Risk Perception and Adherence to Lung Cancer Screening Following Negative Baseline Test

The Team

Dr. Farouk Dako, MD, MPH

Srikar Yelamarthy, UPenn c’24

Background

- Lung cancer is the third most common cancer in the U.S.
- USPSTF recommends annual low dose CT screening for adults who:
  - Are 50 - 80 years old
  - Have a 20 pack year smoking history and smoke
  - (or) have quit within the last 15 years
- Lung-RADS® is a quality assurance tool designed to:
  - Standardize lung cancer screening CT reporting and management recommendations
  - Reduce confusion in lung cancer screening CT interpretations
  - Facilitate outcome monitoring
  - 0, 1, 2, 3, 4A, 4B, 4X, S

Center for Disease Control, 2023; United States Preventive Services Task Force, 2023; American College of Radiology, 2022

Overview: Why are there differences in adherence rates?

- Lung-RADS: Lung CT Screening Reporting & Data System
  - 1 vs 2
- Behavioural Economics
  - Nudges

1	**Negative** Estimated Population Prevalence: 39%	**No lung nodules OR**	12-month screening LDCT
		Nodule with benign features: • Complete, central, popcorn, or concentric ring calcifications **OR** • Fat-containing	
2	**Benign -** Based on imaging features or indolent behavior Estimated Population Prevalence: 45%	**Juxtapleural nodule:** • < 10 mm (524 mm^3) mean diameter at baseline or new **AND** • Solid; smooth margins; and oval, lentiform, or triangular shape	
		Solid nodule: • < 6 mm (< 113 mm^3) at baseline **OR** • New < 4 mm (< 34 mm^3)	
		Part solid nodule: • < 6 mm total mean diameter (< 113 mm^3) at baseline	
		Non solid nodule (GGN): • < 30 mm (< 14,137 mm^3) at baseline, new, or growing **OR** • ≥ 30 mm (≥ 14,137 mm^3) stable or slowly growing (see note 7)	
		Airway nodule, subsegmental - at baseline, new, or stable (see note 11)	
		Category 3 lesion that is stable or decreased in size at 6-month follow-up CT **OR** Category 4B lesion proven to be benign in etiology following appropriate diagnostic workup	

American College of Radiology, 2022

Significance

Public Health Intervention

Improve Adherence Rates

Simple Communication/Language Change

Aim

To analyze differences in recommended follow up in lung and breast cancer screening patients with a negative (1 and 2) baseline screening

Methods

- Initial literature search
- Data collection:
  - Penn
  - Philadelphia hospitals
- Descriptive analysis
- Chi-squared test to measure association

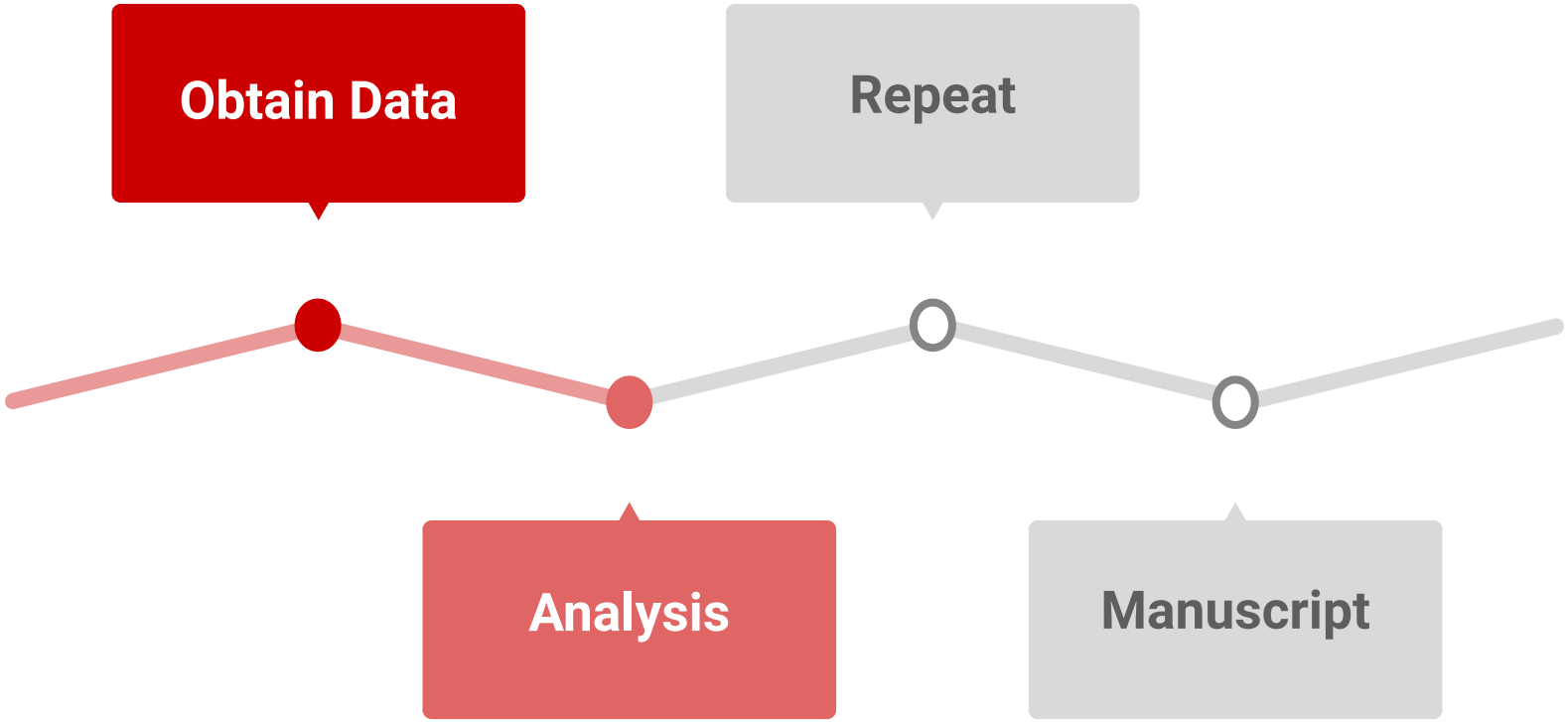
Literature Review Methods

- PubMed, Scopus, EMBASE
- Search terms included variations of "lung," "rads," "adherence," "follow-up," and "compliance"
- Inclusion criteria
  - Analyze adherence
  - 1 and 2 separately
  - Did not have to be statistically significant

Findings

- Literature search confirmed hypothesis
- 697 articles -> 11
  - 8 in accordance, 3 presenting no difference/opposite
- Covariates identified
  - Race, smoking status, SES, etc.

Moving Forward



Lessons Learned

1. *Literature searches and academic writing*
2. *Time management and flexibility*
3. *Career as physician scientist*

References

Mortman KD, Devlin J, Giang B, Mortman R, Sparks AD, Napolitano MA. Patient Adherence in an Academic Medical Center's Low-dose Computed Tomography Screening Program. Am J Clin Oncol. 2021 Jun 1;44(6):264-268. doi: 10.1097/COC.0000000000000817. PMID: 33795600.

Seastedt KP, Luca MJ, Antevil JL, Browning RF, Mullenix PS, Reoma JL, McKay SA. Patient motivations for non-adherence to lung cancer screening in a military population. J Thorac Dis. 2020 Oct;12(10):5916-5924. doi: 10.21037/jtd-20-1841. PMID: 33209424; PMCID: PMC7656399.

Stowell JT, Narayan AK, Wang GX, Fintelmann FJ, Flores EJ, Sharma A, Petranovic M, Shepard JO, Little BP. Factors affecting patient adherence to lung cancer screening: A multisite analysis. J Med Screen. 2021 Sep;28(3):357-364. doi: 10.1177/0969141320950783. Epub 2020 Aug 26. PMID: 32847462.

Barbosa EJM Jr, Yang R, Hershman M. Real-World Lung Cancer CT Screening Performance, Smoking Behavior, and Adherence to Recommendations: Lung-RADS Category and Smoking Status Predict Adherence. AJR Am J Roentgenol. 2021 Apr;216(4):919-926. doi: 10.2214/AJR.20.23637. Epub 2021 Feb 17. PMID: 32755178.

Lake, M., Shusted, C. S., Juon, H. S., McIntire, R. K., Zeigler-Johnson, C., Evans, N. R., Kane, G. C., & Barta, J. A. (2020). Black patients referred to a lung cancer screening program experience lower rates of screening and longer time to follow-up. BMC cancer, 20(1), 561. https://doi.org/10.1186/s12885-020-06923-0

Bellinger C, Foley K, Genese F, Lampkin A, Kuperberg S. Factors Affecting Patient Adherence to Lung Cancer Screening. South Med J. 2020 Nov;113(11):564-567. doi: 10.14423/SMJ.0000000000001167. PMID: 33140110.

Bastani M, Patel D, Silvestri GA, Raoof S, Chusid J, Cohen SL. Factors Associated With Lung Cancer Screening Adherence Among Patients With Negative Baseline CT Results in a Community Health Care Setting. J Am Coll Radiol. 2022 Feb;19(2 Pt A):232-239. doi: 10.1016/j.jacr.2021.10.010. Epub 2021 Nov 30. PMID: 34861204.

Mehrad Bastani, PhD and others, A predictive model for lung cancer screening nonadherence in a community setting health-care network, JNCI Cancer Spectrum, Volume 7, Issue 2, April 2023, pkad019, https://doi.org/10.1093/jncics/pkad019

Erkmen, C.P., Dako, F., Moore, R. et al. Adherence to annual lung cancer screening with low-dose CT scan in a diverse population. Cancer Causes Control 32, 291–298 (2021). https://doi.org/10.1007/s10552-020-01383-0

Lin, Yannan. “Patient Adherence to LungRADS Recommendations at an Academic Institution.” Journal of clinical oncology : official journal of the American Society of Clinical Oncology. 39 (2021): --. Web.

THANK YOU!

Questions?

ysrikar@sas.upenn.edu