Welcome to Grand Rounds - May

Lung Cancer Screening

Presented by Dr. Pooneh Sam

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Lung Cancer Screening

- Pooneh Sam, MD

- United Healthcare Grand Round Series
- 05/11/24

Disclosure

- No disclosure related to this topic

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Learning Objectives

- Discuss NLST data and its impact on lung cancer statistics and mortality.
- Identify the latest lung cancer diagnosis trends based on 2022 American Lung Association data.
- Recognize the U.S. Preventive Services Task Force (USPSTF) recommended criteria for annual screening.
- Explore the NLST guidelines and best practices for effective lung cancer screening.
- Review shared decision-making challenges and strategies to overcome them for successful Medicare reimbursement.
- Explain the multidisciplinary team's role in fostering patient-centered care during lung cancer screening.
- Examine multilevel barriers to effective screening and how to address them for optimal program implementation.

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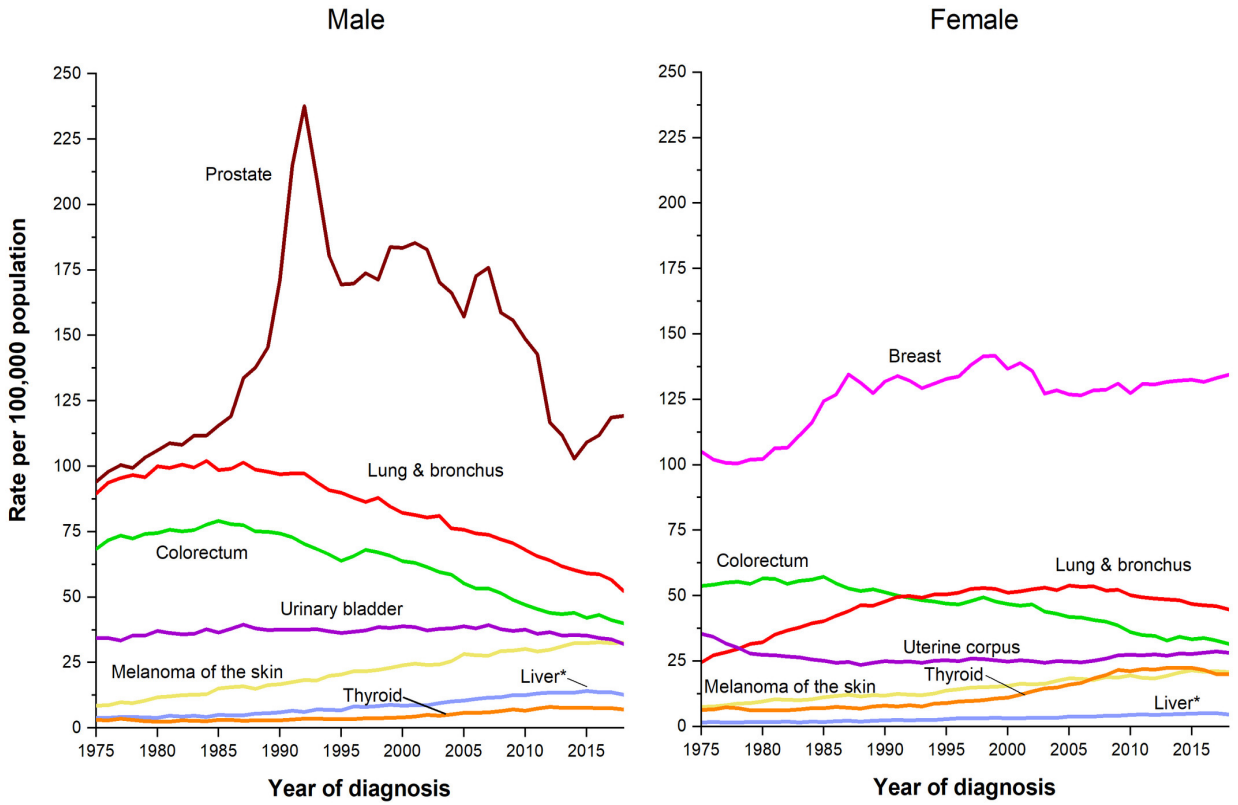
Cancer Statistics 2022

Estimated New Cases

Males				Females		
Prostate	268,490	27%		Breast	287,850	31%
Lung & bronchus	117,910	12%		Lung & bronchus	118,830	13%
Colon & rectum	80,690	8%		Colon & rectum	70,340	8%
Urinary bladder	61,700	6%		Uterine corpus	65,950	7%
Melanoma of the skin	57,180	6%		Melanoma of the skin	42,600	5%
Kidney & renal pelvis	50,290	5%		Non-Hodgkin lymphoma	36,350	4%
Non-Hodgkin lymphoma	44,120	4%		Thyroid	31,940	3%
Oral cavity & pharynx	38,700	4%		Pancreas	29,240	3%
Leukemia	35,810	4%		Kidney & renal pelvis	28,710	3%
Pancreas	32,970	3%		Leukemia	24,840	3%
All Sites	**983,160**	**100%**		**All Sites**	**934,870**	**100%**

Estimated Deaths

Males				Females		
Lung & bronchus	68,820	21%		Lung & bronchus	61,360	21%
Prostate	34,500	11%		Breast	43,250	15%
Colon & rectum	28,400	9%		Colon & rectum	24,180	8%
Pancreas	25,970	8%		Pancreas	23,860	8%
Liver & intrahepatic bile duct	20,420	6%		Ovary	12,810	4%
Leukemia	14,020	4%		Uterine corpus	12,550	4%
Esophagus	13,250	4%		Liver & intrahepatic bile duct	10,100	4%
Urinary bladder	12,120	4%		Leukemia	9,980	3%
Non-Hodgkin lymphoma	11,700	4%		Non-Hodgkin lymphoma	8,550	3%
Brain & other nervous system	10,710	3%		Brain & other nervous system	7,570	3%
All Sites	**322,090**	**100%**		**All Sites**	**287,270**	**100%**



CA A Cancer J Clinicians, Volume: 72, Issue: 1, Pages: 7-33, First published: 12 January 2022, DOI: (10.3322/caac.21708)

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Lung Cancer Statistics

2.5 min

Someone in the U.S. is diagnosed with lung cancer[1]

44 %

Of lung cancer is diagnosed in distant stage[1]

7 %

5-Year survival rate for distant stage[1]

State of Lung Cancer 2022. American Lung Association. Published November 2022

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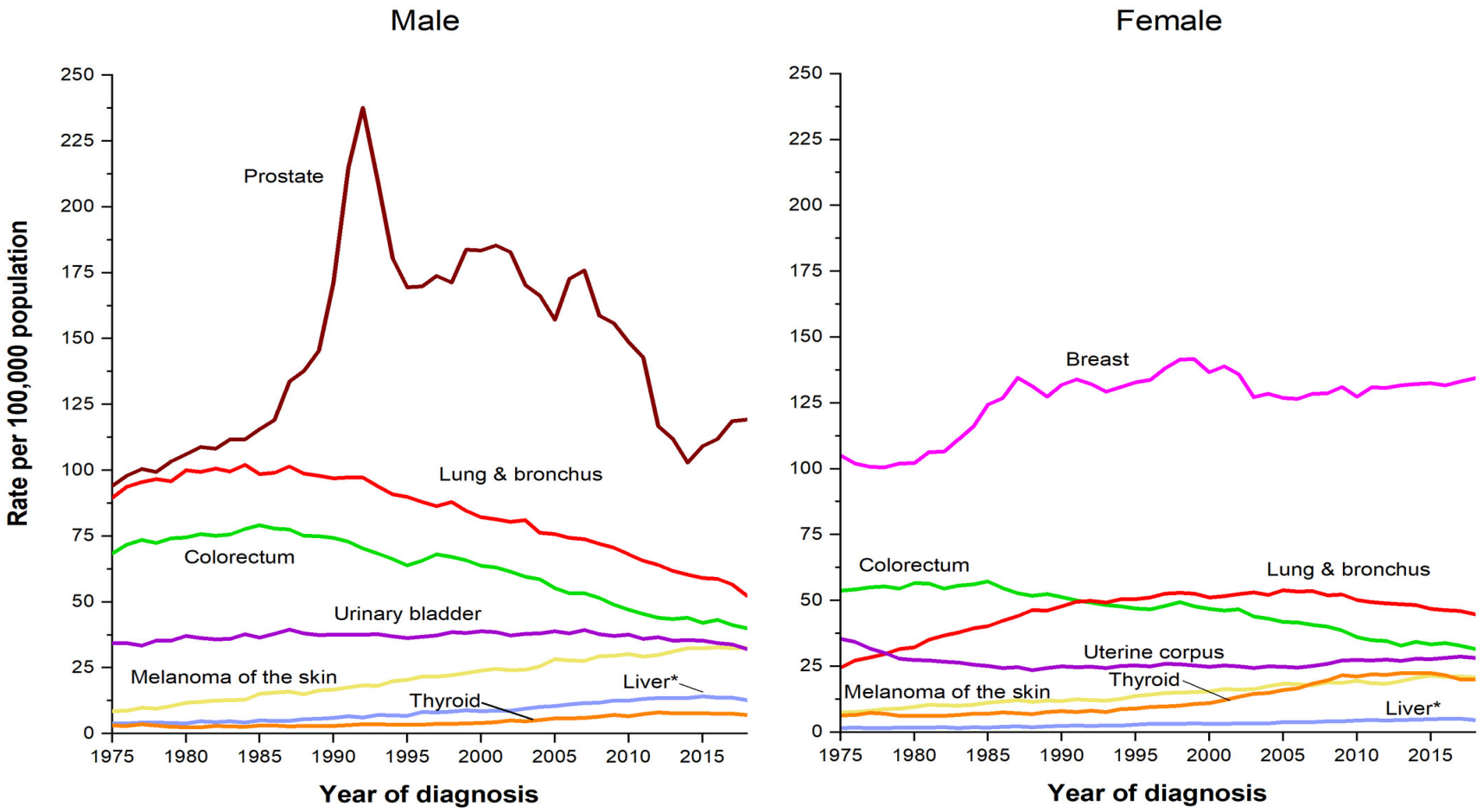
Cancer Statistics 2022



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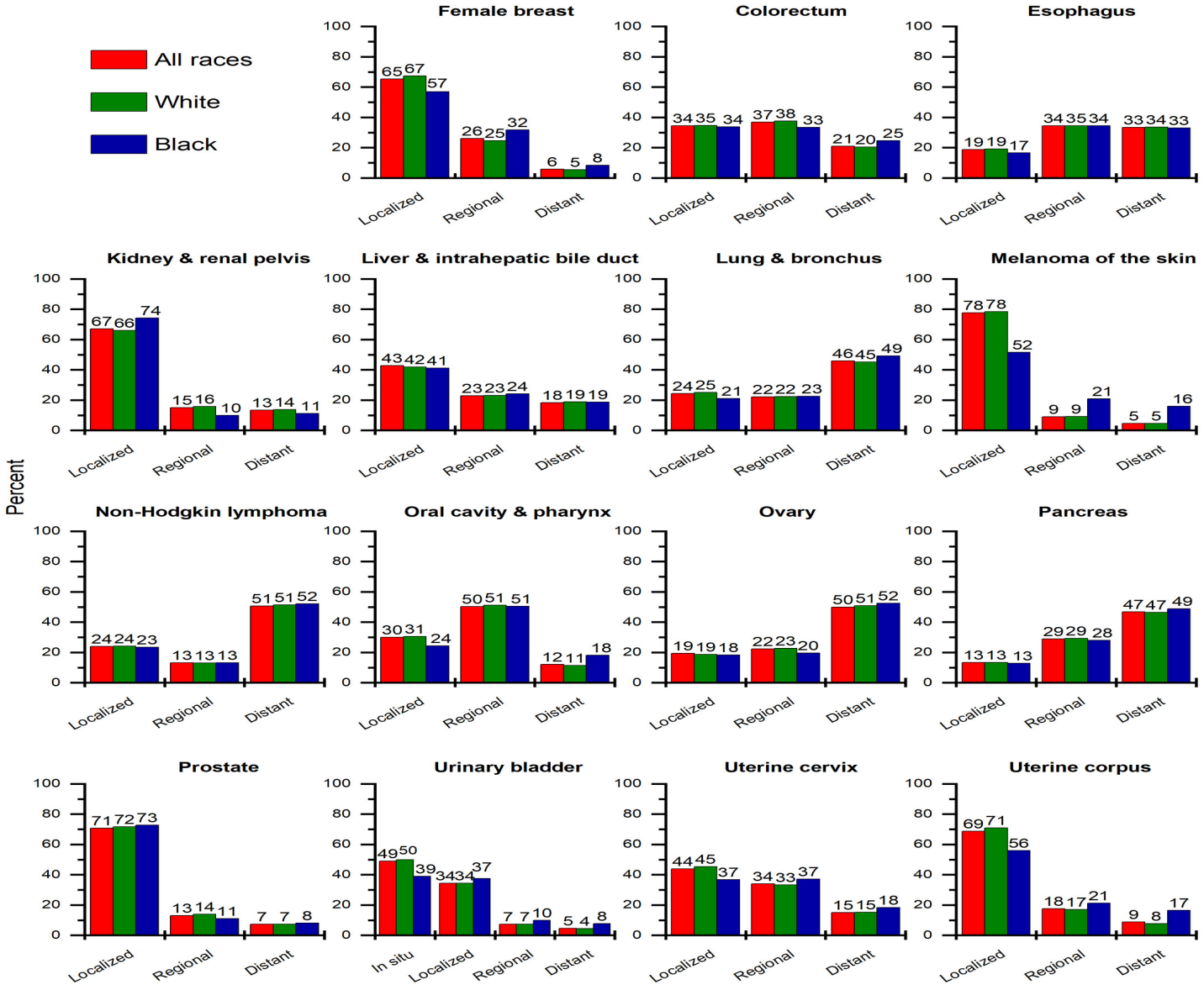

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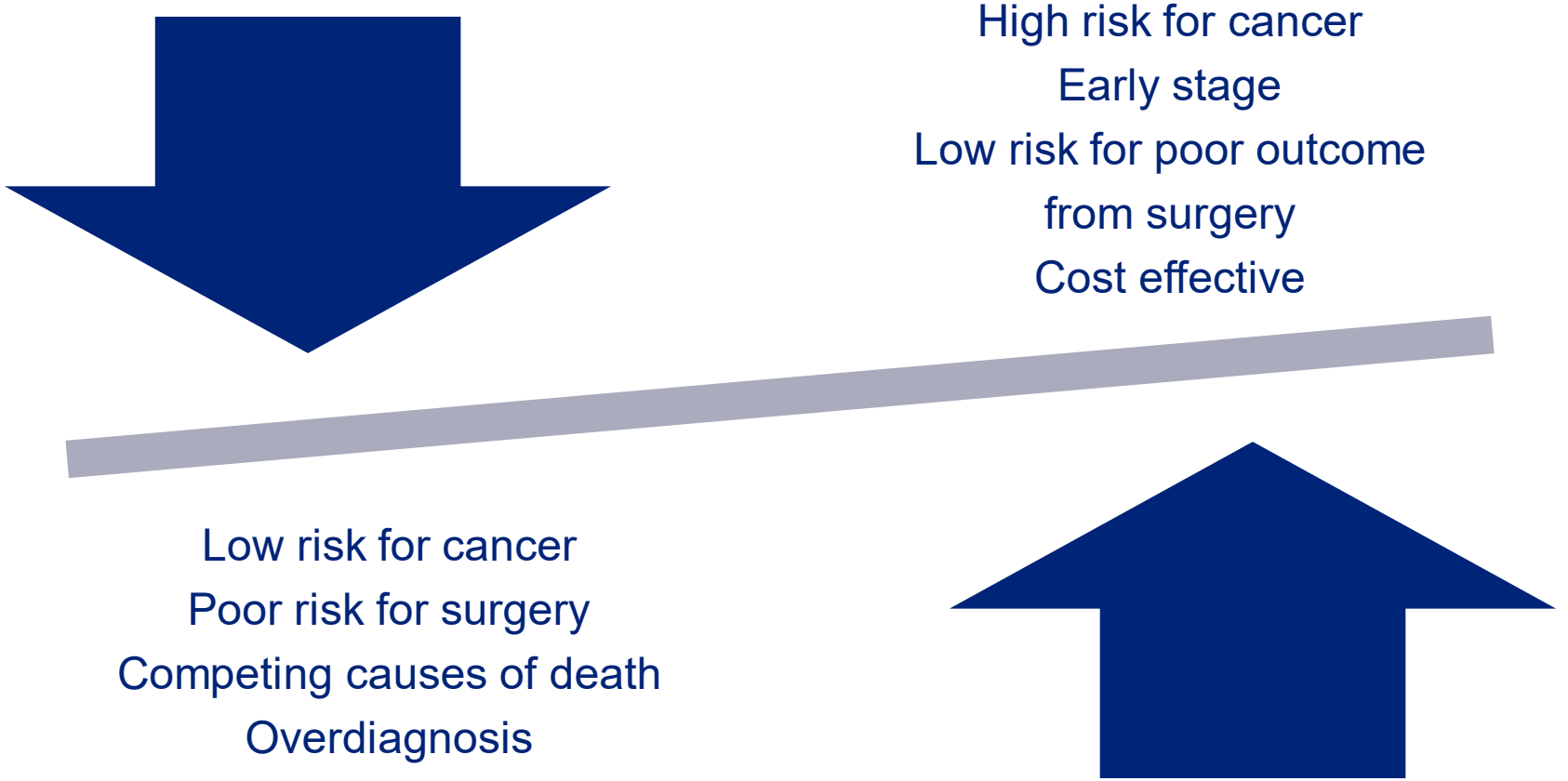
Guideline Outcomes



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Reduced Lung-Cancer Mortality with Low-Dose Computed Tomographic Screening

National Lung Screening Trial Research Team

NEJM

Prospective, randomized trial (n= 53,464)

- 33 centers across the United States
- Low-dose CT screening vs. CXR among patients at high risk

- age 55-74
- >30 pack-year smoking history
- active smokers or former smokers who quit within the past15years
- medically fit to undergo curative surgery

Aberle et al, 2011, *NEJM*

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NLST Results

Nodule detection (positive screens)

- 24.2% in the LDCT group, 6.9% in CXR group
- False positive rate: 96.4% in the LDCT group, 94.5%in CXR group

Results: 356 LCA death in LDCT, 443 in CXR

- 20% relative reduction in deaths from LCA
- 6.7% reduction in overall mortality
- Number Needed to screen: 320

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Screening for lung cancer: U.S. Preventive Services Task Force recommendation statement (2014)

The USPSTF recommends annual screening for lung cancer

- low-dose computed tomography (LDCT)
- adults aged 55 to 80 years
- 30 pack-year smoking history
- currently smoke or have quit within the past 15 years
- health problem that substantially limits life expectancy or the ability or willingness to have curative lung surgery
- Grade B recommendation

Ann Intern Med. 2014 Mar 4;160(5):330-8. doi: 10.7326/M13-277

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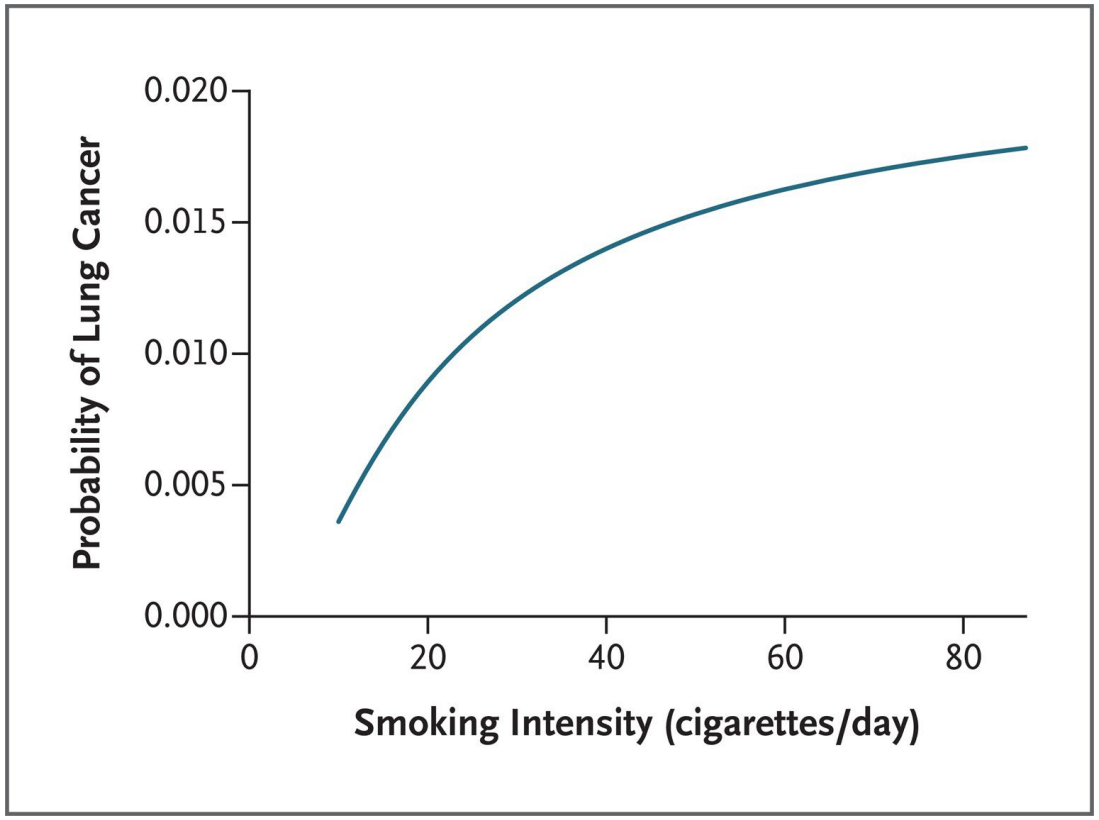

Nonlinear Relationship between Smoking Intensity (Average Number of Cigarettes Smoked per Day) and Lung-Cancer Risk.

Probabilities were calculated on the basis of the following variables: an age of 62 years, white race or ethnic group, some college education, a body-mass index (the weight in kilograms divided by the square of the height in meters) of 27, no chronic obstructive pulmonary disease, no personal history of cancer, no family history of lung cancer, status as a former smoker, smoking history of 27 years, and cessation of smoking 10 years before enrollment.

CHEST 2015; 147(2): 295 - 303

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USPTF 2021; The new guidelines

- Reduce screening age from 55 to 50 years
- Reduce minimum smoking history from 30 to 20 pack-years
- Includes more high-risk women and racial minorities in screening
- 14·5 million Americans will be eligible for screening, which is an increase of 6·5 million compared with the previous guidelines
- Screening under the new guidelines could save an additional 10 000–20 000 lives each year

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Potter et al. Lancet Respir Med. 2021 Jul;9(7):689-691

NELSON and NLST (the only positive studies)

Trial	Age (y/o)	Smoking Status	*n*	Type of Study	Rounds and Follow-Up	Results
NLST	55–75	smokers >30 p/y; <15 years former smokers	53,454	LDCT vs. CXR	3 annual rounds; 5.2 years	20% reduced LC mortality compared to CXR (HR 0.8, $p < 0.004$)
NELSON	55–74	>15 p/y; ≤10 years former smokers	15,792	LDCT observational	4 rounds (1, 2, and 2.5 years after); 11 years	24% and 33% reduced LC mortality in males and females, respectively (HR 0.76)
DANTE	60–74	>20 p/y; <10 years former smoker	2811	LDCT observational	4 annual rounds; 8 years	Non-significant reduction in LC mortality (HR 0.99)
MILD	>49	>20 p/y; <15 years former smoker	4099	LDCT observational	8 years annual or biannual rounds; 10 years	Reduction of 10-year risk of LC mortality (HR 0.61)
ITALUNG	55–69	>20 p/y; <10 years former smoker	3206	LDCT observational	4 annual rounds; 10 years	Non-significant reduction in LC mortality (HR 0.7)
DLCST	50–70	>20 p/y; <10 years former smoker	4104	LDCT vs. CXR	5 annual rounds; 5 years	Non-significant reduction in LC mortality (HR 1.03)
LUSI	50–69	>15 p/y; <10 years former smoker	4052	LDCT observational	5 annual rounds; 8.8 years	Reduction in LC mortality in women (HR 0.31; $p = 0.04$)
UKLS	50–75	N/A	4055	LDCT observational	1 round; 7.3 years	Non-significant reduction in LC mortality (HR 0.65)

NLST, National Lung Screening Trial; NELSON, Nederlands-Leuvens Longkanker Screenings Onderzoek; DANTE, Detection and Screening of Early Lung Cancer by Novel Imaging Technology and Molecular Essays; MILD, Multicentric Italian Lung Detection; DLCST.

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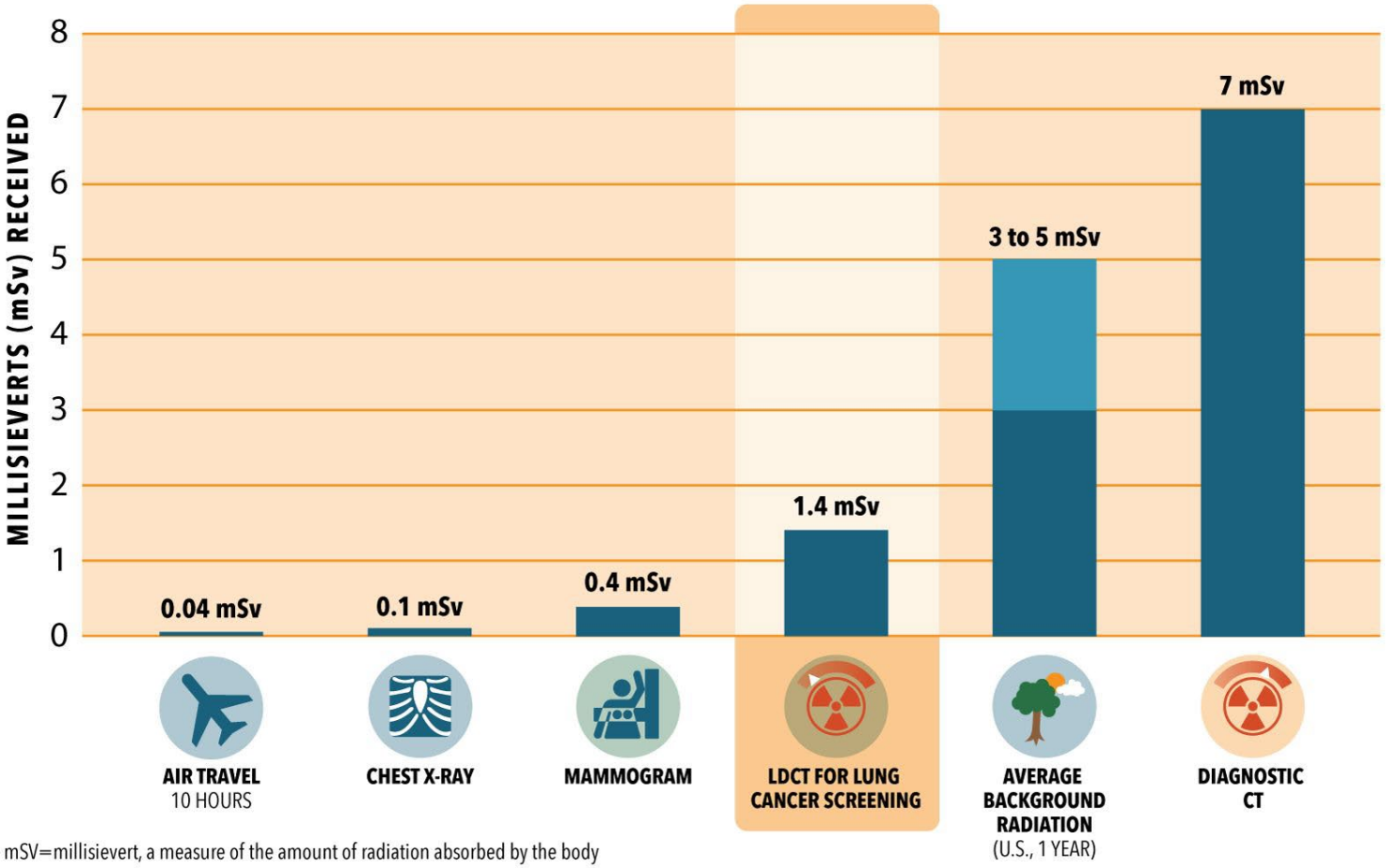
Radiation Risk of Lung Cancer Screening



- Background radiation is about 3.1 mSV annually
- LDCT confers 1.5-3 mSv of radiation
- Based on average dosage of 4.3 mGy from LDCT, lifetime attributable risk of lung cancer mortality is **0.07%** in men and **0.14%** in women

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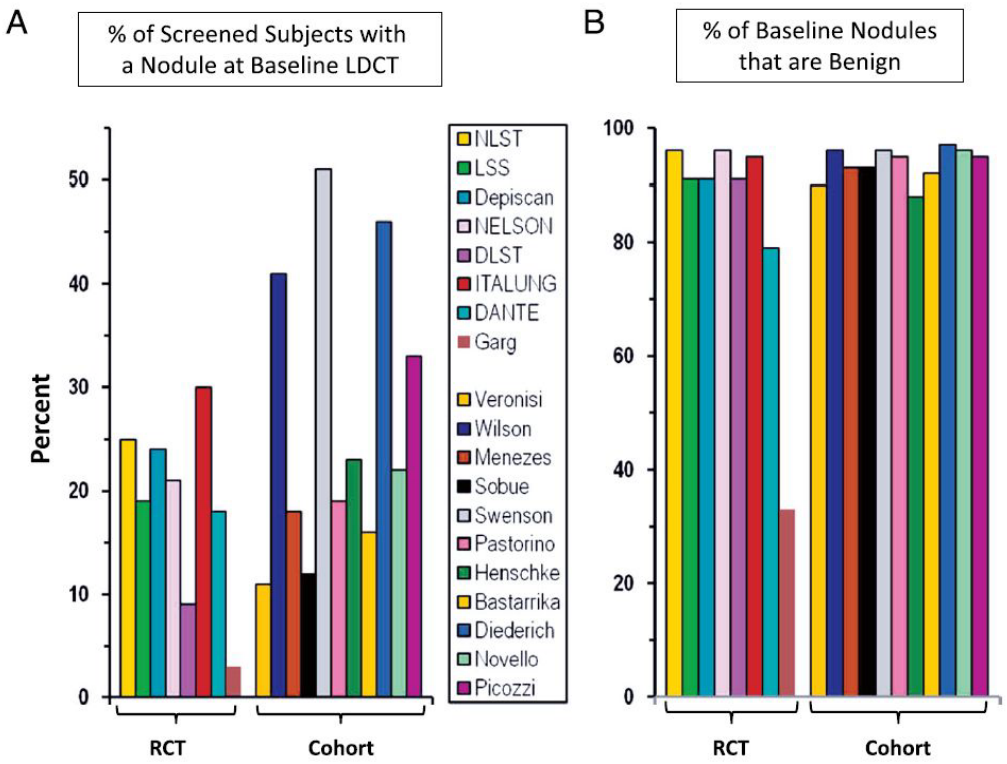
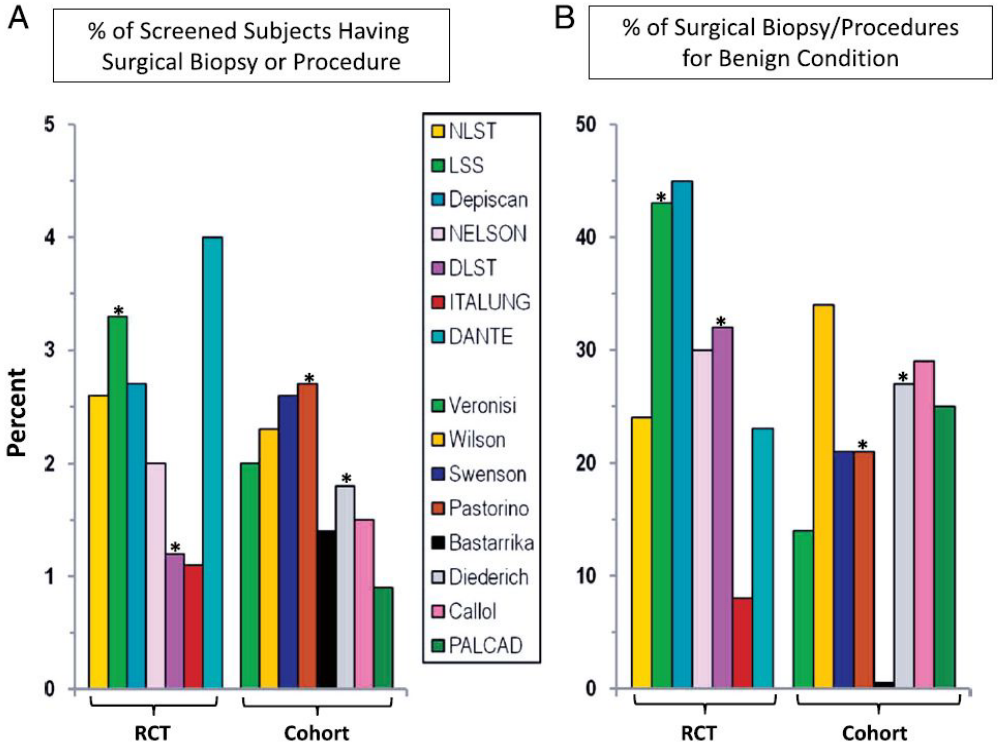
Screening and false positive



Procedures or benign disease



Detterbeck,F; Chest 2013

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Consequences of Potential Nodule Thresholds Within the NLST

Threshold, mm	Nodules, %	Cancer, %	Cancers, No.
4	26.7	3.8	267
7	12.6	7.4	249
11	4.6	17.3	214
21	1.1	33.9	103
30	0.4	41.3	45

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CHEST 2015; 147(2): 295 - 303

Available Society Guidelines for Smaller and Low-Risk Nodules

Nodule Type	Size, mm	Recommended Follow-up, Mo		
		Fleischner Society/ CHEST[21-23]	NCCN	Lung-RADS[20]
Solid	< 6	6-12, 18-24	RTAS	RTAS
	≥ 6 to < 8	3-6, 9-12, 24	3, 6, RTAS	6, RTAS
	≥ 8 to ≤ 10	3-6, 9-12, 24	PET scan and/or biopsy or resect	3, RTAS
Pure GGN	≤ 5	None	RTAS	RTAS
	> 5	3, 12, 24, 36	6, RTAS	RTAS up to 20 mm
Part-solid	≤ 5	3, then annual × 3	RTAS	RTAS (uses 6 mm)
	> 5	3, then biopsy or resect	As for solid	Based on size of solid component

CHEST = American College of Chest Physicians; GGN = ground-glass nodule; NCCN = National Comprehensive Cancer Network; RTAS = return to annual screening.

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CHEST 2015; 147(2): 295 - 303

Components Necessary for High-Quality Lung Cancer Screening

Components		
Who Is Offered Lung Cancer Screening	Outreach to potential eligible Performing risk assessment Engaging in share decision making	
How Often, and for How Long, to Screen	The benefits of identifying new stage I lung cancer persist on subsequent years (T1, T2 and perhaps beyond)	NLST, USPTF criteria
How the CT Scan Is Performed	CT scan screening that is in keeping with the ACR-STR technical specifications and credentialing criteria.	Non-contrast-enhanced-thin cut, low dose
Lung Nodule Identification	Size threshold	
Structured Reporting	communication tool, to define what constitutes a positive finding on the LDCT, and to be a lung nodule management strategy for low-risk nodules	Lung RADS (ACR)
Lung Nodule Management Algorithms	Multidisciplinary team including radiology, pulmonary/interventional, oncology and thoracic surgery	Risk calculation, guideline recommended interventions
Smoking Cessation	Integrated smoking cessation program and reporting data	
Patient and provider education	Guidelines, patient selection, Shared decision making (f2f meeting)	Educating providers and patients
Data collection	Reporting of above components	Quality improvement and research

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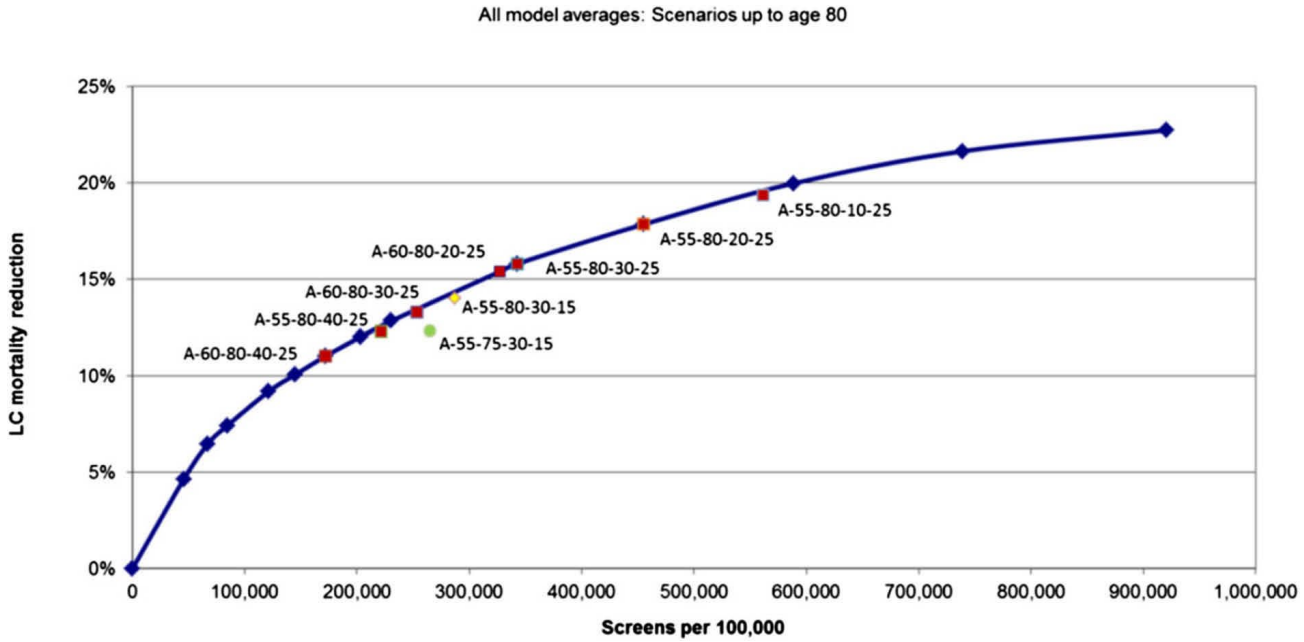
CHEST 2015; 147(2): 295 - 303

Variation in Benefit (Number Needed to Screen to Prevent One Death From Lung Cancer) to Harm (FPs per Prevented Lung Cancer Death) Based on the Quintile of Risk Within the NLST

5-y Risk of Lung Cancer Death, %	FP per Prevented Lung Cancer Death	Number Needed to Screen
All	108	302
0.15-0.55	1,648	5,276
0.56-0.84	181	531
0.85-1.23	147	415
1.24-2.00	64	171
>2.00	65	161

FP = false positive (benign nodule detected on screening CT scan);
NLST = National Lung Screening Trial.



Most efficient strategies based on modeling performed for the US Preventive Services Task Force. All used an annual strategy. 5 Estimated
lung cancer mortality reduction (average of five models) from annual CT scan screening in the 1950 birth cohort for programs with eligible ages of 55 to 80 years and different smoking eligibility cutoff s.
A= annual; LC=lung cancer.

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CHEST 2015; 147(2): 295 - 303

Lung-RADS

Lung-RADS Version 1.0 Versus Lung-RADS Version 1.1

Assessment Categories Pertinent to This Study (Categories 2-4A)

Category Descriptor	Lung-RADS Score	Findings under Lung-RADS v1.0	Findings under Lung-RADS v1.1	Management
Benign Appearance or Behavior Nodules with a very low likelihood of becoming a clinically active cancer due to size or lack of growth	2		**Perifissural nodule(s):** <10 mm	**Continue annual screening with LDCT in 12 months**
		Solid nodule(s): < 6 mm or new < 4 mm	**Solid nodule(s):** < 6 mm or new < 4 mm	
		Part solid nodule(s): < 6 mm total diameter on baseline screening	**Part solid nodule(s):** < 6 mm total diameter on baseline screening	
		Non solid nodule(s) (GGN): <20 mm OR ≥ 20 mm and unchanged or slowly growing	**Non solid nodule(s) (GGN):** <30 mm OR ≥ 30 mm and unchanged or slowly growing	
		Category 3 or 4 nodules unchanged for ≥ 3 months	Category 3 or 4 nodules unchanged for ≥ 3 months	
Probably Benign Probably benign finding(s) - short term follow up suggested; includes nodules with a low likelihood of becoming a clinically active cancer	3	**Solid nodule(s):** ≥ 6 to < 8 mm at baseline OR new 4 mm to < 6 mm	**Solid nodule(s):** ≥ 6 to < 8 mm at baseline OR new 4 mm to < 6 mm	**6 month LDCT**
		Part solid nodule(s): ≥ 6 mm total diameter with solid component < 6 mm OR new < 6 mm total diameter	**Part solid nodule(s):** ≥ 6 mm total diameter with solid component < 6 mm OR new < 6 mm total diameter	
		Non solid nodule(s) (GGN): ≥ 20 mm on baseline CT or new	**Non solid nodule(s) (GGN):** ≥ 30 mm on baseline CT or new	
Suspicious Findings for which additional diagnostic testing is recommended	4A	**Solid nodule(s):** ≥ 8 to < 15 mm at baseline OR growing < 8 mm or new 6 to < 8 mm	**Solid nodule(s):** ≥ 8 to < 15 mm at baseline OR growing < 8 mm or new 6 to < 8 mm	**3 month LDCT; PET/CT may be used when there is a ≥ 8 mm solid component**
		Part solid nodule(s): ≥ 6 mm with solid component ≥ 6 mm to <8 mm OR with a new or growing < 4 mm solid component	**Part solid nodule(s):** ≥ 6 mm with solid component ≥ 6 mm to <8 mm OR with a new or growing < 4 mm solid component	

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Shared Decision Making

Few clinicians are trained in methods to promote effective

communication with patients

Competing demands of practice limit what can be done in a 15 minute visit

Visit dedicated to discussing the risks and benefits associated with lung cancer screening (Required by Medicare for re-imbursement)

Risk of Screening	Benefits of Screening
Unnecessary testing and potential complications	Reduced cancer associated mortality
Psychological distress	Reduced overall mortality
Over-diagnosis	Other incidental diagnosis
Radiation exposure	Smoking cessation success

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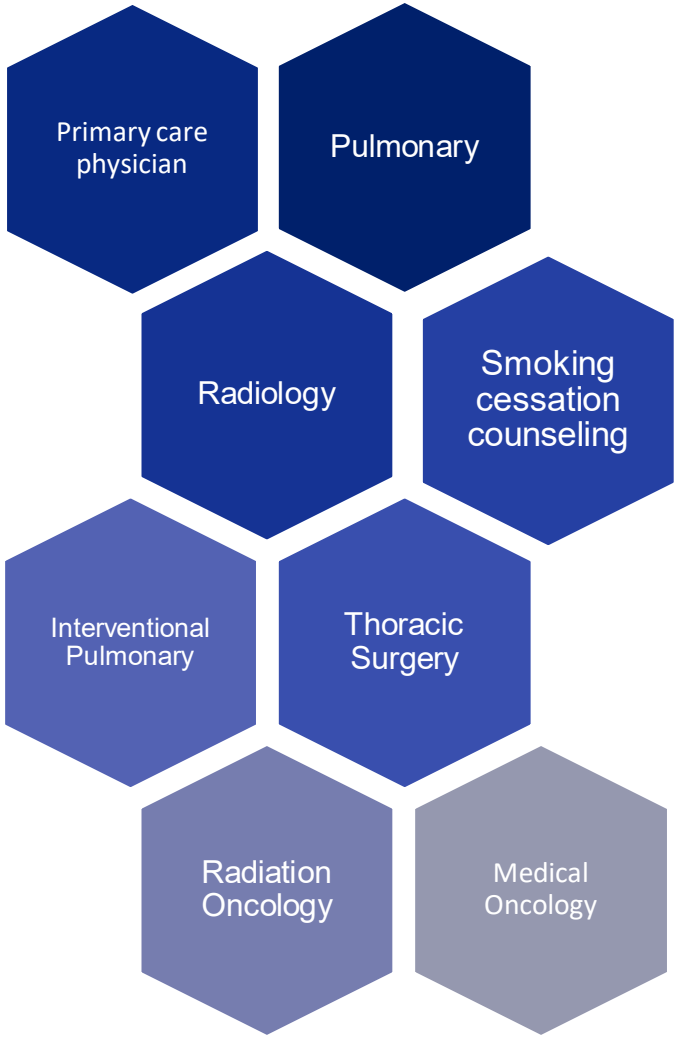
Multidisciplinary Team



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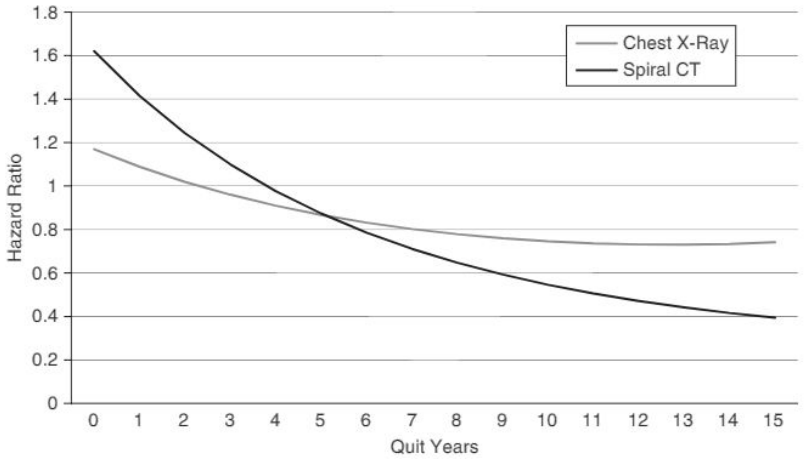
The Association between Smoking Abstinence and Mortality in the National Lung Screening Trial

- Screening is a teachable moment for smokers to consider smoking cessation
- Cost per QALY for smoking cessation is $1108-4542,
- LDCT is about $81,000
- Aim: Determine when abstinence alone results in the same mortality reduction seen with screening
- Methods: Secondary data analysis of the NLST

Current smokers had an increased lung cancer-specific (HR range 2.14-2.29) and all-cause mortality (HR range 1.79-1.85) compared to former smokers irrespective of screening arm

Former smokers in the control arm abstinent for 7 years had a 20% mortality reduction comparable to the benefit reported with LDCT screening in the NLST

The combination of smoking abstinence and LDCT screening resulted in a 38% reduction in lung cancer-specific mortality (HR 0.62, 95% CI 0.51 – 0.76)



Adjusted hazard ratios for LC specific mortality, quit years by intervention group in former smokers

Tanner et al, AJRCCM, 2014

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Multilevel barriers to effective lung cancer screening

Patient-level barriers
- Competing needs and demands for health care
- Cost
- Fear (e.g., procedures, diagnosis, treatment)
- Lack of awareness
- Lack of interest due to stigma associated with smoking
- Limited access to care due to financial or social factors
- Limited information and misinformation
- Logistical issues (e.g., inconvenience, time)
- Mistrust of the health care system and/or health care
- Nihilism

Provider-level barriers
- Competing demands for time
- Evolving attitudes about the effectiveness of screening
- Lack of awareness
- Limited information and misinformation
- Limited training in shared decision-making
- Nihilism related to treatment of lung cancer
- Requirement for behavior change (adaptive challenge)

System-level barriers
- Lack of support from health system leaders
- Limited resources to support screening, including equipment, personnel, and information technology resources
- Competing demands for limited resources (e.g., other screening programs or preventive health interventions)
- Uncertain return on investment
- Complexity of implementation (requires multidisciplinary collaboration)
  - Conflicting upper age range recommendations for screening
  - Identification of screening-eligible patients (gaps in smoking status data)

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Reminders

Continued Education Credit is available to:

- RNs/LPNs/Social Workers – CEU
- MD/DO/PAs/Pharmacists – CME

Steps:

- Navigate to Optum Health Education
- Request CEU/CME credit by June 5th, 2024

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  - ❑ Click on the ellipsis and select add to calendar

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Upcoming

Mark your Calendars

06/13/2024

A Saliant History in Narcotics and the Opioid Epidemic

presented by Dr. Jonathan Sorci

Thank you for attending!