

Comparison of 13 Guidelines for Nodule Management in LDCT screening



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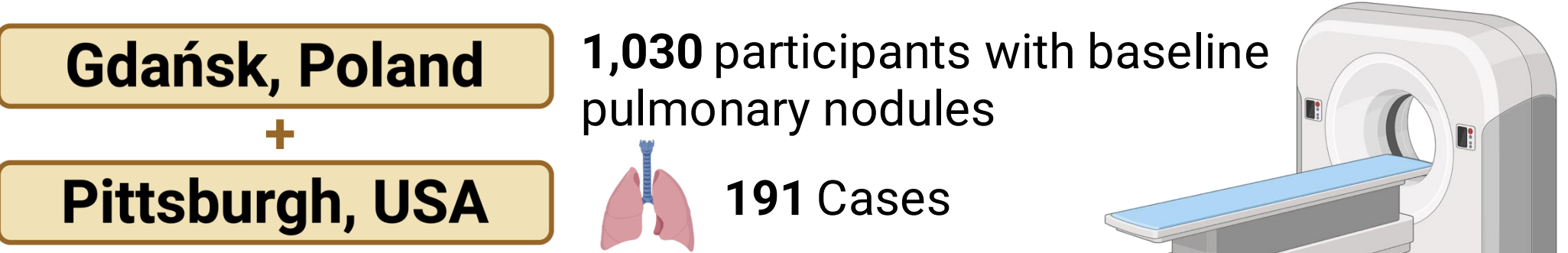
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INTRODUCTION

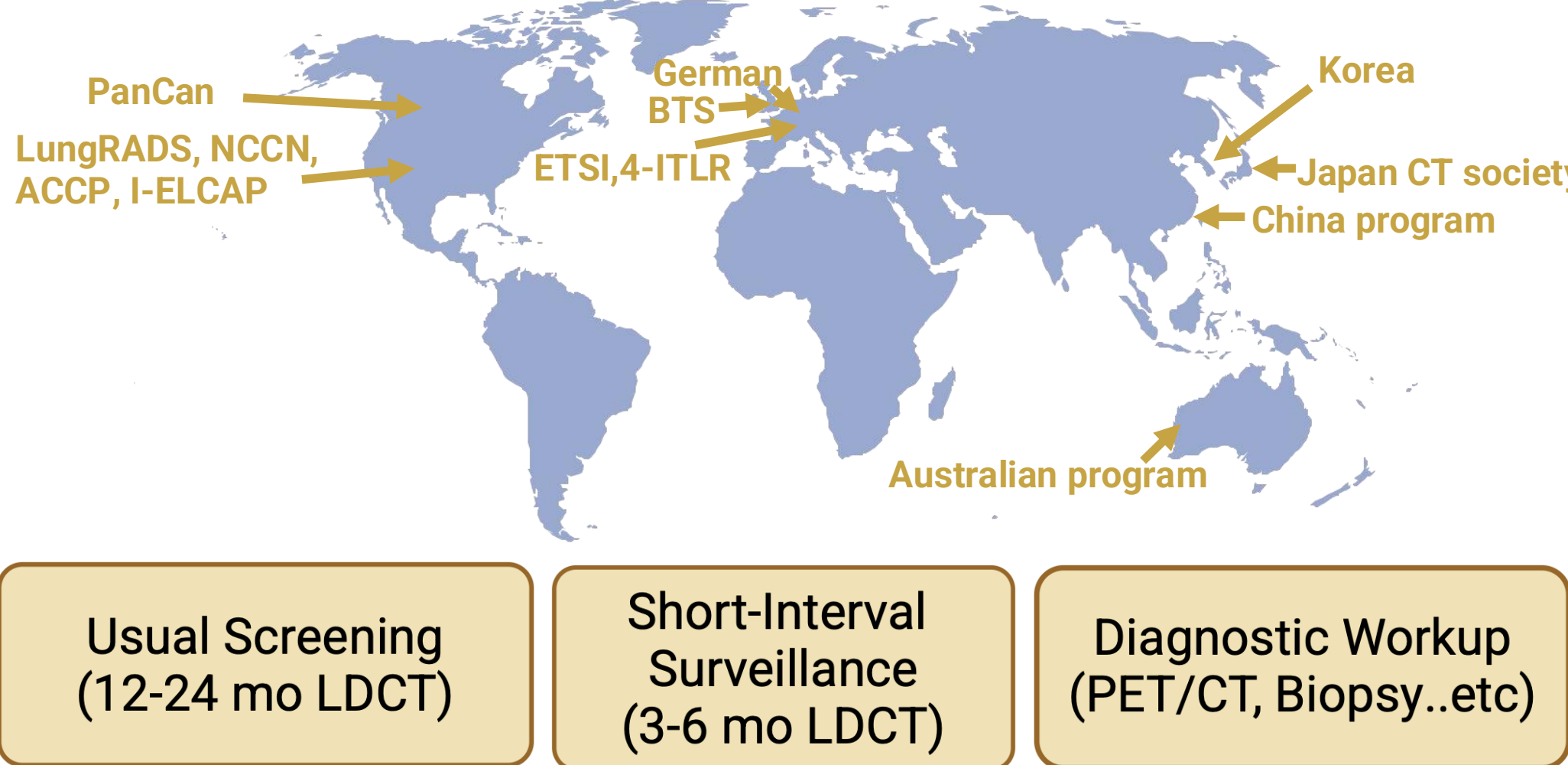
- Low-dose computed tomography (LDCT) screening has demonstrated a significant mortality benefit, reducing lung cancer mortality by 20-24%^{1,2}.
- Management of screen-detected pulmonary nodules remains challenging, because of the high prevalence of benign nodules and the risk of unnecessary investigations.³
- Although many guidelines have been developed to standardize nodule management. Differences in classification, surveillance intervals, and thresholds for further diagnostic evaluation may lead to variation in clinical management.
- In this present study, we reviewed and compared 13 nodule management guidelines.**

METHODS

Two LDCT screening cohorts



13 guidelines applied across 3 management levels



DISCUSSION AND CONCLUSION

Actionable Take Away Message

Pulmonary nodule management varies substantially across guidelines

PanCan/Australian program

↓ Unnecessary procedures

⌚ Possible delayed diagnosis

Morphology-based (e.g, LungRADS, NCCN)

! May improve early cancer detection but increase potential harms

Future Directions for Research

- Future studies should identify the optimal balance between cancer detection and diagnostic burden.
- Research should also evaluate guideline performance across longitudinal follow-up, beyond baseline recommendations.

RESULTS

Guideline	Usual screening	Short-interval surveillance	Diagnostic workup
	12mo or 24mo LDCT	3mo or 6mo LDCT	PET/CT, tissue sampling, etc
Lung-RADS	Solid <6 mm Part solid <6 mm Ground glass <30 mm	Solid ≥6 to <8mm Part solid ≥6mm and solid component <8mm Ground glass ≥30 mm	Solid ≥8mm Part solid ≥6 mm and solid component ≥8mm
Korean modified Lung-RADS	Solid <6 mm Part solid <6mm Ground glass <20mm	Solid ≥6 to <8 mm Part solid ≥6mm and solid component <8mm Ground glass ≥20mm	Solid ≥8mm Part solid ≥6mm and solid component ≥8mm
4-In the Lung Run (4-ITLR)	Solid <6mm Part solid solid component <5mm Ground glass: <8mm	Solid ≥6-8mm Part-solid solid component ≥5-10mm Ground glass ≥8mm	Solid ≥8mm Part solid solid component >10mm
National Comprehensive Cancer Network (NCCN)	Solid <6mm Part solid <6mm Ground glass <20mm	Solid ≥6-8mm Part solid ≥6mm and solid component <6mm Ground glass ≥20mm	Solid ≥8mm Part solid ≥6mm and solid component ≥6mm
International Early Lung Cancer Action Program (I-ELCAP)	Solid <6mm Part solid solid component <6mm Ground glass any size	Solid 6-14.9mm Part solid with solid component 6-14.9mm	Solid ≥15mm Part solid ≥15mm
Japanese Society of CT Screening 6th edition (Japan CT Society)	Any nodule <6mm	Solid ≥6-10mm Part solid ≥6-15mm and solid component <8mm Ground glass ≥6-15mm	Solid ≥10mm Part solid ≥6-15mm with solid component ≥8mm Part solid ≥15mm Ground glass ≥15mm
European Society of Thoracic Imaging (ESTI)	Solid <6mm Part solid solid component <6mm Ground glass <30 mm	Solid ≥6-10mm Part solid: solid component ≥6-10mm Ground glass ≥30mm	Solid ≥10mm Part solid solid component ≥10mm
China National Lung Cancer Screening (2025) (Chinese program)	Solid <6 mm Part solid <6mm Ground glass <8mm	Solid ≥6-15mm Part solid ≥6-15mm Ground glass ≥8-15mm	Solid ≥15mm Part solid ≥15mm Ground glass ≥15mm
British Thoracic Society (BTS)	Solid <6mm Subsolid <5mm	Solid: ≥6-8mm Solid ≥8mm and Brock<10% Subsolid ≥5mm	Solid ≥8mm and Brock≥10%
American College of Chest Physicians (ACCP)	Solid <4mm Ground glass >5-10mm	Solid >4-8mm Solid >8mm and Brock<5% Part solid <8mm Ground glass >10mm	Solid >8mm and Brock≥5% Part solid >8mm
German modified Lung-RADS (German)	Solid <6mm Part solid <6mm Ground glass <30mm	Solid ≥6 to <8mm Solid ≥8-15mm and Brock<10% Part solid ≥6mm and solid component <8mm Ground glass ≥30mm	Solid ≥8-15mm and Brock<10% Solid ≥15mm Part solid solid component ≥8mm
Pan-Canadian Early Detection of Lung Cancer (PanCan)	Brock score <6%	Brock 6% to <30%	Brock ≥30%
Australian nodule management protocol (Australian program)	Brock score <6%	Brock 6% to 30%	Brock >30%

Table 1. Nodule Management Guidelines: For the Korean modified Lung-RADS, category 2B* includes Lung-RADS 1.0 categories 3 and 4 when findings are associated with tuberculosis; however, tuberculosis information was not available in our datasets. When applicable we used guideline-specific high-risk conditions. and recommendations were applied to baseline nodules.

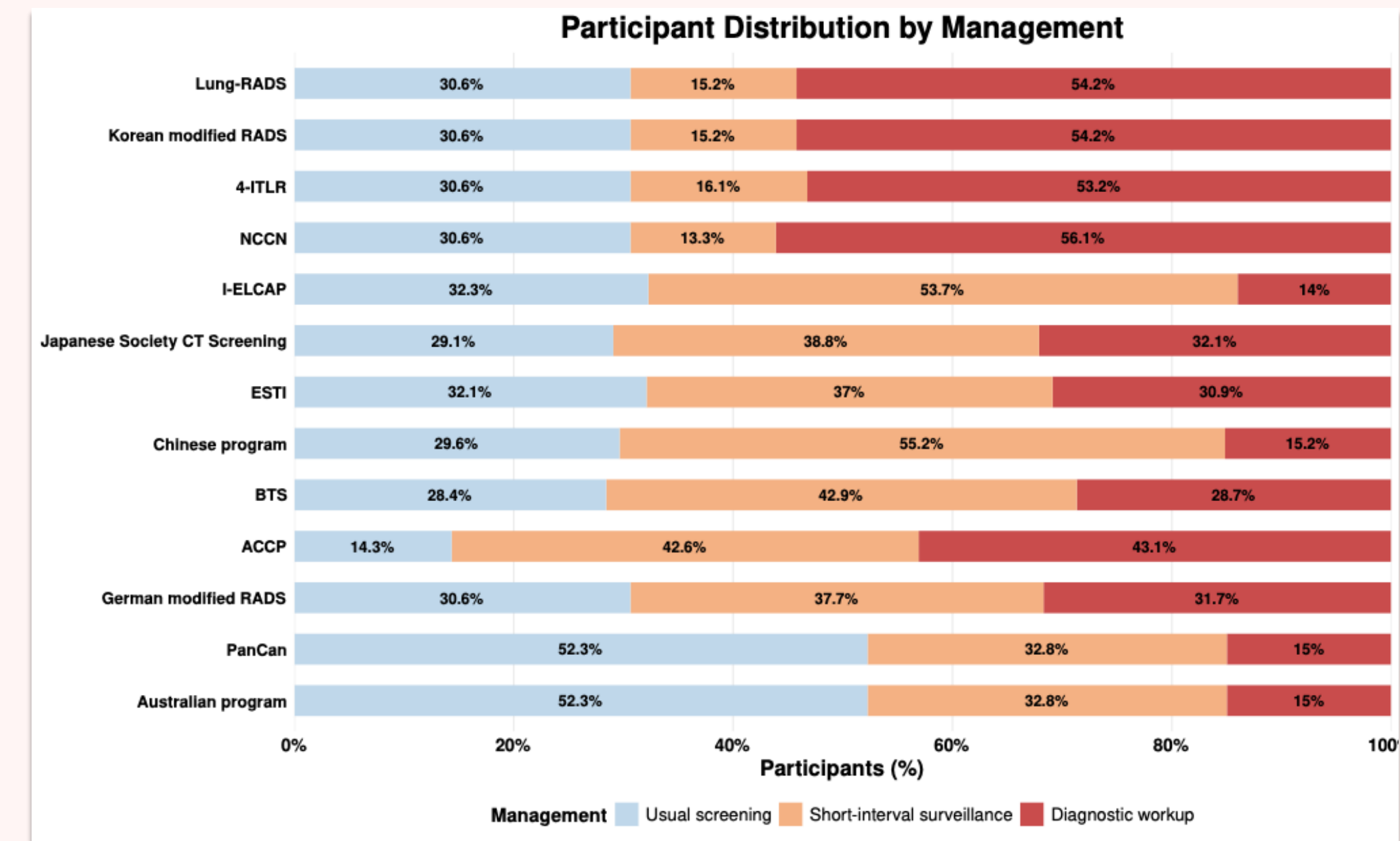


Figure 1. Distribution of Participants Across 13 Management According to Lung Nodule Management Guidelines

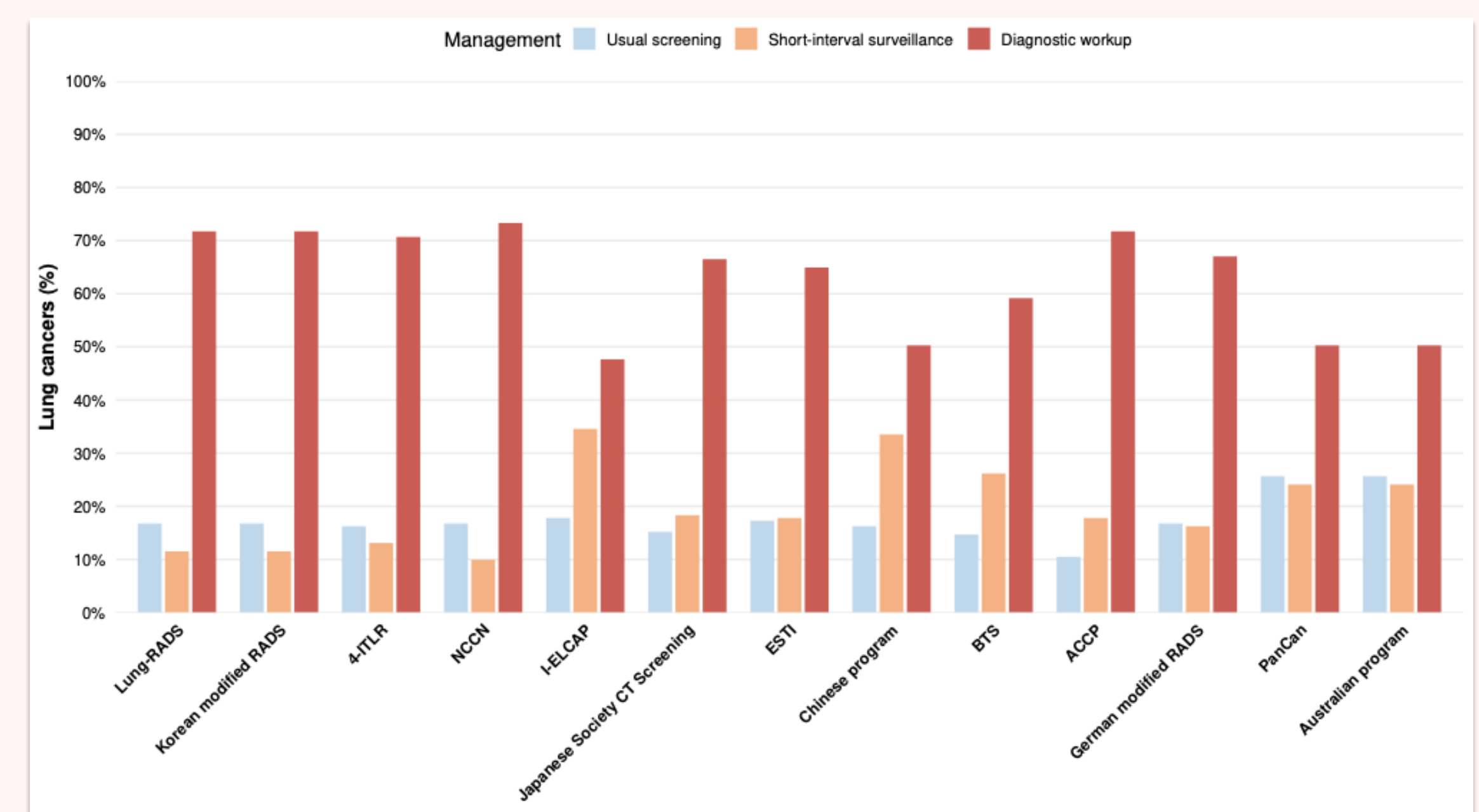


Figure 2. Management Classification of 191 Lung Cancer Cases Diagnosed Within 2 Years Across Pulmonary Nodule Guidelines.

Guideline	Non-cases per Detected Lung Cancer	
	Short-interval surveillance	Diagnostic workup
Lung-RADS	163 / 22 (7.4)	525 / 137 (3.8)
Korean modified RADS	163 / 22 (7.4)	525 / 137 (3.8)
4-ITLR	172 / 25 (6.9)	515 / 135 (3.8)
NCCN	143 / 19 (7.5)	545 / 140 (3.9)
I-ELCAP	590 / 66 (8.9)	80 / 91 (0.9)
Japanese Society CT Screening	439 / 35 (12.5)	265 / 127 (2.1)
ESTI	418 / 34 (12.3)	253 / 124 (2.0)
Chinese program	610 / 64 (9.5)	89 / 96 (0.9)
BTS	474 / 50 (9.5)	237 / 113 (2.1)
ACCP	486 / 34 (14.3)	389 / 137 (2.8)
German modified RADS	429 / 31 (13.8)	259 / 128 (2.0)
PanCan	354 / 46 (7.7)	87 / 96 (0.9)
Australian program	354 / 46 (7.7)	87 / 96 (0.9)

Table 2. Clinical Burden Associated with each Management Strategy. Number of cancer-free participatns assigned to short-interval surveillance or diagnostic workup per lung cancer detected in the corresponding category.

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