The Role of Computed Tomography (CT) Screening for Lung Cancer

Recommendations from the American College of Chest Physicians and the American Society of Clinical Oncology
Introduction & Context

• High mortality associated with lung cancer
• Most diagnoses occur at later stages
• Prior to screening with low-dose computed tomography (LDCT), no evidence that screening strategies decreased lung cancer mortality risk
• National Lung Screening Trial (NLST) – first randomized controlled trial (RCT) to show a screening benefit in people with a history of heavy smoking (e.g. smoking 1 pack a day for 30 years or 2 packs a day for 15 years)
• All screening technologies carry potential benefits and potential harms
Guideline Methodology: Systematic Review

- Guideline based on a systematic review by the American Cancer Society, American College of Chest Physicians, American Society for Clinical Oncology and National Comprehensive Cancer Network
- An Expert Panel reviewed relevant medical literature
- Databases searched and data parameters
  - MEDLINE: 1996-April 2012
  - EMBASE: 1996-April 2012
  - Cochrane Collaboration Library: April 2012
- Evidence base: Eight RCTs and thirteen cohort studies in which all subjects were screened with LDCT
Clinical Questions

• Key Question 1: What are the potential benefits of screening individuals at elevated risk of developing lung cancer using LDCT?
• Key Question 2: What are the potential harms of screening individuals at elevated risk of developing lung cancer using LDCT?
• Key Question 3: Which groups are most likely to benefit or not benefit from screening?
• Key Question 4: In what setting is screening likely to be effective?

Abbreviations: LDCT, low-dose computed tomography
RECOMMENDATIONS

Note: Grade of recommendations based on modified GRADE approach (http://www.gradeworkinggroup.org)
Recommendation 1

• For smokers and former smokers who are age 55 to 74 and who have smoked for 30 pack years or more and either continue to smoke or have quit within the past 15 years, we suggest that annual screening with low-dose CT should be offered over both annual screening with chest radiograph or no screening, but only in settings that can deliver the comprehensive care provided to NLST participants.

• Grade of recommendation: 2B

• Note: Pack year = the number of packs of cigarettes smoked per day multiplied by the number of years a person has smoked
Remarks for Recommendation 1

• **Remark 1**: Counseling should include a complete description of potential benefits and harms, as outlined the guideline (*online*), so the individual can decide whether or not to undergo LDCT screening.

• **Remark 2**: Screening should be conducted in a center similar to those where the NLST was conducted, with multi-disciplinary coordinated care and a comprehensive process for screening, image interpretation, management of findings, and evaluation and treatment of potential cancers.

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Remarks for Recommendation 1, cont’d

• **Remark 3:** A number of important questions about screening could be addressed if individuals who are screened for lung cancer are entered into a registry that captures data on follow-up testing, radiation exposure, patient experience, and smoking behavior.

• **Remark 4:** Quality metrics should be developed such as those in use for mammography screening, which could help enhance the benefits and minimize the harm for individuals who undergo screening.

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Remarks for Recommendation 1, cont’d

- **Remark 5:** Screening for lung cancer is not a substitute for stopping smoking. The most important thing patients can do to prevent lung cancer is not smoke.

- **Remark 6:** The most effective duration or frequency of screening is not known.
Recommendation 2

• For individuals who have accumulated fewer than 30 pack years of smoking or are either younger than age 55 or older than 74, or individuals who quit smoking more than 15 years ago, and for individuals with severe comorbidities that would preclude potentially curative treatment and/or limit life expectancy, we suggest that CT screening should not be performed.

• Grade of recommendation: 2C
Summary of the Evidence

1. The National Lung Screening Trial (NLST), a large, high quality randomized controlled study demonstrated that among adults between the ages of 55-74 who smoked at least 30 pack years, including former smokers who quit within 15 years, annual screening with low-dose CT for 3 consecutive years reduced the absolute risk of lung cancer death by 0.33% when compared to annual screening with chest radiography. (continued on next slide)
Summary of the Evidence, cont’d

1 *(cont’d)*. This translates to 3 fewer deaths from lung cancer for every 1,000 high-risk individuals who undergo CT screening rather than screening with chest radiography and a 20% relative risk reduction. This mortality reduction was observed over a median follow-up of 78 months. Another smaller randomized controlled trial of CT screening did not find a benefit when compared with no screening.
2. Multiple studies have shown that screening with low-dose CT finds lung nodules in about 180 of every 1,000 individuals who undergo screening. While 95% of these nodules ultimately prove not to be cancerous, their evaluation typically involves repeat CT scanning, and sometimes requires the use of invasive procedures, including surgery. Invasive procedures carry risks, including rarely, major complications and even death.
3. The reported outcomes for CT screening have been achieved in selected, high-risk, motivated study volunteers who underwent screening at centers with experience in imaging, diagnosis and treatment, using an organized process of scanning, scan interpretation and nodule evaluation. Application of CT screening to lower risk groups or outside of these settings may alter the balance of observed benefits and harms unfavorably.
Summary of the Evidence, cont’d

4. The reported benefit of CT screening is primarily from a study that compared LDCT screening to chest x-ray screening rather than no screening. Studies have not found a benefit of chest x-ray screening.

5. Extrapolated estimates suggest that the magnitude of the harm from radiation delivered by low-dose CT screening is smaller than the estimated benefit of screening individuals such as those screened in the NLST for lung cancer.
Clinician-Patient Communication

- Quantify the potential benefits
- Quantify the potential harms
- Emphasize smoking cessation
- Point to useful tools on smoking cessation, risk of radiation exposure and calculating lung cancer risk
Future Directions/Research

Outstanding questions/suggested research

• Generalizability of reported findings
• Comparison of limited # of annual screenings to potentially higher # of annual screenings
• Optimum screening schedule
• Cost-effectiveness studies
• Randomized trials with participants of different ages and smoking histories than in the NLST and in settings unlike those in previous studies
## Guideline Methodology: Panel Members

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*Note: *authors of guideline, †authors of systematic review*
Additional Resources

• The systematic review and guideline recommendations was published in *JAMA*, May 20, 2012
• The full guideline and systematic review supplementary materials are available at *JAMA*
• A patient guide is also available at [http://www.cancer.net](http://www.cancer.net)
ASCO Guidelines

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