

# Lung Cancer Screening

Marshfield Clinic Grand Rounds  
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Marshfield Clinic®

# Cancer Screening

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- Fundamental principle: detection of cancer at an early, *asymptomatic* stage will result in more effective treatment and reduced cancer-specific mortality
  - Ideal screening program
    - Targets high risk individuals
    - Uses a cost-effective test
    - Excludes individuals without clinically significant abnormalities
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# Lung Cancer Epidemiology

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- 13% of all US cancers
- Leading cause of cancer-related mortality
  - 1.4 million annual deaths worldwide
  - 158,000 annual deaths in U.S. in 2015
    - 27% of all cancer deaths
    - Exceeds deaths due to colorectal, breast, prostate and pancreatic cancers combined
    - Lung cancer among *never-smokers* would be the 6<sup>th</sup>-8<sup>th</sup> most common cause of cancer mortality

# Lung Cancer in Wisconsin

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- 4370 estimated cases 2015
  - 3050 estimated deaths 2015
  - 192-257 cases annually seen at Marshfield Clinic
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# Lung Cancer Risk Factors

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- Environmental factors
    - **Tobacco smoking**
      - 85-90% of lung cancers occur in smokers
      - Relative risk 20-30x
    - Radon<sup>222</sup> exposure
    - Indoor cook stoves
    - Other exposures (e.g. asbestos, silica, arsenic)
    - Diet ?
  - Host factors
    - Family history
    - Specific genetic polymorphisms or mutations
    - Chronic lung disease
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# Effect of Smoking Cessation on Lung Cancer Incidence

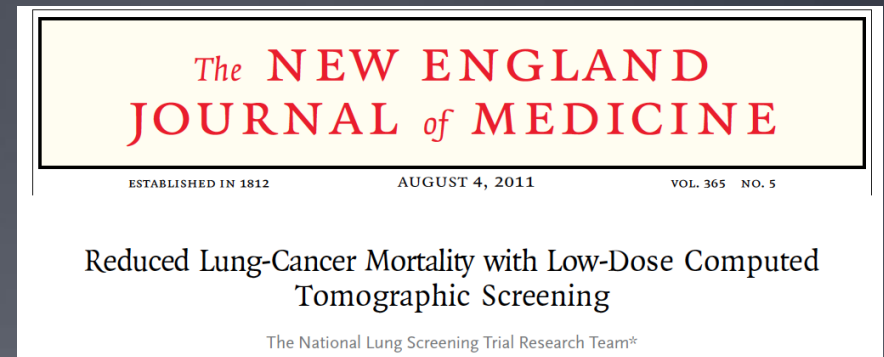
Smoking Status	Risk Ratio	
	Men	Women
Current Smoker	1.00	1.00
Quit < 10 years	0.66	0.69
Quit 10-19 years	0.44	0.21
Quit 20-29 years	0.20	0.05 <sup>1</sup>
≥ 30 years	0.10	
Never-smoker	0.03	0.05

<sup>1</sup>For women ≥ 20 years

## Lung Cancer Screening

Until 2010, no evidence existed for a mortality benefit from screening with chest x-ray, lung CT scanning or sputum cytology

October 2010 results of the National Lung Screening Trial (NLST) initially announced followed by a full report published online June 29, 2011 and in print August 2011



# National Lung Screening Trial (NLST)

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- ***Randomized, controlled trial*** comparing low dose CT scans (LDCT) to chest radiograph (CXR) annually for 3 years in high risk population
- Powered to detect 20% reduction in lung cancer- specific mortality
- 55,434 randomized (2520 @ Marshfield Clinic)
- Screening conducted at 33 sites in US 2002-2007



# National Lung Screening Trial (NLST) Eligibility and Exclusions

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- **Eligibility**
  - Age 55-74 years
  - $\geq 30$  pack-years smoking history
  - Former smokers quit  $\leq 15$  years
- Exclusions
  - Previous lung cancer diagnosis
  - Chest CT within 18 months
  - Hemoptysis
  - Unexplained weight loss  $>15$  lbs.

# NLST

## Bottom Line

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- With median follow-up 6.5 years, cancer deaths
  - LDCT 247
  - CXR 309 } **20% mortality reduction**
- 13% excess of lung cancers in LDCT arm—possible *overdiagnosis*
- 50% of cancers in LDCT arm stage IA-IB (compared to 10% of clinically diagnosed lung cancers); 57.1% stage I-II
- Number needed to screen to prevent 1 death=320

# Potential Impact of LDCT Lung Cancer Screening

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- NLST cited as 1 of 10 most important advances in 2011
  - Estimated potential to save  $\approx 30,000$  lives annually in US
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# LDCT Lung Cancer Screening CMS (Medicare) Coverage

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- CMS approval 2-5-15
  - “. . . evidence is sufficient to add a lung cancer screening counseling and shared decision making visit, and for **appropriate beneficiaries**, annual screening for lung cancer with low dose computed tomography (LDCT), as an additional preventive service benefit under the Medicare program . . .”
  - CMS eligibility criteria
    - Same as NLST, except **age 55-77**
    - Screening program must incorporate shared decision-making and tobacco cessation counseling

# University of Michigan Decision Aid

## <http://www.shouldiscreen.com/>

### LUNG CANCER CT SCREENING

Should I get screened?

[CLICK HERE TO LEARN MORE](#)

#### We can help you.

Deciding whether or not to go through lung cancer CT screening is not easy. Here, there is up to date information provided by doctors to help you make an informed choice.



BENEFITS AND HARMS OF SCREENING



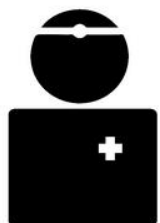
LUNG CANCER RISK CALCULATOR

### Questions for risk calculator

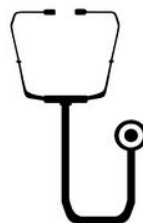
- Age
- Smoking status
- Smoking dose
- Gender
- Education
- Race/ethnicity
- BMI calculation
- Hx of cancer
- Family hx of lung cancer
- COPD

# Lung Cancer Screening

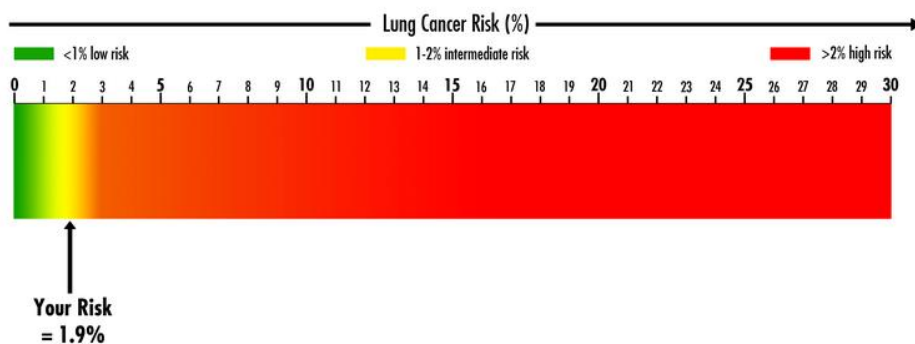
## SHOULD I DO IT?



Given your age and smoking history, you are **eligible** for screening according to the US Preventive Services Task Force criteria.



The chance of you developing lung cancer in the next 6 years is 1.9%. Talk to your doctor about the option to screen or not to screen as s/he will understand your situation best.



Compared to other people like you, there will be 4 fewer deaths out of 1000 in the next 6 years if you get screened.

## BENEFITS



### 4 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 (overdiagnosis). This may lead to unnecessary treatment and complications.

# Marshfield Clinic Lung Screening Program

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- Personel
    - *Jackie Pfeifer, APNP, Pulmonary Medicine, Lung Cancer Screening Program Coordinator (extension 75619)*
    - Marian Greenburg, M.D., General Internal Medicine
    - Joel McCauley, M.D., Pulmonary/Critical Care Medicine
    - Kori Krueger, M.D., IQIPS
    - Heidi Kenney, M.D., Radiology
    - John Warner, M.D., Radiology
    - Linda Pelton, District Administrator
    - Larry Sternitzky, Operations Manager, Pulmonary Medicine
    - Kenneth Brown, Regional Radiology Manager
  - LDCT performed at Marshfield, Wausau, Minocqua, Eau Claire, Rice Lake, Flambeau Hospital (not DTC)
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# LDCT Screening Cost Marshfield Clinic

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- Standard fee \$250
  - Covered by WI Medicare and Medicaid
  - Commercial coverage variable
  - Much of the total screening-related cost results from diagnostic evaluation of positive LDCTs
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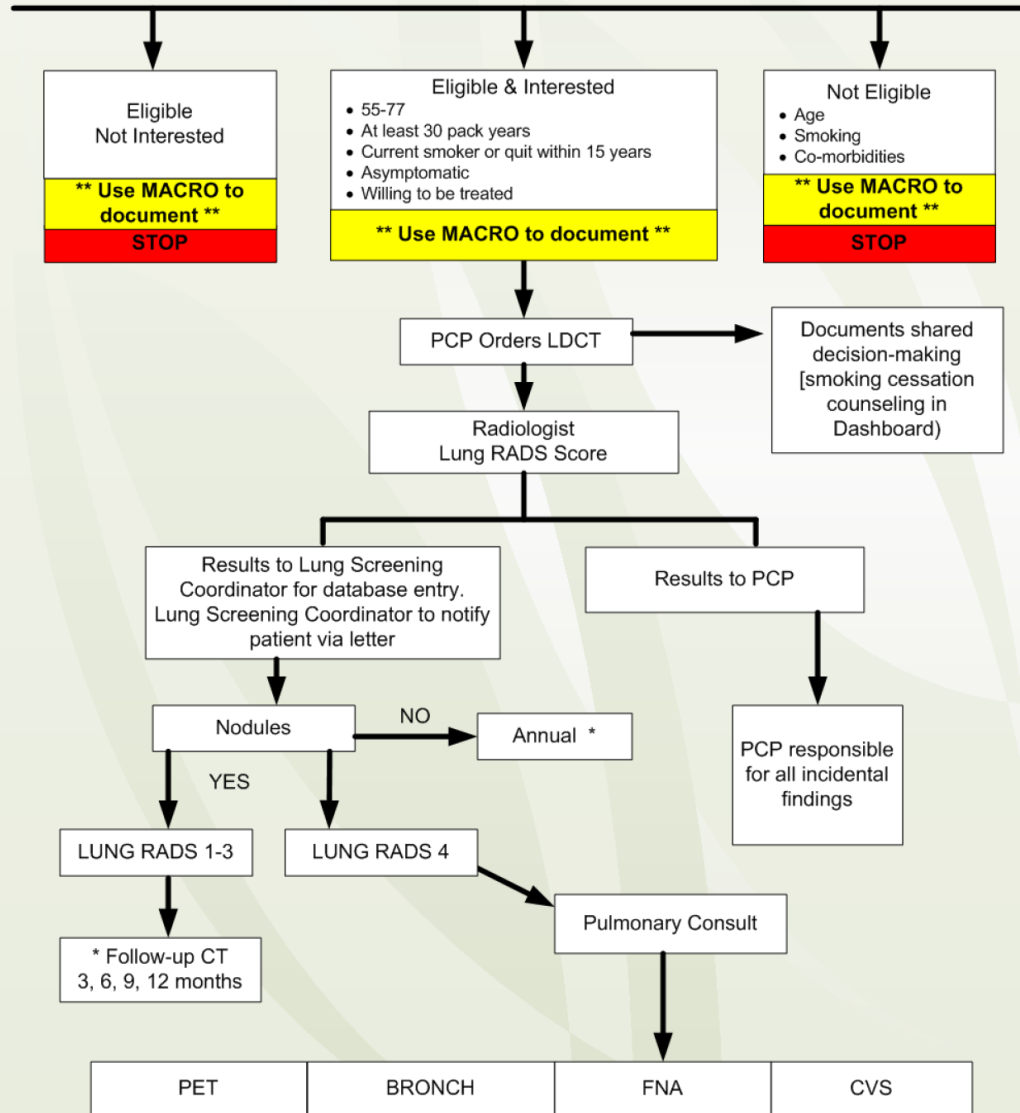


# Ordering LDCT Screening Examination

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- Assess eligibility of patient
  - **Shared decision making**—discuss risks and benefits of screening (decision aid may be helpful)
  - If patient consents to screening, order **low-dose chest CT** (service code 5417)
  - Discuss **smoking cessation** for current smokers
  - **Document** using document manager macro—required by CMS
    - Symptoms suggestive of lung cancer
    - Shared decision making
    - Smoking cessation
  - Referring provider responsible for follow-up of CT results (negative, positive, incidental findings) and ordering of subsequent LDCT or diagnostic studies
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# Patient & PCP Pathway for Low-Dose CT Screening with Shared Decision Making



\* All F/U CTs to be ordered by PCP. Coordinator will send a reminder to PCP

# Marshfield Clinic Initial Lung Cancer Screening Experience

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- Tracking patients since April 2014
  - 150 patients screened
    - 5 LungRADS 4 patients
    - No confirmed lung cancers
    - 3 of 5 had PET/CT
    - 1 FNA (infection)
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# LDCT Lung Cancer Screening *Program*

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- This is not a one time test—patient is being entered into a screening program
  - Screening continues until
    - Patient declines further participation
    - Patient no longer meets eligibility criteria
    - Lung cancer is diagnosed
  - Individual patient data is submitted to CMS registry
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# Summary

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- Lung cancer is the #1 cause of cancer mortality
- Data from NLST demonstrate a 20% mortality reduction from LDCT screening of high-risk population
- In appropriate populations, the benefits of screening outweigh the harms
- LDCT screening now covered by CMS and most insurers
- Implementation of an effective screening program is complex and requires multi-disciplinary collaboration, organization, data collection, quality improvement
- There remain many unanswered questions that can be addressed by continued data collection and research