

Saving Lives from Lung Cancer

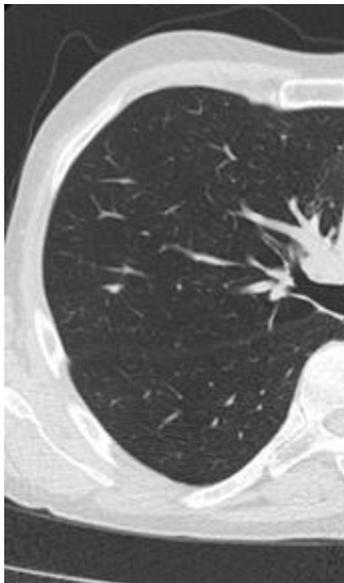
Dominique Pepper, MD

Lung Nodule and Robotic Bronchoscopy Program

St. Joseph's VMFH Tacoma WA

December 6, 2025

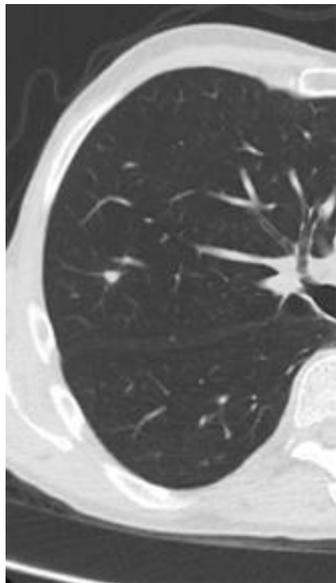
T - 2 years



5mm

Stage IA1

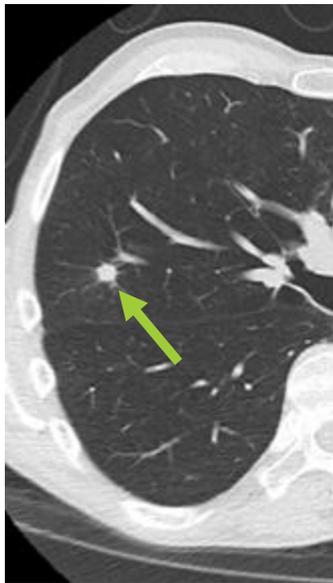
T - 1 year



7mm

Stage IA1

Time 0



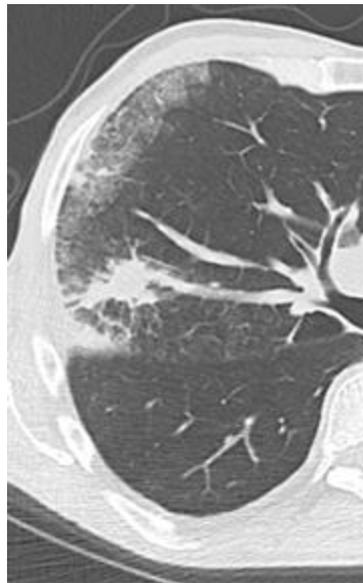
9mm spiculated

Stage IA1

5-year survival:

92%

T + 4 months

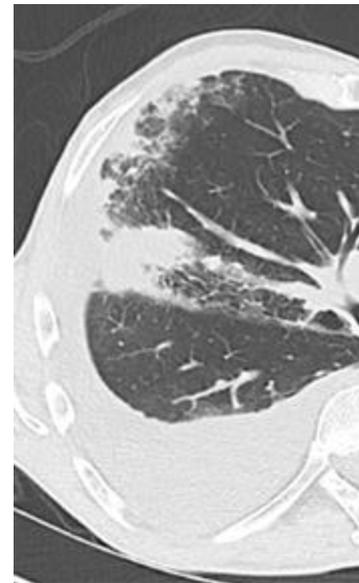


34mm, 11R node

Stage IIB/ IIIA

36 - 53%

T + 5 months



42mm, 2R node, effusion

Stage IV

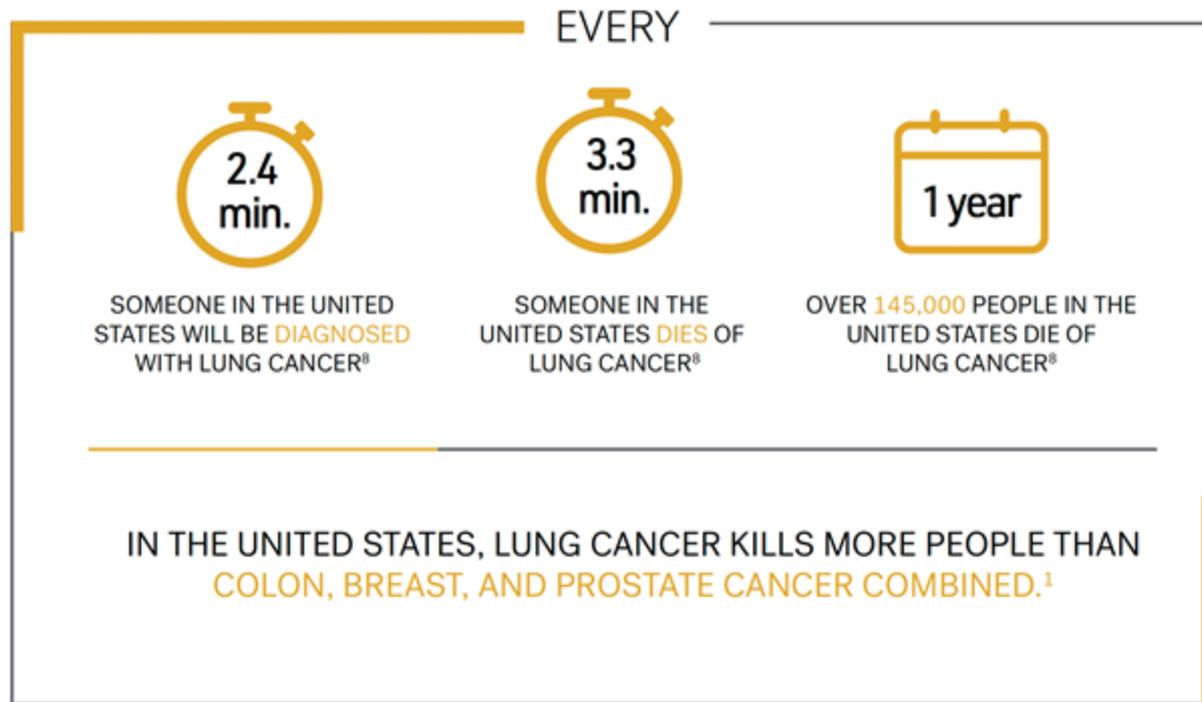
10%

The Challenge

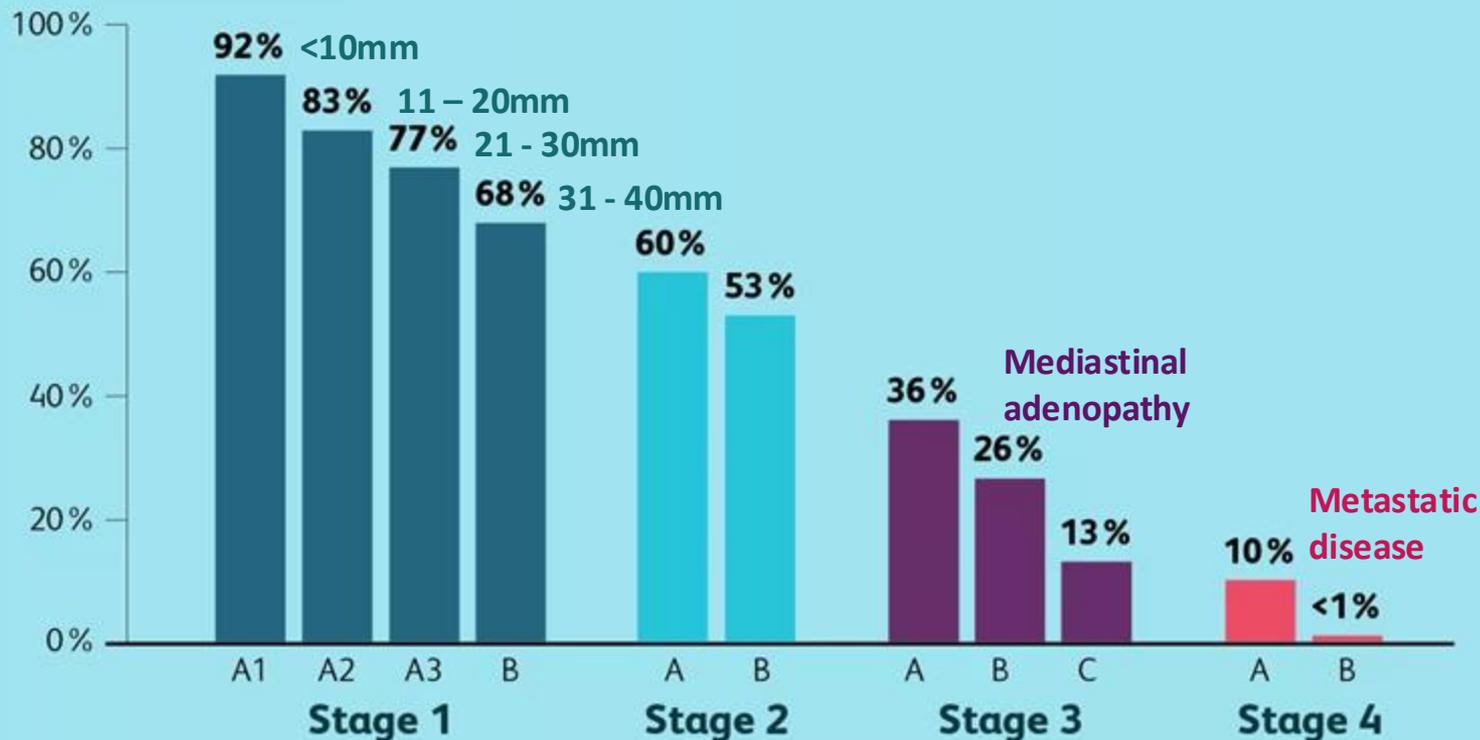
Providence St. Peters, Olympia, WA in 2021

- **1 in 3 dead** within 12 months of bronchoscopy
- **56%** of lung cancers were **late-stage**
- **2 – 3 months** from nodule detection to cancer treatment

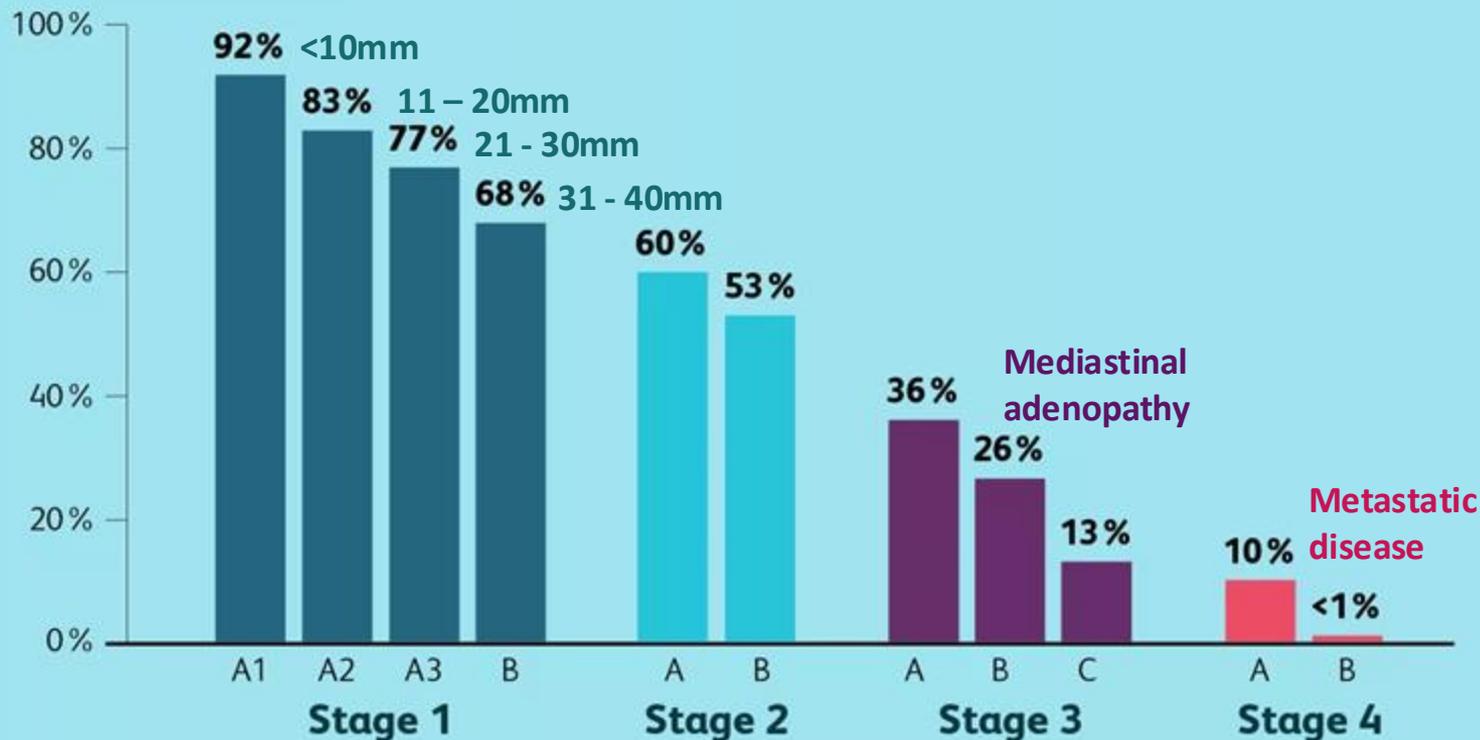
Lung cancer kills



Non-Small Cell Lung Cancer: 5-Year Survival Rates



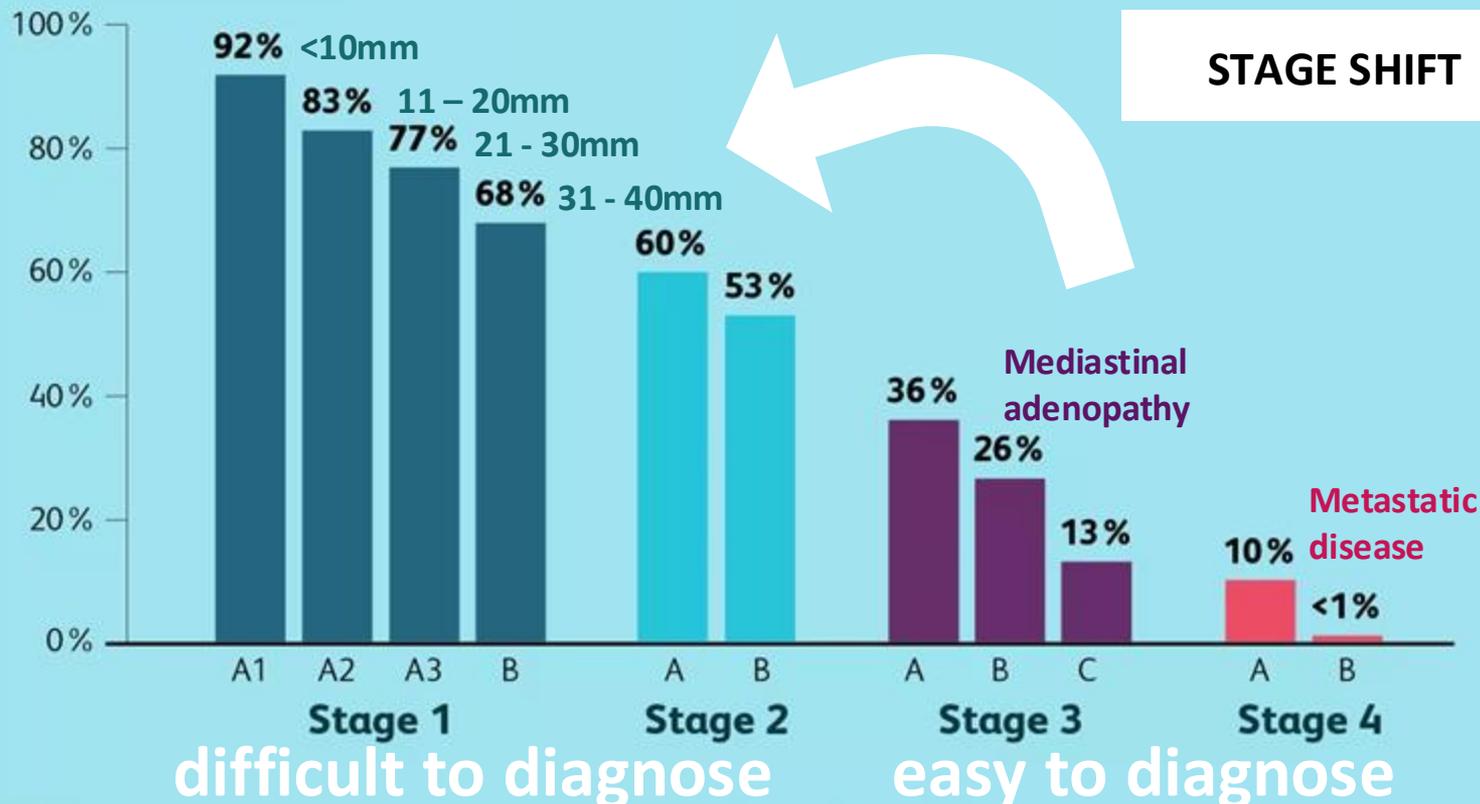
Non-Small Cell Lung Cancer: 5-Year Survival Rates



difficult to diagnose

easy to diagnose

Non-Small Cell Lung Cancer: 5-Year Survival Rates



Prior Lung Nodule Biopsy Strategy

Super D bronchoscopy

- ~50 cases a year
- Biopsy 31 days after initial CT chest
- Targets central lung nodules
- Diagnostic yield: 50%
- Pneumothorax rate: 2 – 4%

“We discussed the final pathology report from her bronchoscopy as below. Patient and her husband understandably frustrated at the lack of conclusive evidence of malignancy. They are mainly not happy about the need to continue following up with images and another potential biopsy.”

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CT guided needle biopsy

- ~200 cases a year
- Biopsy 51 days after initial CT chest
- Targets peripheral lung nodules
- Diagnostic yield: 75%
- Pneumothorax rate: 4 – 20%

“The CT guided needle biopsy caused a pneumothorax requiring chest tube insertion. He was admitted to the hospital several days ago and is anxiously awaiting his lung to re-expand.”

Diagnostic yield for pulmonary nodules

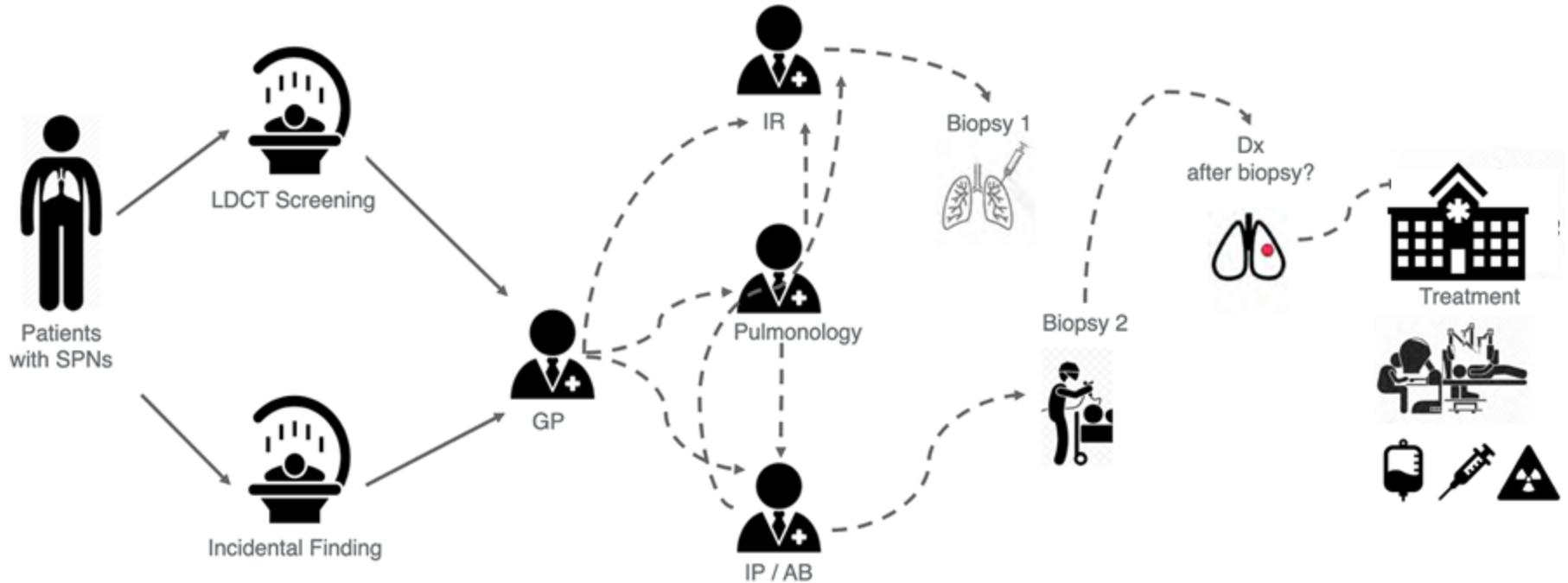
Navigation bronchoscopy vs. CT guided needle biopsy

- NEJM 2025: First randomized clinical trial with direct comparisons
 - **Navigational bronchoscopy** (n=119) vs. **CT guided needle biopsy** (n=110)
- 12 month follow-up
- Multicenter trial (7 centers)

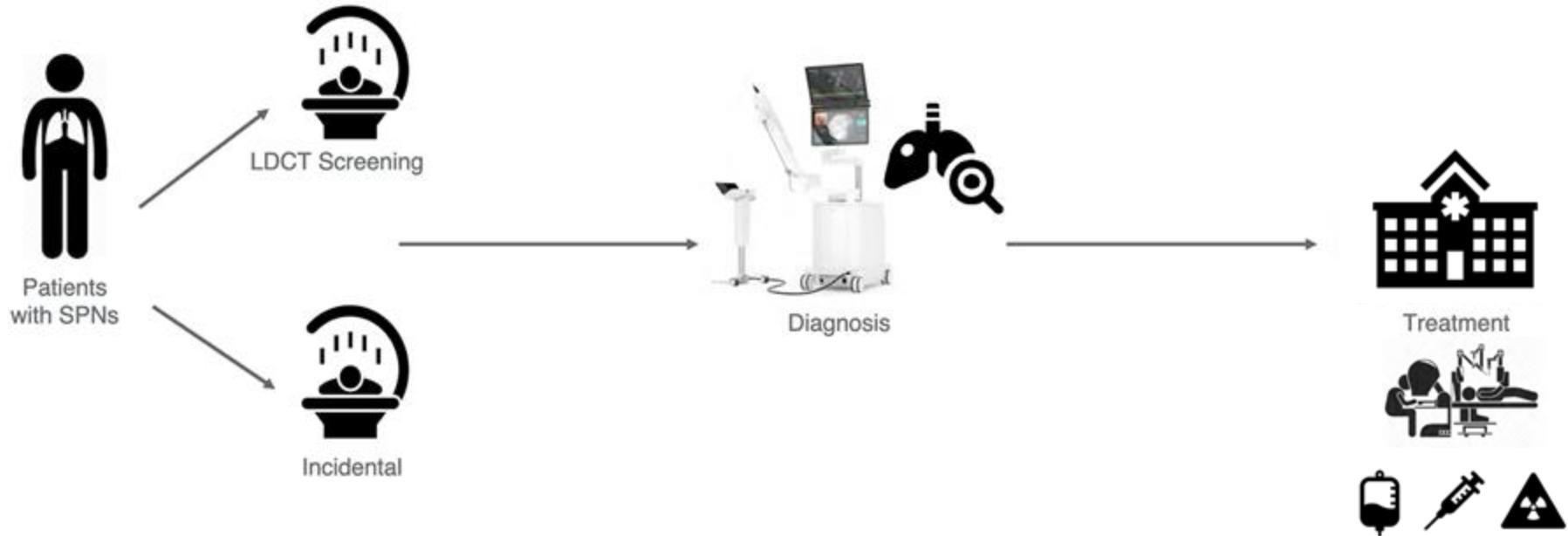
	Navigational bronchoscopy	CT guided needle biopsy
Overall diagnostic accuracy	79%	74%
Pneumothorax	3%	28%
Pneumothorax requiring admission or chest tube	1%	12%

Published May 18, 2025 | N Engl J Med 2025;392:2100-2112 | DOI: 10.1056/NEJMoa2414059

The current pathway for lung biopsy is suboptimal



We need to expedite the diagnosis/ treatment pathway



The Vision

**Saving lives
from lung cancer**

The Vision

Saving lives from lung cancer

We will safely, accurately,
reliably, and efficiently
expedite the diagnosis and
treatment of cancerous lung
nodules

Simple (but not easy)

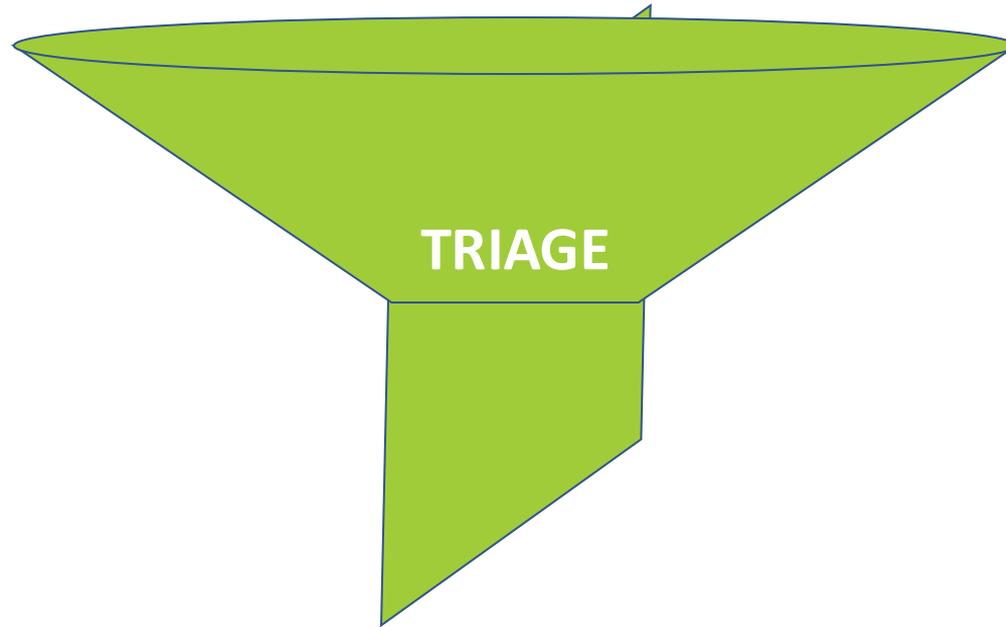
The Solution

Our Revitalized Lung Nodule Program

Executing the Vision
**4 pronged
approach**

- 1. Detect nodules and refer**
- 1. Evaluate patients**
- 1. Acquire technology and skills**
- 1. Build capacity**

1. Detect Nodules and Refer



Goal: Assess ASAP in lung nodule clinic

2. Evaluate Patients

- **Dedicated lung nodule clinic**

3. Acquire Technology and Skills

- Standard bronchoscopy tools
- Garner support for technology



4. Secure Resources to Build Capacity

- Interdepartmental collaboration
- Dedicated anesthesia bronchoscopy days
- Staffing

Our first 6 months

75%

diagnostic yield*

2%

pneumothorax**

* strict definition

** 22% with IR needle biopsy

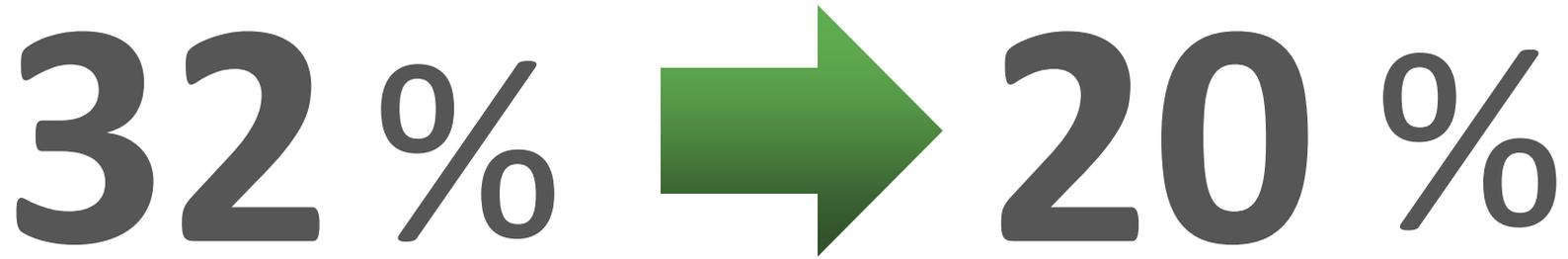
We **shortened** lung cancer
diagnosis & treatment **by 3 weeks**

We diagnosed more early-stage NSCLC*

44% → 58%

of all early-stage NSCLC,
RAB diagnosed 51/76 (67%)

We saved lives



Dead within 12 months

Dead within 12 months

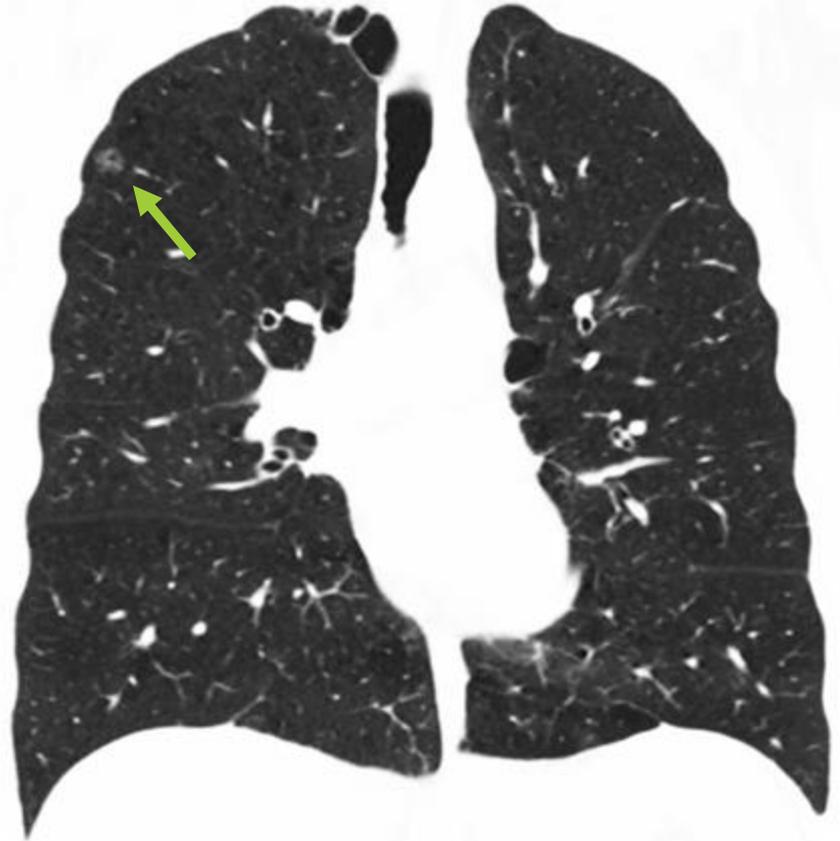
P = 0.002

Progress

- We diagnosed and treated our patients **faster**
- We diagnosed our patients **more safely**
- We diagnosed almost **twice as many** lung cancers
- We **stage-shifted** our patients to earlier lung cancer
- We **improved 12-month survival**
- **Everyone benefited**

Scott,
53-year-old male

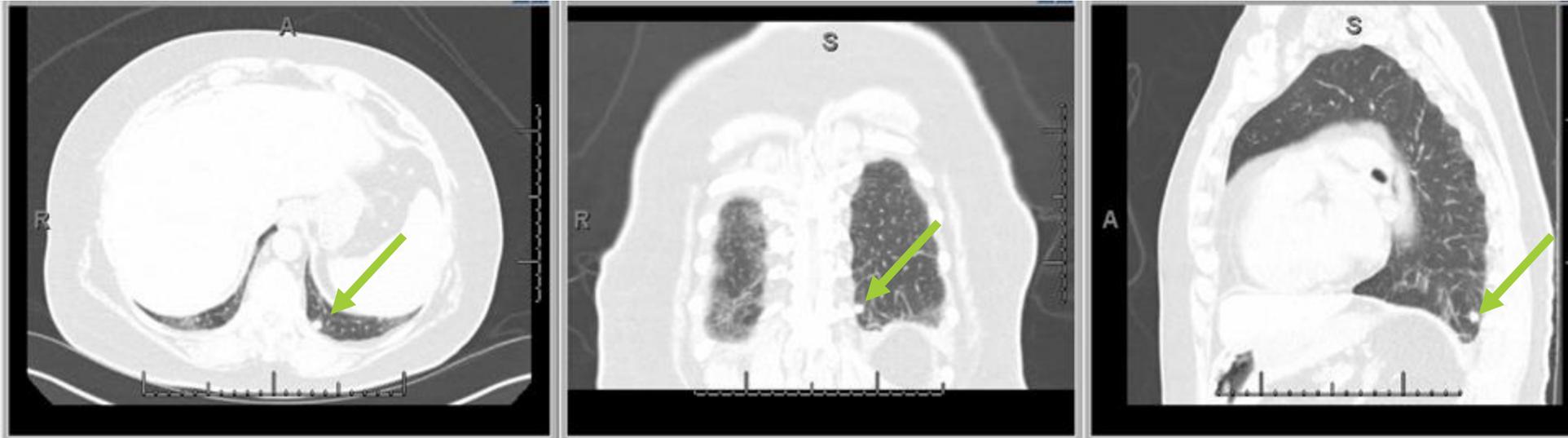
Believed he would
die from lung
cancer



Dye-marking to tag cancer nodule for segment resection



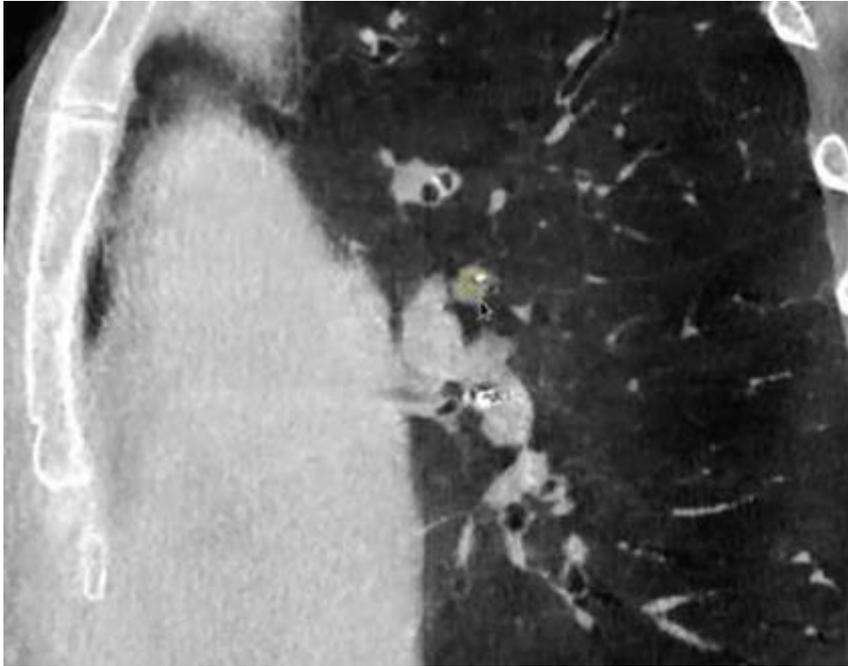
The challenge of successfully biopsying this 7mm nodule



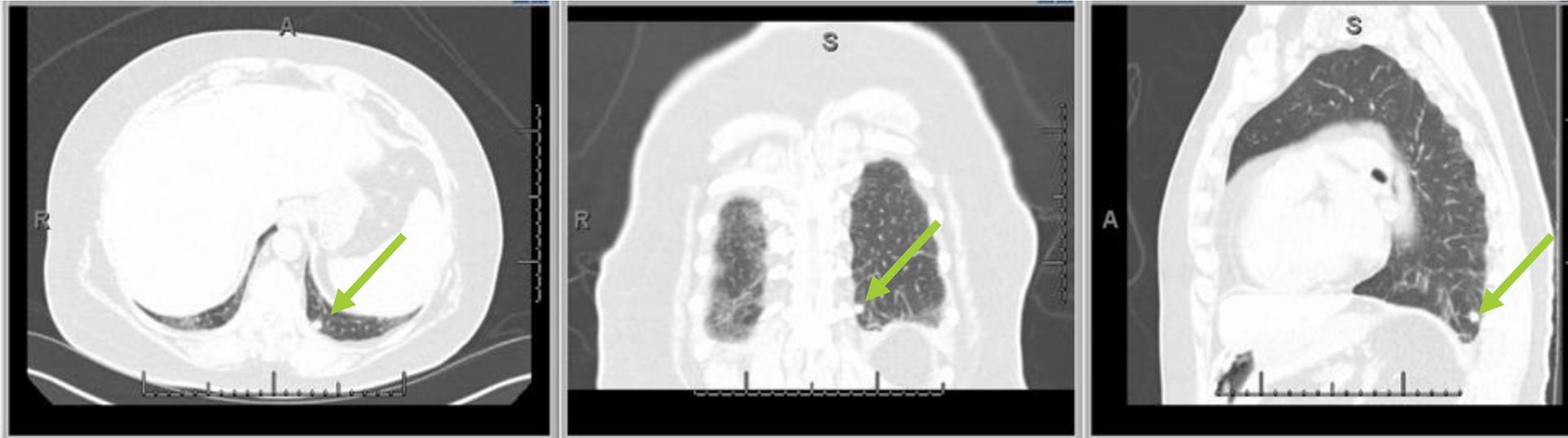
Robotic bronchoscopy Integrated with Cone Beam CT



Augmented fluoroscopy (fluoro overlay)



The challenge of successfully biopsying this 7mm nodule



November 2024

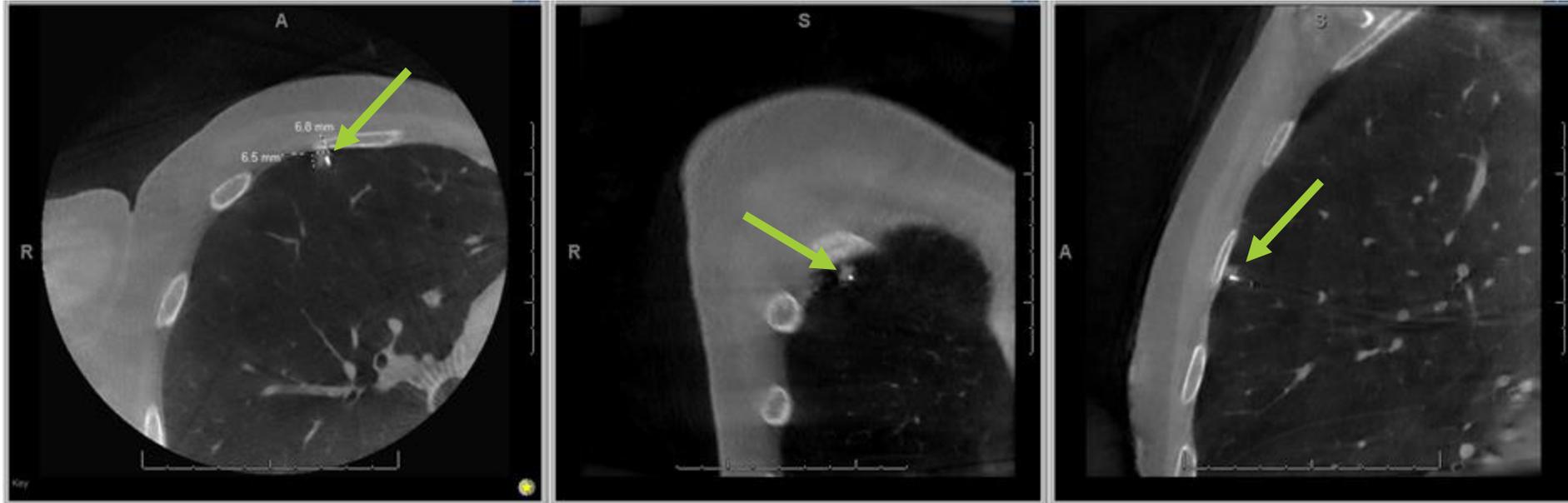
Ampullary Adenocarcinoma

Robotic bronchoscopy + Mobile CBCT + Cryobiopsy



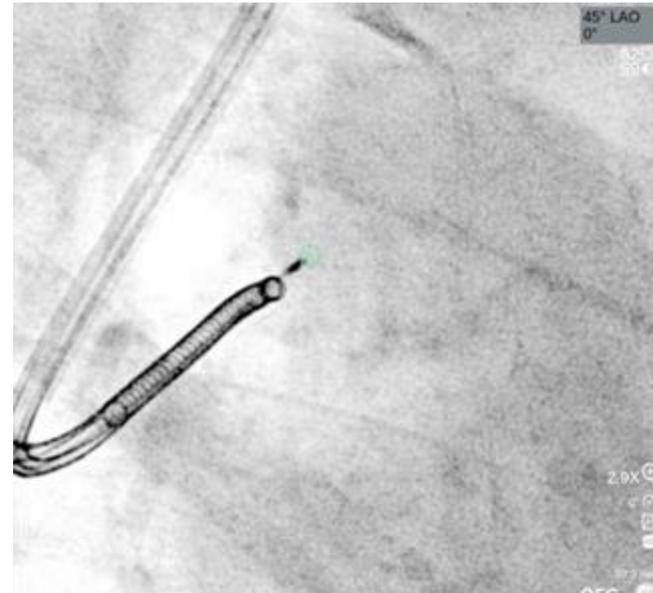
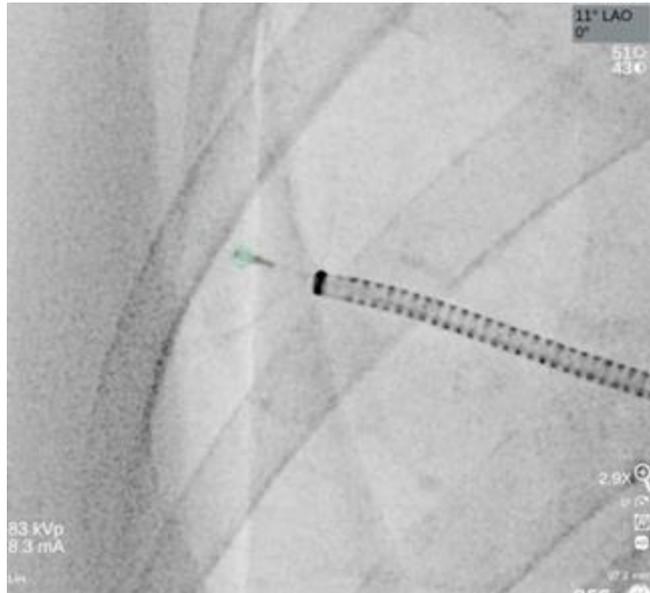
April 2025

**6 – 7 mm nodule in RUL anterior
Oligometastatic esophageal cancer**



April 2025

**6 – 7 mm nodule in RUL anterior
Oligometastatic esophageal cancer**



Diagnostic Yield Improved

*Legacy
Platform*

ssRAB

50% → 75%

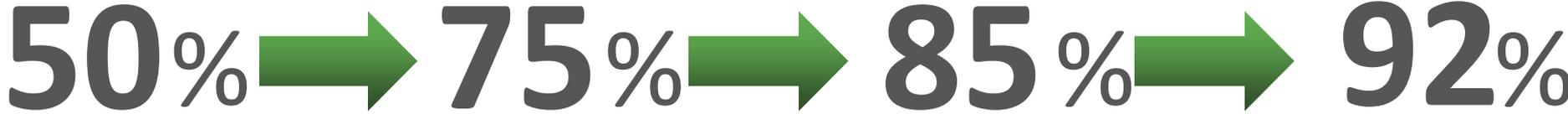
Diagnostic Yield Improved

*Legacy
Platform*

ssRAB

*ssRAB
+mCBCT*

*ssRAB
+mCBCT
+AF*



P = 0.0002

**We can safely, accurately and reliably
biopsy almost any lung nodule with
robotic bronchoscopy and cone beam CT**

VMFH Lung Nodule & Robotic Bronchoscopy Program

1. **Dedicated Lung Nodule Clinic**
1. **Dedicated Bronchoscopy Days**
1. **Strong collaboration**
1. **Expedite safe, accurate, reliable and efficient lung nodule evaluation and treatment**

Who to refer to the Lung Nodule Program?

Epic order: REF421 *URGENT*

Lung Nodule or Mass

- Lung RADS 4A, 4B, 4X
or
- $\geq 8\text{mm}$
or
- $\geq 6\text{mm}$ with prior cancer history

Program Referral to Lung Nodule Program
St Joe's Hospital, Tacoma WA

Epic chat: Dominique Pepper, MD

Bridget Lonergan, ARNP

Fax: 253.426.4142
(Clinic Fax Number)

Cell: 360.789.3095 (Pepper)

Thank you

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