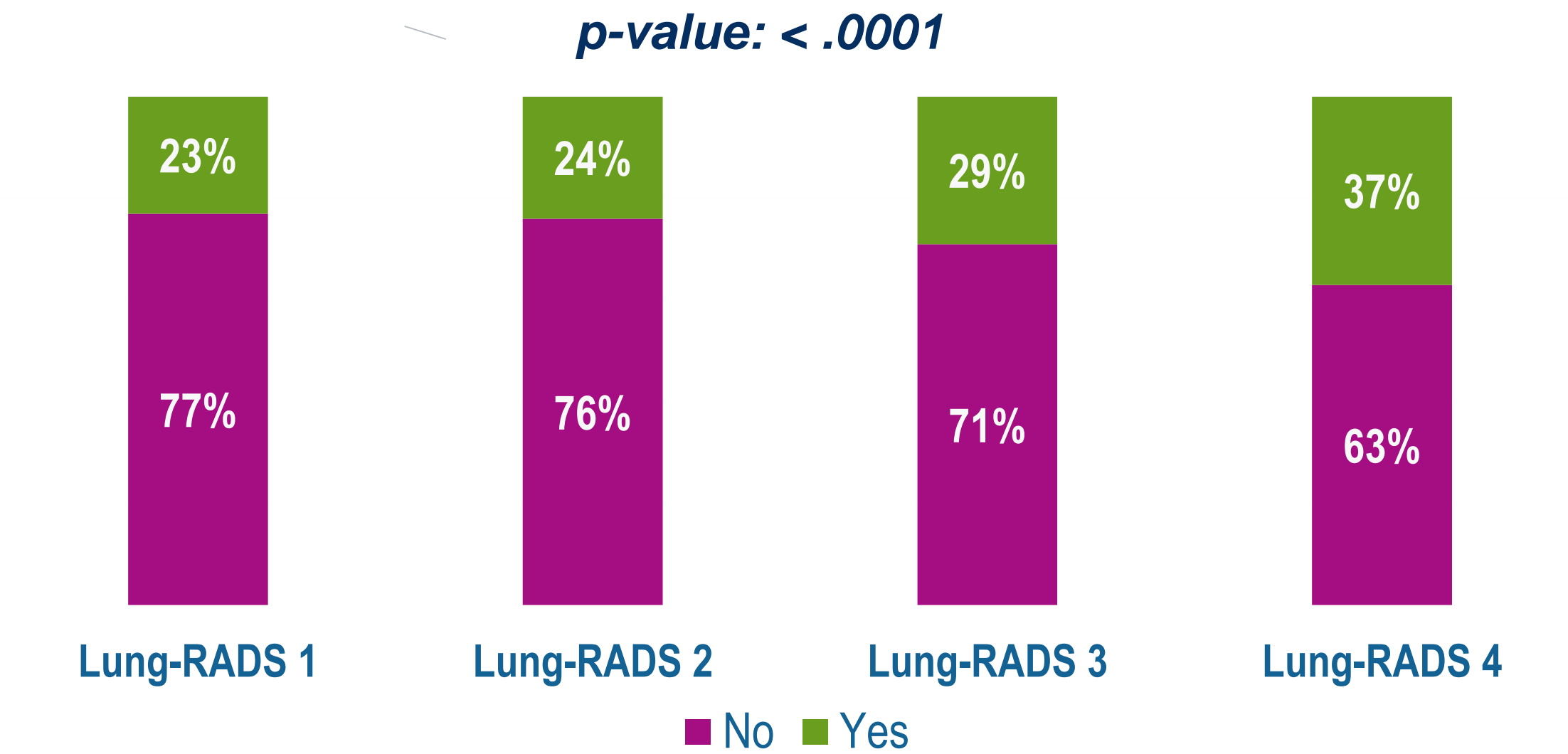


Figure 6: Lung-RADS Distribution by Age at Screen p-value: < .0001

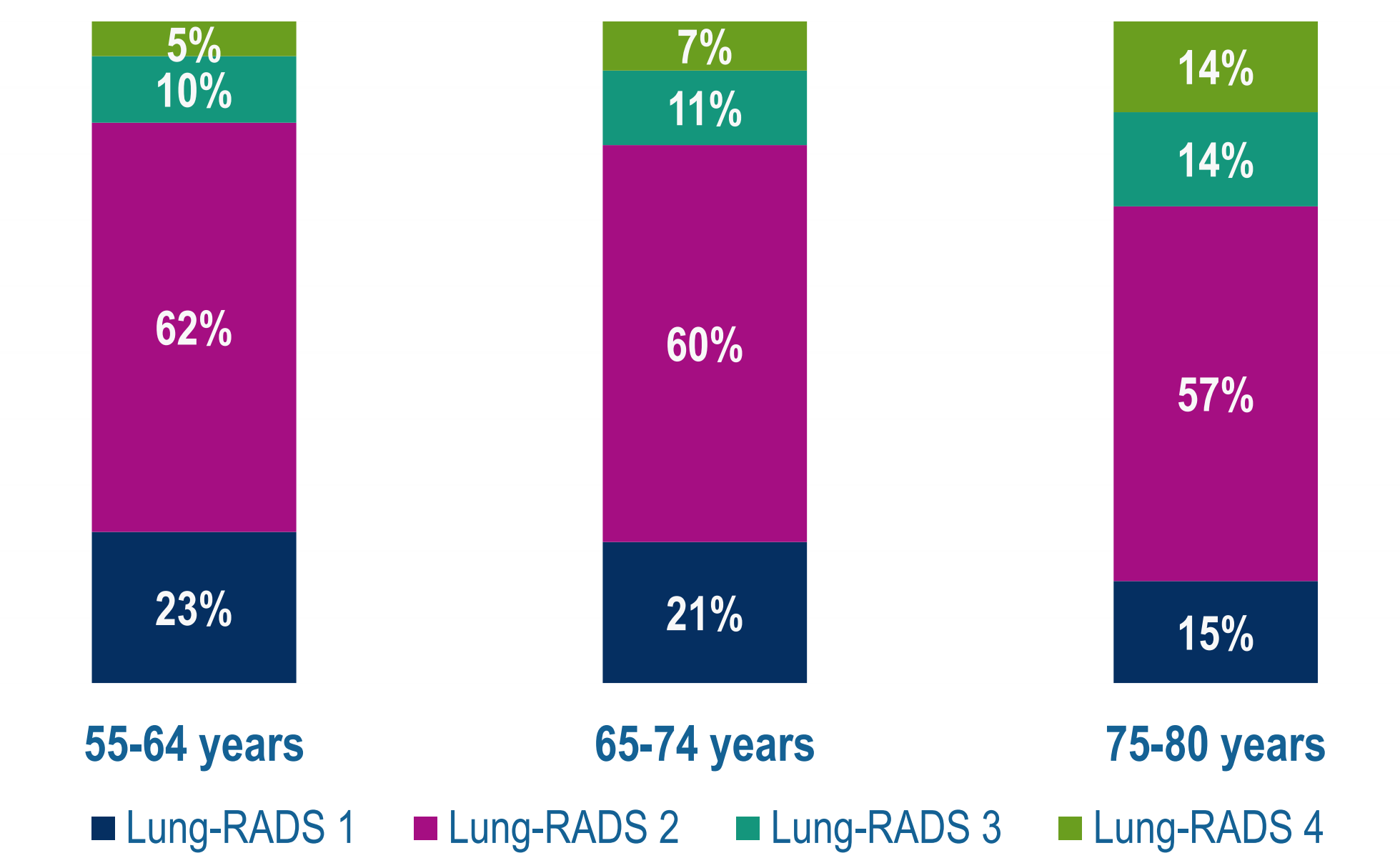
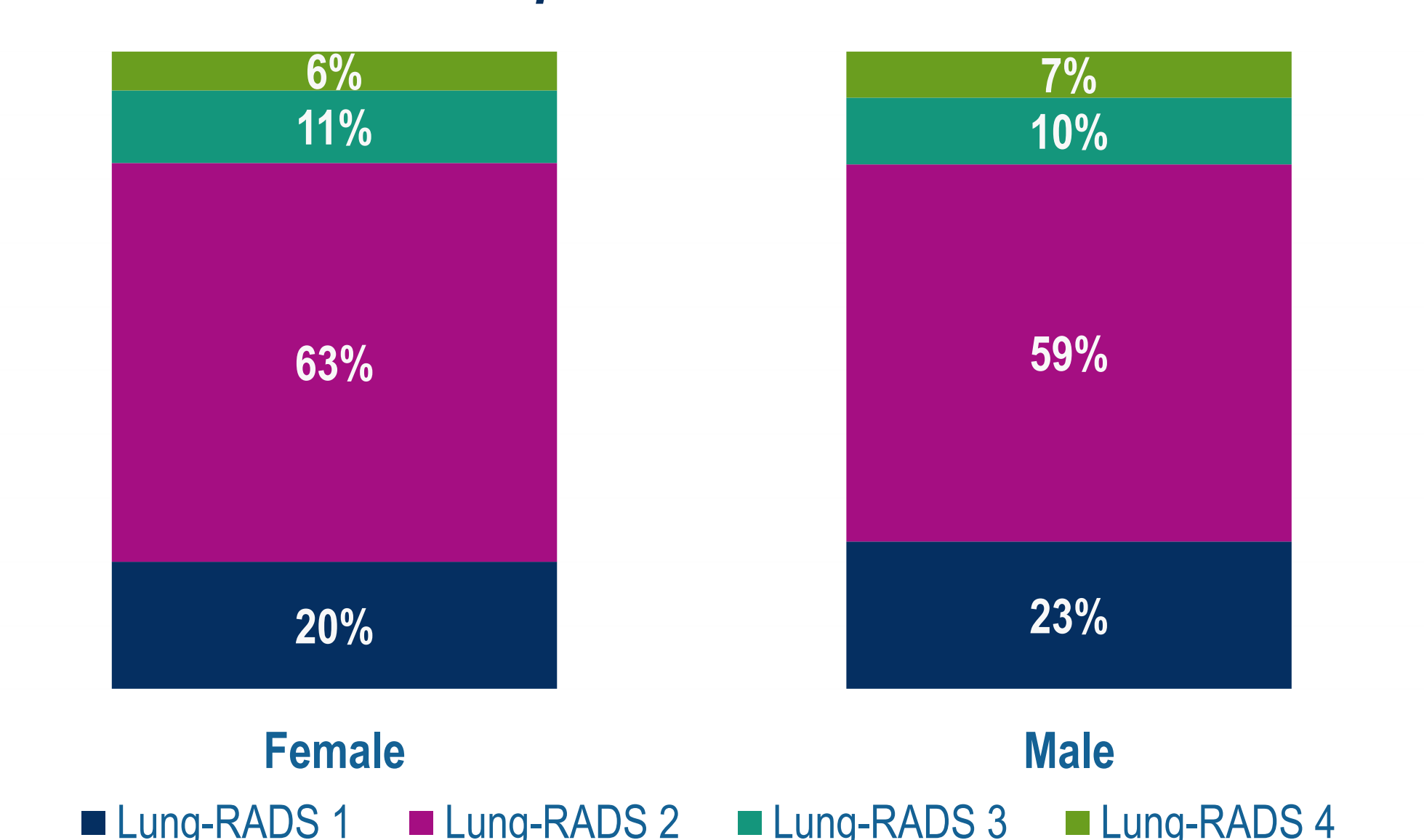


Figure 7: Lung-RADS Distribution by Gender p-value: 0.0017



Conclusions

There was significant variation between healthcare systems in the distribution of Lung-RADS assignments for patients undergoing initial LCS LDCT. This variation may be driven by differences in lung nodule prevalence associated patient demographics and other patient factors or in how providers apply the Lung-RADS classification system. Our future research will determine how much of the variation in the distribution of Lung-RADS between healthcare systems is due to patient factors vs. practice variation in the application of Lung-RADS.