Lung cancer screening, diagnosis, and staging

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The Lung Center

Disclosures/Conflicts of Interest

- None

Outline

- **Epidemiology**
- **Screening**
- **Diagnostic approach to lung nodules**
- **Lung cancer staging**

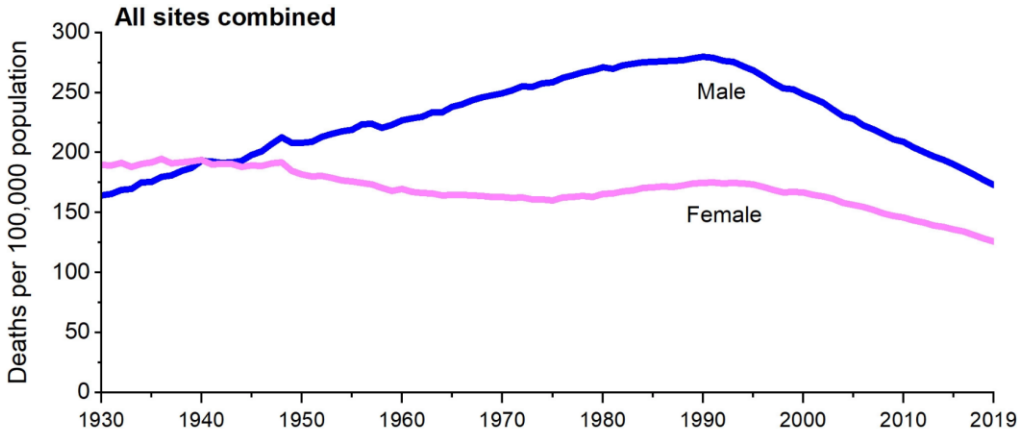
Lung Cancer 2022

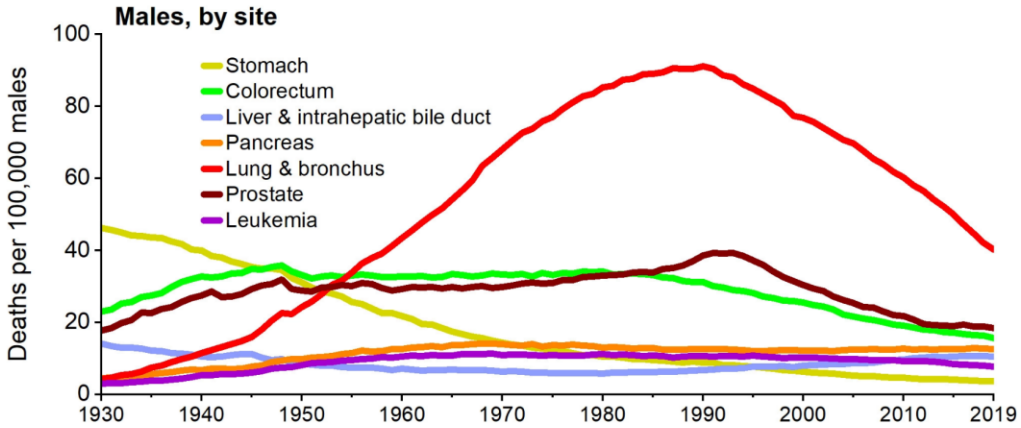
Estimated new cases: **236,740**

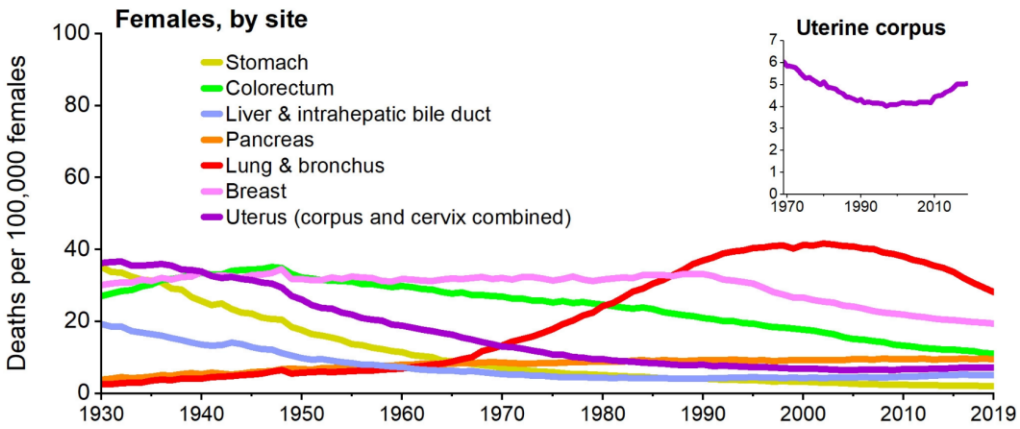
Estimated deaths: **130,180**

Note: in 2016 the estimated # of deaths: **160,340**

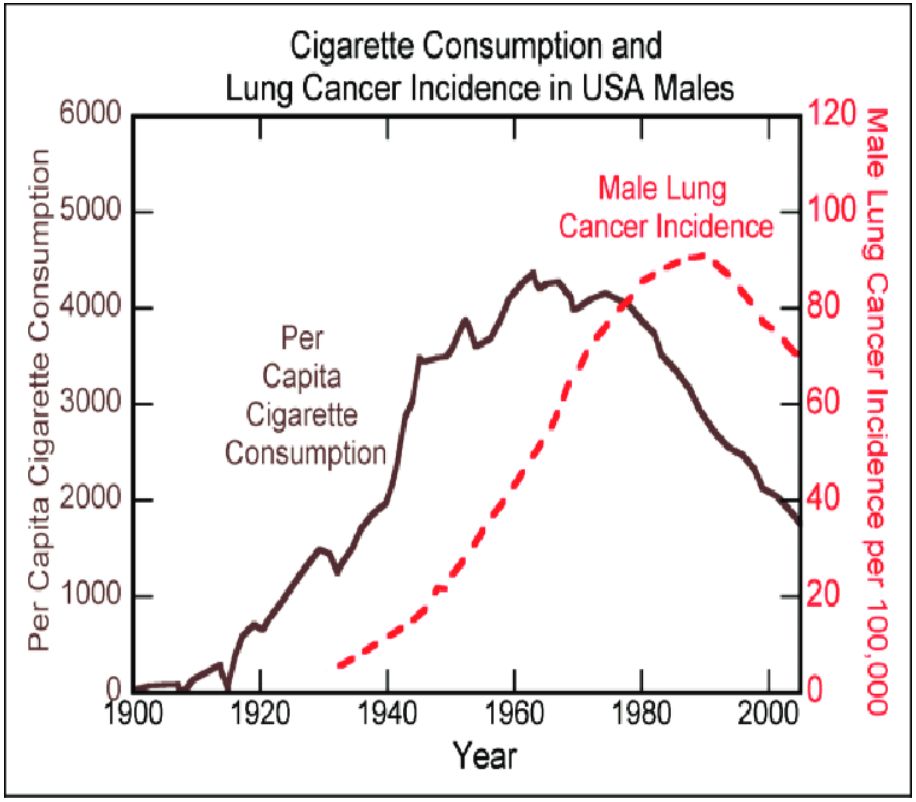
- **Increasing worldwide corresponding with increasing smoking.**
- **Decreasing in the U.S. corresponding with decreasing smoking.**
- **85-90% believed to be caused by cigarette smoking.**
- **High death rate related to advanced stage at diagnosis.**

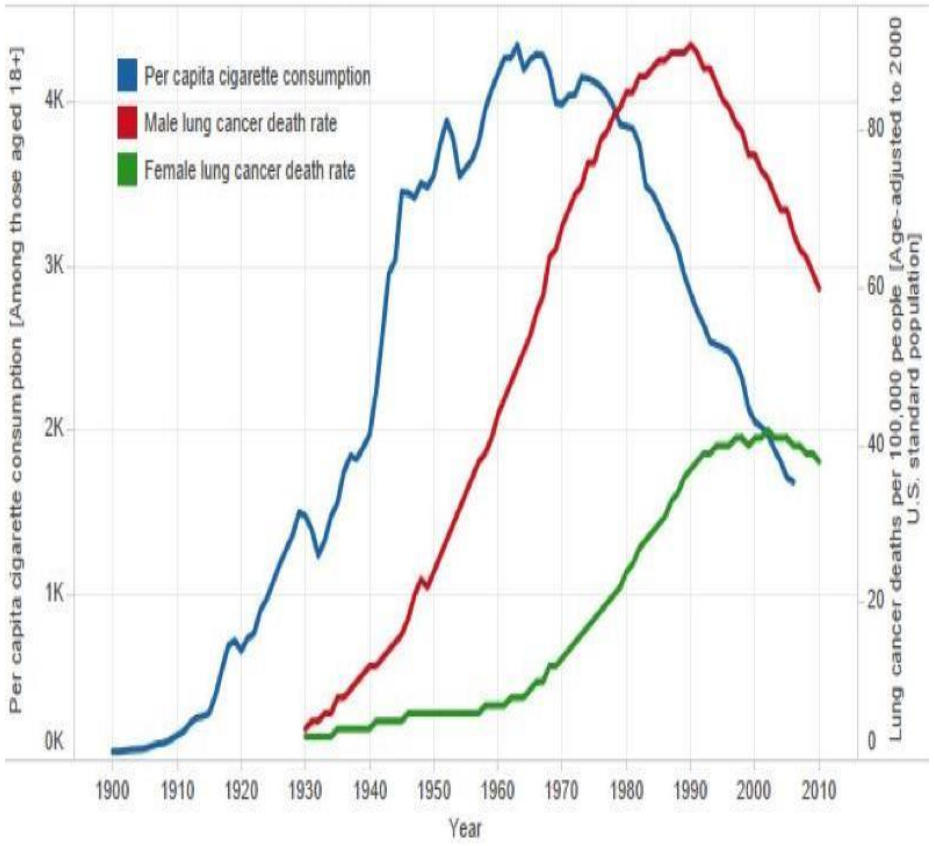


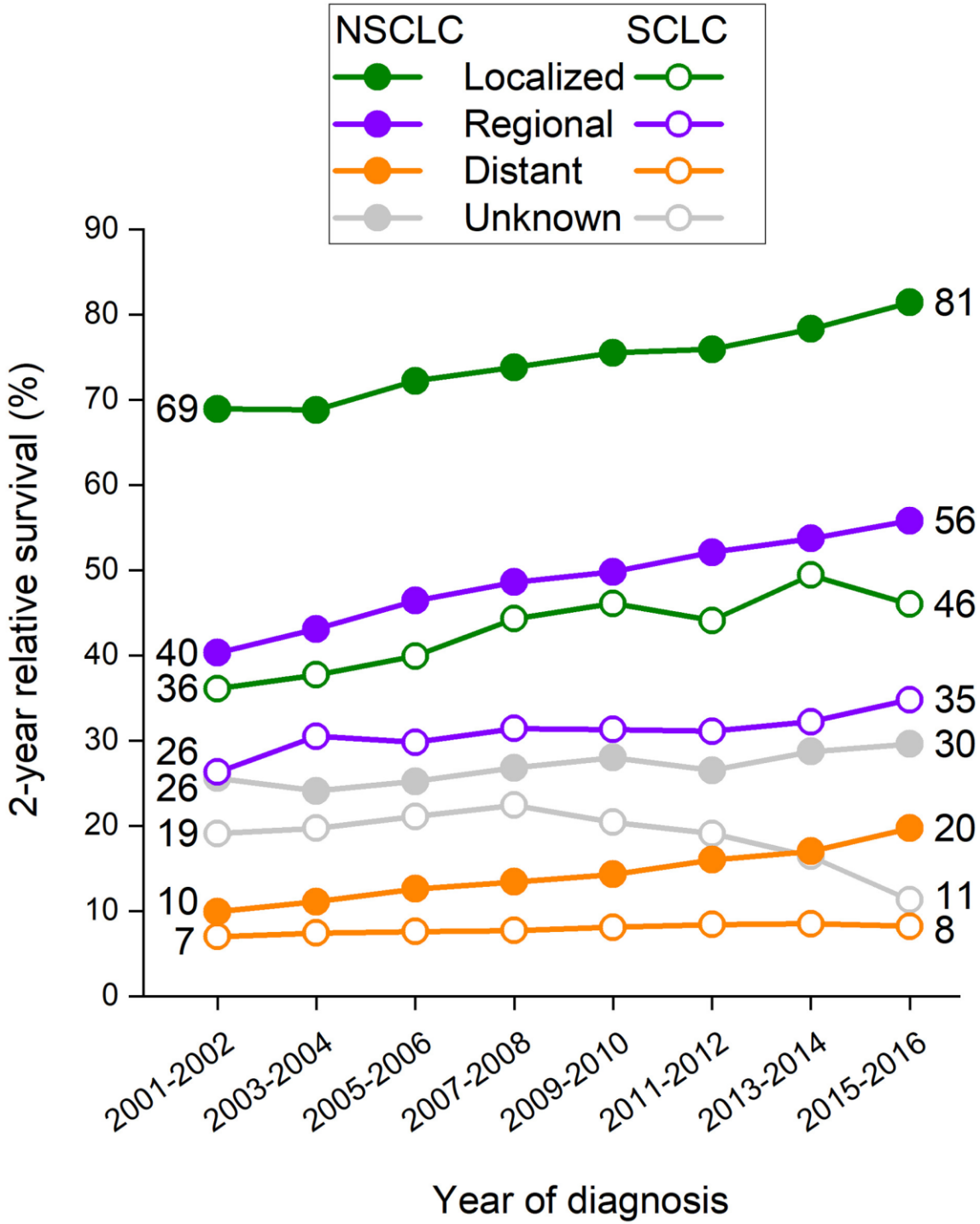




Lung Cancer


Cigarette Consumption and
Lung Cancer Incidence in USA Males
Per Capita Cigarette Consumption
Male Lung Cancer Incidence per 100,000
Male Lung Cancer Incidence
Per Capita Cigarette Consumption
Year
0
1000
2000
3000
4000
5000
6000
0
20
40
60
80
100
120
1900
1920
1940
1960
1980
2000


Per capita cigarette consumption
Male lung cancer death rate
Female lung cancer death rate
Per capita cigarette consumption [Among those aged 18+]
Lung cancer deaths per 100,000 people [Age-adjusted to 2000 U.S. standard population]
Year
0K
1K
2K
3K
4K
0
20
40
60
80
1900
1910
1920
1930
1940
1950
1960
1970
1980
1990
2000
2010


NSCLC
SCLC
Localized
Regional
Distant
Unknown
2-year relative survival (%)
90
80
70
60
50
40
30
20
10
0
69
81
40
56
36
46
26
35
26
30
19
20
10
11
7
8
2001-2002
2003-2004
2005-2006
2007-2008
2009-2010
2011-2012
2013-2014
2015-2016
Year of diagnosis

- 46% metastatic at diagnosis
- 30% locally advanced
- 24% early stage

- **Five year survival:**
  - **Breast cancer 90%**
  - **Colon cancer 65%**
  - **Prostate cancer ~100%**
  - **LUNG CANCER 23.7% (a 14% increase in 5 yr)**
    - **20% communities of color**
    - **18% Black Americans**
  - **Stage I NSCCA 58-73%**

How to beat lung cancer

- 1. **Smoking cessation**: Fewer smokers, fewer lung cancers
- 2. **Better treatment**: Longer, better quality of life
- 3. **Earlier detection---** Screening

Lung Cancer Screening

Pro

- **Outcome and treatment related to stage at diagnosis**
- **Identifiable risk factors**
- **High prevalence**
- **Lengthy pre-clinical phase**

Con

- **Radiation exposure**
- **False positives leading to additional tests, procedures, and anxiety**
- **Cost**
- **Disparities in care**

National Lung Screening Trial (NLST)

Prospective, randomized trial comparing low-dose helical CT screening to chest x-ray screening with the endpoint of lung cancer specific mortality in high-risk participants

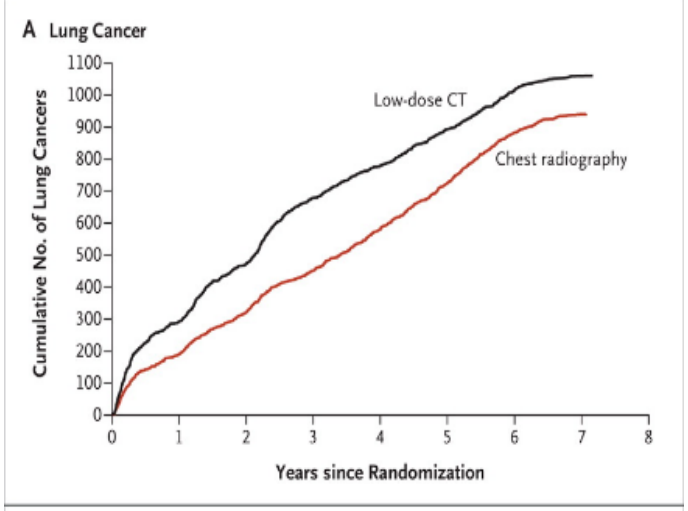
- **Ages 55 – 74**
- **30 pack year smoking history**
- **If former smoker have quit within 15 years**

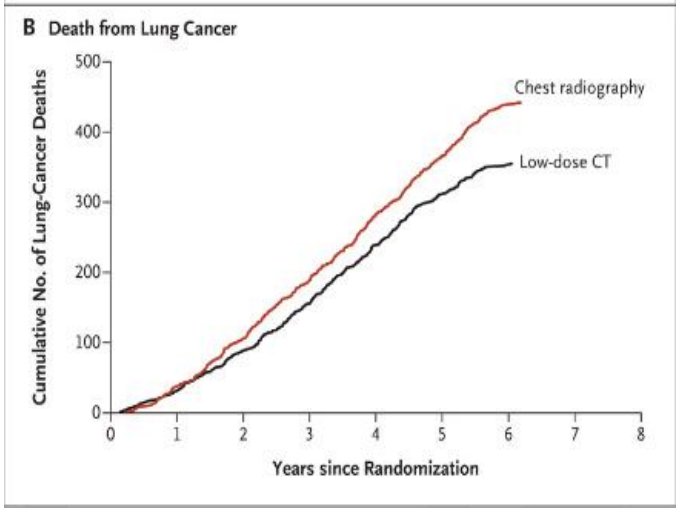
National Lung Screening Trial (NLST)

	LD-CT	CXR	Stats
Lung Cancer cases per 100,000 person-years	645	572	RR 1.13, 95% CI 1.03-1.23
Lung cancer deaths per 100,000 person years	247	309	Relative reduction of 20% (95% CI 6.8 - 26.7, p = 0.004)
Deaths from any cause, N	1877	2000	Relative reduction of 6.7% (95% CI 1.2-13.6, p = 0.02)

NLST Investigators, *NEJM*

epublished 2011





The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 FEBRUARY 6, 2020 VOL. 382 NO. 6

Reduced Lung-Cancer Mortality with Volume CT Screening in a Randomized Trial

H.J. de Koning, C.M. van der Aalst, P.A. de Jong, E.T. Scholten, K. Nackaerts, M.A. Heuvelmans, J.-W.J. Lammers, C. Weenink, U. Yousaf-Khan, N. Horeweg, S. van 't Westeinde, M. Prokop, W.P. Mali, F.A.A. Mohamed Hoesein, P.M.A. van Ooijen, J.G.J.V. Aerts, M.A. den Bakker, E. Thunnissen, J. Verschakelen, R. Vliegenthart, J.E. Walter, K. ten Haaf, H.J.M. Groen, and M. Oudkerk

The NELSON Trial

- 15 cig/day for > 25 yr, or
- > 10 cig/day for > 30 yr
- If quit, within 10 yr
- 10 year follow-up
- Focused on men participants
- 13,195 men, 2594 women
- CT screening intervals 1, 2, 2.5 yr
- Follow-up at 5,7,and 10-11 years
- Primary outcome lung cancer specific mortality

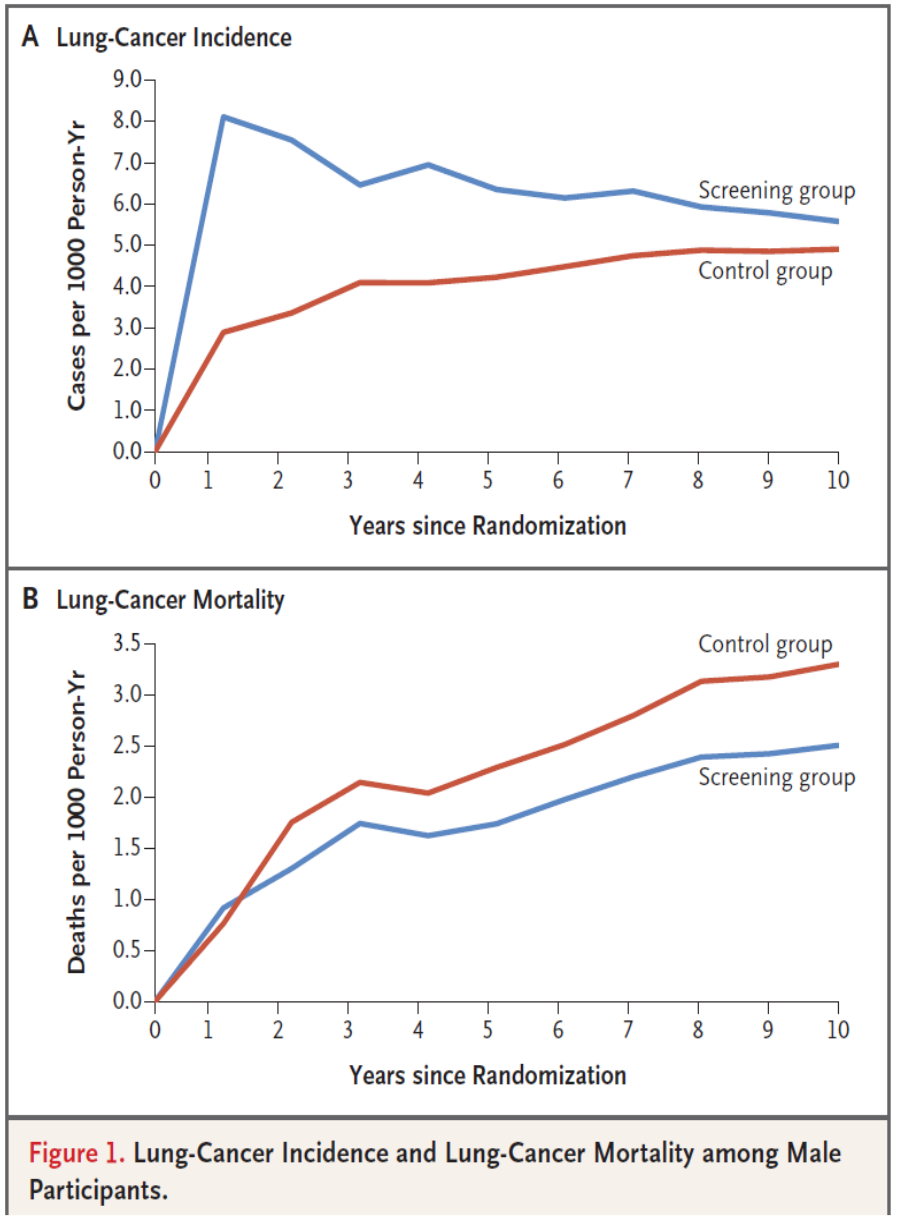


Figure 1. Lung-Cancer Incidence and Lung-Cancer Mortality among Male Participants.

Table 4. Cause of Death of Deceased Male Participants at 10 Years of Follow-up or until the Data-Cutoff Date of December 31, 2015.*

Variable	Screening Group (N=868)	Control Group (N=860)	Total (N=1728)	Rate Ratio (95% CI)
		number (percent)		
Cause of death — no. (%)				
Lung cancer	160 (18.4)	210 (24.4)	370 (21.4)	0.76 (0.62–0.94)
No lung cancer after cause-of-death review, no other specification	6 (0.7)	11 (1.3)	17 (1.0)	0.55 (0.17–1.61)

Mortality benefit was enjoyed by women as well

Using volume CT screening led to fewer harms; false positives and unnecessary workups, without jeopardizing favorable outcomes.

U.S. Preventive Services TASK FORCE

USPSTF Bulletin

An independent, volunteer panel of national experts in prevention and evidence-based medicine

U.S. Preventive Services Task Force Issues Draft Recommendation Statement on Screening for Lung Cancer

New evidence shows screening can help more people at high risk

WASHINGTON, D.C. – July 7, 2020 – The U.S. Preventive Services Task Force (USPSTF) today posted a draft recommendation statement, draft evidence review, and draft modeling study on screening for lung cancer in people who do not have signs or symptoms.

Based on the evidence, the USPSTF recommends annual screening using a low-dose computed tomography (CT) scan for people aged 50 to 80 years old who are at high risk for lung cancer because of their smoking history. **This is a B recommendation.**

Grade in this recommendation:

B: Recommended.

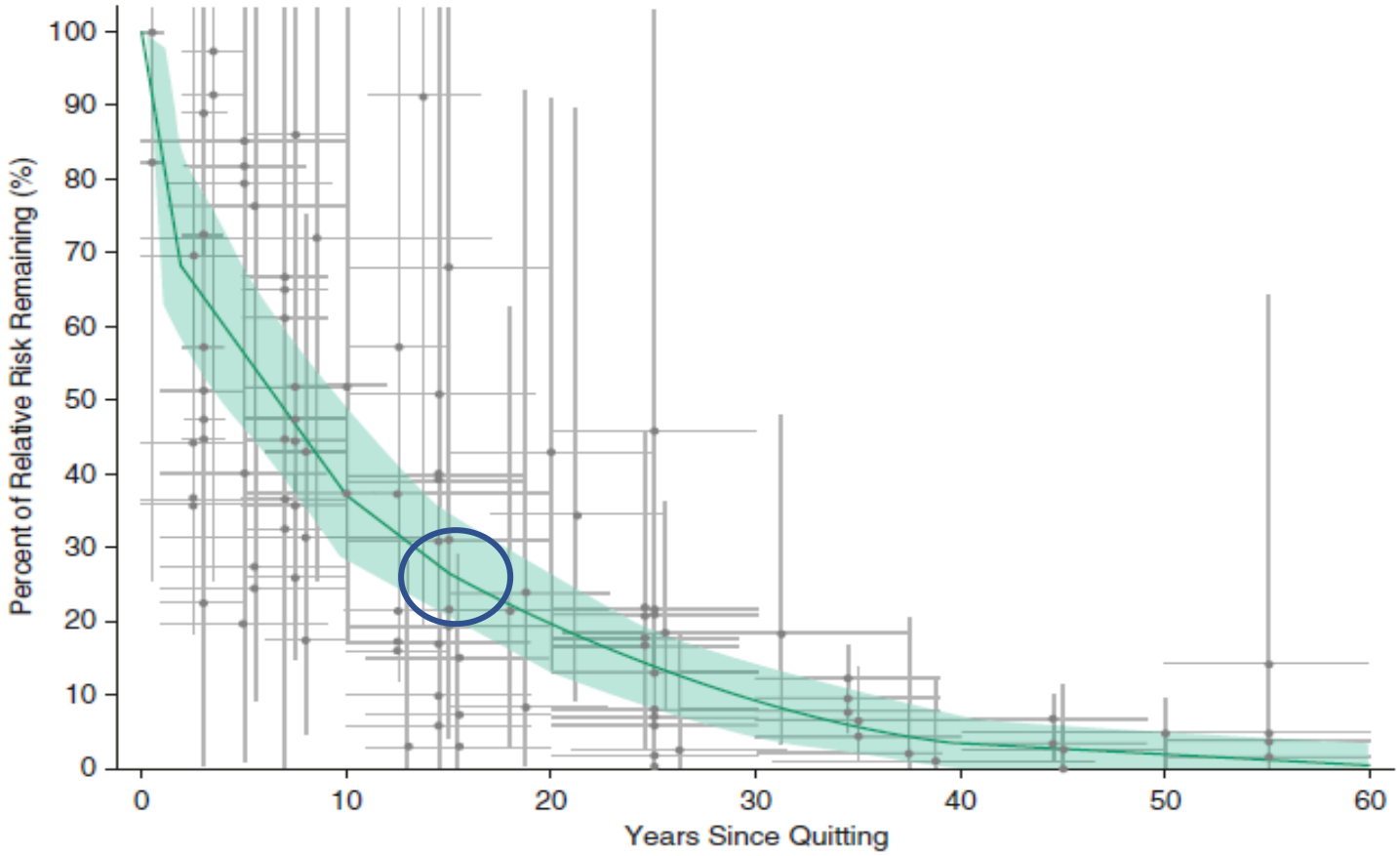
Learn more here

Smoking is the leading cause of lung cancer. Those at high risk are people who have smoked at least 20 pack-years over their lifetime, and still smoke or have quit smoking within the last 15 years. A *pack-year* is a way of calculating how much a person has smoked. One pack-year is the equivalent of smoking an average of 20 cigarettes, or one pack, per day for a year. People between 50 and 80 years old who are current or former smokers should talk to their doctor about whether they are at high risk for lung cancer. If they are, they should discuss the benefits and harms of screening so they can determine whether screening for lung cancer is right for them.

Reexamining Rates of Decline in Lung Cancer Risk after Smoking Cessation

A Meta-analysis

Marissa Reitsma, Parkes Kendrick, Jason Anderson, Nicholas Arian, Rachel Feldman, Emmanuela Gakidou, and Vin Gupta



Disparities in care

AMERICAN THORACIC SOCIETY DOCUMENTS

Addressing Disparities in Lung Cancer Screening Eligibility and Healthcare Access

An Official American Thoracic Society Statement

M. Patricia Rivera, Hormuzd A. Katki, Nichole T. Tanner, Matthew Triplette, Lori C. Sakoda, Renda Soylemez Wiener, Roberto Cardarelli, Lisa Carter-Harris, Kristina Crothers, Joelle T. Fathi, Marvella E. Ford, Robert Smith, Robert A. Winn, Juan P. Wisnivesky, Louise M. Henderson*, and Melinda C. Aldrich*; on behalf of the American Thoracic Society Assembly on Thoracic Oncology

This official statement of the American Thoracic Society was approved September 2020

Lung Cancer Risk Factors

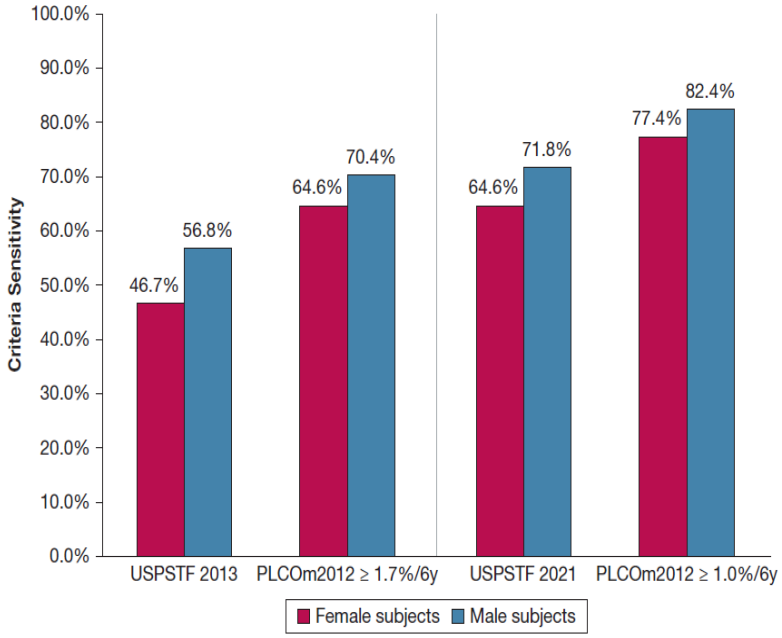
Intrinsic factors
- Genetic mutations
- Female sex
- Race and ethnicity
- Familial risk

Extrinsic factors
- *Exogenous risk factors*
  - Tobacco smoke
  - Occupational and environmental exposures
  - Lifestyle and behavioral factors
  - Socioeconomic status
- *Endogenous risk factors*
  - DNA-repair capacity
  - Growth factors
  - Hormones (estrogen and progesterone)
  - Aging
  - Inflammation
  - HIV

- Black men are about 15% more likely to develop lung cancer than white men.
- There is a higher incidence of lung cancer in young women then young men

Screening per USPSTF guidelines does not take either race or sex into account

Disparities in care
By Sex



Addressing Sex Disparities in Lung Cancer Screening Eligibility
USPSTF vs PLCOm2012 Criteria

Variable	Odds Ratio (95% CI)	P Value	Beta Coefficient
Age, per 1–yr increase†	1.081 (1.057–1.105)	<0.001	0.0778868
Race or ethnic group‡			
White	1.000		Reference group
Black	1.484 (1.083–2.033)	0.01	0.3944778
Hispanic	0.475 (0.195–1.160)	0.10	−0.7434744
Asian	0.627 (0.332–1.185)	0.15	−0.466585
American Indian or Alaskan Native	1		0
Native Hawaiian or Pacific Islander	2.793 (0.992–7.862)	0.05	1.027152
Education, per increase of 1 level†§	0.922 (0.874–0.972)	0.003	−0.0812744
Body-mass index, per 1-unit increase†	0.973 (0.955–0.991)	0.003	−0.0274194
Chronic obstructive pulmonary disease (yes vs. no)	1.427 (1.162–1.751)	0.001	0.3553063
Personal history of cancer (yes vs. no)	1.582 (1.172–2.128)	0.003	0.4589971
Family history of lung cancer (yes vs. no)	1.799 (1.471–2.200)	<0.001	0.587185
Smoking status (current vs. former)	1.297 (1.047–1.605)	0.02	0.2597431
Smoking intensity¶			−1.822606
Duration of smoking, per 1-yr increase†	1.032 (1.014–1.051)	0.001	0.0317321
Smoking quit time, per 1-yr increase†	0.970 (0.950–0.990)	0.003	−0.0308572
Model constant			−4.532506

INTERPRETATION: Although the USPSTF 2021 eligibility criteria are more sensitive than the USPSTF 2013 guidelines, sex disparities in eligibility remain. Adding the PLCOm2012 risk prediction model to the USPSTF guidelines would improve sensitivity and attenuate sex disparities.

CHEST 2022; 161(1):248-256

Disparities in care

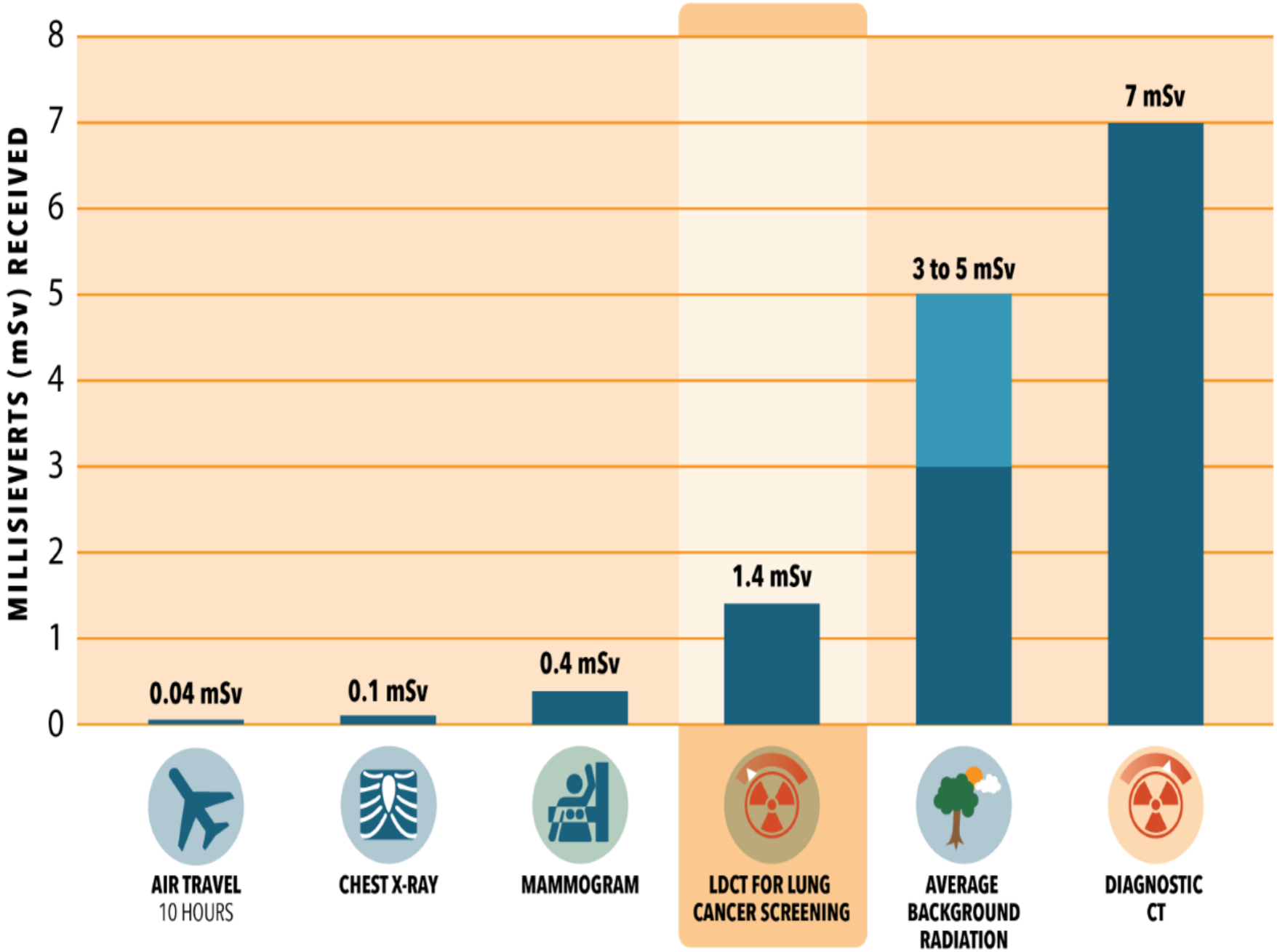
By geography:

40 Medicaid fee-for-service programs cover lung cancer screening, 7 programs do not provide coverage, and 3 states did not have information available on their coverage policy.

By race:

- **Black Americans were:**
  - **18% less likely to be diagnosed early**
  - **23% less likely to receive surgical treatment**
  - **9% more likely to receive no treatment**
  - **21% less likely to survive 5 years**
- **Latinx:**
  - **16% less likely to be diagnosed early**
  - **Equally likely to receive surgical treatment**
  - **16% less likely to survive 5 years**

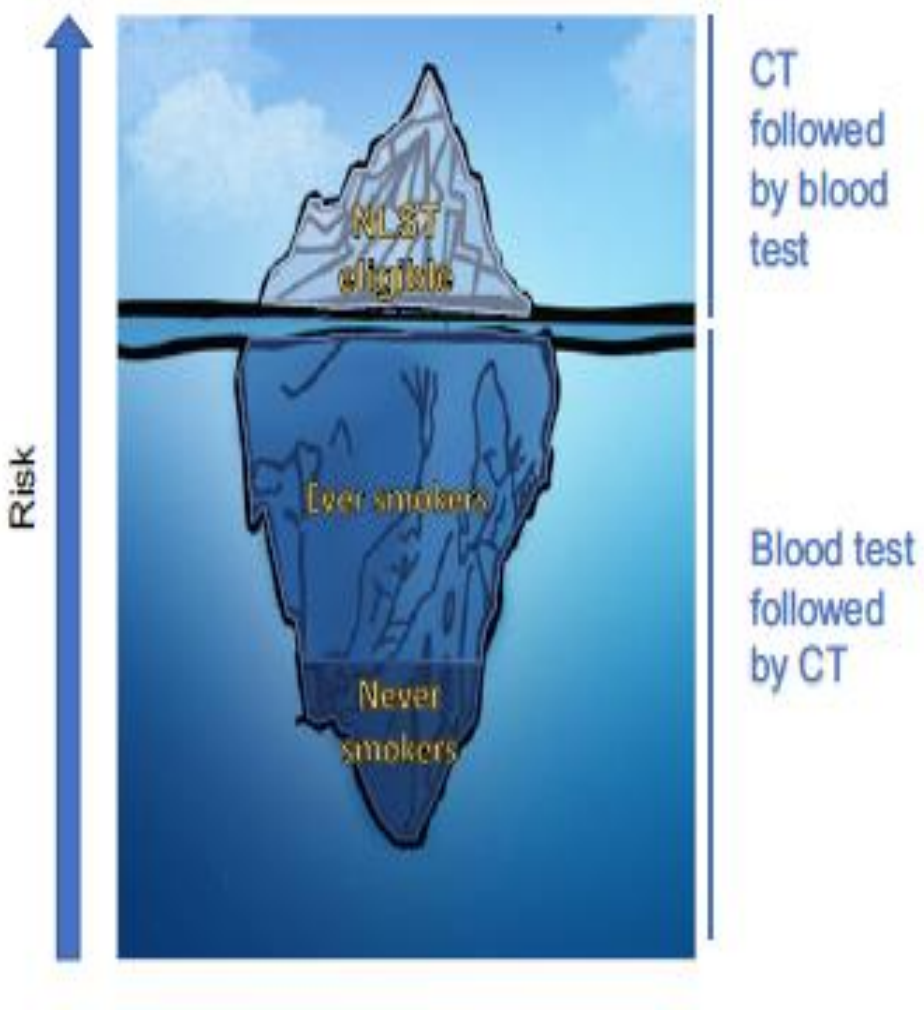
AMERICAN LUNG ASSOCIATION.



mSV=millisievert, a measure of the amount of radiation absorbed by the body

Biomarkers for Lung Cancer Screening and Detection

Edwin J. Ostrin[1], David Sidransky[2], Avrum Spira[3,4], and Samir M. Hanash[5]



4% NLST-eligible patients undergo screening

If all NLST-elibible patients underwent screening, 27% of lung cancers would be detected.

73% of lung cancers occur in NLST-ineligible patients!

doi: 10.1158/1055-9965.EPI-20-0865

Lung cancer risk calculator
"Should I be screened"

2. What is your current smoking status?*

Smoker
Former Smoker
Never Smoker

2.1. At what age did you quit smoking for the last time?*
3. For how many years total have you smoked cigarettes?*
4. On average, how many cigarettes do/did you smoke per day?*
5. What is your gender?
6. What is the highest grade or year of school you completed?
7. How would you describe your race/ ethnicity?
8. How tall are you? ft. in.
9. How much do you weigh? (lbs.)
10. Have you ever been told by a doctor that you have cancer?

YesNo

11. Does your family have a history of lung cancer?

YesNo

12. Have you ever been told by your doctor that you have chronic pulmonary disease also known as COPD (chronic bronchitis or emphysema)?

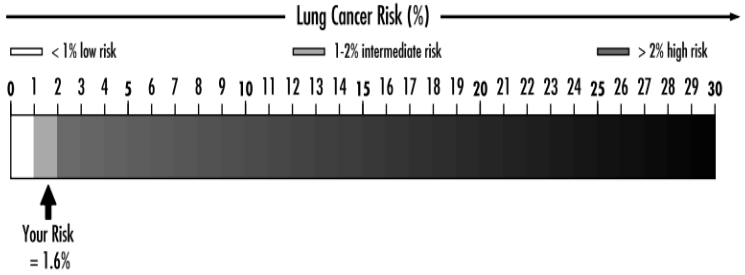
YesNo

54 yr old
Current smoker
35 years
20/day
Female
College graduate
White, non-Hispanic
5'7"
150 lbs
No prior cancer
No family history
Emphysema

Lung Cancer Screening - Should I Do It?

According to your age and smoking exposure, the US Preventive Services Task Force does not recommend* lung cancer screening for you.

*However, the chance of you developing lung cancer in the next 6 years is 1.6%, which is above the threshold where we believe the benefits of screening are large enough to consider CT screening as an option. You should consider talking to your doctor about whether lung cancer screening might still be a good choice for you.



Compared to other people like you, there will be 3 fewer deaths out of 1000 in the next 6 years if you get screened.

BENEFITS

3 in 1000

fewer people like you will die from lung cancer among those who were screened compared to those who were not screened.

HARMS

- 365 in 1000 people who were screened found a lung nodule that was not cancer.
- 18 in 1000 had an invasive procedure, such as biopsy or surgery, due to a lung nodule that was not cancer.
- 3 in 1000 had a major complication from invasive procedures.
- Of the lung cancers found by screening, about 1 in 10 would have never harmed you. This may lead to unnecessary treatment and complications.

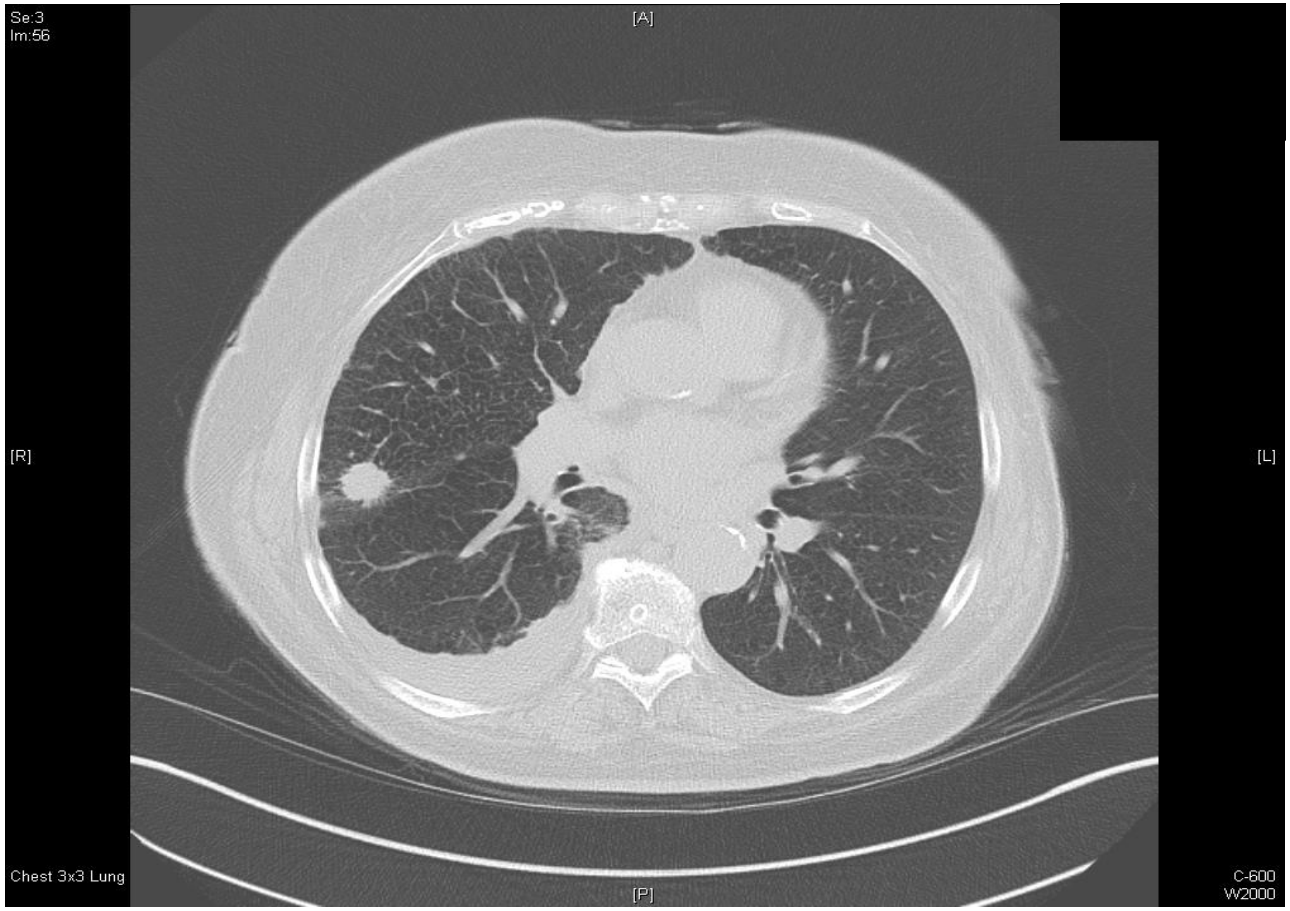
Lung Cancer Screening

- **“Systematic” screening is not recommended**
- **Any program of screening undertaken would have to be prepared for:**
  - **long term follow-up**
  - **counseling on the implications of the results**
  - **should include smoking cessation as the most established means of prevention**
- We can still do better:
  - How can we reduce the false positives
  - How can we reduce the radiation risk
  - How does screening affect smoking behavior
  - How can we make it more cost effective
  - How do we address the disparities in care

Solitary Pulmonary Nodule

Spherical opacity measuring up to 3 cm in greatest diameter, surrounded by lung parenchyma.

“Nodule” becomes a “mass” arbitrarily 3-4 cm



Solitary Pulmonary Nodule

• **Infectious disease** Tuberculosis (tuberculoma) Round pneumonia Lung abscess Fungal disease Parasitic disease Atypical mycobacteria Nocardia *Pneumocystis jiroveci* Measles Septic embolus	• **Benign tumor** Hamartoma Chondroma Fibroma Neurofibroma Schwannoma Lipoma Sclerosing hemangioma Plasma cell granuloma Endometriosis	• **Malignant tumor** Lung cancer Pulmonary carcinoid Solitary metastasis Teratoma Leiomyoma
• **Inflammatory disease** Organizing pneumonia Rheumatoid arthritis Granulomatosis with polyangiitis Microscopic polyangiitis Sarcoidosis	• **Vascular origin** Arteriovenous malformation Pulmonary infarct Pulmonary artery aneurysm Pulmonary venous varix Hematoma	• **Lymphatic origin** Intrapulmonary or subpleural lymph node Lymphoma
• **Miscellaneous** Rounded atelectasis Lipoid pneumonia Amyloidosis Mucoid impaction Infected bulla Pulmonary scar Pleural thickening, mass or fluid (pseudotumor)	• **Congenital malformation** Bronchogenic cyst Lung sequestration Bronchial atresia with mucoid impaction	

Risk of malignancy

Historic

- **Age/demographics**
- **Smoking**
- **Other exposure, i.e. asbestos, radon, passive smoke, pollution (coal)**
- **Family history**
- **History of other malignancy**

Risk of malignancy

Radiographic

- **Large > small**
- **Upper lobe > lower lobe**

- **Irregular “spiculated” border versus smooth**

- **Pattern of calcification**
  - **Asymmetric (eccentric)pattern more likely malignant then “popcorn”, diffuse, concentric, central patterns.**

- **Less dense versus more dense**
  - **Solid, part-solid, sub-solid (“ground glass”)**

- **Growth**

Risk of malignancy

- **Estimates of the probability of malignancy can be made based on tables of likelihood ratios incorporating clinical and radiographic features.**

- **Management needs to be individualized in partnership with the patient.**

- **An old x-ray or other imaging study may provide crucial information related to the age of the lesion and thus the likelihood it is malignant or benign.**

Management approach

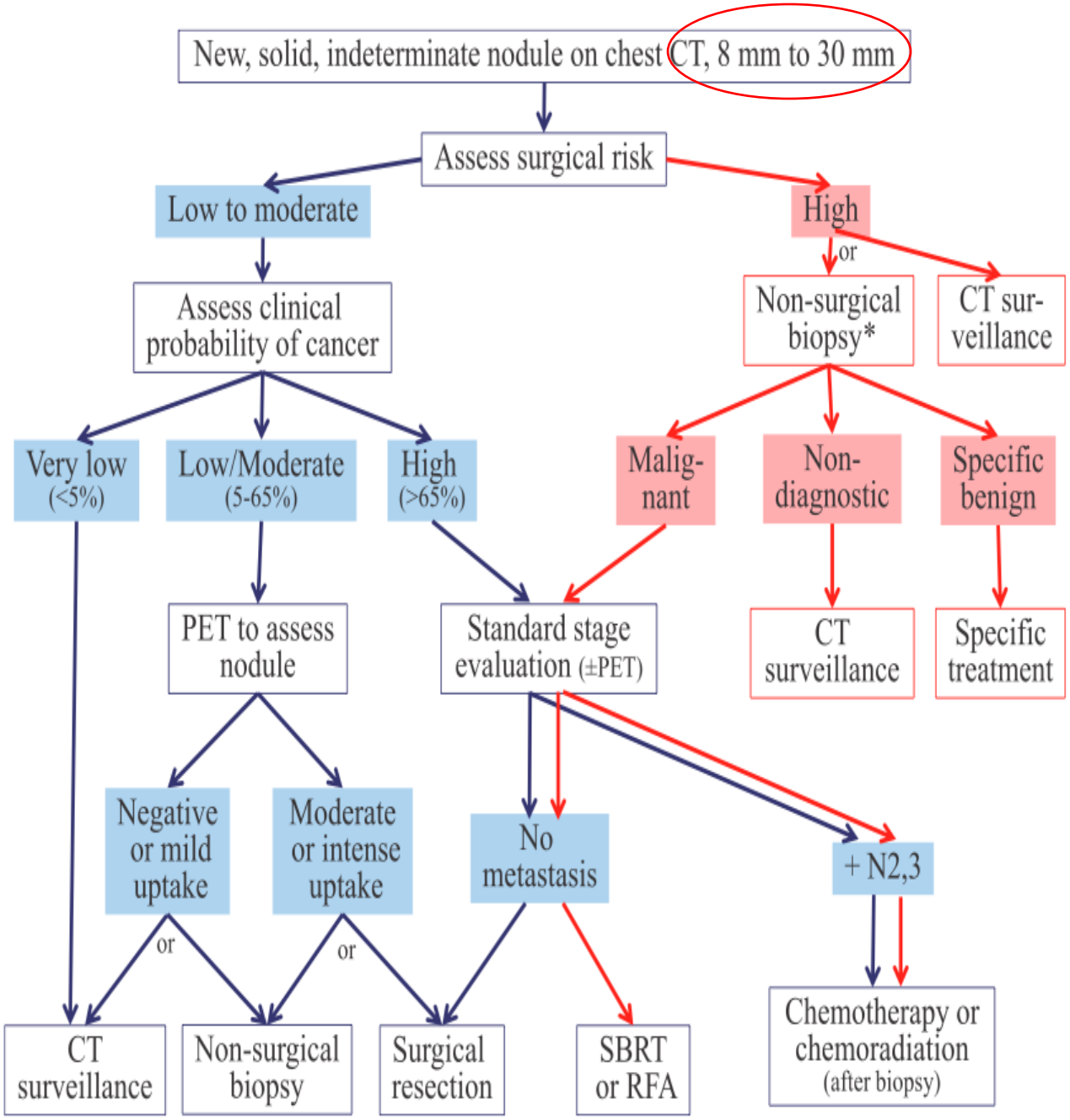
- **Principles:**
  - **A nodule observed to grow on serial CT should be excised or biopsied.**
  - **A solid nodule that has been stable for > 2 yr may be considered benign.**
  - **A nodule larger then 1 cm may be evaluated by PET scan**
  - **A nodule smaller then 1 cm may be observed if intermediate or low probability of malignancy**
  - **Any nodule that is low probability of malignancy can be observed**
  - **Any nodule that is high probability of malignancy should be excised.**

Guidelines for CT Management of Pulmonary Nodules
Statement from the Fleischner Society

Fleischner Society 2017 Guidelines for Management of Incidentally Detected Pulmonary Nodules in Adults

A: Solid Nodules*

	Size			
Nodule Type	<6 mm (<100 mm^3)	6–8 mm (100–250 mm^3)	>8 mm (>250 mm^3)	Comments
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	Nodules <6 mm do not require routine follow-up in low-risk patients (recommendation 1A).
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	Certain patients at high risk with suspicious nodule morphology, upper lobe location, or both may warrant 12-month follow-up (recommendation 1A).
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	Use most suspicious nodule as guide to management. Follow-up intervals may vary according to size and risk (recommendation 2A).
High risk†	Optional CT at 12 months	CT at 3–6 months, then at 18–24 months	CT at 3–6 months, then at 18–24 months	Use most suspicious nodule as guide to management. Follow-up intervals may vary according to size and risk (recommendation 2A).



1. Radiology

2. Surgical Risk

3. Probability of cancer

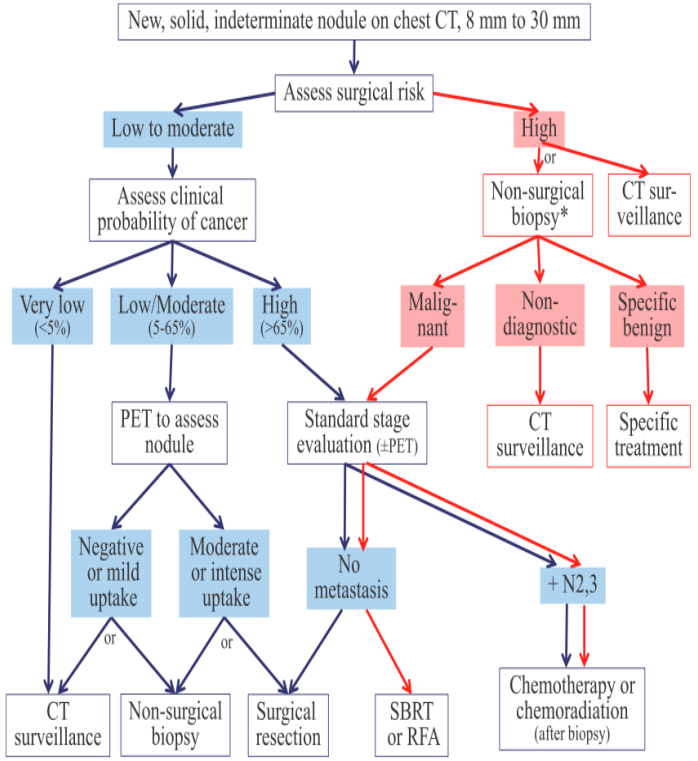
4. Shared Decision-making

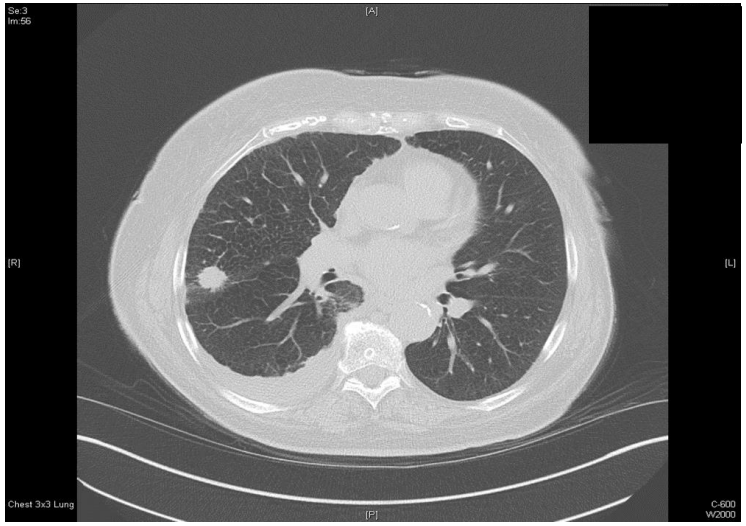
Probability of malignancy (Mayo Clinic Risk Calculator)

- **Age**: 80
- **History of smoking**: smoker
- **Extrathoracic Cancer** (more then 5 yr prior): no
- **Diameter**: 16 mm
- **Spiculated**: yes
- **Upper lobe**: yes

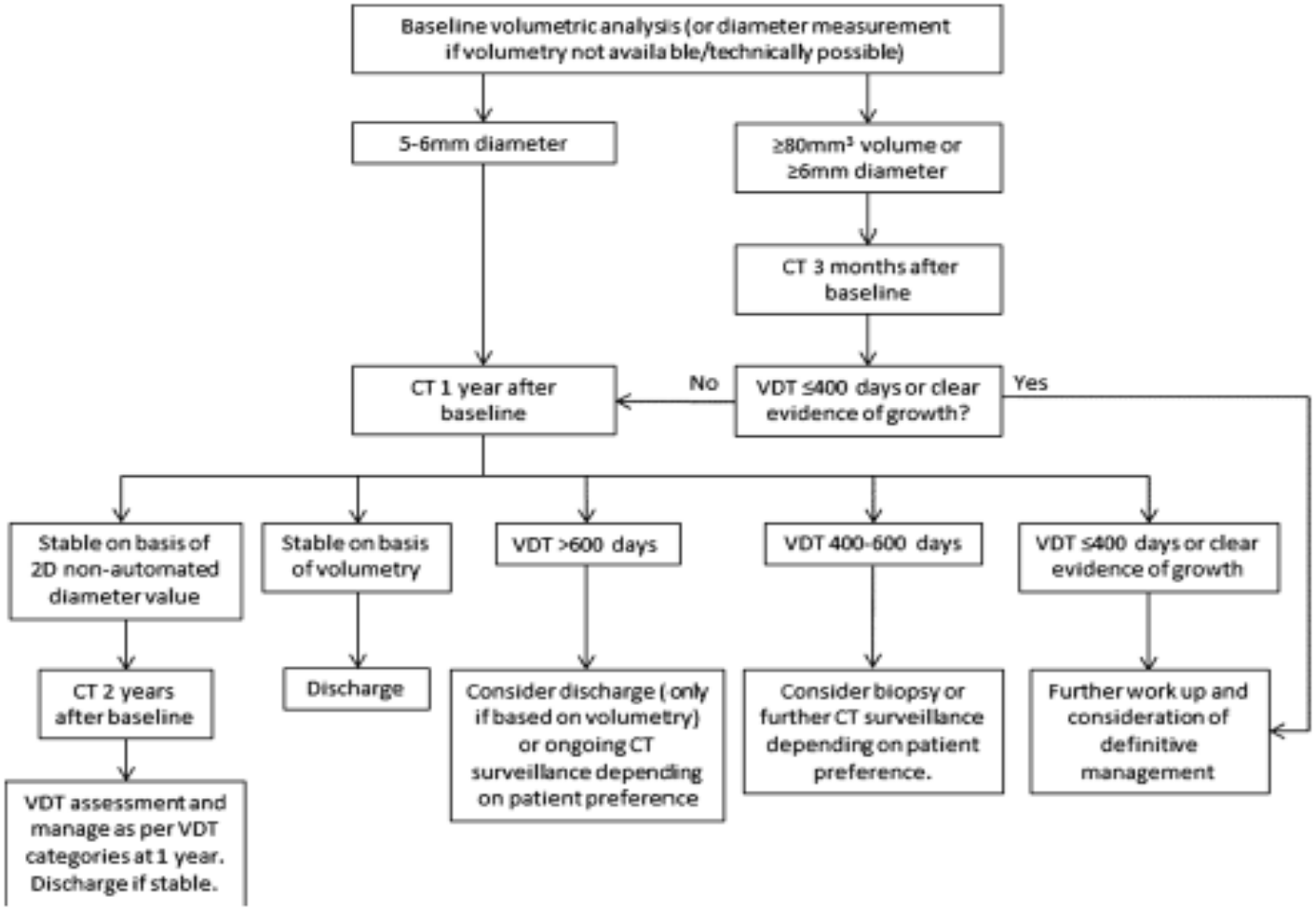
Surgical risk : moderate

Probability of malignancy: 72.2%





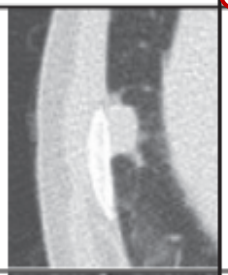
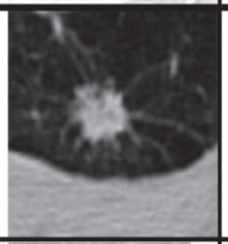
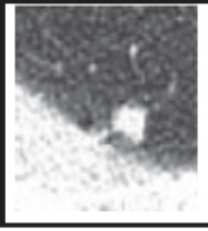
British Thoracic Society Guidelines



Solid pulmonary nodule surveillance algorithm. VDT, volume doubling time.

Baldwin DR, *et al. Thorax* 2015;70:794–798.

Lung cancer probability (risk) models: be aware of their validation population

Clinical Scenarios		Probability Models							
		Gurney	Mayo	Herder	VA	Brock	TREAT	BIMC	Diagnosis
53-yr-old woman, former smoker, 10 pack-years Quit 15 yr ago No emphysema Smooth RLL 1.2-cm module Hypermetabolic SUVmax 3.3		76%	8%	54.4%	15.2%	6.9%	38%	52%	Necrotizing granuloma
69-yr-old man, former smoker, 38 pack-years Quit 20 yr ago History of emphysema Irregular LUL 1.6-cm nodule Hypermetabolic SUVmax 3.2		98%	63%	90%	42.3%	41.2%	73%	85%	Non–small cell carcinoma
54-yr-old man, active smoker, 58 pack-years History of emphysema Spiculated RUL 1.4-cm nodule Hypermetabolic SUVmax 12		100%	42%	83%	36.1%	25.3%	69%	97%	Adenocarcinoma
72-yr-old woman, active smoker, 75 pack-years History of emphysema RUL 6-mm nodule found on low-dose CT scan for lung cancer screening No FDG-PET		62%	16%	16%	48%	4.2%	68%	12%	Likely benign Stable for >2 yr

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The Probability of Lung Cancer in Patients With Incidentally Detected Pulmonary Nodules: Clinical Characteristics and Accuracy of Prediction Models

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Interpretation

Almost 10% of patients with an incidental pulmonary nodule measuring > 8 mm in diameter will receive a lung cancer diagnosis. Existing prediction models have only fair accuracy and overestimate the probability of cancer

Southern California
1/3 never smokers
Cancer:

5.4% never smokers
12.2% former smokers
17.7% current smokers

Mayo Clinic model slightly more accurate than Brock model but both over estimated probability of cancer.

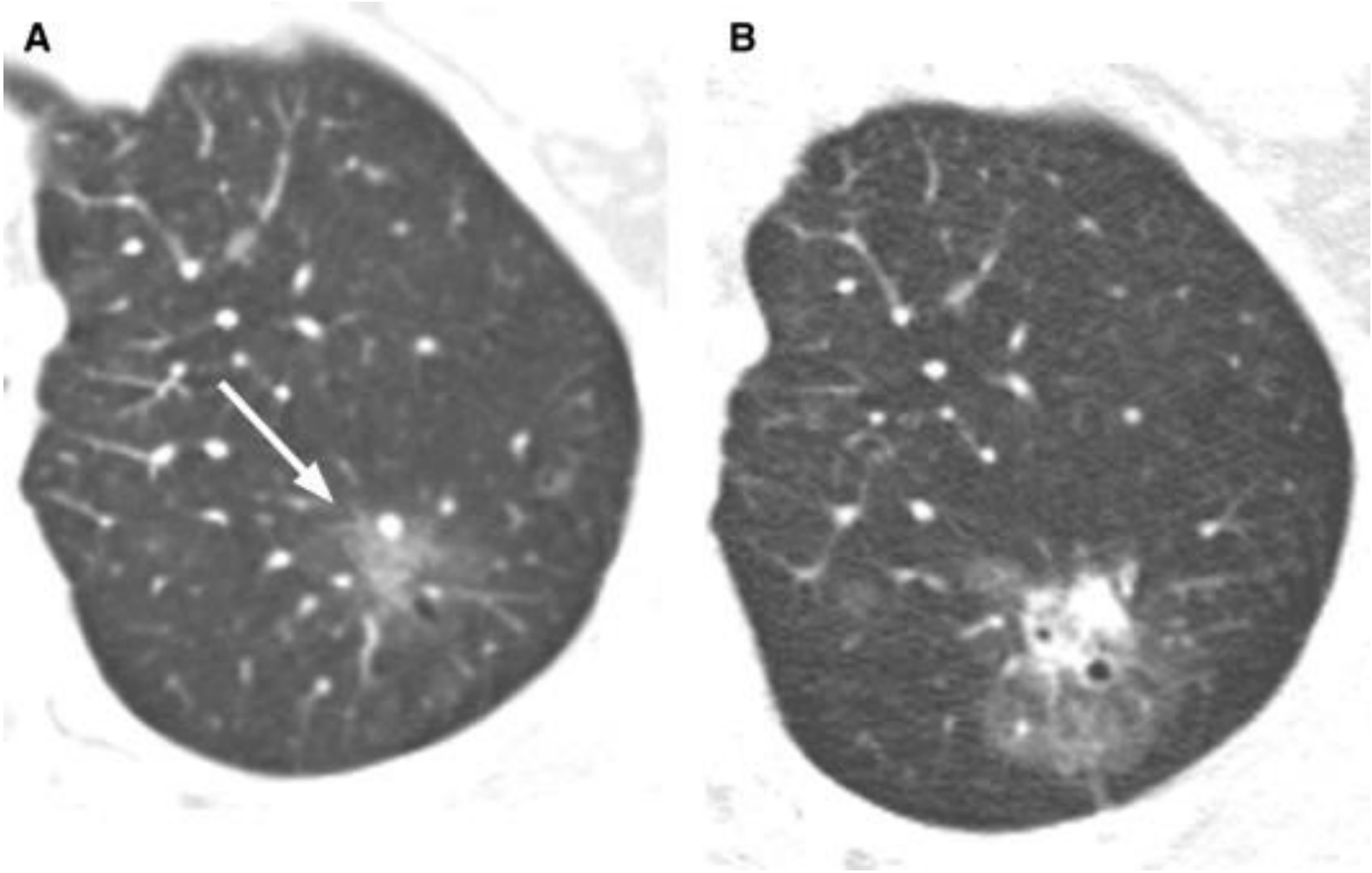
Chest 2022; 161, 562-571

Management of subsolid pulmonary nodules

B: Subsolid Nodules*

Nodule Type	Size: <6 mm (<100 mm^3)	Size: ≥6 mm (>100 mm^3)	Comments
Single			
Ground glass	No routine follow-up	CT at 6–12 months to confirm persistence, then CT every 2 years until 5 years	In certain suspicious nodules < 6 mm, consider follow-up at 2 and 4 years. If solid component(s) or growth develops, consider resection. (Recommendations 3A and 4A).
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.	In practice, part-solid nodules cannot be defined as such until ≥6 mm, and nodules <6 mm do not usually require follow-up. Persistent part-solid nodules with solid components ≥6 mm should be considered highly suspicious (recommendations 4A-4C)
Multiple	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).	Multiple <6 mm pure ground-glass nodules are usually benign, but consider follow-up in selected patients at high risk at 2 and 4 years (recommendation 5A).

Radiology 2017:284:228-243


A
B

Non-Small Cell Lung Cancer staging: TNM system

8th Edition

T (Primary Tumor)		Label
T0	No primary tumor	
Tis	Carcinoma in situ (Squamous or Adenocarcinoma)	Tis
T1	Tumor ≤3 cm,	
T1a(mi)	Minimally Invasive Adenocarcinoma	T1a*(mi)*
T1a	Superficial spreading tumor in central airways[a]	T1a *SS*
T1a	Tumor ≤1 cm	T1a *≤1*
T1b	Tumor >1 but ≤2 cm	T1b *>1-2*
T1c	Tumor >2 but ≤3 cm	T1c *>2-3*
T2	Tumor >3 but ≤5 cm or tumor involving:	
	visceral pleura[b],	T2 *Visc Pl*
	main bronchus (not carina), atelectasis to hilum[b]	T2 *Centr*
T2a	Tumor >3 but ≤4 cm	T2a *>3-4*
T2b	Tumor >4 but ≤5 cm	T2b *>4-5*
T3	Tumor >5 but ≤7 cm	T3 *>5--7*
	or invading chest wall, pericardium, phrenic nerve	T3 *Inv*
	or separate tumor nodule(s) in the same lobe	T3 *Satell*
T4	Tumor >7 cm	T4 *>7*
	or tumor invading: mediastinum, diaphragm, heart, great vessels, recurrent laryngeal nerve, carina, trachea, esophagus, spine;	T4 *Inv*
	or tumor nodule(s) in a different ipsilateral lobe	T4 *Ipsi Nod*

N (Regional Lymph Nodes)	
N0	No regional node metastasis
N1	Metastasis in ipsilateral pulmonary or hilar nodes
N2	Metastasis in ipsilateral mediastinal/subcarinal nodes
N3	Metastasis in contralateral mediastinal/hilar, or supraclavicular nodes

M (Distant Metastasis)		
M0	No distant metastasis	
M1a	Malignant pleural/pericardial effusion[c] or pleural /pericardial nodules	M1a *Pl Dissem*
	or separate tumor nodule(s) in a contralateral lobe;	M1a *Contr Nod*
M1b	Single extrathoracic metastasis	M1b *Single*
M1c	Multiple extrathoracic metastases (1 or >1 organ)	M1c *Multi*

T/M	Label	N0	N1	N2	N3
T1	T1a *≤1*	IA1	IIB	IIIA	IIIB
	T1b *>1-2*	IA2	IIB	IIIA	IIIB
	T1c *>2-3*	IA3	IIB	IIIA	IIIB
T2	T2a *Cent, Visc Pl*	IB	IIB	IIIA	IIIB
	T2a *>3-4*	IB	IIB	IIIA	IIIB
	T2b *>4-5*	IIA	IIB	IIIA	IIIB
T3	T3 *>5-7*	IIB	IIIA	IIIB	IIIC
	T3 *Inv*	IIB	IIIA	IIIB	IIIC
	T3 *Satell*	IIB	IIIA	IIIB	IIIC
T4	T4 *>7*	IIIA	IIIA	IIIB	IIIC
	T4 *Inv*	IIIA	IIIA	IIIB	IIIC
	T4 *Ipsi Nod*	IIIA	IIIA	IIIB	IIIC
M1	M1a *Contr Nod*	IVA	IVA	IVA	IVA
	M1a *Pl Dissem*	IVA	IVA	IVA	IVA
	M1b *Single*	IVA	IVA	IVA	IVA
	M1c *Multi*	IVB	IVB	IVB	IVB

CHEST 2017; 151(1):193-203

Small cell lung cancer staging

- **Limited disease**: Confined to the ipsilateral hemithorax, which can be safely encompassed within a tolerable radiation field (T any, N any, M0; except T3-T4 due to multiple lung nodules that do not fit in a tolerable radiation field). Supraclavicular lymph nodes might still be considered limited stage as long as ipsilateral and within a reasonable radiation field

- **Extensive disease**: Beyond ipsilateral hemithorax, which may include malignant pleural or pericardial effusion or hematogenous metastases (T any, N any, M1a/b/c; T3-T4 due to multiple lung nodules that do not fit in a tolerable radiation field)

Summary

- **Beating lung cancer involves:**
  - **smoking cessation to reduce the incidence**
  - **better treatments for improved prognosis after diagnosis**
  - **early detection by lung cancer screening**
- **Screening is recommended for select patients who meet criteria and who can be seen at a center with an infrastructure that supports a screening program.**
- **Evaluation of a solitary pulmonary nodule is based on the risk of malignancy and patients' candidacy for surgery**

Question #1

- **A 66 year old asymptomatic smoker of 1 pack per day for the past 45 years with a history of congestive heart failure should be counseled on the importance of smoking cessation and**

  - **A. Should not be considered for lung cancer screening**
  - **B. Undergo a yearly CT scan of the chest.**
  - **C. Undergo an initial chest x-ray and sputum cytology**
  - **D. Screening could be considered but may not be advisable based on potential severe, life-limiting comorbidities**
  - **E. Undergo an initial regular, diagnostic CT scan of the chest**

References

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Thanks

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