Incidental Pulmonary Nodule
v
Lung Cancer Screening Programs:
How they compare.

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2025 FLASCO Early Lung Cancer Summit. Hollywood, FL. January 25, 2025

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DISCLOSURES

Chair: NCI Cancer Prevention Steering Committee

Vice-Chair IASLC 10th Edition Staging Project

Co-chair: SWOG Early Lung Cancer Sub-Committee

Consultant: American Cancer Society, AstraZeneca, GE Healthcare, Genentech/Roche, National Cancer Institute

Member: Fleischner Society

Patents: Lymph node specimen collection kit; Method for lymph node analysis

Scientific Advisory Board: National Cancer Institute; University of Pennsylvania Telehealth Research Center of Excellence (TRACE); Fred Hutch Cancer Center, Hutchinson Institute for Cancer Outcomes Research (HICOR); AstraZeneca US Lung Ambition Advisory Council; Median Technologies.

Steering Committee: National Lung Cancer Round Table.

Stock: Bridge Bio, Eli Lilly, Gilead Sciences, Immunocore, Pfizer
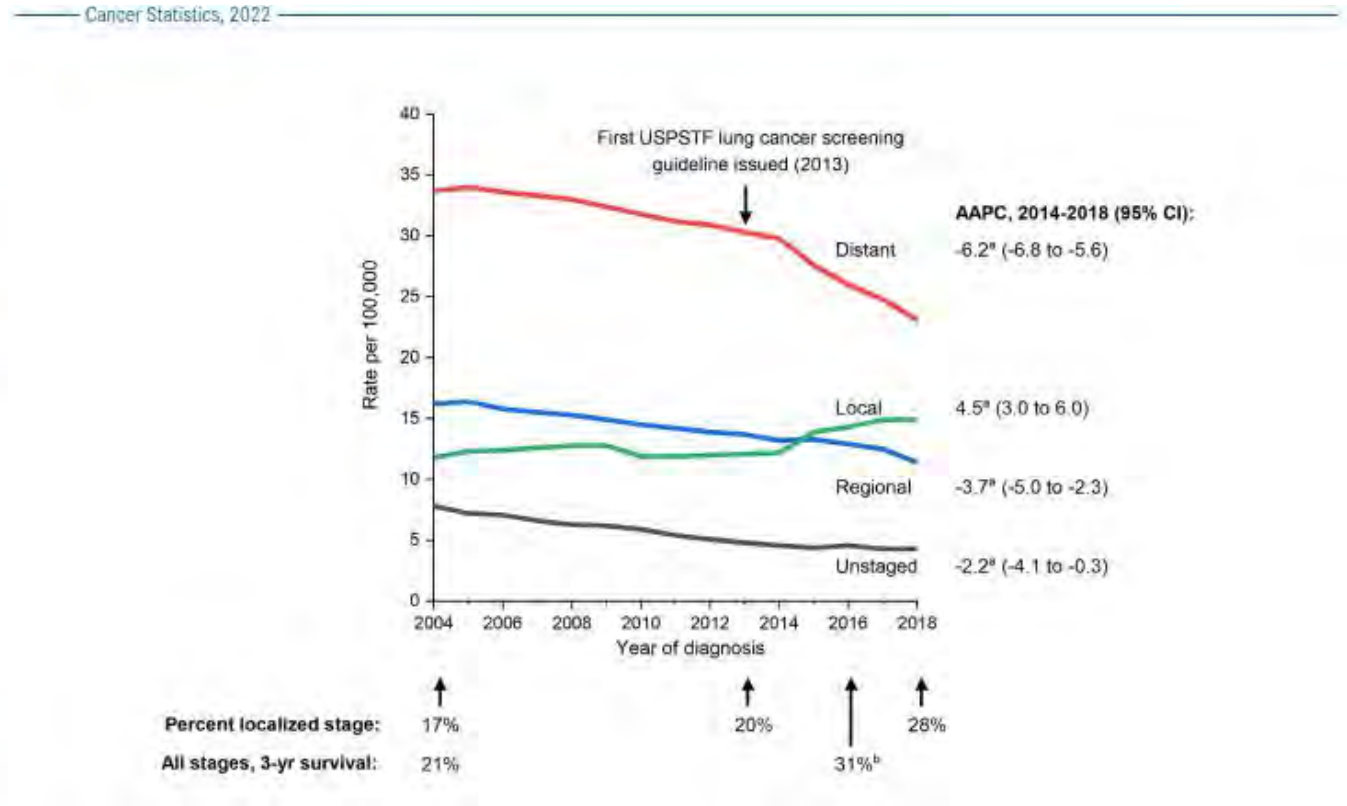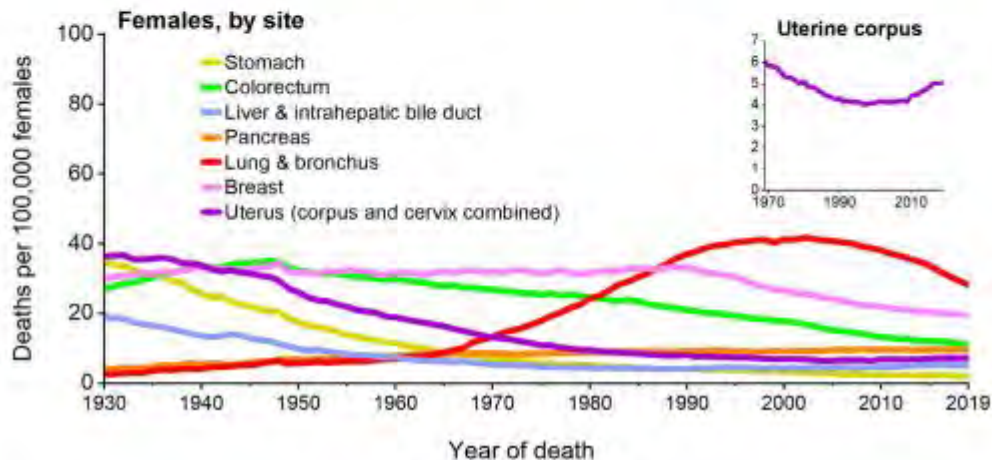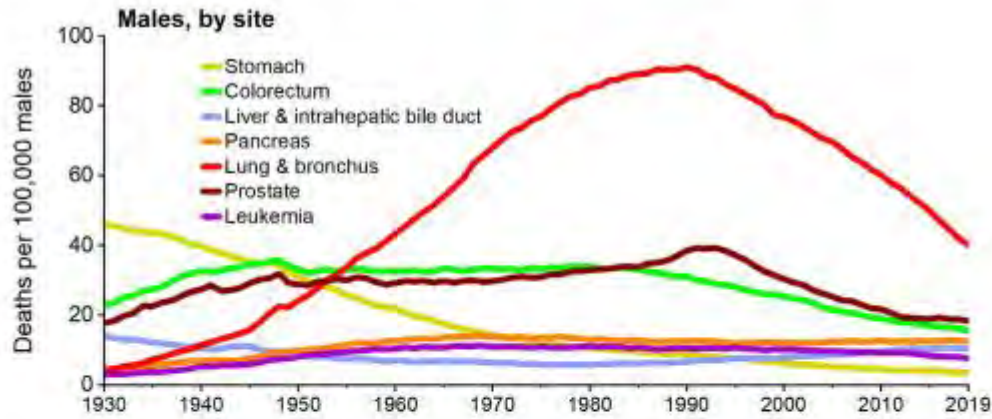
Objectives

1. Review two approaches to early lung cancer detection.

2. Compare patient and lung cancer characteristics, outcomes between the approaches.

3. Future directions.

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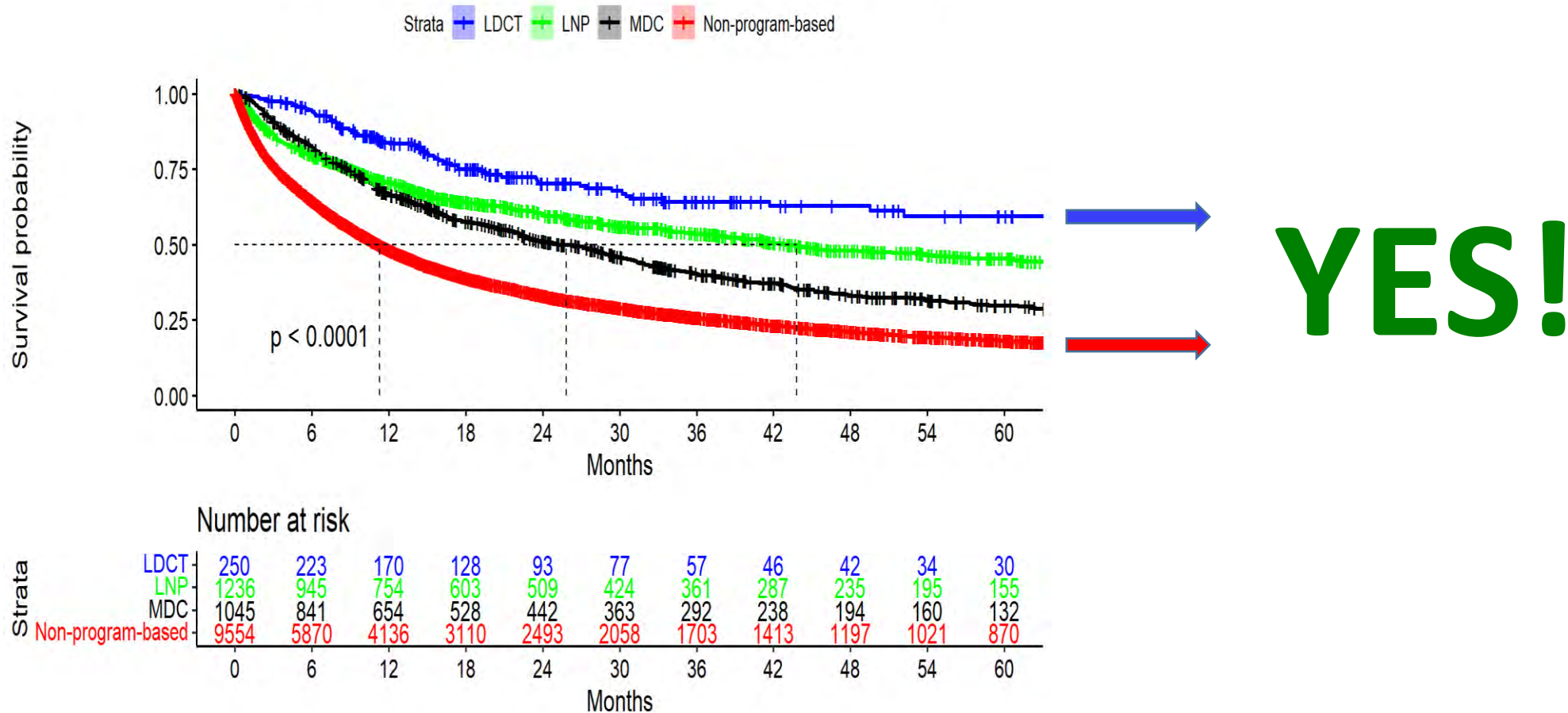# The Good News: Evolving US Lung Cancer Statistics

Siegel RL, Miller KD, Fuchs HE, Jemal A. Cancer statistics, 2022. CA Cancer J Clin. 2022 PMID: 35020204.

Does Lung Cancer Screening Work in 'Real-World' Settings?

BMHCC Tumor Registry Data: 2015 - 2021

Figure 4A. K-M plot in whole cohort (2011-2021): Stratified by program pathway

Liao et al. **JTOCRR 100629.**

Approaches to Early Lung Cancer Detection: Screening

- Pros:
  - Reduces lung cancer-specific and overall mortality
  - High level evidence: 3 large RCT + international meta-analysis[1-4]

- Cons:
  - Implementation barriers[5-7]
  - Low adoption rates (US);[8] no adoption (rest of the world)[7]
  - Eligibility criteria limitations[9,10]
  - Potential to exacerbate care and outcome disparities[8,10-15]

[1]Aberle et al. NEJM 2011 **PMID: 21714641**; [2]de Koning et al. NEJM 2020 **PMID: 31995683**; [3]Pastorino et al. Ann Oncol. 2019 **PMID: 31168572**; [4]Field et al Lancet Reg Health Eur. 2021. **PMID: 34806061**

[5]Kinsinger et al. JAMA Intern Med. 2017 **PMID: 28135352**; [6]Field JK, et al. ESMO Open. 2019. **PMID: 31673428**; [7]Veronesi et al. Cancers (Basel). 2020 **PMID: 32599792**

[8]Fedewa et al. JNCI 2021 **PMID: 33176362**

[9]Pinsky PF, Berg CD. J Med Screen 2012 **PMID: 23060474**; [10] Pinsky PF et al Chest. 2021 **PMID: 33545164**

[11] Aldrich et al. JAMA Oncol 2019 **PMID: 31246249**; [12]Han et al. JNCI 2020 **PMID: 32040195**; [13]Prosper et al. JAMA Netw Open. 2021 **PMID: 34427681**; [14]Tanner et al. Am J Respir Crit Care Med. 2015 **PMID: 25928649**; [15]Rivera et al. Am J Respir Crit Care Med. 2020 **PMID: 33000953**.

Barriers to full Benefit of Early Lung Cancer Detection

Figure 1. Histogram of Barriers to Lung Cancer Screening Impact

2015 - 2023
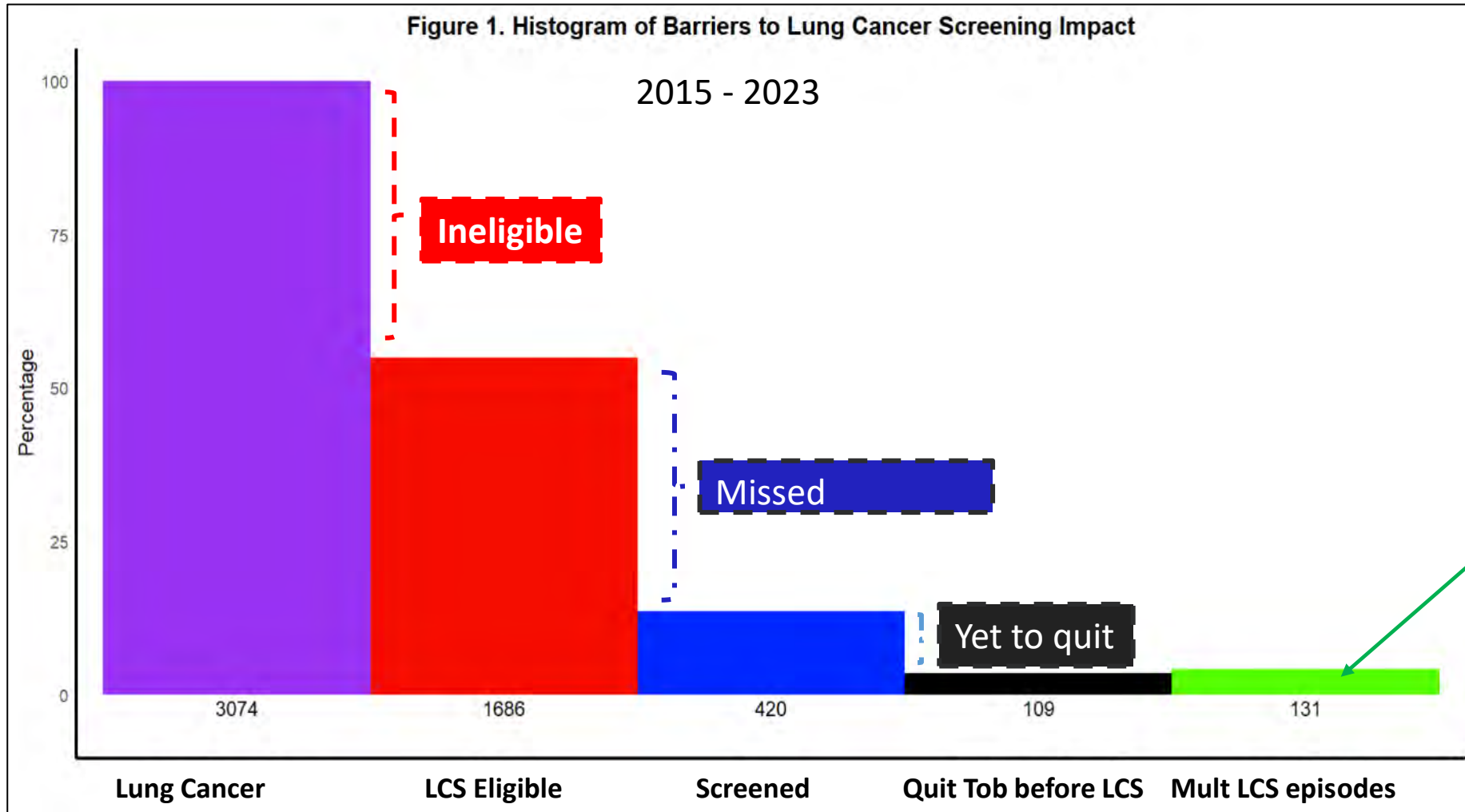
Liao, Goss, et al. DELUGE in the Mississiippi DeltaUnpublished, please do not post!

Guideline-Concordant Management of Incidentally Detected Lung Nodules[1,2]

- Pros:
  - Starts from the point of detection of potentially malignant lung lesion
  - LDCT eligibility criteria less relevant
  - Bypasses LDCT implementation barriers
  - Leverages existing clinical material, infrastructure
  - Expands the reach of early detection to hard-to-reach populations
  - Alleviates a medico-legal quandry

- Cons:
  - Requires some infrastructure for identifying, tracking, oversight
  - Optimally requires transparent, interdisciplinary decision-making

[1]Gould MK, Donington J, Lynch WR, et al. ACCP evidence-based clinical practice guidelines. Chest. 2013 **PMID: 23649456,**
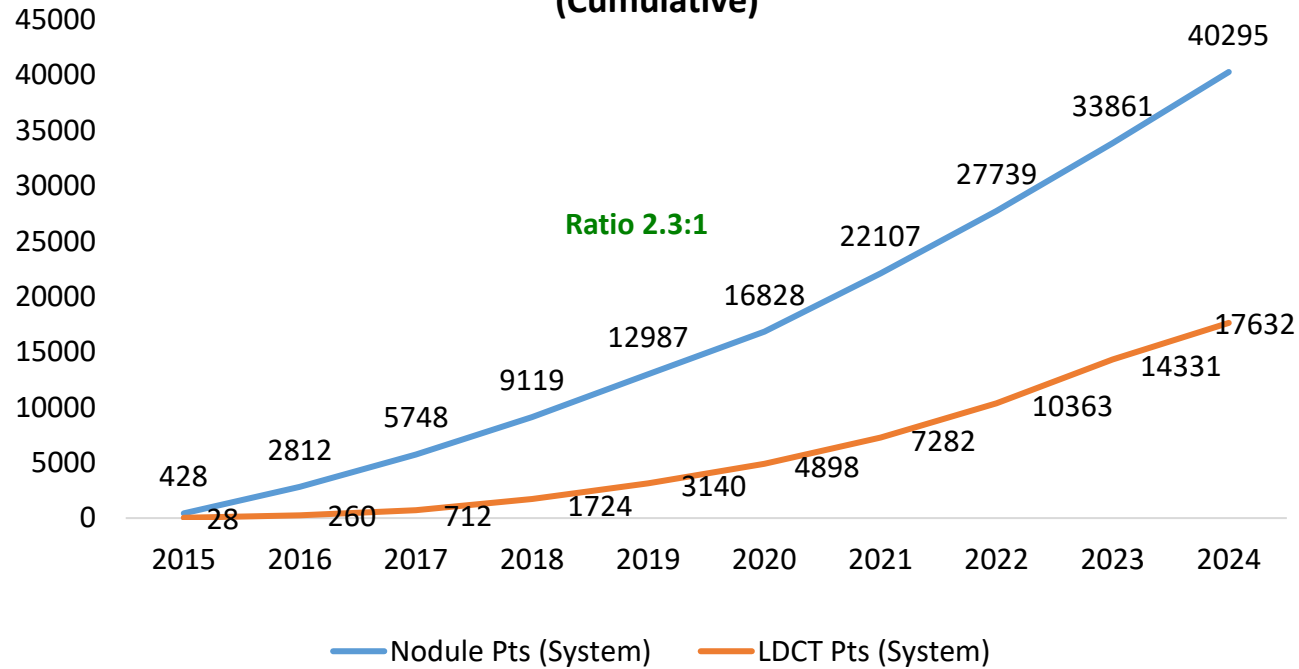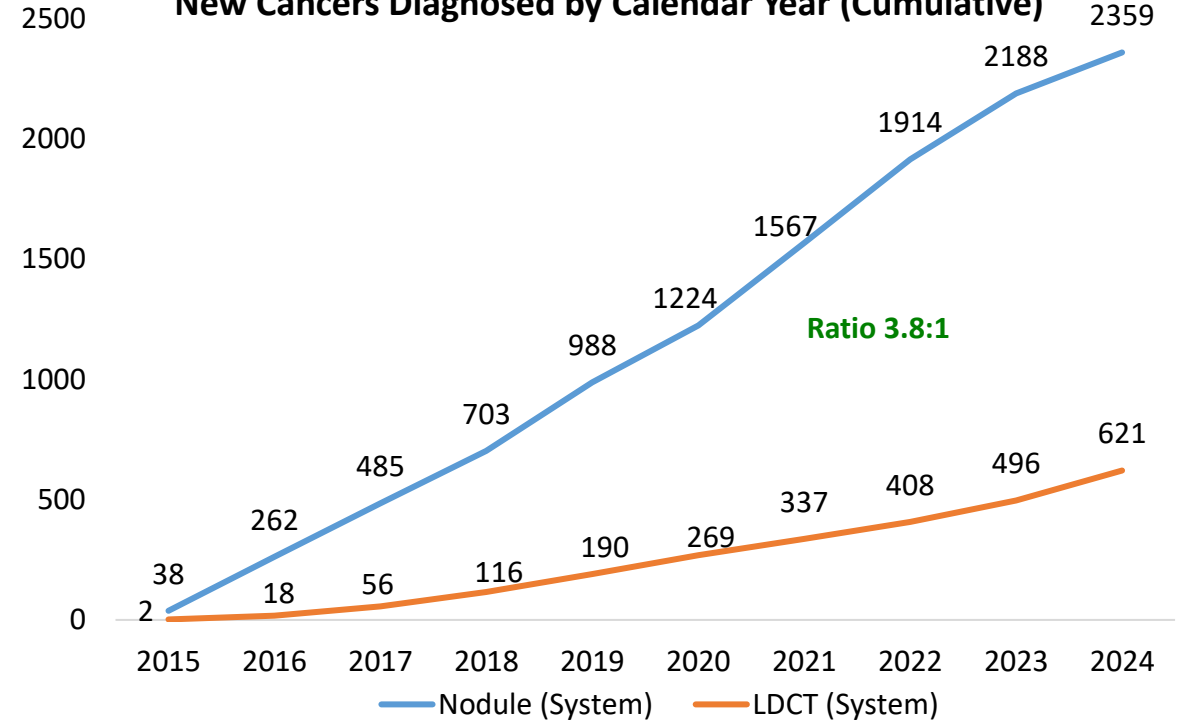[2]MacMahon H, Naidich DP, Goo JM, et al. From the Fleischner Society 2017. Radiology. 2017 **PMID: 28240562.**

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Detecting Early Lung Cancer (DELUGE) in MS Delta*
Program Volumes

System Early Detection Programs – Volumes by Calendar Year (Cumulative)

Ratio 2.3:1

Nodule Pts (System): 428, 2812, 5748, 9119, 12987, 16828, 22107, 27739, 33861, 40295

LDCT Pts (System): 28, 260, 712, 1724, 3140, 4898, 7282, 10363, 14331, 17632

Years: 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024

— Nodule Pts (System) — LDCT Pts (System)

System Early Detection Programs – New Cancers Diagnosed by Calendar Year (Cumulative)

Ratio 3.8:1

Nodule (System): 38, 262, 485, 703, 988, 1224, 1567, 1914, 2188, 2359

LDCT (System): 2, 18, 56, 116, 190, 269, 337, 408, 496, 621

Years: 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024

— Nodule (System) — LDCT (System)

Annual Volumes	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024*
Nodule	452	2,415	2,985	3,406	3,981	3,923	5,951	5,817	5,271	6,434
LDCT	28	232	452	1,012	1,416	1,758	2,384	3,081	3,897	6,301

Cumulative Rates of Detection
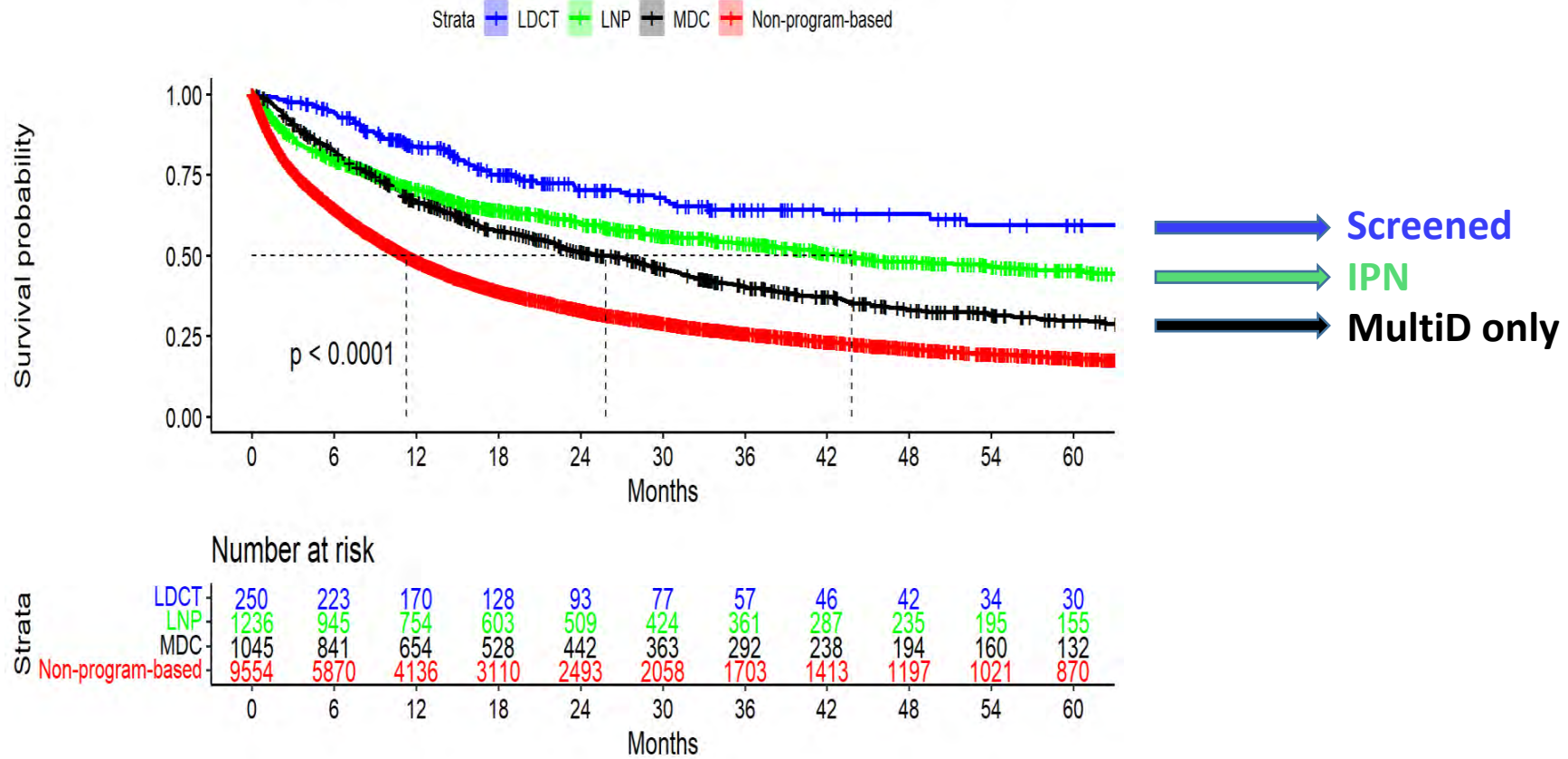Nodule – 5.85%
LDCT –3.53%

*Data through Sept 2024

Osarogiagbon. IPN v LDCT. FLASCO Early Lung Cancer Summit. Hollywood, FL. January 25, 2025

Survival of Cohorts of Patients Stratified According to Program

BMHCC 2015 - 2021

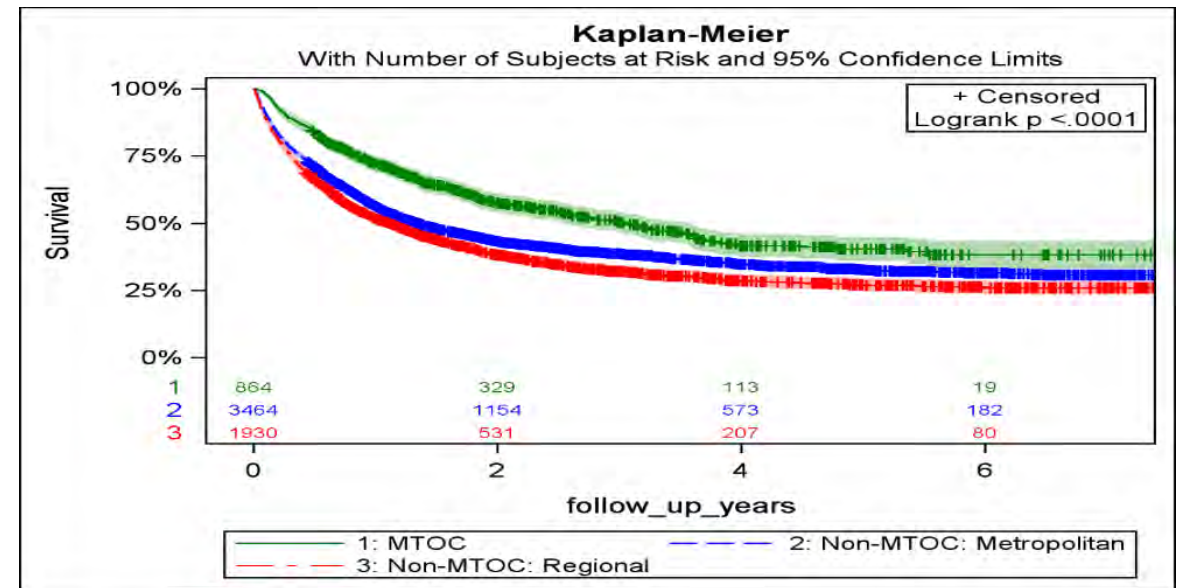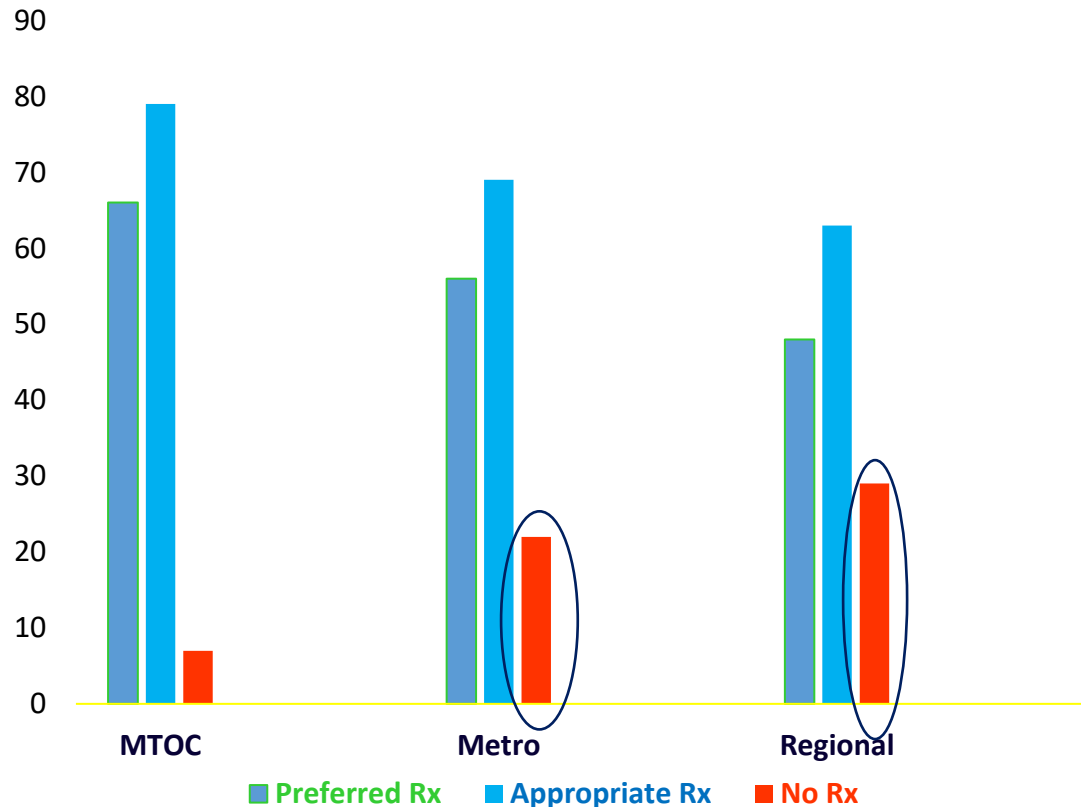Figure 4A. K-M plot in whole cohort (2011-2021): Stratified by program pathway

Strata: + LDCT + LNP + MDC + Non-program-based

p < 0.0001

→ Screened
→ IPN
→ MultiD only

Number at risk

Strata	0	6	12	18	24	30	36	42	48	54	60
LDCT	250	223	170	128	93	77	57	46	42	34	30
LNP	1236	945	754	603	509	424	361	287	235	195	155
MDC	1045	841	654	528	442	363	292	238	194	160	132
Non-program-based	9554	5870	4136	3110	2493	2058	1703	1413	1197	1021	870

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MultiD Care Saves Lives

'Building a multidisciplinary bridge across the quality chasm of thoracic oncology...'

Baptist Memorial Healthcare Corporation NSCLC patients 2011-2017

Ray MA, et al. JTO Clin Res Rep 2021. **PMID: 34590046**

Osarogiagbon RU. 'Program-Based Lung Cancer Care: Structure, Processes and Outcomes.' UNC Chapel Hill. April 16 2024.

Screening Experience Within a Multidisciplinary Thoracic Oncology Program: 2015 - 2023
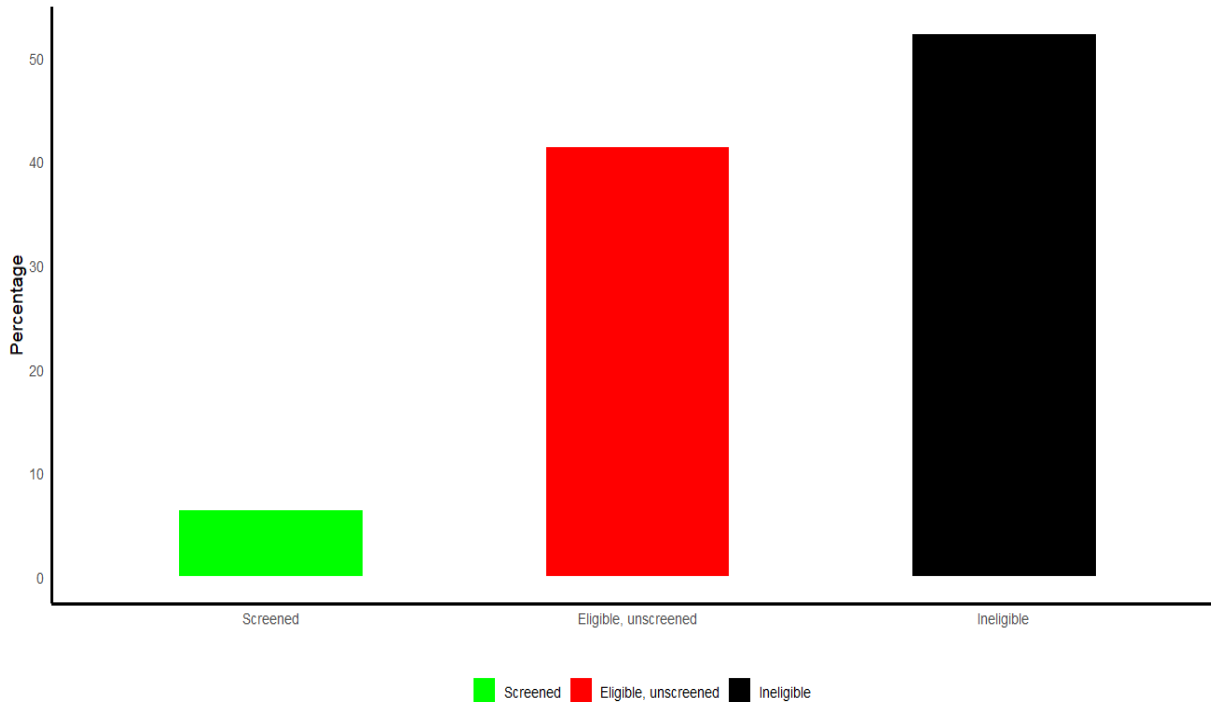
Liao et al. Under peer review.
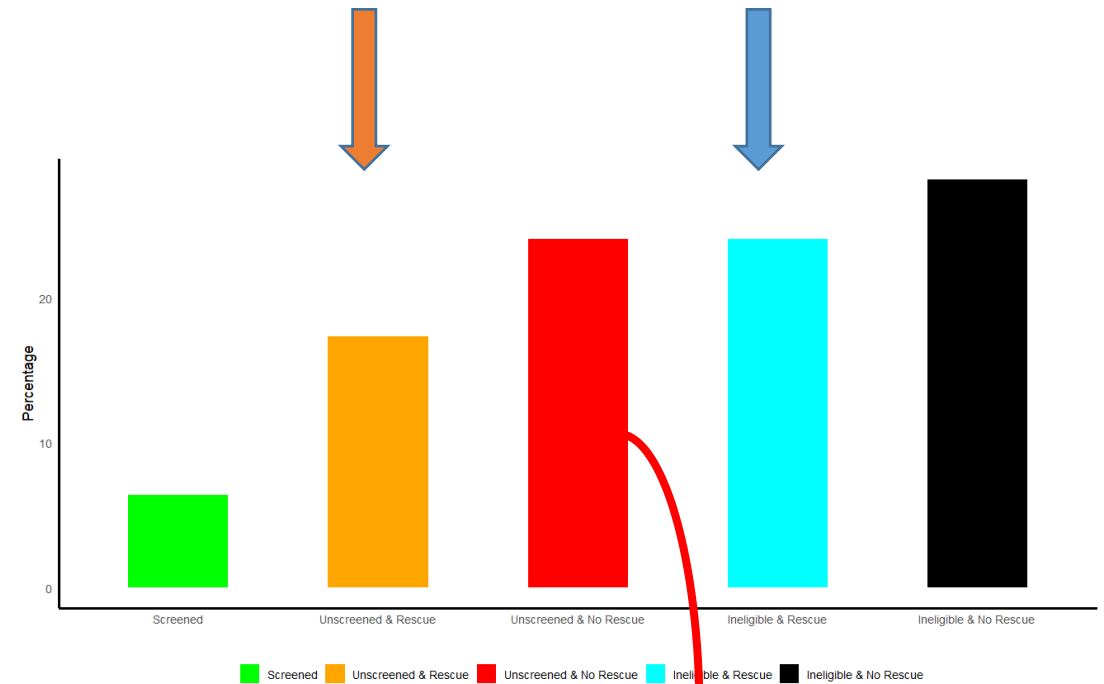
Missed Opportunity! 33% had an encounter within healthcare system between 12 and 36 months before lung cancer diagnosis

	Screened N=122 (6%)	Eligible, Unscreened N= 788 (41%)	Ineligible N=994 (52%)
Age	70 (65 -74)	67 (62 – 73)	72 (63 – 79)
Female	50	46	53
Black race	17%	**30%**	**30%**
Uninsured	0	2%	6%
Never smoked	0	0	**20%**

Rescued by the nodule program!

Screened | Unscreened, rescued | Unscreened, not rescued | Ineligible, rescued | Ineligible not rescued

Stage I · Stage II · Stage III · Stage IV
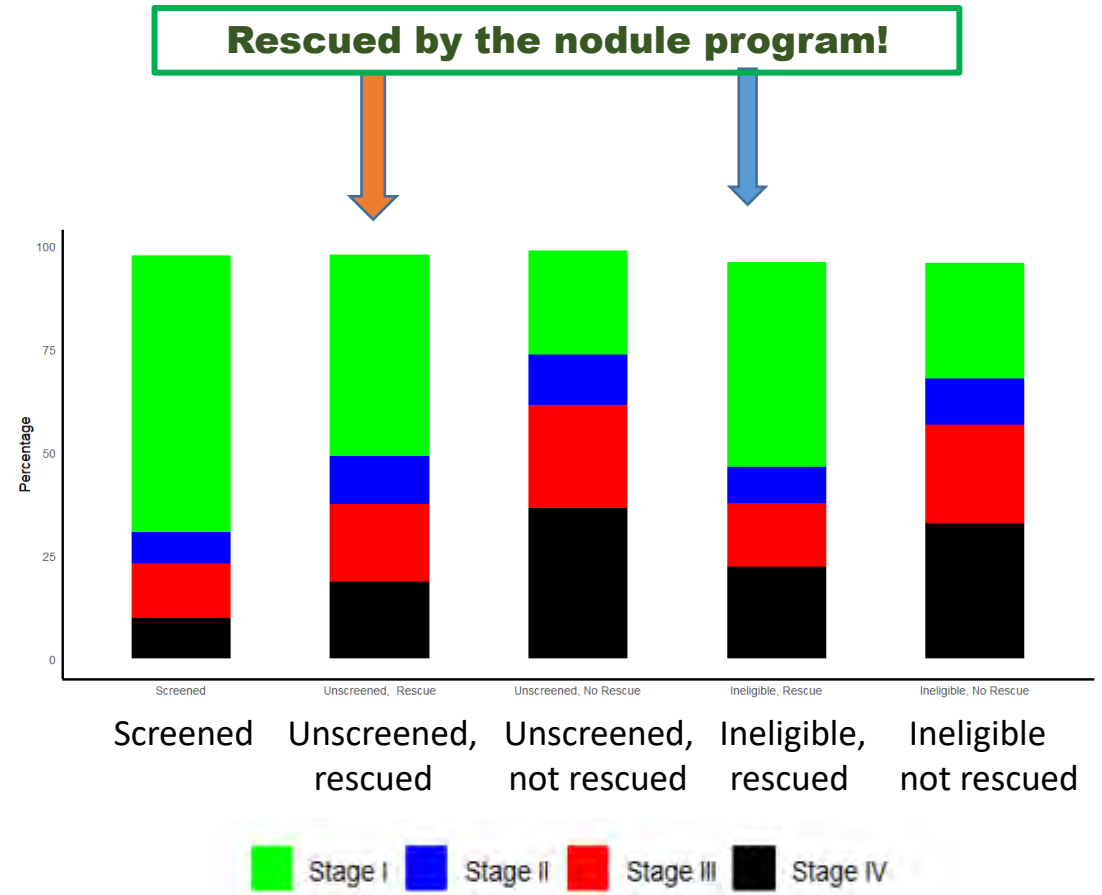
Liao et al. Under peer review.

Mitigation by the IPN Program: Survival
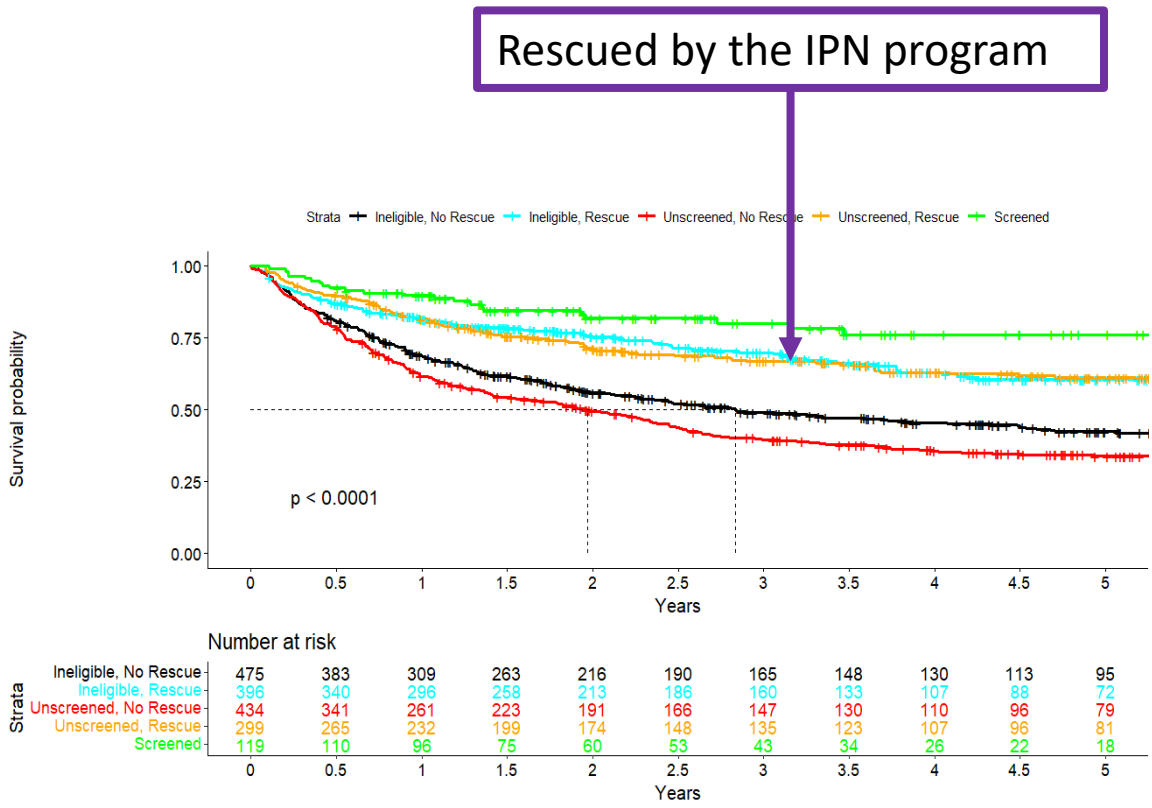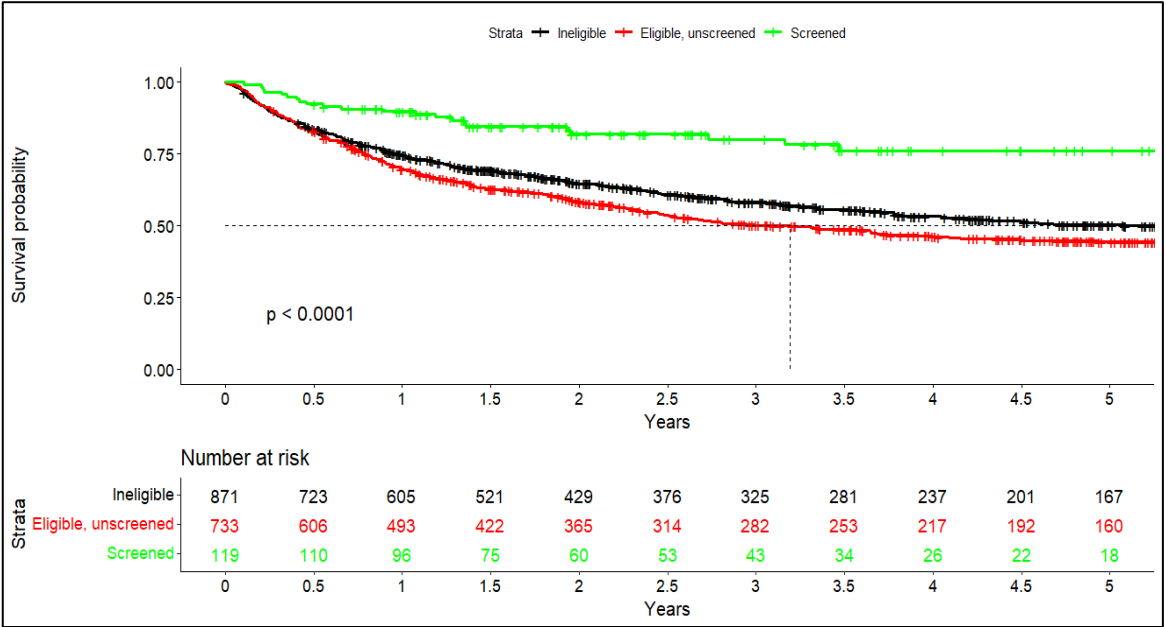
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Liao et al. Under peer review.

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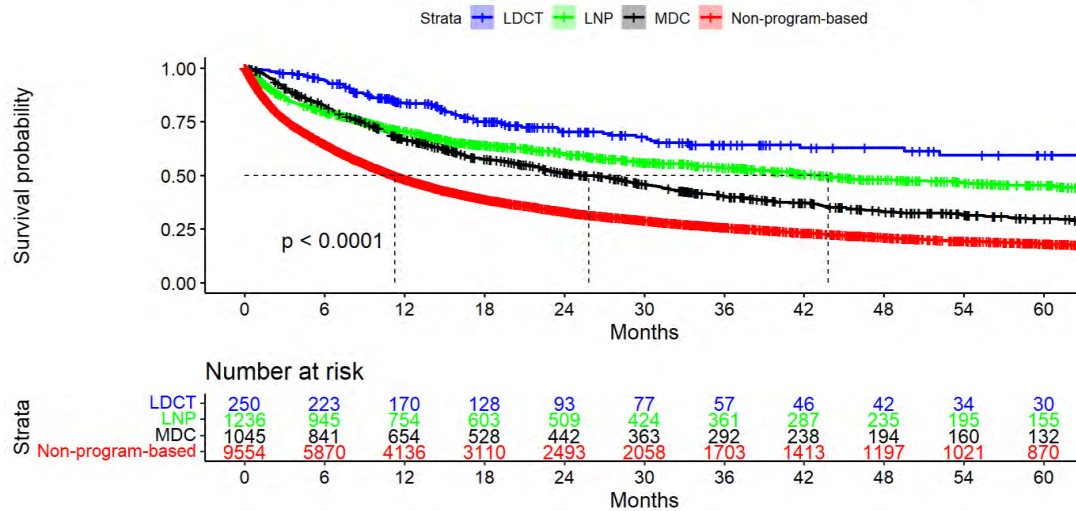
Figure 4B. K-M plot in whole cohort (2011-2021): Program-based care cohort combined vs. Non-program-based care cohort
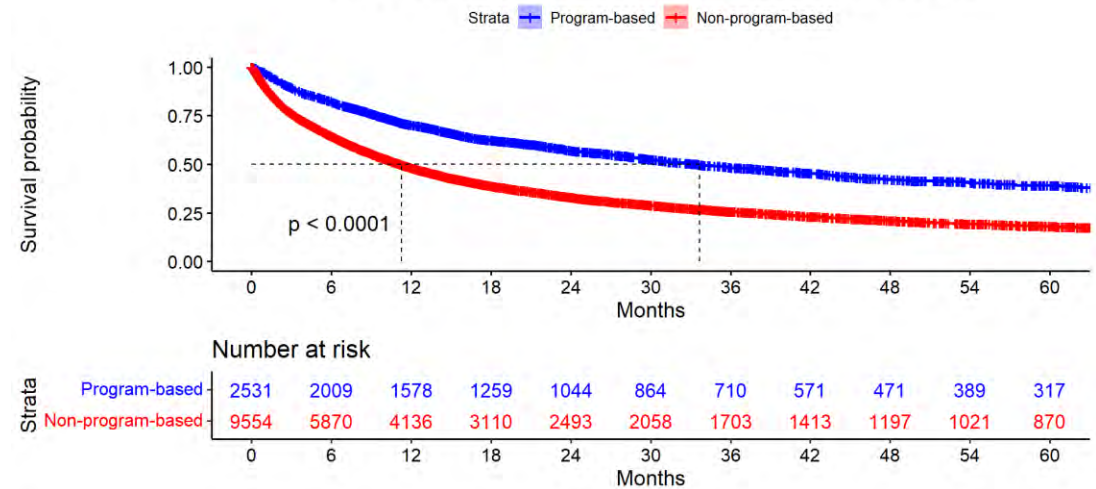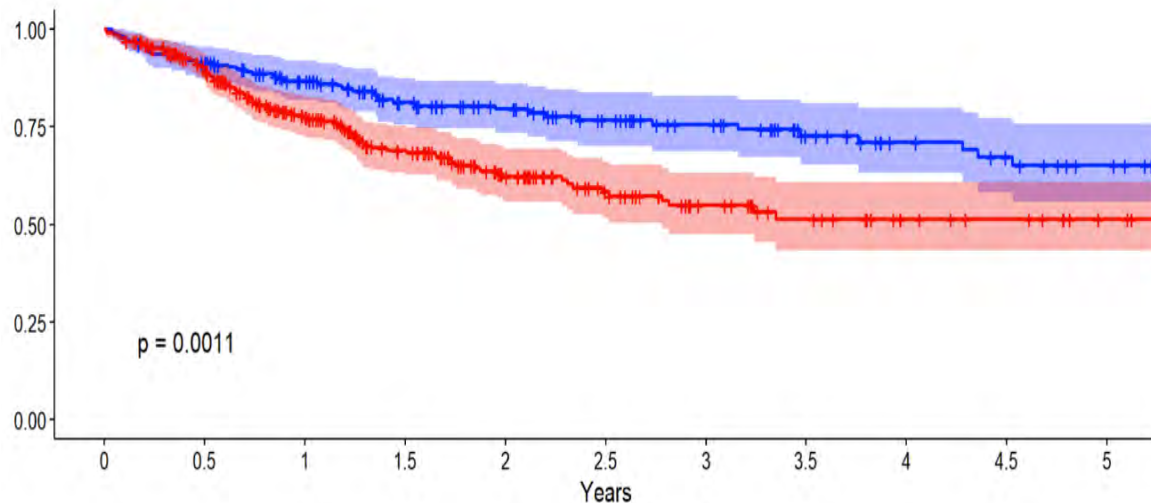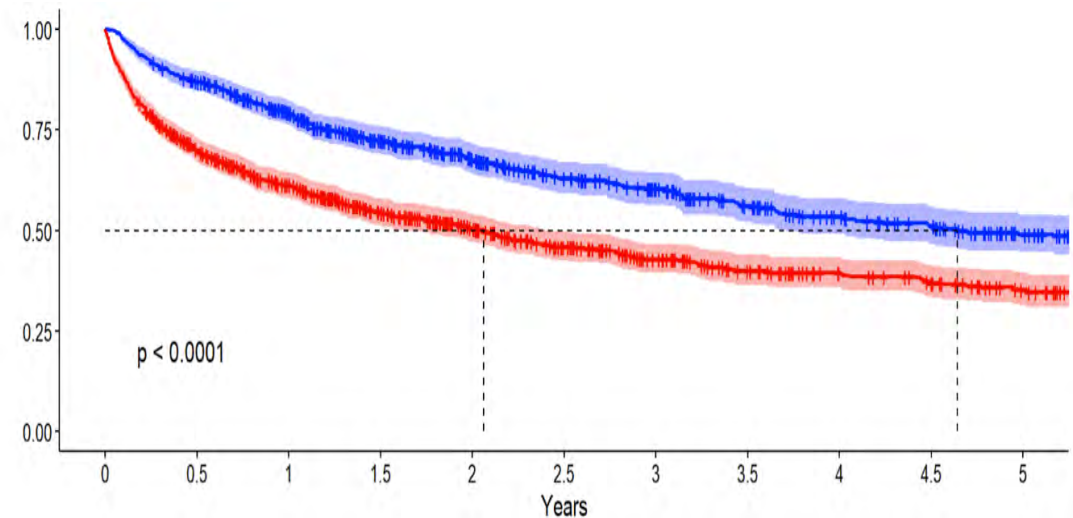
Liao et al. **JTOCRR 100629.**

Structured Multidisciplinary Decision-Making is Vital...
even in the context of early lung cancer detection.
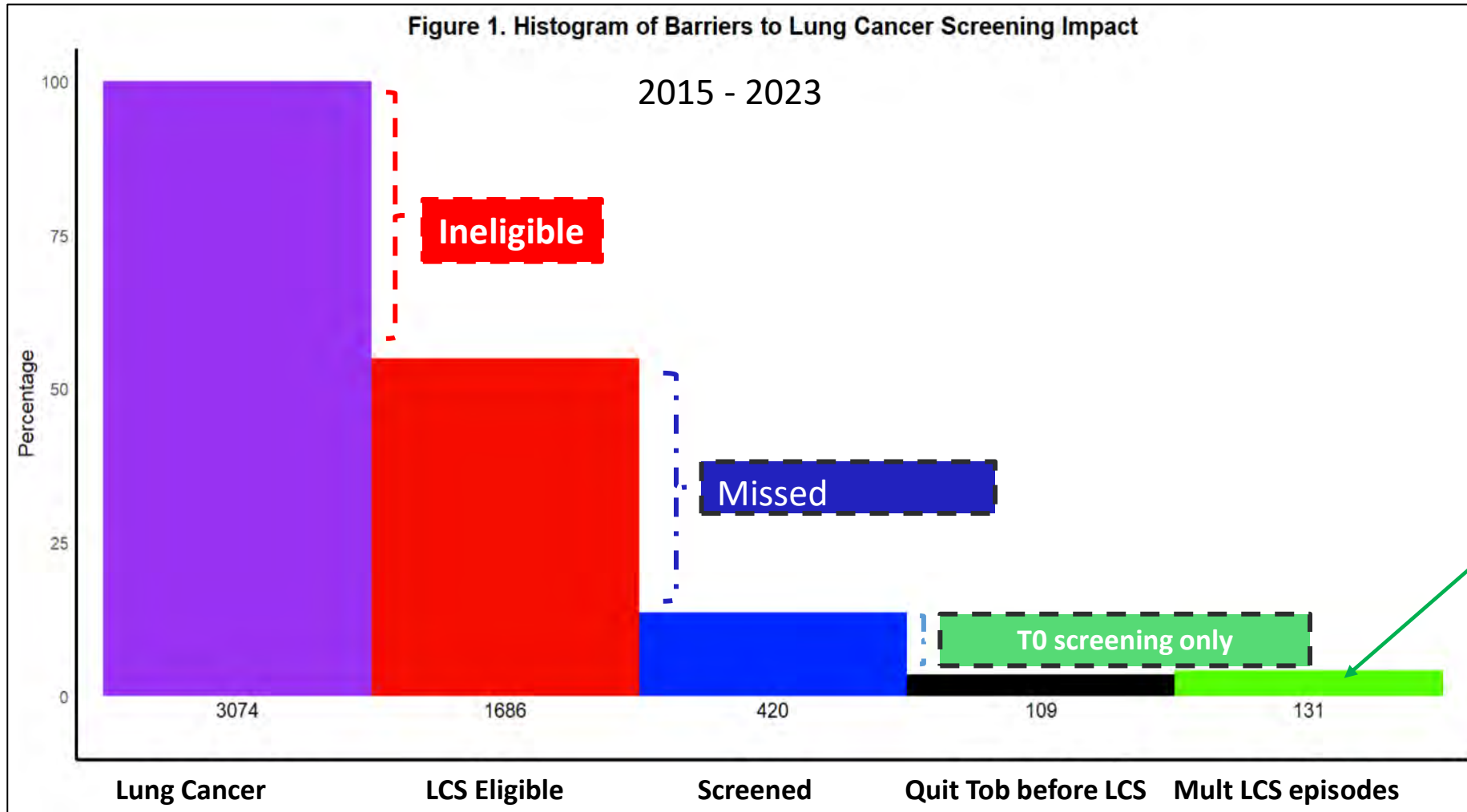
Lung cancer screening cohort

Incidental pulmonary nodule cohort

Where the Barriers Are: DELUGE in the Mississippi Delta/MDC Cohorts

Figure 1. Histogram of Barriers to Lung Cancer Screening Impact

2015 - 2023

Ineligible

Missed

T0 screening only

Adherent: Multiple screening episodes before diagnosis

Lung Cancer — 3074
LCS Eligible — 1686
Screened — 420
Quit Tob before LCS — 109
Mult LCS episodes — 131

Liao, Goss, et al. Unpublished, please do not post!

Barriers to the Full Survival Impact of Lung Cancer Screening
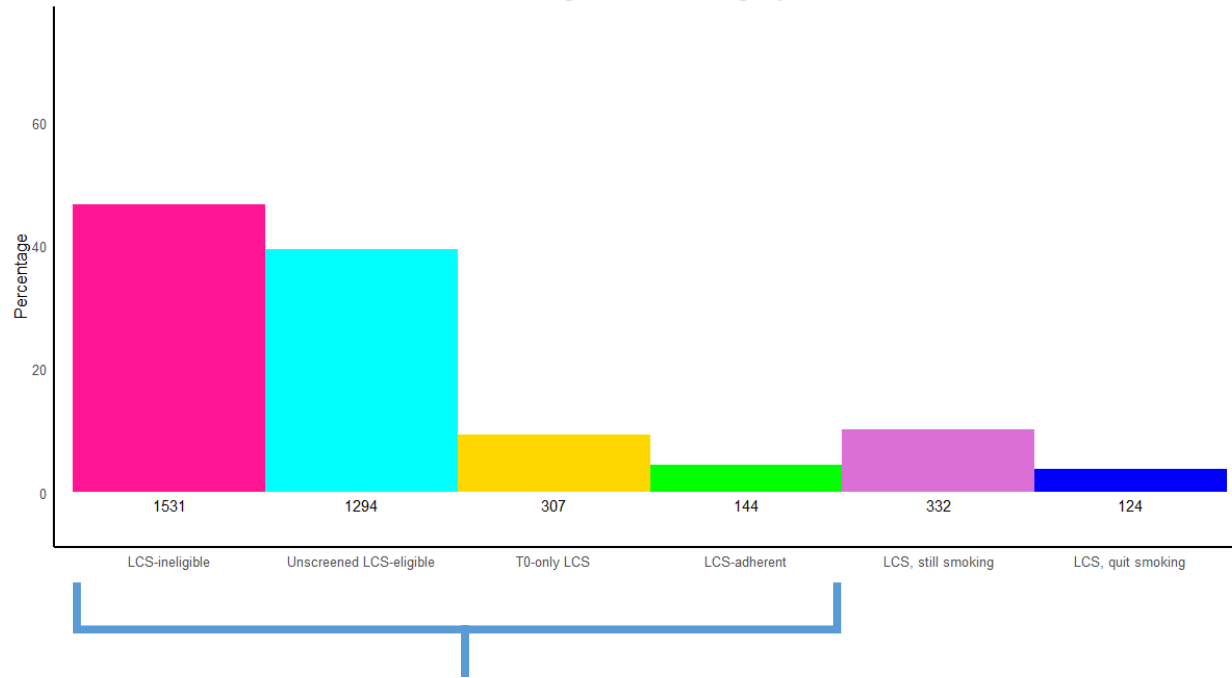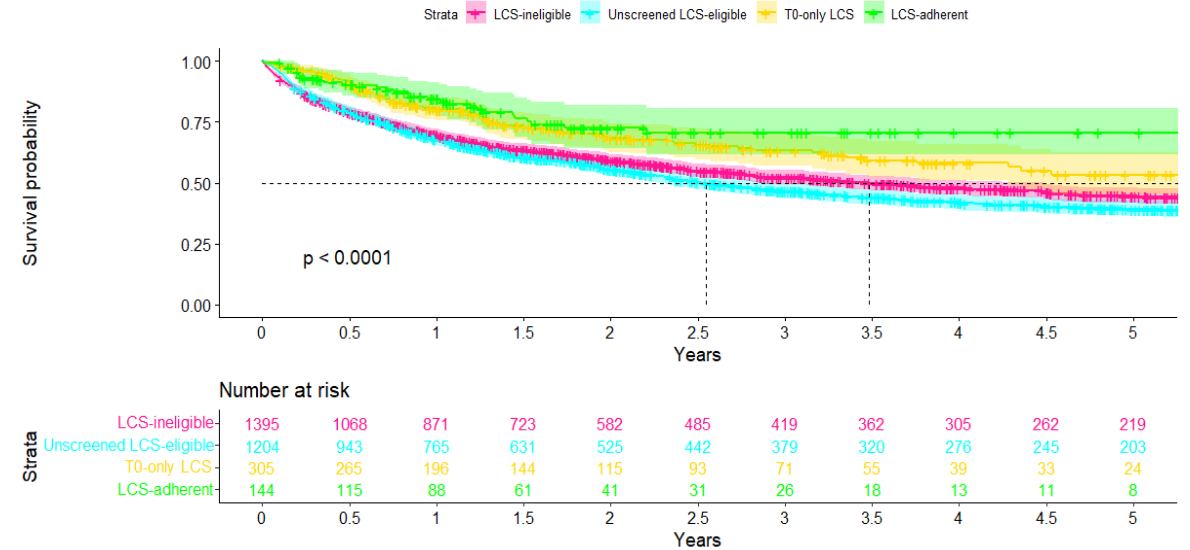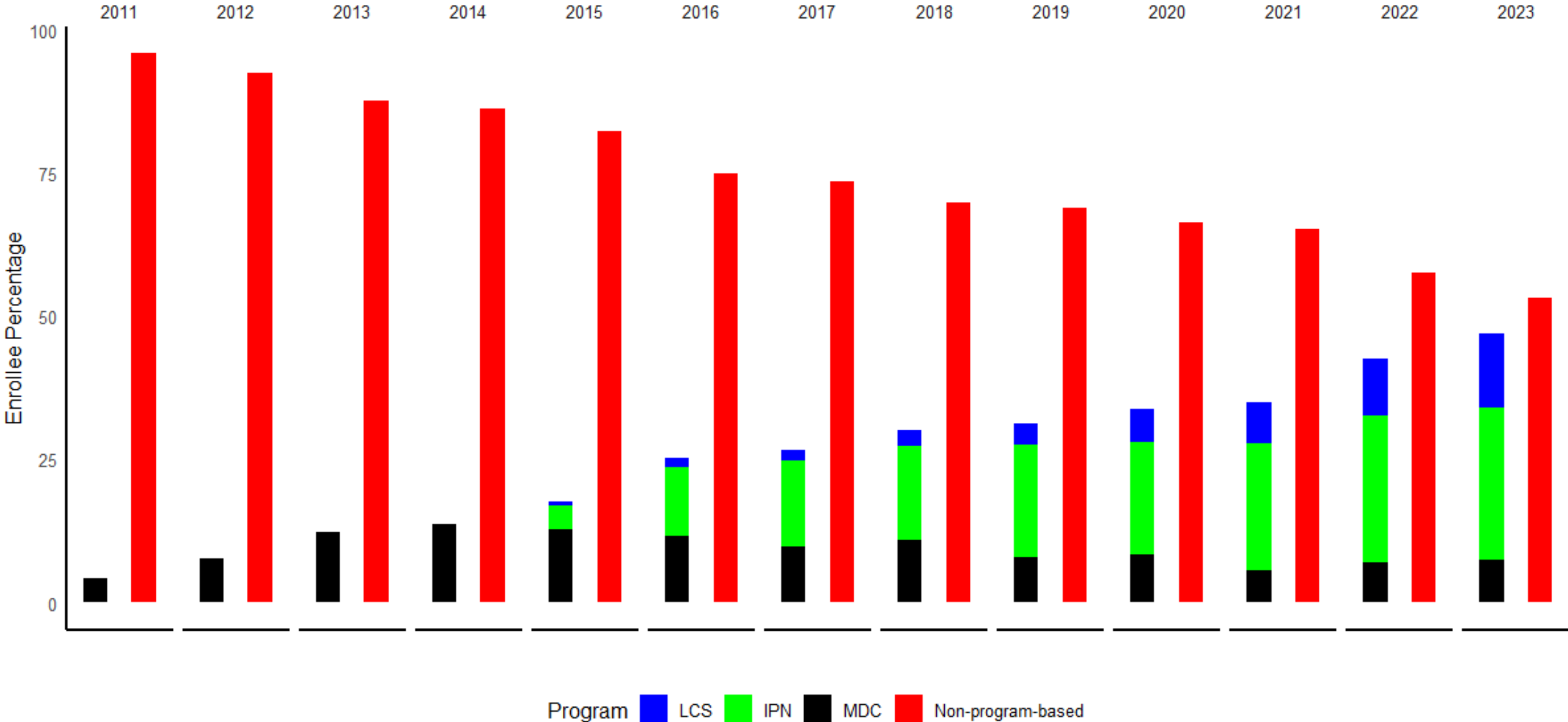

Liao et al. Manuscript in development

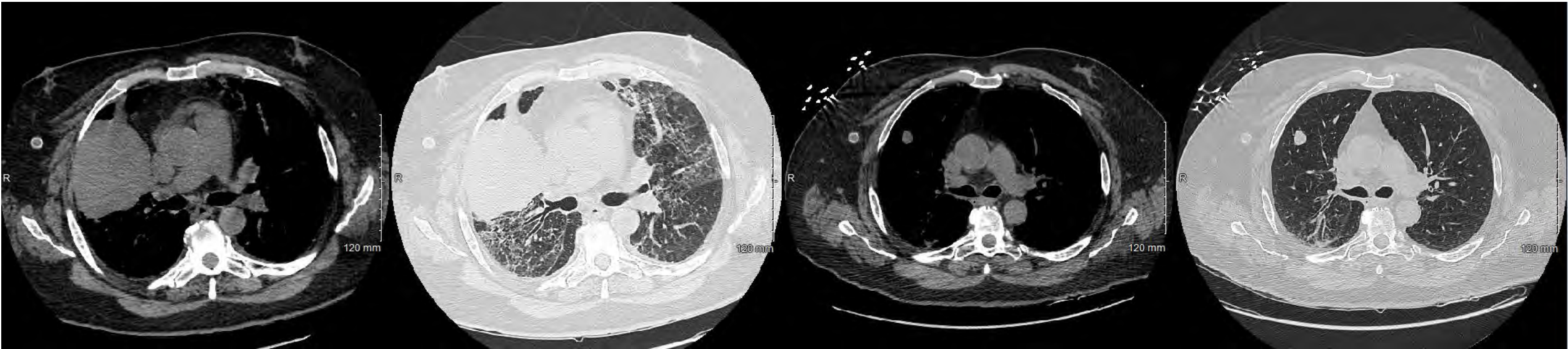# Can We Scale-up Program-Based Lung Cancer Care?

Figure 2. Evolution of Program-based care vs. Non-program-based from 2011 to 2023

Take-Home Messages

- IPN programs expand the reach of early lung cancer detection to a much broader spectrum of the at-risk population:
  - Disadvantaged (eg. under-insured, racial minorities, rural dwellers).
  - Criteria-restricted (eg. people who never smoked/quit too long ago)
- Epidemiologically powerful: may rescue more people than LDCT
- Pragmatic: uses pre-existing material.
- Can be implemented even in places where LDCT is not available.
- Provide rich material for discovery.

Avoid This…. Save Lives

02/14/22   10/24/20

THANK YOU!