Lung Cancer Screening in Rural Arizona:

Experiences and Lifesaving Opportunities

BRIDGER BODILY AND AHMED MAHGOUB, M.D.

About us

Bridger Bodily

- From Kingman, Arizona
- Undergraduate Neuroscience student at Brigham Young University
- Clinical Research Assistant at KRMC

Ahmed Mahgoub, M.D.

- Pulmonary and Critical Care Medicine Specialist at Kingman Regional Medical Center
- Medical degree at Cairo University School of Medicine
- Internal Medicine Residency at Zucker School of Medicine
- Fellowship at Virginia Tech Carillion School of Medicine

Kingman Regional Medical Center

Health Resources and Services Administration
https://data.hrsa.gov/maps/quick-maps?config=mapconfig/MUA.json

- Mohave County Hospital District 1
  - Catchment Area population of 70,000 over 10,000 square miles
  - Serves the communities of Kingman, Golden Valley, Dolan Springs, Wikieup, Meadview, Peach Springs, Supai, etc.
  - HRSA classified as a Health Professional Shortage Area for Primary Care, Dental, and Mental Health
  - Largest medical center in Northwest Arizona

MOHAVE COUNTY, SELECTED DEMOGRAPHICS	Mohave County	Arizona	United States
Total population	210,998	7,174,064	326,569,308
GENDER			
Male	50.4%	49.7%	49.2%
Female	49.6%	50.3%	50.8%
AGE			
Under 5 years	4.4%	6.0%	6.0%
5 to 19	14.3%	19.6%	19.1%
20-44 years	23.6%	32.9%	33.3%
45-64 years	27.1%	24.0%	25.6%
65 and older	30.4%	17.6%	16.0%
RACE/ETHNICITY			
Hispanic or Latino (of any race)	16.7%	31.5%	18.2%
White	76.7%	54.1%	60.1%
Black or African American	0.9%	4.3%	12.2%
American Indian and Alaska Native	1.8%	3.8%	0.6%
Some other race	1.5%	3.6%	6.1%
Two or more races	2.5%	2.6%	2.8%
EDUCATION (Population 25 years and over)			
Highest Education Level Attained			
Up to 12th grade, no diploma	13.6%	12.1%	11.5%
High school graduate or equivalency	34.3%	23.8%	26.7%
Some college/associate's degree	38.7%	33.8%	28.9%
Bachelor's degree	8.3%	18.8%	20.2%
Graduate or professional degree	5.1%	11.5%	12.7%

INCOME AND POVERTY			
Median household Income	$47,686	$61,529	$64,994
Percent of population living below poverty level	16.2%	14.1%	12.8%
Number of residents living below poverty	33,529	990,528	40,910,326
Percent of children (under 18 years) living in poverty	25.2%	20.0%	17.5%
Percent of seniors (65 years and over) living in poverty	8.4%	8.9%	9.3%
Unemployment rate	6.0%	6.2%	5.2%
OTHER			
Percent of population with a disability	22.2%	13.2%	12.7%
Number of individuals with a disability	46,007	935,769	40,786,461
Percent of population insured	90.6%	89.4%	91.3%
Percent of population who are veterans	14.3%	8.9%	7.1%

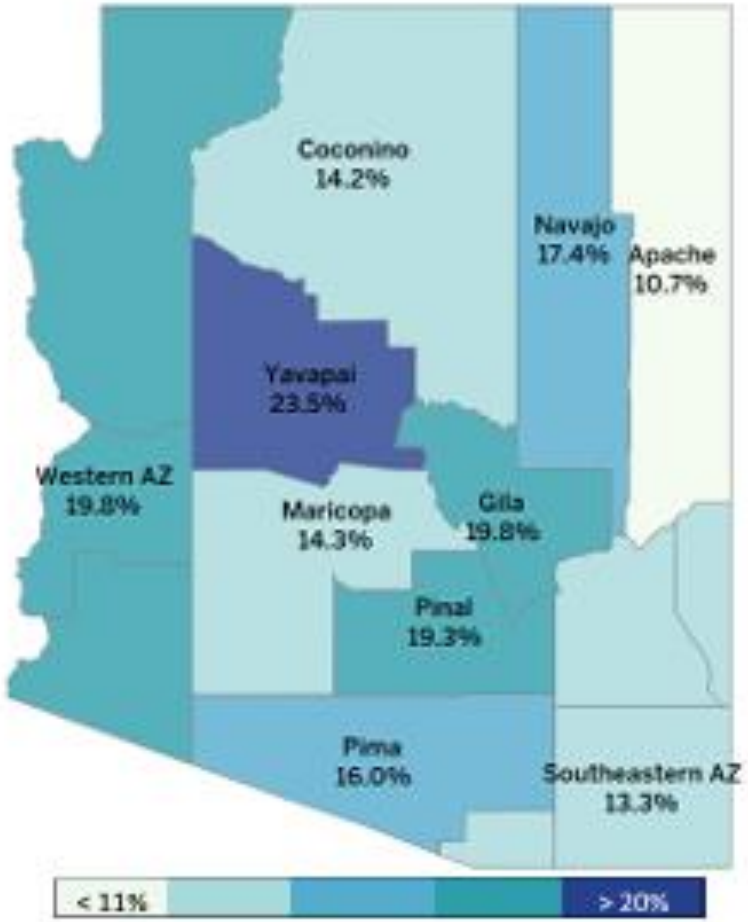
*Data from the KRMC Community Health Needs Assessment for Mohave County, 2022

Mohave County Population Demographics

Data from 2019 Arizona State Health Assessment, Arizona Dept. of Health Services

Cancer Mortality Rate

- Mohave County - 178 per 100,000
- Arizona – 136 per 100,000
- National – 146 per 100,000



Data from 2019 Arizona State Health Assessment, Arizona Dept. of Health Services

Smoking Rates

- Mohave County – 22.2% of adults
- Arizona – 12.7% of adults
- National – 11.5% of adults

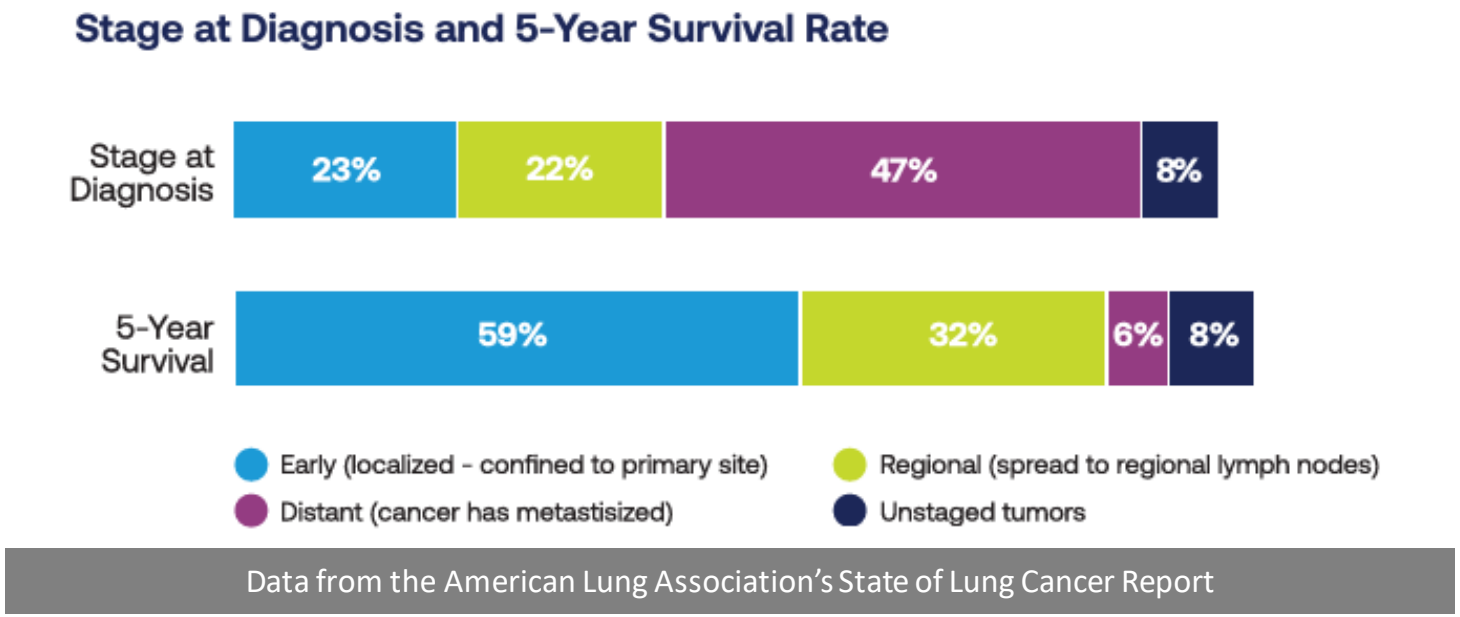
- Cigarette smoking prevalence is higher in rural than urban U.S. communities across the country (Parker, et al., 2022)
- "I've always said if you wanted to make money in Mohave County, open a convenience store that specializes in alcohol in tobacco products -- the amount of smokers here is unbelievable." –Mohave CHNA, 2022

Lung Cancer Prevalence

- Mohave County – 43 per 100,000
- Arizona – 26 per 100,000
- National – 31 per 100,000

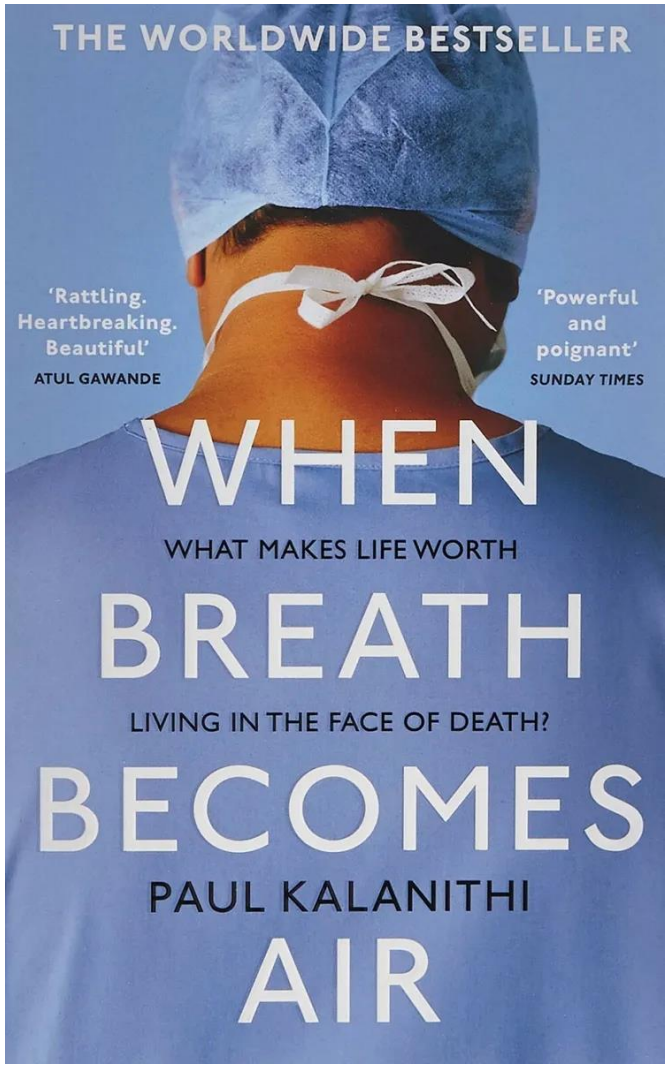
- Lung Cancer mortality has declined nationally since 1999, but the rate has declined significantly less in rural compared to urban and suburban communities (Gaddam, et al., 2023)

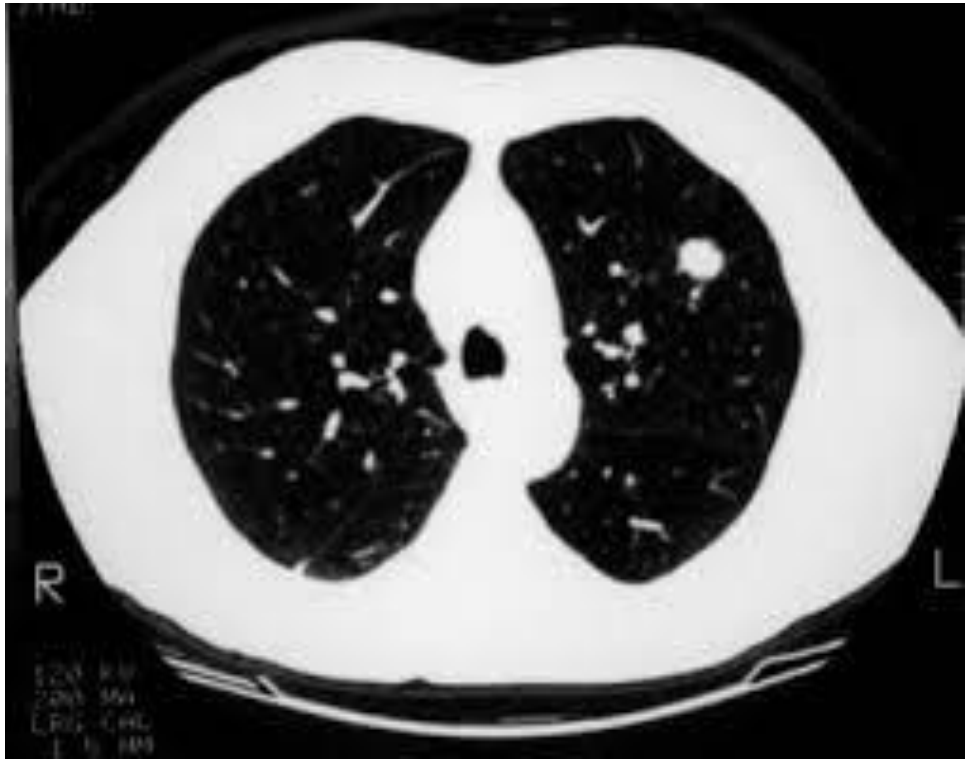
Early Detection Means Better Outcomes

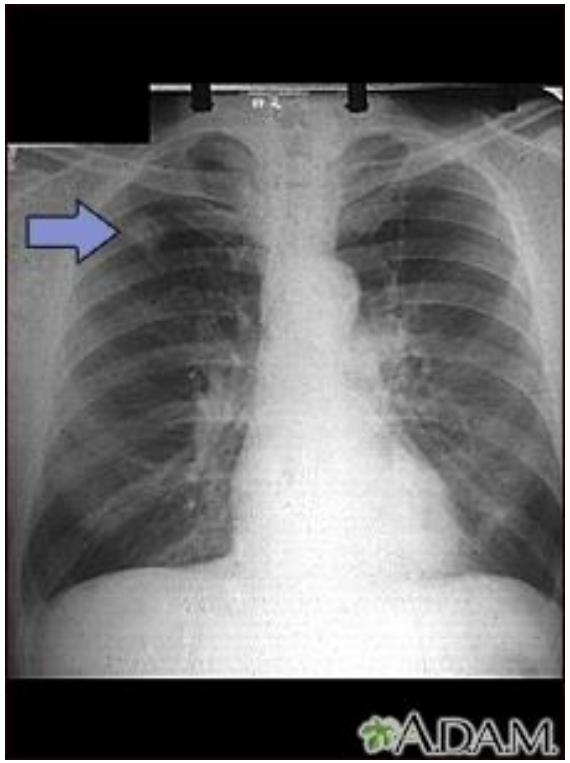


Data from the American Lung Association's State of Lung Cancer Report

- Lung Cancer is often diagnosed late-stage
- 5 year survival rates are much higher when it is diagnosed earlier

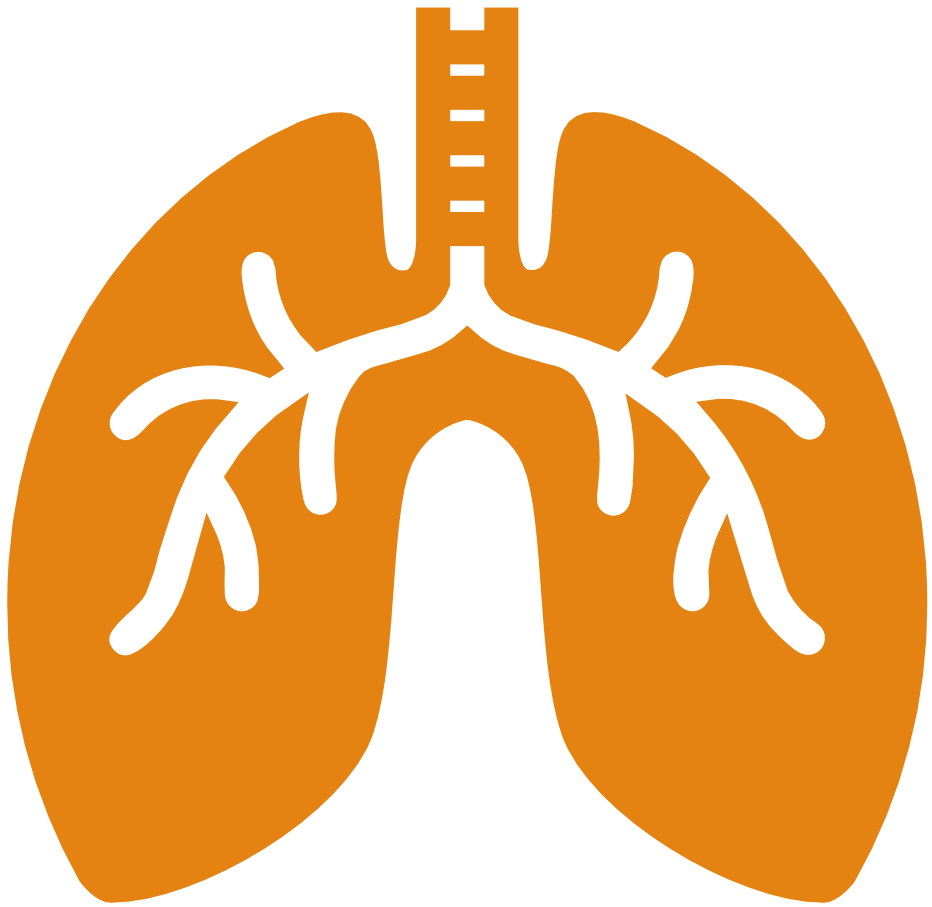

THE WORLDWIDE BESTSELLER
'Rattling. Heartbreaking. Beautiful'
ATUL GAWANDE
'Powerful and poignant'
SUNDAY TIMES
WHEN
WHAT MAKES LIFE WORTH
BREATH
LIVING IN THE FACE OF DEATH?
BECOMES
PAUL KALANITHI
AIR





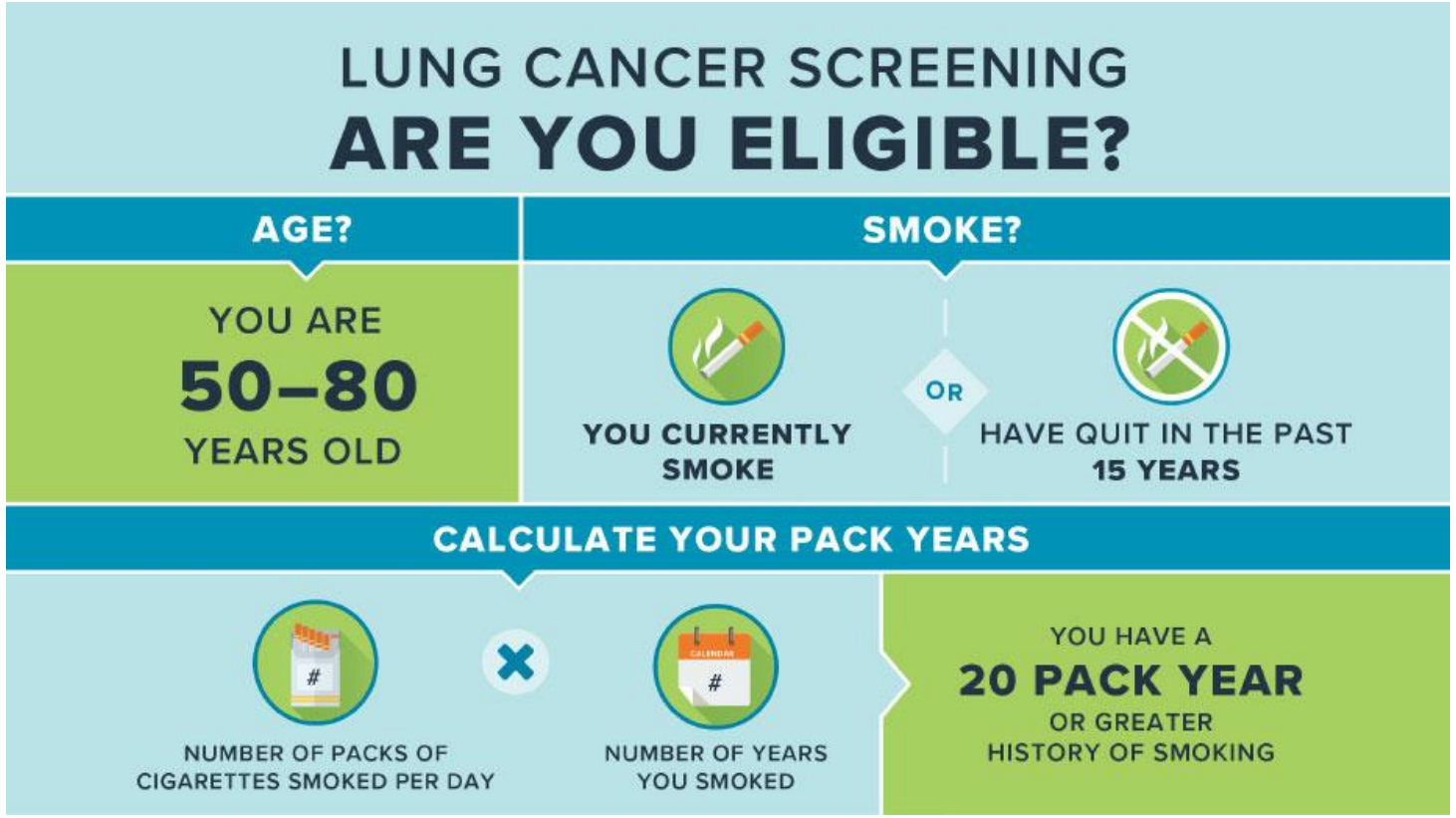
"Early lung cancer is almost always asymptomatic, and it takes it several years to grow and produce signs or symptoms that may alert the patient" (Polanco, et al., 2021)

What does early detection look like?



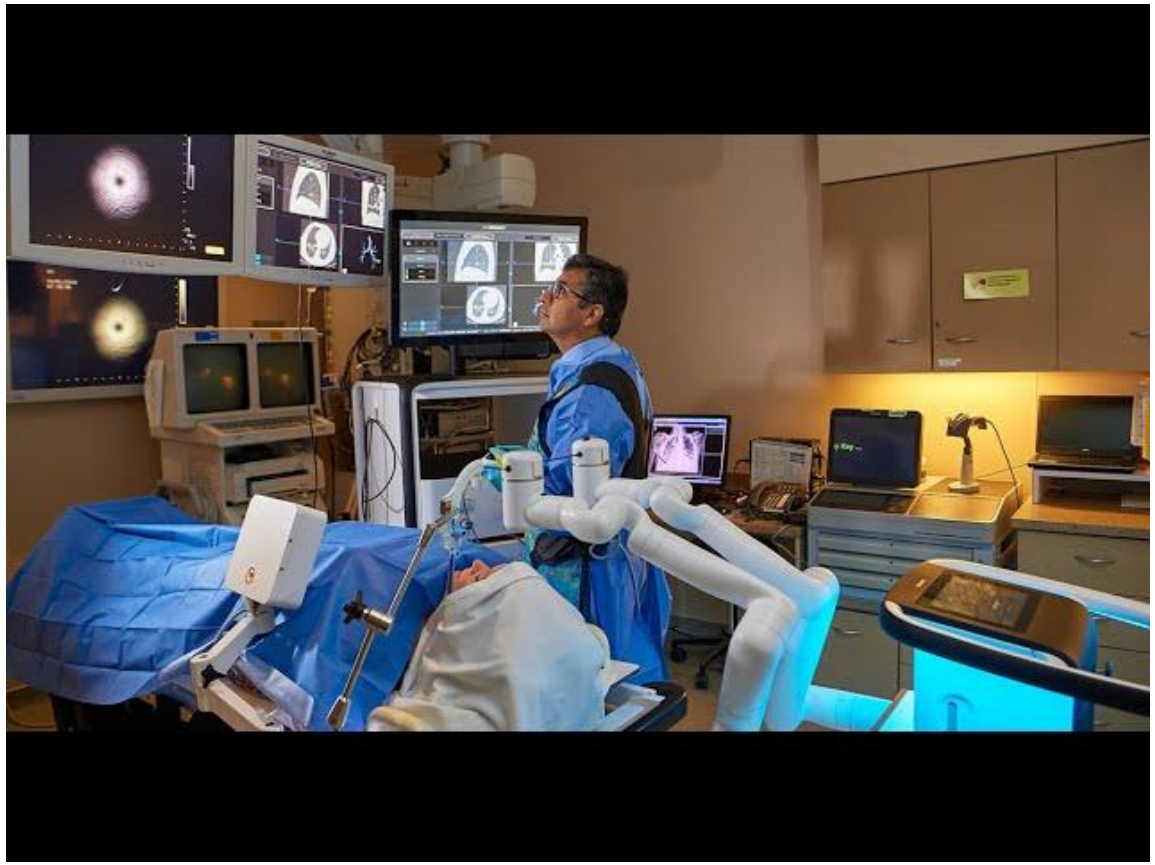
Lung Cancer Screening with LDCT

- Low-dose Computed Tomography (LDCT) became a promising tool for the effective detection of early-stage lung cancers through screening
- The NLST found a 20% reduction in lung cancer mortality with LDCT screening among high risk group
- 2013 – first recommendation issued by USPSTF
- 2021 – recommendation broadened



Current Screening Guidelines

- Current USPSTF recommendations have been adopted by CMS and almost all private insurance



Screening Protocols

Negative – No pulmonary nodules are identified

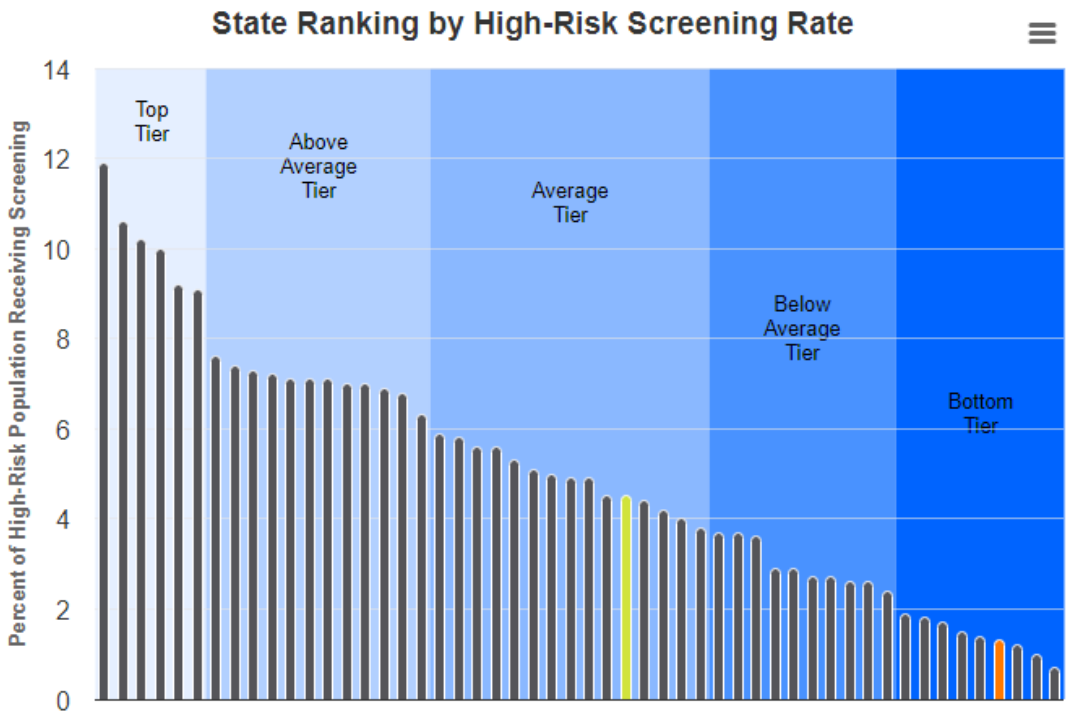
Positive – Pulmonary Nodules identified

- The size, texture, and presentation of the nodule determines what is recommended next
- Recommendations for follow-up can include PET scan, CT-guided tissue biopsy, or an additional CT scan in 3 or 6 months.

Lung-RADS

ACR Lung-RADS for SSNs

Category		Findings	Management	Probability of malignancy
Benign appearance or behaviour	2	**GGNs** < 20 mm or ≥ 20 mm and unchanged or slowly growing	Continue annual screening with LDCT in 12 months	< 1%
		PSNs < 6 mm total diameter on baseline screening		
		Category 3 or 4 nodules unchanged for ≥ 3 months		
Probably benign	3	**GGNs** ≥ 20 mm on baseline CT or new	6 month LDCT	1-2%
		PSNs ≥ 6 mm total diameter with solid component < 6 mm or new < 6 mm total diameter		
Suspicious	4A	**PSNs** ≥ 6 mm with solid component ≥ 6 mm to < 8 mm or with a new or growing < 4 mm solid component	3 month LDCT; PET/CT may be used when there is a ≥ 8 mm solid component	5-15%
	4B	**PSNs** a solid component ≥ 8 mm or a new or growing ≥ 4 mm solid component	Chest CT, PET-CT and/or tissue sampling	> 15%
	4X	Category 3 or 4 nodules with additional features or imaging findings that increase the suspicion of malignancy	As appropriate to the specific finding	



Lung Cancer Screening in Arizona

- LCS is highly underutilized in Arizona
  - 1.3% of eligible population, compared to a 5% national average
  - Arizona also ranks in the lowest quartile of screening rates for colorectal and breast cancer (Joseph, et al., 2018)
- Research suggests residents of rural communities undergo LCS at lower rates than their urban and suburban counterparts (Niranjan, 2022)

LCS at KRMC

- Offered since 2016
- The only medical center in the region offering until 2021
- How effective is lung cancer screening in a rural community?

“The NLST stated that one weakness of the study was that the trial was conducted at institutions “which are recognized for their expertise in radiology and the diagnosis and treatment of cancer. It is possible that community facilities will be less prepared to undertake screening programs” [6]. Furthermore, community facilities in smaller rural settings often face greater limitations in resources and expertise [10-13]. To evaluate these concerns, we sought to describe the performance of an LCS program within a non-NLST rural community hospital.” (Bodily, et al., 2022)

Study Aims

- Screening effectiveness
  - •What portion of screening exams are positive (Lung-RADS 3, 4A, 4B, or 4X)
  - •What portion of screening exams identify a nodule that is diagnosed as cancer, specifically early-stage cancers
    - •How many screening exams must be completed to diagnose a lung cancer, early-stage lung cancer

- Patient Outcomes –
  - What percentage of patients completed recommended follow-up imaging or testing?
  - What percentage of patients returned for annual screening in subsequent years?
  - What portion of the eligible high-risk population is being screened?
  - Incidental findings?

Study Design

- Retrospective chart review (KHI IRB 0193)
  - Screening dates, screening results, diagnostic results, recommended follow-up, course of treatment, patient outcomes, etc.

Cureus. 2022 Mar; 14(3): e23299.
Published online 2022 Mar 18. doi: 10.7759/cureus.23299
PMCID: PMC9013513
PMID: 35464508

Results of Lung Cancer Screening in a Rural Setting: A Retrospective Cohort Study

Monitoring Editor: Alexander Muacevic and John R Adler

Bridger Bodily,[1] John Ashurst,[2] Jason Fredriksen,[3] Brent Bedke,[4] Adam Braze,[5] Robert Matheny,[6] and Jay Vlaminck[3]

Results – Screening Effectiveness

- 1474 patients underwent LCS with LDCT between September 2016 and December 2019.
- 1776 LDCT exams performed
- 375 (21.1%) categorized as positive, compared to 24.4% in the NLST
  - 189 (50.7%) of these were classified as Lung-RAD 3
- 29 (1.6%) of exams identified a malignancy, compared to 1.4% in the NLST
- 61 exams to diagnose one cancer of any stage
- 77 exams to diagnose an early-stage cancer

Results - Outcomes

Table 3

Malignancy staging of those who underwent lung cancer screening with low-dose computed tomography.

Stage	Total cases (N = 29)
I	17 (58.6%)
II	6 (20.6%)
IIIA	1 (3.4%)
IIIB	2 (6.9%)
IV	3 (10.3%)

- "A total of 82.8% (23/29) malignancies were low-stage malignancies (stage I or II), 79.3% (24/29) were potentially surgical candidates (stage IIIA or less), and 17.2% (5/29) were not surgical candidates based on stage (stage IIIB or IV)."

Results - Outcomes

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"An additional finding is that compliance with annual LCS after the initial LCS test is low in the current population. Only 28.7% and 9.9% of eligible patients underwent second and third annual LCS tests, respectively. It is possible that a lack of understanding of the need for annual screening contributes to this attrition. Lack of continuity with primary care providers, limitations in access to care, and other social factors may contribute to this trend as well."

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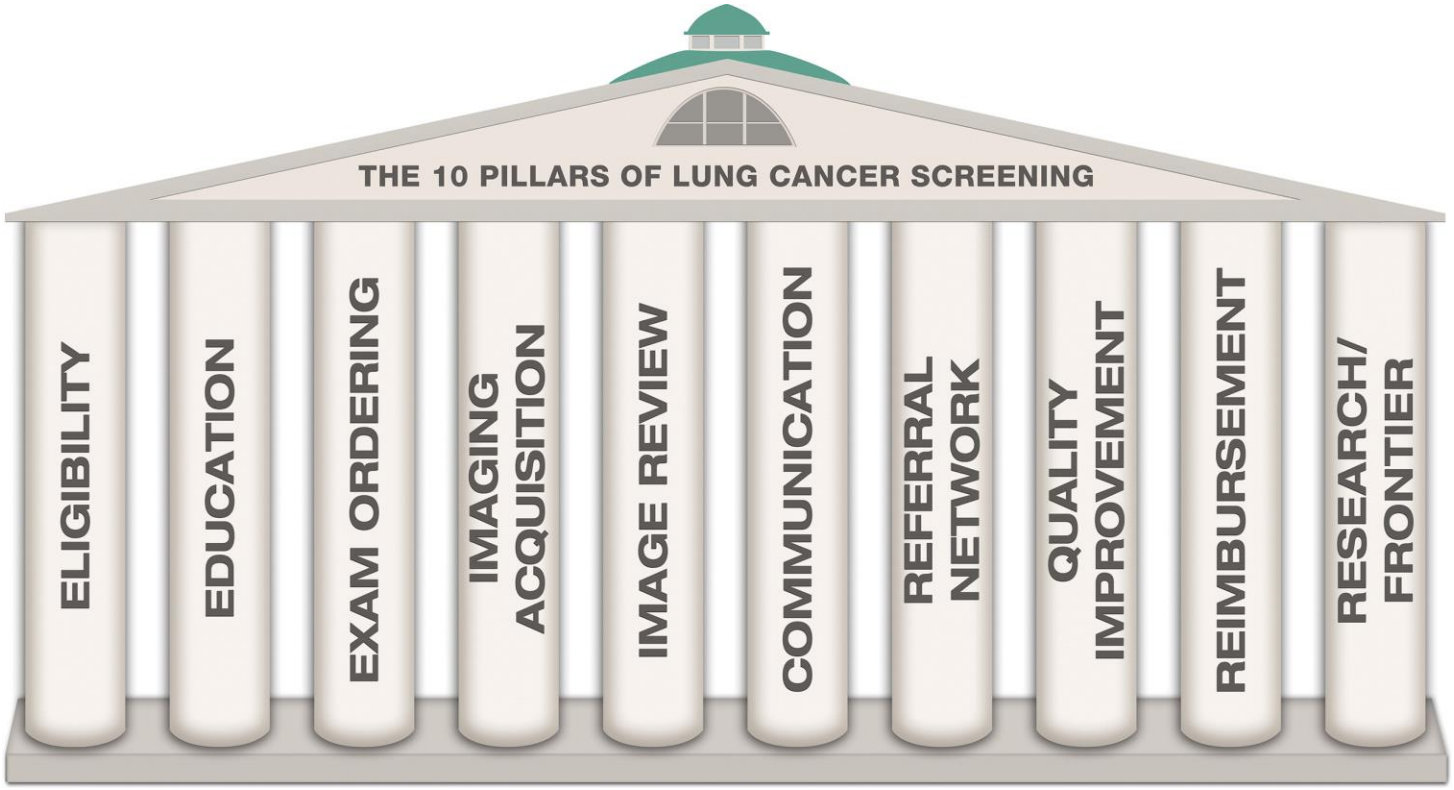
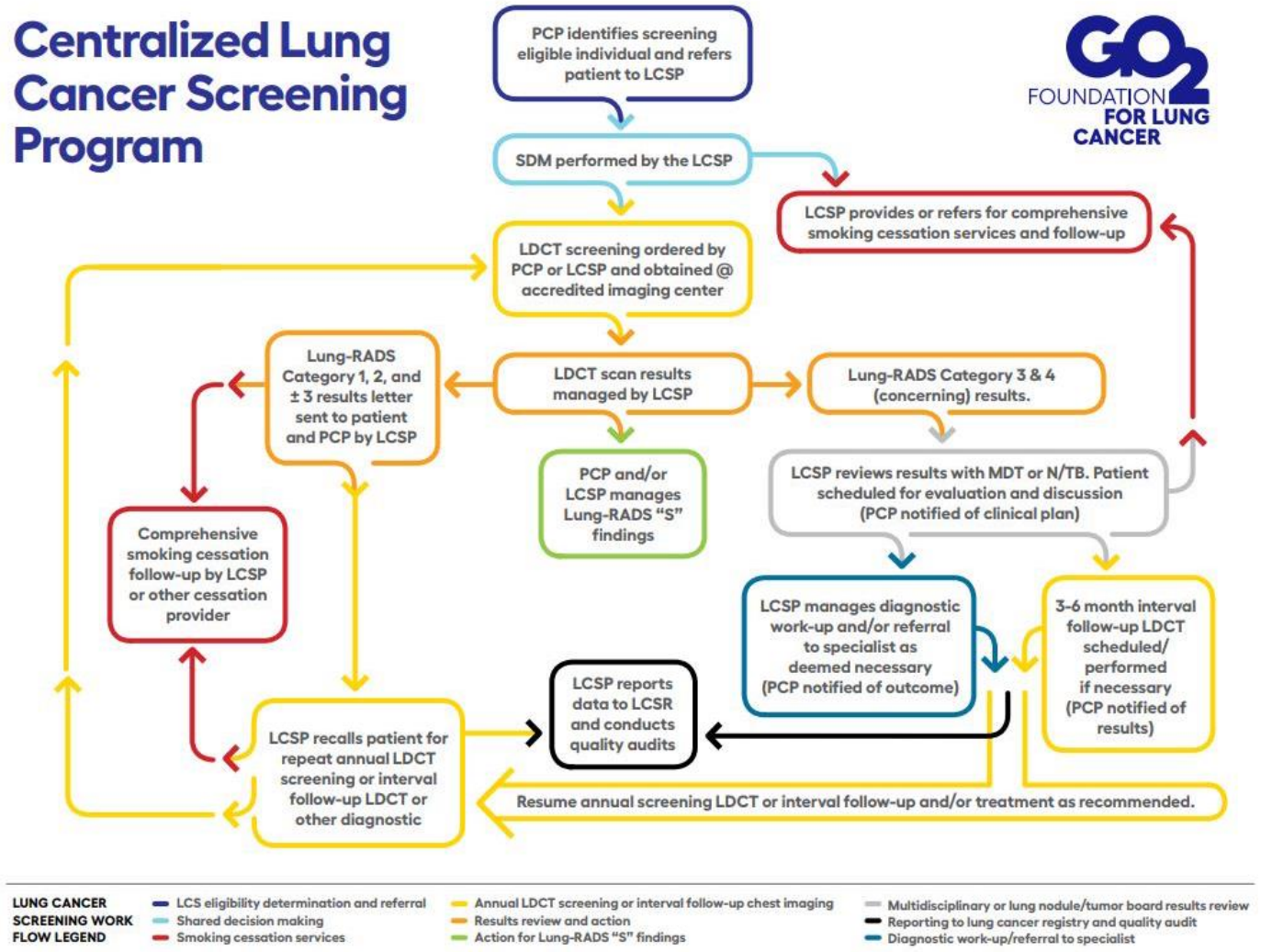
Results - Outcomes

- "No evidence of further workup was available in 57.6% (215/375) patients with positive tests."
- "One concerning finding from the study is that 57.6% of patients with positive LCS tests did not pursue further testing or treatment at Kingman Regional Medical Center. It is possible that a proportion of these patients did pursue further care at a larger institution due to the perceived benefit of a further workup at an academic institution or a larger institution due to the potential seriousness of the diagnosis."



Pintelman et al. identified the “10 Pillars of Lung Cancer Screening” necessary for an effective lung cancer screening program



KRMC Lung Nodule Clinic

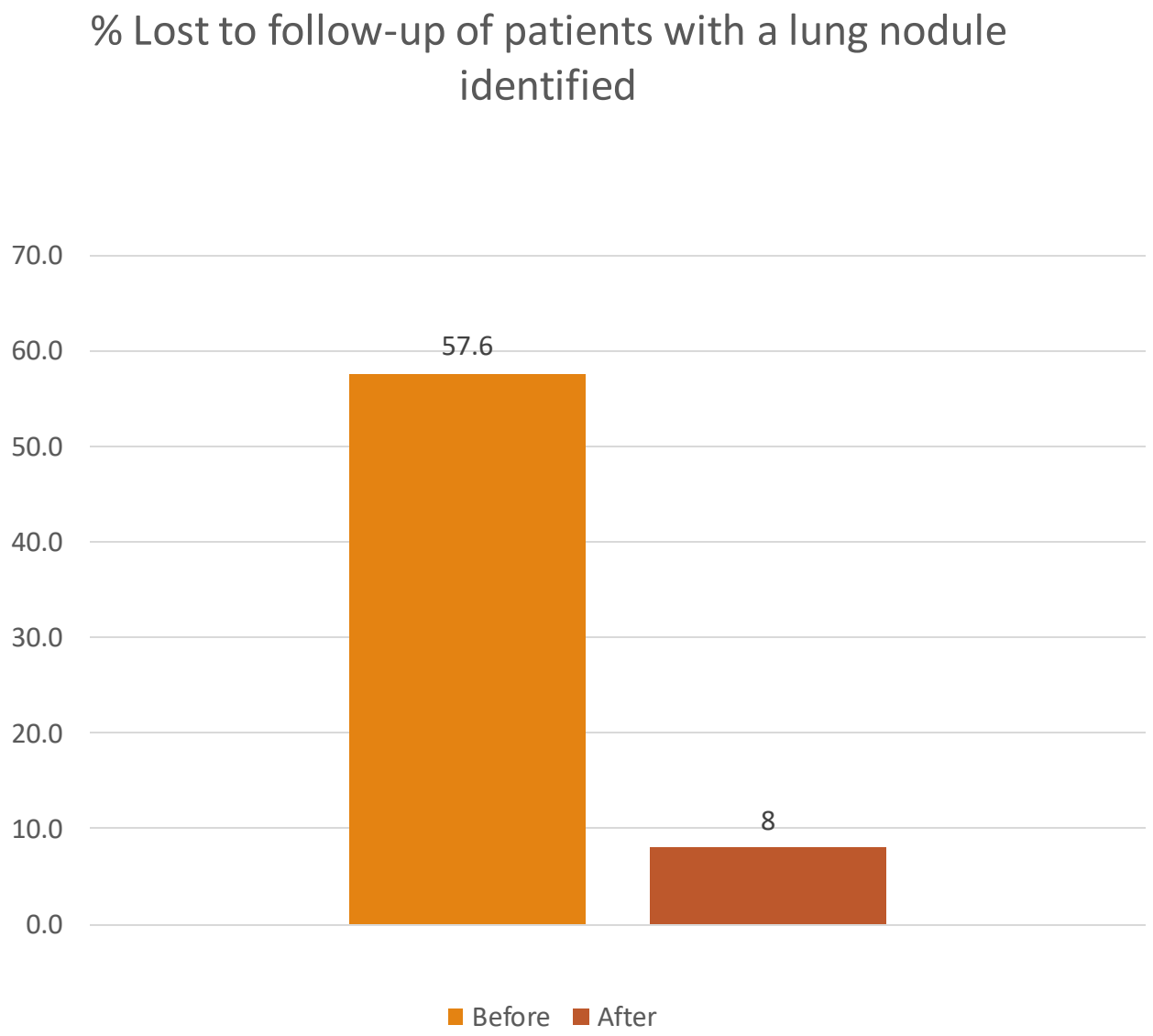
- Officially established in September of 2022
- Dedicated patient-tracking software
- Nurse-navigators hired to encourage compliance with follow-up recommendation and also screening uptake

Increased Compliance

- An analysis was completed of LDCT exams completed between April and August 2023 to evaluate the effect of the Lung Nodule Clinic on cancer detection and rates of patient followup.
- 551 LDCT exams completed
- 75 positive nodules
- 69 (92%) of patients with a positive lung nodule returned for the recommended follow-up testing or imaging
- 11 lung cancers identified, 9 of which were early-stage.

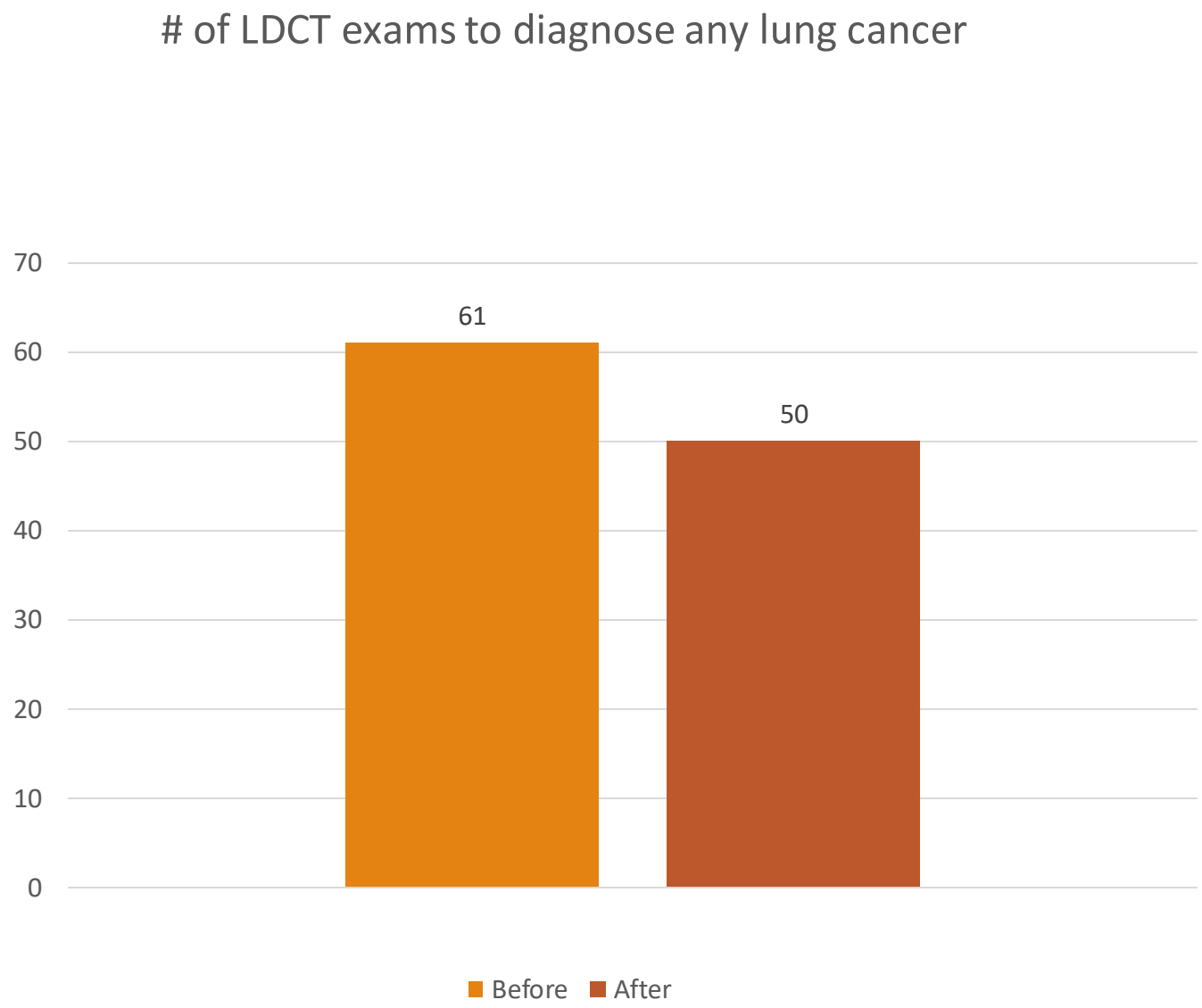
Improvements

- 87% reduction



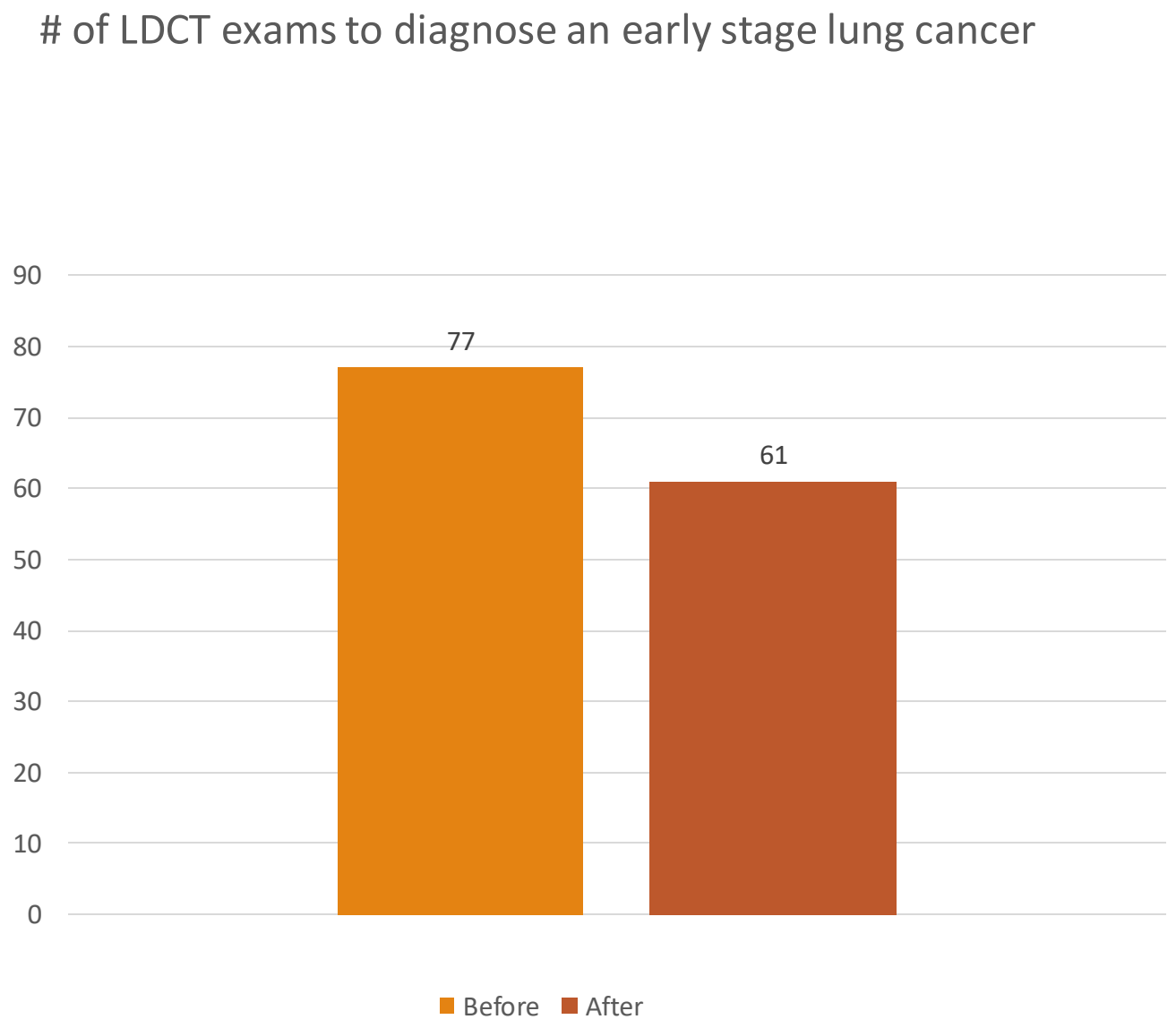
Improvements

- 18% reduction

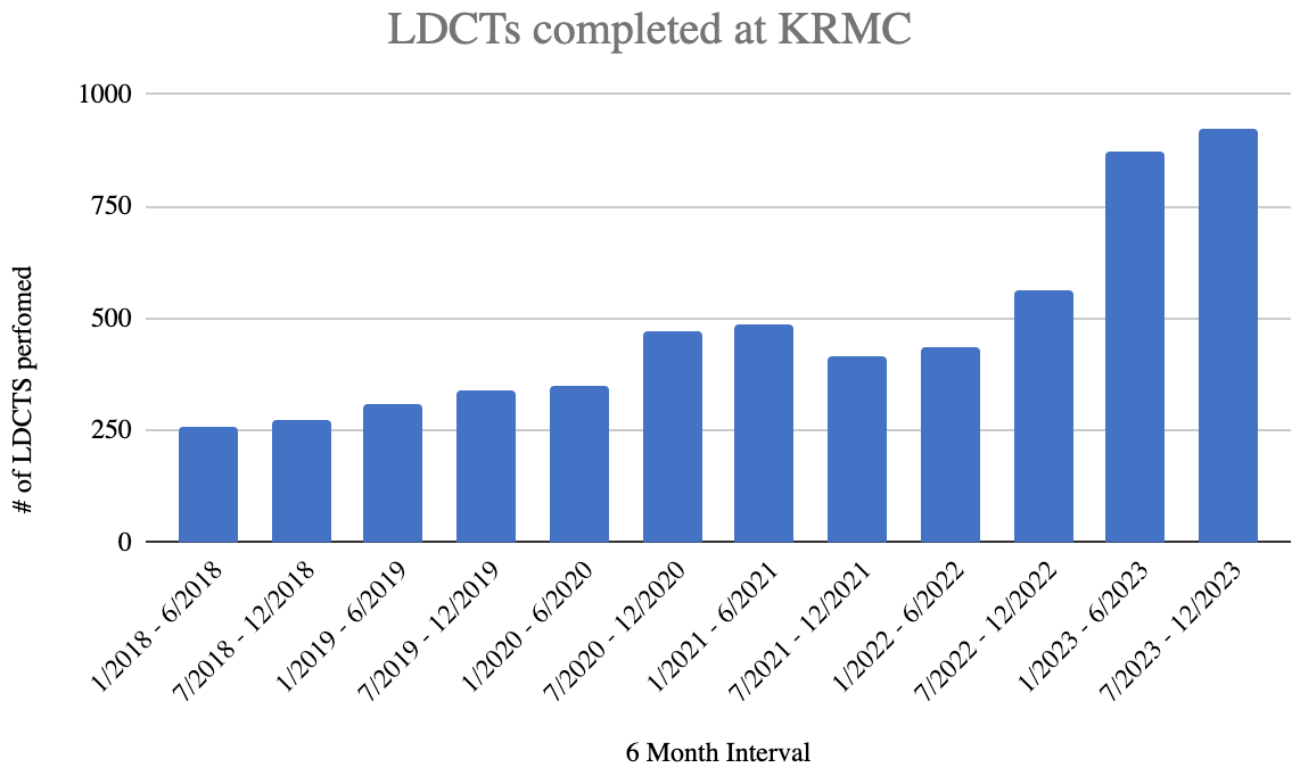


Improvements

21% reduction



Screening Uptake



What contributed to the screening uptake?

- In-reach
  - Recruiting patients who have been screened in the past.
- Outreach
  - Provider education
  - Community education

Opportunities to improve: time to followup

- Lung-RAD 3 –

Median: 191 days

Mean: 179 days

Ideal: 182 days

- Lung-RAD 4A –

Median: 43 days

Mean: 61 days

Ideal: 90 days

- Lung-RAD 4B –

Median: 32

Mean: 53

Ideal: 7

Opportunities to improve: Smoking cessation

- Currently, patients are referred to Ashline or to the County Department of Health for smoking cessation resources. A systematic smoking cessation program could be beneficial

Barriers to Screening

Largest barriers to screening reported by community-based primary care providers (Coughlin, et al., 2021) were:

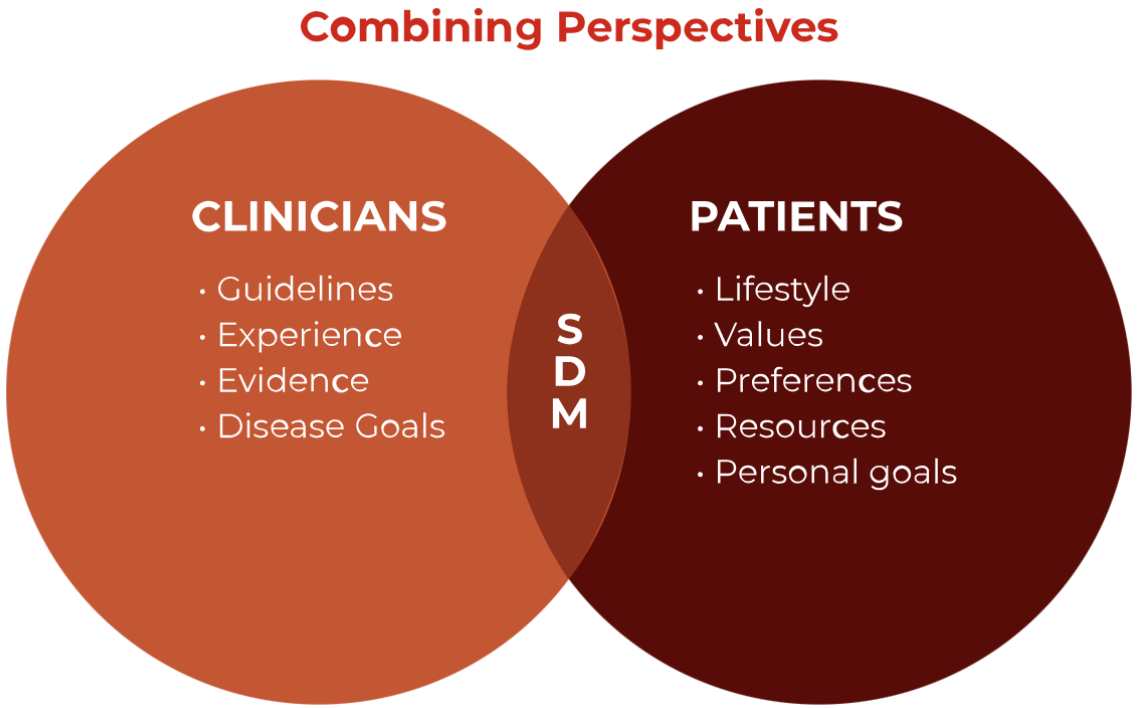
- lack of EMR notifications (58.1%)
- patient refusal (48.4%)
- lack of insurance coverage (25.8%)

Lack of EMR Notifications

- Provider education campaign

Patient refusal

- Shared decision-making visit



Lack of Insurance

- Catch-it-Early Program

What can be done in your communities?

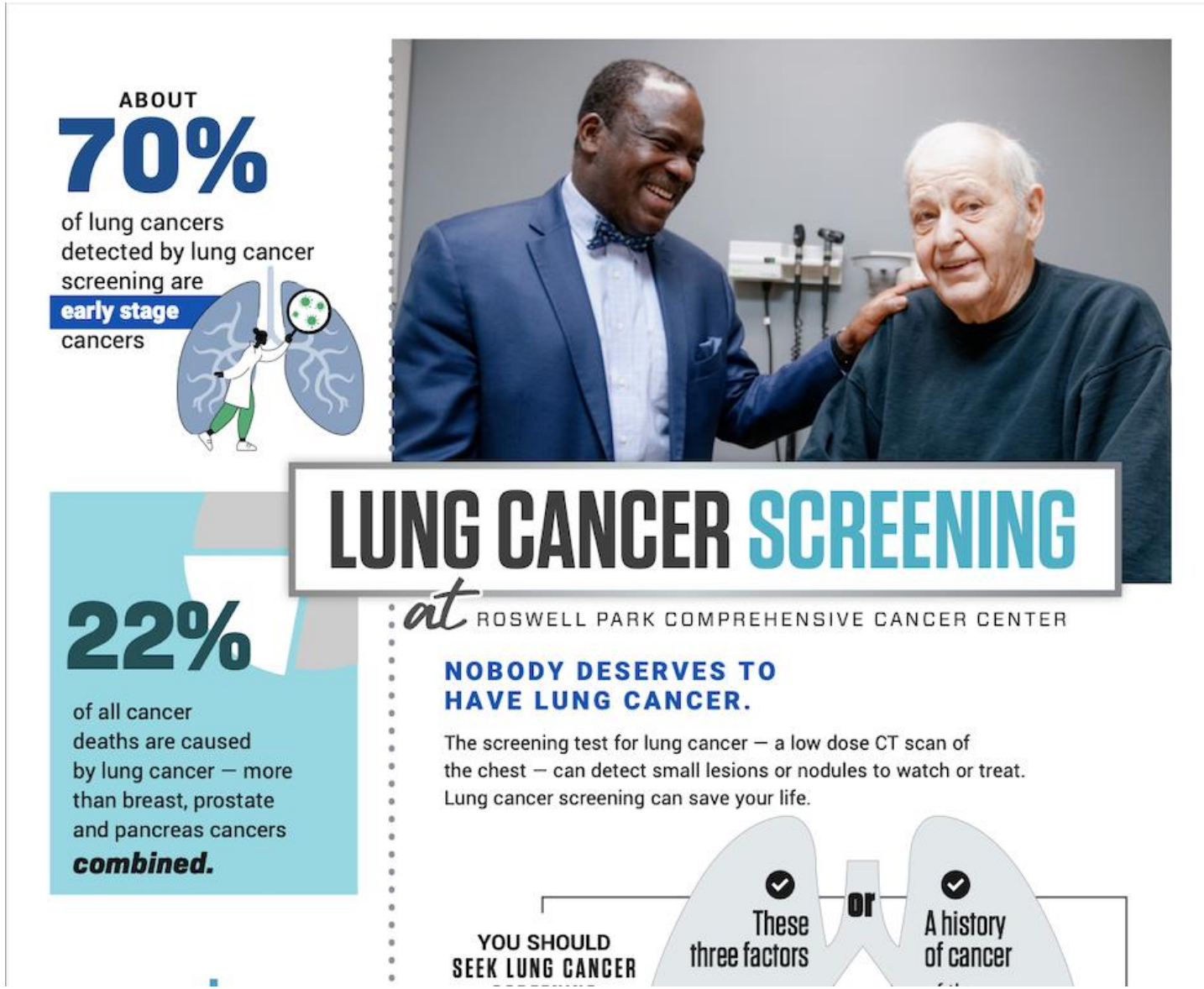
- Provider education (Colamanici, et al., 2023)
  - Presentations to PCPs result in sustained increases in the number of referrals for lung cancer screening
  - Provider education results in higher screening uptake than community education

What can be done in your communities?

- Patient navigation (Neal, et al., 2018)
- Fundraising for underinsured patients
- Tobacco cessation
- UT-SW Lung Cancer Screening and Patient Navigation Program (Le, et al., 2022)

What can be done in your communities?

- Community education (Williams, et al., 2021)
  - Patients are more likely to undergo screening after hearing a presentation
    - 38% increase



You Have a Lung Nodule ,

Then What?

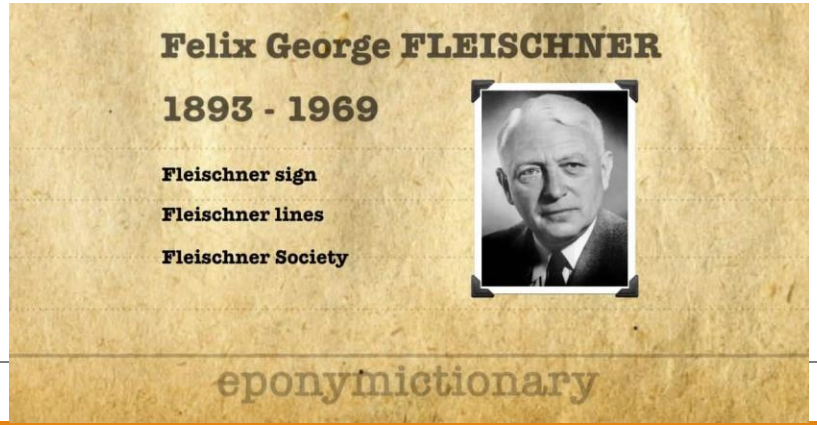
Initial Risk Stratification

Size

Major risk factors for lung cancer

- Age
- Smoking status
- Any personal cancer history

Fleischner Society



Dr Felix Fleischner was born in Vienna in 1893 and received his medical degree in 1919 from the University of Vienna

He immigrated to United States in 1938

He spent his first 2 years in the United States at the Massachusetts General Hospital

He was appointed to the staff at Boston's Beth Israel Hospital in 1942 as their first full time radiologist, becoming Chairman of the department in 1945 and serving in this position until 1960

Total publications of 251, mostly dealing with the pathogenesis and diagnosis of lung disease through the use of the chest radiograph

Fleischner Society History

In November 1969, a group of 8 radiologists first met to form a new society to study chest disease primarily through radiology

Dr Fleischner had been invited to the meeting, but when he suddenly died of a heart attack 3 months before the meeting, the group dedicated and named the new organization under his name

Fleischner Society History

First Congress, held in 2005

First guideline in 2005

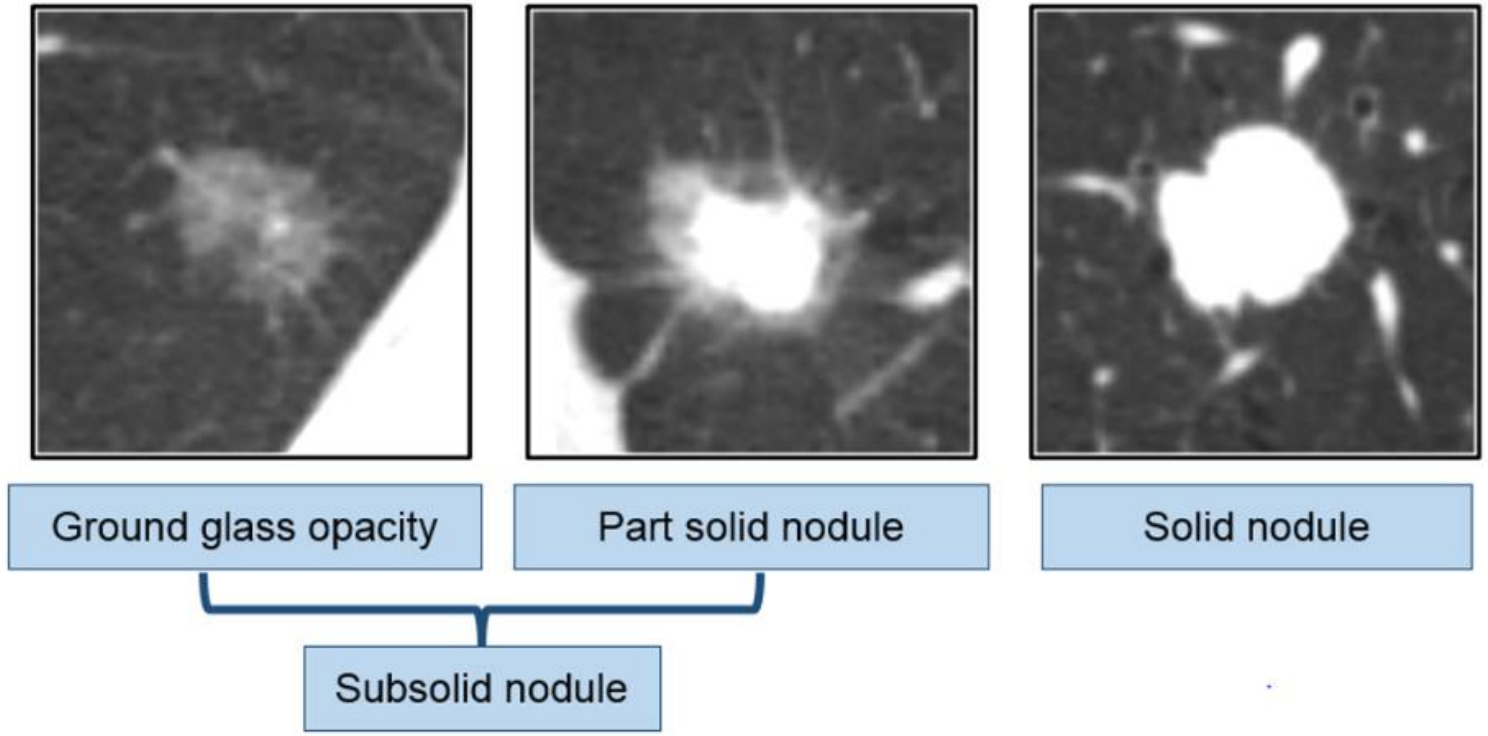
First update in 2013

Most recent update 2017

Fleischner Society Lung Nodule Recommendations

Pertain to the follow-up and management of indeterminate lung nodules detected incidentally on CT.
The guideline does not apply to:
Lung cancer screening
Patients younger than 35 years (low risk of cancer)
Patients with a history of cancer (high risk of other cancers)
Patients with immunosuppression (high risk of opportunistic infections)

Nodule Density Matters!



https://dx.doi.org/10.1594/ecr2017/C-1099

2 Minute Medicine®	**Solid Nodules**		2minutemedicine.com
	<6 mm (<100 mm^3)	**6-8 mm (100-250 mm^3)**	**>8 mm (>250 mm^3)**
Single			
Low Risk	No routine follow-up	CT at 6-12 months, then consider CT at 18-24 months	Consider CT at 3 months, PET/CT, or tissue sampling
High Risk	Optional CT at 12 months	CT at 6-12 months, then CT at 18-24 months	Consider CT at 3 months, PET/CT, or tissue sampling
Multiple			
Low Risk	No routine follow-up	CT at 3-6 months, then consider CT at 18-24 months	CT at 3-6 months, then consider CT at 18-24 months
High Risk	Optional CT at 12 months	CT at 3-6 months, then CT at 18-24 months	CT at 3-6 months, then CT at 18-24 months

Table I. 2017 Fleischner Society Guidelines for Management of Incidentally Detected Solid Pulmonary Nodules in Adults.

2 Minute Medicine®	**Subsolid Nodules**	2minutemedicine.com
	<6 mm (<100 mm^3)	**≥6 mm (>100 mm^3)**
Single		
Ground Glass	No routine follow-up	CT at 6-12 months to confirm persistence, then CT every 2 years until 5 years
Part Solid	No routine follow-up	CT at 3-6 months to confirm persistence. If unchanged and solid component remains <6 mm, annual CT should be performed for 5 years.
Multiple		
Ground Glass or Part Solid	CT at 3-6 months. If stable, consider CT at 2 and 4 years.	CT at 3-6 months. Subsequent management based on the most suspicious nodule(s).

Table II. 2017 Fleischner Society Guidelines for Management of Incidentally Detected Subsolid Pulmonary Nodules in Adults.

Lung RADS

Lung-RADS (Lung Imaging Reporting and Data System)

Introduced in 2014

Proposed to aid with findings in low-dose CT screening exams for lung cancer

Complements Fleischner guidelines

ACR Lung-RADS for SSNs

Category		Findings	Management	Probability of malignancy
Benign appearance or behaviour	2	**GGNs** < 20 mm or ≥ 20 mm and unchanged or slowly growing	Continue annual screening with LDCT in 12 months	< 1%
		PSNs < 6 mm total diameter on baseline screening		
		Category 3 or 4 nodules unchanged for ≥ 3 months		
Probably benign	3	**GGNs** ≥ 20 mm on baseline CT or new	6 month LDCT	1-2%
		PSNs ≥ 6 mm total diameter with solid component < 6 mm or new < 6 mm total diameter		
Suspicious	4A	**PSNs** ≥ 6 mm with solid component ≥ 6 mm to < 8 mm or with a new or growing < 4 mm solid component	3 month LDCT; PET/CT may be used when there is a ≥ 8 mm solid component	5-15%
	4B	**PSNs** a solid component ≥ 8 mm or a new or growing ≥ 4 mm solid component	Chest CT, PET-CT and/or tissue sampling	> 15%
	4X	Category 3 or 4 nodules with additional features or imaging findings that increase the suspicion of malignancy	As appropriate to the specific finding	

Solid Nodules > 8 mm, further risk stratification

Lung Nodule Risk Calculators:

1. Brock University Calculator

2. NPS-BIMC (Bayesian Inference Malignancy Calculator)

3. Solitary Pulmonary Nodule Malignancy Risk (Mayo Clinic model)

Mayo Clinic Model

Age		years
Nodule diameter		mm
Current or former smoker	**No 0**	Yes +1
Extrathoracic cancer diagnosis ≥5 years prior	**No 0**	Yes +1
Upper lobe location of tumor	**No 0**	Yes +1
Nodule spiculation	**No 0**	Yes +1
FDG-PET	**PET not performed**	

Probability of Lung Cancer

Low probability (< 5% probability of cancer): CT follow up in 3 months

Intermediate probability (5-65% probability of cancer): PET scan or tissue sampling

High probability (> 65% probability of cancer): Biopsy

Lung Nodule Biopsy Challenges

Most of them are relatively small

Not easy to reach

Tidal breathing movements and resulting variations

Atelectasis can obscure

Risk of pneumothorax

Lung Nodule Biopsy Techniques

- Conventional Bronchoscopy with fluoroscopy
- Navigational Bronchoscopy
- CT-guided
- Robotic-assisted Navigational Bronchoscopy

ION Robotic Bronchoscopy

- Advanced 3D navigation
- Advanced software with comprehensive CT mapping
- Accurate localization
- Robotic maneuverability
- Real-time & high-resolution images
- Superior stability and control
- Extreme flexibility and distal articulation
- Cath diameter 3.5 mm, can reach very far and distal in lung
- Safety with pleural lines demarcation

Clinical Applications

- All types and locations of lung nodules
- Other lung lesions (GGO, cavity,…etc)
- Different types of biopsies (TBNA, TBBx forceps, cryo, brush)
- Improved other non-cancer diagnosis (Coccidio)
- Therapeutic interventions

- Advanced 3D navigation
- Advanced software with comprehensive CT mapping
- Accurate localization
- Robotic maneuverability
- Real time & high-resolution images
- Superior stability and control
- Extreme flexibility and distal articulation
- Cath diameter 3.5 mm, can reach very far and distal in lung
- Safety

- Better Dx yield (90s%)
- Early detection of cancer with more survival
- Minimally invasive
- Low complication rate (PTX rate ~2%)
- Faster time-to-treat
- Therapeutic capabilities
- Outpatient procedure
- Decreased repeat biopsies
- Single Dx anesthesia encounter
- Staging in one Anesthesia encounter

After Diagnosis

Counseling about lung cancer

Staging

- LN biopsy
- PET
- Brain MRI

Referrals

- Medical Oncology
- Radiation-Oncology
- Thoracic surgery

Future of Lung Cancer Screening

Future of Lung Cancer Screening-AI

AI has the potential to truly revolutionize the early detection of lung cancer

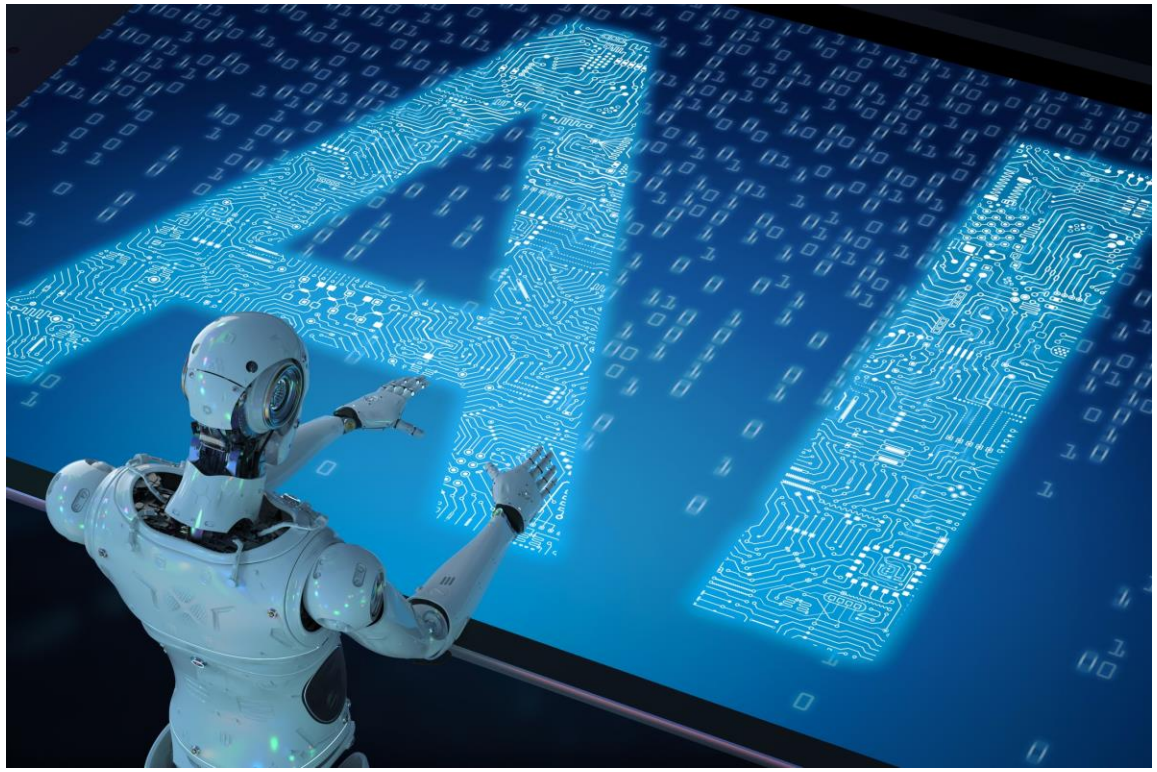
Personalized pre-screening risk assessments

Personalized screening programs

Image reconstruction to provide the best image quality with the lowest radiation dose

Automated nodule detection to reduce the radiologist's workload

Nodule characterization as benign or malignant to guide resources and management, avoid high costs and unnecessary biopsy or surgery



Future of Lung Cancer Screening-New Guidance in the Horizon

In November 2023, the American Cancer Society expanded lung cancer screening guidelines

- Anyone age 50-80
- Smoking history of 20 pack-years
- No matter how long ago they quit

More inclusive criteria, aiming to prevent later-stage diagnosis

Why the 15-year Quitting Rule Should Go Aways!

10% to 15% of patients with lung cancer quit smoking between 15 and 30 years

In a secondary analysis of individuals in the Framingham Heart Study:

- 40.8% of lung cancers in people who used to smoke were found in those who had quit more than 15 years previously
- Lung cancer risk in those who had been smoke free for 25 years or more was more than 3 times that of people who never smoked

Future of Lung Cancer Screening-Beyond Cigarette Smoking

The majority of people diagnosed with lung cancer now are former smokers or never smoked

Your risk factors of lung cancer go well beyond whether you smoked and how much:

- Exposure to Radon
- Hazardous chemical exposures
- Radiation exposure
- Family history
- Personal history of lung disease such as COPD or ILD
- Air pollution

Other Lung Cancer Risk Prediction Models

The PLCOm2012:

Validated lung cancer risk prediction model based on data collected from the control arm of the Prostate, Lung, Colorectal, and Ovarian Cancer Screening Trial, a randomized controlled trial studying screening to reduce cancer mortality

Risk prediction models include multiple variables known to increase the risk for lung cancer

Help estimating the risk of lung cancer beyond determining if an individual is eligible for screening

Tammemagi CM, Pinsky PF, Caporaso NE, Kvale PA, Hocking WG, Church TR, Riley TL, Commins J, Oken MM, Berg CD, Prorok PC. Lung cancer risk prediction: Prostate, Lung, Colorectal And Ovarian Cancer Screening Trial models and validation. J Natl Cancer Inst. 2011 Jul 6;103(13):1058-68. doi: 10.1093/jnci/djr173. Epub 2011 May 23. PMID: 21606442; PMCID: PMC3131220.

PLCOm2012 Model

The PLCOm2012 model incorporates 11 predictors:

(1) Age

(2) Highest level of education obtained

(3) Body mass index (BMI)

(4) Chronic obstructive pulmonary disease (COPD)

(5) Personal history of cancer

(6) Family history of lung cancer

(7) Race and ethnicity

(8) Smoking status (former or current)

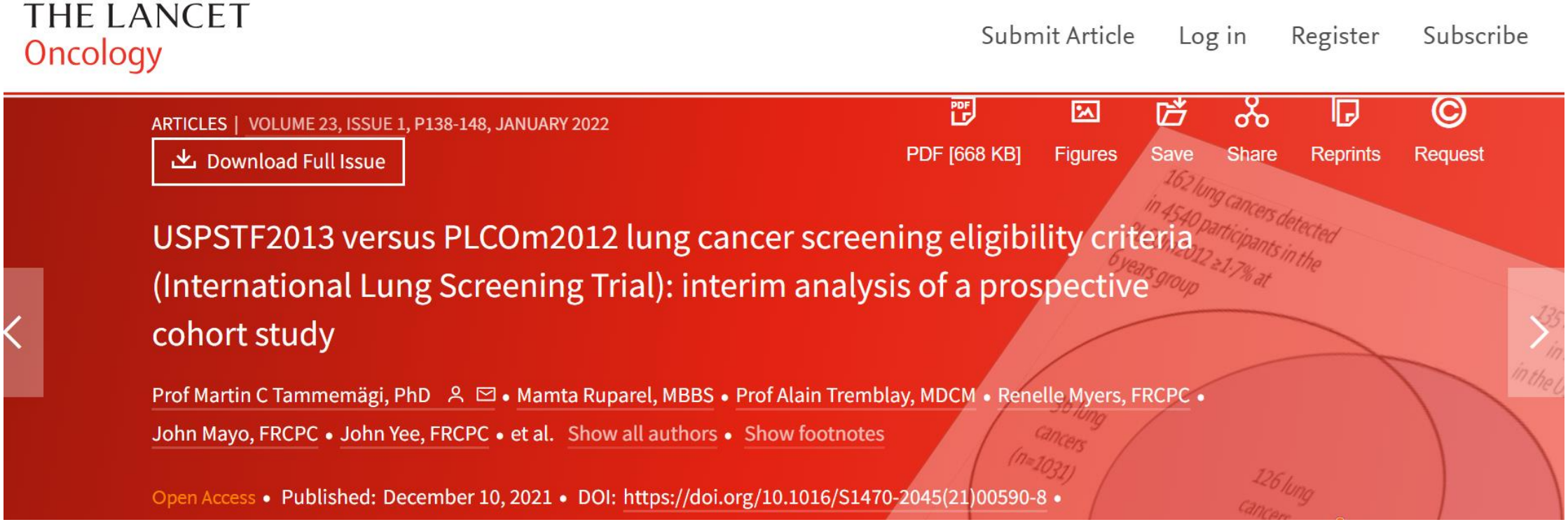
(9) Average number of cigarettes smoked per day

(10) Duration smoked (years)

(11) Years of quitting smoking

The PLCOm2012 model has been validated by different research teams in several countries

PLCOm2012 appears to be more efficient than the USPSTF2013 criteria for selecting individuals to enroll into lung cancer screening



The use of the $PLCO_{M2012}$ model was more sensitive than the NLST criteria for lung-cancer detection

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Selection Criteria for Lung-Cancer Screening

This article has been corrected. VIEW THE CORRECTION

Authors: Martin C. Tammemägi, Ph.D., Hormuzd A. Katki, Ph.D., William G. Hocking, M.D., Timothy R. Church, Ph.D., Neil Caporaso, M.D., Paul A. Kvale, M.D., Anil K. Chaturvedi, Ph.D., Gerard A. Silvestri, M.D., Tom L. Riley, B.Sc., John Commins, B.Sc., and Christine D. Berg, M.D. Author Info & Affiliations

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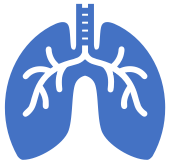


PLCOm2012 VS. USPSTF2013

15.8% more lung cancers detected for the same number of individuals screened (mean follow up 2.3 years)

More women with lung cancer were identified by PLCOm2012

98 women were diagnosed with lung cancer in the study sample

Of those, only 72 qualified for screening using the USPSTF criteria compared to 94 who qualified for screening using the PLCOm2012 model

More African Americans with lung cancer were identified by PLCOm2012

PLCOm2012 model identified 71.3% African American cases, whereas the USPSTF criteria only identified 50.3%.

Tammemägi MC, Ruparel M, Tremblay A, Myers R, Mayo J, Yee J, Atkar-Khattra S, Yuan R, Cressman S, English J, Bedard E, MacEachern P, Burrowes P, Quaife SL, Marshall H, Yang I, Bowman R, Passmore L, McWilliams A, Brims F, Lim KP, Mo L, Melsom S, Saffar B, Teh M, Sheehan R, Kuok Y, Manser R, Irving L, Steinfort D, McCusker M, Pascoe D, Fogarty P, Stone E, Lam DCL, Ng MY, Vardhanabhuti V, Berg CD, Hung RJ, Janes SM, Fong K, Lam S. USPSTF2013 versus PLCOm2012 lung cancer screening eligibility criteria (International Lung Screening Trial): interim analysis of a prospective cohort study. Lancet Oncol. 2022 Jan;23(1):138-148. doi: 10.1016/S1470-2045(21)00590-8. Epub 2021 Dec 11. PMID: 34902336; PMCID: PMC8716337.

What about screening for E-cigarettes and Vaping ?

The use of e-cigarettes or vape pens has not been around long enough for researchers to understand the long-term effects and potential risk for lung cancer

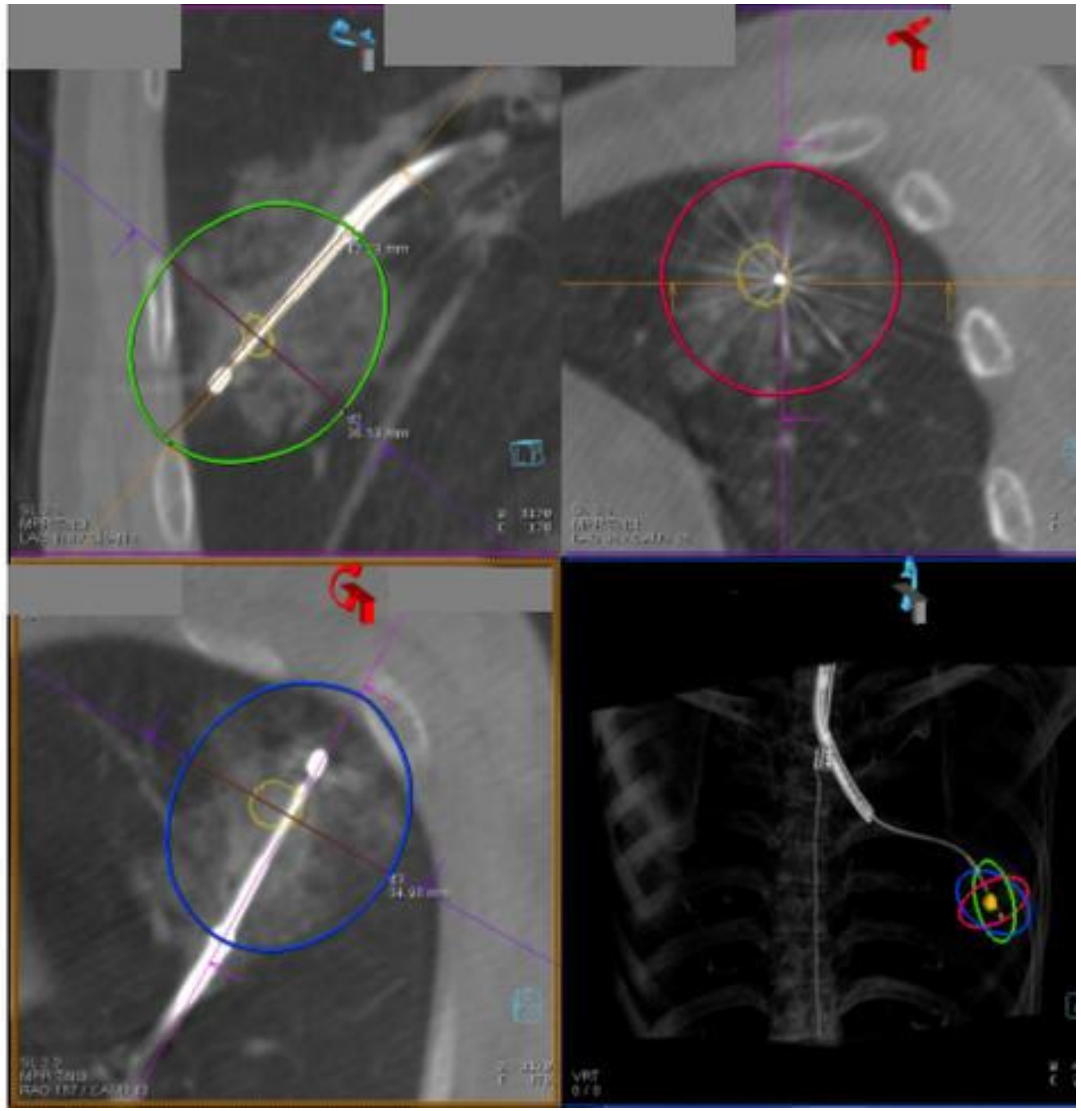
EVALI

There are potential cancer-causing compounds found in in these products, so there is a concern over time that we may see an association with the development of lung cancer

Future of Lung Cancer Therapy-Ablation

Ongoing clinical trials for transbronchial ablation technology using Robotic-Assisted Bronchoscopy for lung cancer (early and advanced stage)

Aim to avoid surgeries for stage 1 and induce immune response in advanced stage cancer



Case 1

76 Male, active and heavy smoker

What Questions You Should Ask?

Why patient did the CT to begin with?

This patient had SOB, productive cough, fever, and night sweating

Any baseline previous CTs for comparisons?

8 months prior

Current presentation

Case 1 Conclusion

Highly unlikely cancer

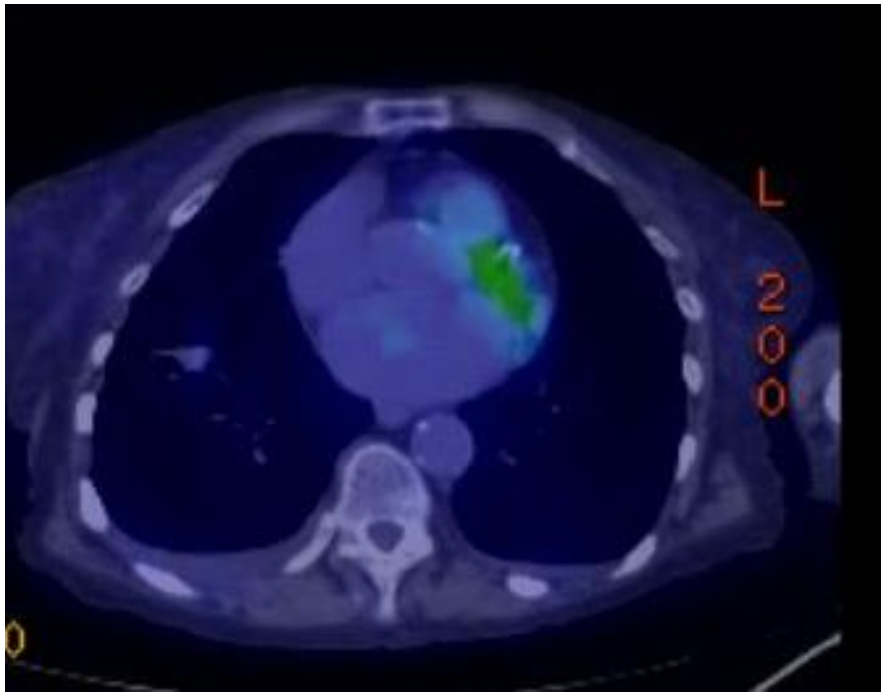
Lung cancer volume doubling time 150-400 days

Final Diagnosis: Coccidioidomycosis

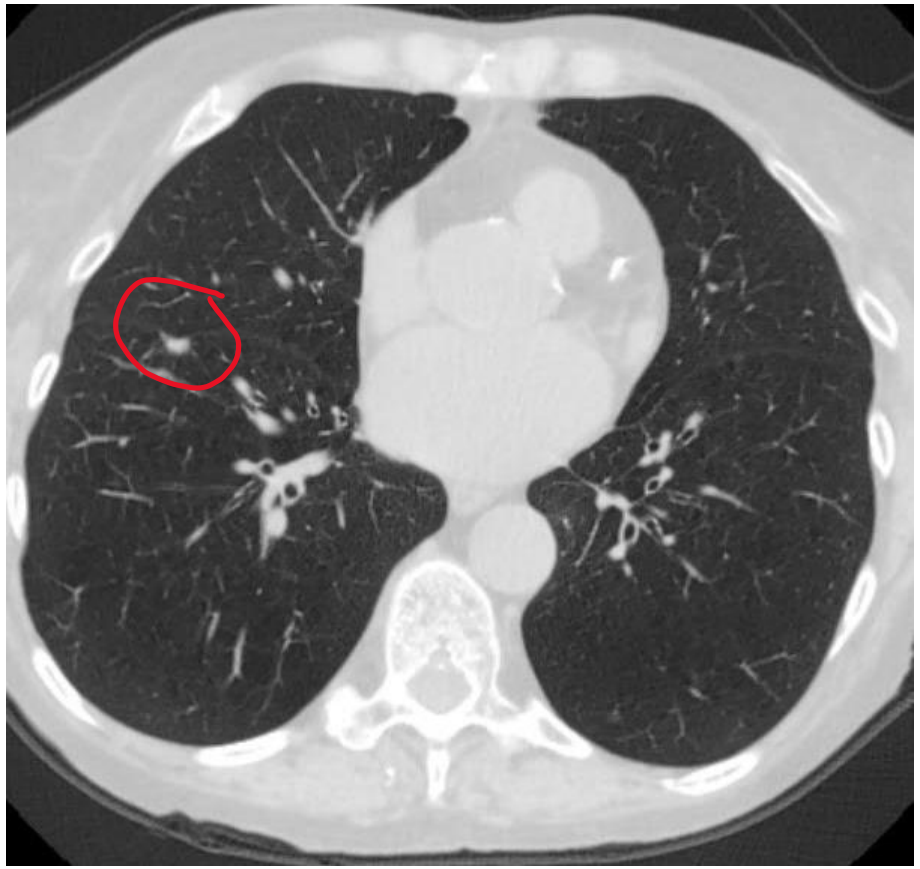
Case 2

- 73 Female, active heavy smoker
- Slowey growing lung nodule over a year
- Asymptomatic patient

SUV: 1.7



1 year prior



Current presentation

Case 2 Conclusion

Biopsied prior by the conventional methods: scant lung tissue and non-diagnostic

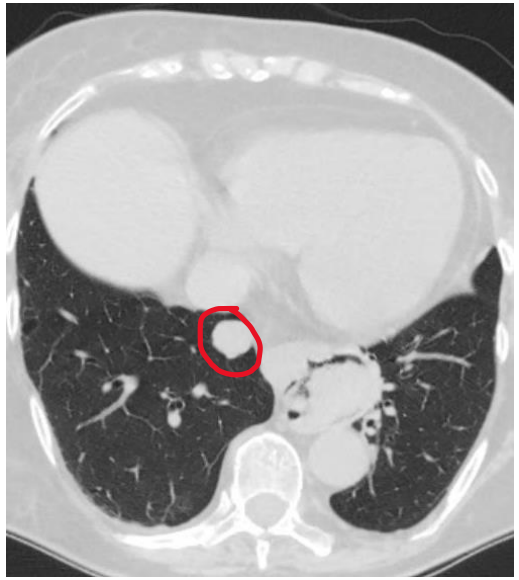
Second Biopsy with ION Robotic Bronchoscopy, adenocarcinoma

Stage: 1

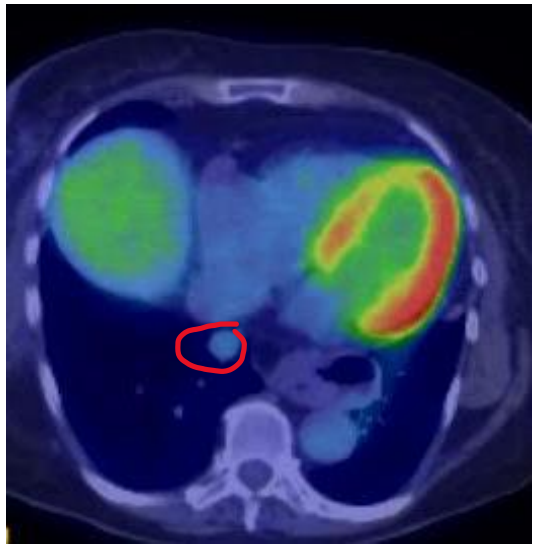
Plan: Surgery

Case 3

- 73 Female, never smoker
- History of breast cancer in 2018 s/p lumpectomy and radiation
- History of RUL lung nodule s/p biopsy showing granulomatous inflammation



SUV: 2



Case 3 Conclusion

ION Robotic Bronchoscopy biopsy: carcinoid tumor

Plan: Surgical excision (RLL lobectomy)

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