Low Dose CT Lung Cancer Screening

April Cox D.O.
Diagnostic Radiologist
Good Samaritan Hospital
Disclosures

• None
Objectives

- National Lung Screening Trial (NLST)
- Current Low dose Lung Cancer Screening guidelines
- Lung-RADS
- Controversies in Screening
- Possible changes in future of Screening
Lung Cancer

- Lung cancer is 2\textsuperscript{nd} most common cancer in US
- #1 Leading cause cancer death in both men and women
- Estimated 224,390 new diagnoses 2016
  - 158,080 deaths in 2016
- Indiana 35,180 estimated new cases 2016
  - 13,510 deaths 2016
Lung cancer

- **Risk Factors**
  - #1 – Cigarette smoking
    - Estimated 90% of male and 78% female lung cancers caused by smoking
    - Indiana is 7th in nation for highest smoking rates at 24.7%
  - Exposure to second hand tobacco smoke
  - Exposure to other carcinogens
    - Radon gas, asbestos, arsenic, chromium, and nickel
Lung cancer

- Lung cancer five year survival rate is on ave. 17.8%
  - lower than colon 65.4%, breast 90.5%, and prostate 99.6% cancers
  - More lung cancer deaths per year than all other 3 combined
- Surgically treated early stage lung cancer has improved survival of approximately 88%
  - However only 15% are found at this stage
  - 50-60% of patients are stage 3 or 4 at diagnosis

1,2

Early detection can increase the survival rate of stage I lung cancer to nearly 90%
SCREENING TRIALS
Early Lung Screening Trials

- 1970’s National Cancer Institute sponsored 3 randomized control trials
  - John Hopkins
  - Memorial Sloan Kettering
  - Mayo Lung Project
- Benefit of chest radiography with sputum cytology in lung cancer detection
- Experimental arm: Annual chest radiography and sputum every 4 mo
- Control arm: Annual chest radiography alone
Early Lung Screening Trials

- Enrolled 29,638 total patients across all 3 hospitals
  - 14,812 in experimental arm
  - 14,826 in control arm
- Screened for 6 years
- Results:
  - Lung cancer incidence rate, resectability, and survivorship were greater in screened group than control group
  - **No Significant Reduction in lung cancer mortality**
National Lung Screening Trial (NLST)

- Randomized multicenter study
  - 33 U.S. medical centers
- Compare low dose CT chest with chest x-ray
    - Sept. 2002– April 2004 Enrolled patients
    - Collected data thru Dec. 31, 2009
- Enrolled 53,454 high risk participants
  - 55-74 years of age
  - Current or former heavy smokers
    - Quit < 15 years
  - At least 30 pack-year history
  - Asymptomatic
  - No history of lung cancer
National Lung Screening Trial (NLST)

- Each participant was randomized into two arms
  - undergo 3 annual screenings by using either low-dose CT (LDCT) or chest x-ray
    - 26,722 in low dose CT arm
    - 26,732 in CXR arm
  - Data was collected on lung cancer cases and lung cancer related deaths.
  - Primary endpoint of the study was lung cancer mortality.
### NLST: Stage Groupings

#### Table 5. Stage and Histologic Type of Lung Cancers in the Two Screening Groups, According to the Result of Screening.*

<table>
<thead>
<tr>
<th>Stage and Histologic Type</th>
<th>Low-Dose CT</th>
<th>Chest Radiography</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Positive Screening Test (N = 649)</td>
<td>Negative Screening Test (N = 44) †</td>
</tr>
<tr>
<td>Stage</td>
<td>Positive</td>
<td>Negative</td>
</tr>
<tr>
<td>IA</td>
<td>329/635</td>
<td>5/44</td>
</tr>
<tr>
<td>IB</td>
<td>71/635</td>
<td>2/44</td>
</tr>
<tr>
<td>IIA</td>
<td>26/635</td>
<td>2/44</td>
</tr>
<tr>
<td>IIB</td>
<td>20/635</td>
<td>3/44</td>
</tr>
<tr>
<td>IIIA</td>
<td>59/635</td>
<td>3/44</td>
</tr>
<tr>
<td>IIIB</td>
<td>49/635</td>
<td>15/44</td>
</tr>
<tr>
<td>IV</td>
<td>81/635</td>
<td>14/44</td>
</tr>
</tbody>
</table>

*Percentages are calculated as number/total number
National Lung Screening Trial (NLST)

- 645 cases and 247 deaths from lung cancer per 100,000 person-years in the low-dose CT group
- 572 cases and 309 deaths per 100,000 person-years in the radiography group
  - **20% reduction in lung-cancer specific mortality with LDCT** (95% CI, 6.8 to 26.7; \( P=0.004 \)).
  - **6.7% reduction in all cause mortality with LDCT**
- 3 fewer deaths per 1000 people screened in CT compared to CXR
National Lung Screening Trial (NLST)

- Non-small cell lung cancer detected more frequently at earlier stage by CT
  - Adenocarcinoma and squamous cell carcinoma
- Small cell lung cancer infrequently detected at early stage on LDCT or CXR
  - very aggressive
Timeline for CT Lung Cancer Screening Approval

- **June 2011**: NLST\(^1\) releases initial findings for CT lung cancer screening for high-risk individuals
- **December 2013**: USPSTF gives low-dose CT lung cancer screening “B” recommendation
- **November 2014**: CMS releases proposal in favor of lung cancer screening
- **February 2015**: CMS releases final rule on lung cancer screening

- **2011**
  - June 2013: USPSTF\(^2\) releases draft recommendation

- **2013**
  - April 2014: MEDCAC\(^3\) recommends against Medicare coverage for lung screening

- **2014**
  - January 2015: Lung cancer screening commercial reimbursement expected to begin
Who gets screening?

### Lung Cancer: Screening

**Release Date:** December 2013

#### Recommendation Summary

<table>
<thead>
<tr>
<th>Population</th>
<th>Recommendation</th>
<th>Grade (What’s This?)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adults Aged 55-80, with a History of Smoking</td>
<td>The USPSTF recommends annual screening for lung cancer with low-dose computed tomography (LDCT) in adults aged 55 to 80 years who have a 30 pack-year smoking history and currently smoke or have quit within the past 15 years. Screening should be discontinued once a person has not smoked for 15 years or develops a health problem that substantially limits life expectancy or the ability or willingness to have curative lung surgery.</td>
<td>B</td>
</tr>
</tbody>
</table>

---

**Supporting Documents**

- Final Evidence Review
- Evidence Summary
- Modeling Report

---

**Clinical Summary**

Clinical summaries are one-page documents that provide guidance to primary care clinicians for using recommendations in practice.
GUIDELINES AND REQUIREMENTS
## Current Guidelines

<table>
<thead>
<tr>
<th>Primary Criteria</th>
<th>National Comprehensive Cancer Network</th>
<th>USPTF Grade B Recommendation</th>
<th>CMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>55 – 74 years</td>
<td>• 55 – 74 years</td>
<td>• 55 – 80 years</td>
<td>• 55 – 77 years</td>
</tr>
<tr>
<td>30 pack-yrs</td>
<td>• ≥ 30 pack-yrs</td>
<td>• ≥ 30 pack-yrs</td>
<td>• ≥ 30 pack-yrs</td>
</tr>
<tr>
<td>Current smoker or quit ≤ 15 yrs</td>
<td>• Current smoker or quit ≤ 15 yrs</td>
<td>• Current smoker or quit ≤ 15 yrs</td>
<td>• Current smoker or quit ≤ 15 yrs</td>
</tr>
<tr>
<td>Asymptomatic</td>
<td>• Asymptomatic</td>
<td>• Asymptomatic</td>
<td>• Asymptomatic</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Secondary Criteria</th>
<th>None</th>
<th>None</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 50 years</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥ 20 pack-yrs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>At least one other risk factor (not second-hand smoke)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

11,12
CMS: Requirements

- Initial LDCT must be ordered during a lung cancer screening counseling and shared decision making visit

- Documentation Required
  1. Eligibility Criteria are all met and documented
  2. One or more decision aids to discuss benefits, harms, follow-up diagnostic testing, over-diagnosis, false positive rate, total radiation exposure
  3. Counseling on importance of adherence to annual LDCT screening
     - impact of comorbidities
     - willingness to undergo diagnosis and/or treatment
  4. Counseling on smoking cessation (or continued abstinence)
     - Offering additional tobacco cessation counseling services if appropriate
Importance of Tobacco Cessation Counseling with Screening

• Screening is more effective with tobacco cessation
• Cigarette smoking is the MOST important risk factor in lung cancer
• Cessation
  • decreases risk of lung cancer
  • Increases cost effectiveness of lung cancer screening
• Required by CMS for reimbursement
Importance of Tobacco Cessation Counseling with Screening

• NLST secondary analysis
  • 26,073 Non-smokers -quit smoking less than 15 years

• After 7 yrs of not smoking and LDCT screening - 20% reduction in death from lung cancer

• Each additional year (>7yrs) the risk of dying of lung cancer decreased by 9%
Importance of Tobacco Cessation Counseling with Screening

- NLST
  - 24,190 current smokers

- For each additional 10 pack/yrs smoked in screening patients
  - 10% increase in Lung cancer mortality
  - 6% increase in all cause mortality
CMS: Additional Requirements

- LDCT Must be performed at specialized centers
  - Radiology imaging center with appropriate expertise and equipment
- Centers must collect and submit data to a CMS-approved national registry
  - American College of Radiology (ACR) Lung Cancer Screening Registry
CMS: Additional Requirements

- 20 Indiana hospitals in the ACR LCSR as of April 25, 2016
  - Cameron Memorial Community Hospital 416 E Maumee St Angola IN
  - Elkhart General Hospital 600 East Boulevard Elkhart IN
  - Deaconess Health System 600 Mary St Evansville IN
  - Community Imaging Center County Line 333 East County Line Rd, Suite A Greenwood IN
  - Community Hospital East 1500 North Ritter Ave Indianapolis IN
  - Community Hospital North 7150 Clearvista Drive Indianapolis IN
  - Community Hospital South 1402 East County Line Road Indianapolis IN
  - Community Imaging Center East 7910 East Washington St, Suite 150 Indianapolis IN
  - Community Imaging Center North 8181 Clearvista Parkway Indianapolis IN
  - NWR 10603 N Meridian Street 10603 North Meridian St Indianapolis IN
  - Memorial Hospital and Health Care Center 800 W. 9th Street Jasper IN
  - RHN Clark Memorial Hospital, LLC 1220 Missouri Avenue Jeffersonville IN
  - IU Health Starke Hospital 102 E. Culver Rd. Knox IN
  - Advanced Medical Imaging 2008 W Boulevard Kokomo IN
  - Dearborn County Hospital 600 Wilson Creek Rd Lawrenceburg IN
  - IU Health LaPorte Hospital 1007 Lincolnway La Porte IN
  - Community Imaging Center Noblesville 9669 East 146th St, Suite 140 Noblesville IN
  - Terre Haute 3901 S. 7th Street Terre Haute IN
  - Union Hospital 1606 N 7th Street Terre Haute IN
  - Good Samaritan Hospital 520 South 7th Vincennes IN
LDCT REPORTING
LDCT Reporting

• Consistency of radiology reporting is extremely important
  • Convey information regarding findings and follow up
• Fleischner Society Guidelines
  • Solid nodules
  • Low and high risk
  • Begin follow up at 4mm
Reporting

- NLST-- More than half of baseline exams in NLST were positive for nodules 4 - 6mm
- Raising the threshold to 6mm decreases baseline positives down to 13%
- Reduction in false positive rate
- Increase positive predictive value
- No increase in false negatives
EVALUATION OF SCREENING FINDINGS

- <6 mm
  - Solid or part-solid nodule
    - If low suspicion of lung cancer, LDCT in 3 months
    - No increase in size, proceed to surgical excision
    - Increase in size, proceed to surgical excision

- 6-8 mm
  - LDCT in 3 months
  - If no increase in size, proceed to surgical excision
  - Increase in size, proceed to surgical excision

- >8 mm
  - Consider PET/CT
  - If no resolution, proceed to bronchoscopy

FOLLOW-UP OF SCREENING FINDINGS

- Annual LDCT for 2 years (category 1) and suggest annual LDCT until patient no longer eligible for definitive treatment
- Annual LDCT for 2 years (category 1) and suggest annual LDCT until patient no longer eligible for definitive treatment

Note: All recommendations are category 2A unless otherwise indicated. Clinical Trials: NCCN believes that the best management of any cancer patient is in a clinical trial. Participation in clinical trials is especially encouraged.
Lung RADS

- Lung Reporting and Data System (L-RADS)
  - Developed by ACR Lung Cancer Screening Committee
  - Includes recommendations for both solid and semisolid nodules
  - Reflective of NCCN lung cancer screening guidelines
<table>
<thead>
<tr>
<th>Category</th>
<th>Category Descriptor</th>
<th>Category</th>
<th>Findings</th>
<th>Management</th>
<th>Probability of Malignancy</th>
<th>Estimated Population Prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incomplete</td>
<td>*</td>
<td>0</td>
<td>prior chest CT examination(s) being located for comparison or part or all of lungs cannot be evaluated</td>
<td>Additional lung cancer screening CT images and/or comparison to prior chest CT examinations is needed</td>
<td>n/a</td>
<td>1%</td>
</tr>
</tbody>
</table>
| Negative | No nodules and definitely benign nodules | 1        | no lung nodules
nodules(s) with specific calcifications: complete, central, popcorn, concentric rings and fat containing nodules | | | |
| Benign Appearance or Behavior | Nodules with a very low likelihood of becoming a clinically active cancer due to size or lack of growth | 2        | solid nodule(s):
< 6 mm
new < 4 mm
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 category 3 or 4 nodules unchanged for ≥ 3 months | Continue annual screening with LDCT in 12 months | < 1% | 90% |
| 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
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 | 6 month LDCT | 1-2% | 5% |
| Suspicious | Findings for which additional diagnostic testing and/or tissue sampling is recommended | 4A       | solid nodule(s):
≥ 8 to < 15 mm at baseline OR
growing < 8 mm OR
new 6 to < 8 mm
part solid nodule(s):
≥ 6 mm with solid component ≥ 6 mm to < 8 mm OR
with a new or growing < 4 mm solid component
endobronchial nodule | 3 month LDCT; PET/CT may be used when there is a ≥ 8 mm solid component | 5-15% | 2% |
| | | 4B       | solid nodule(s):
≥ 15 mm OR
new or growing, and ≥ 8 mm
part solid nodule(s) with:
a solid component ≥ 8 mm OR
a new or growing ≥ 4 mm solid component | chest CT with or without contrast, PET/CT and/or tissue sampling depending on the probability of malignancy and comorbidities. PET/CT may be used when there is a ≥ 8 mm solid component. | > 15% | 2% |
| | | 4X       | Category 3 or 4 nodules with additional features or imaging findings that increases the suspicion of malignancy | | | |
| Other | Clinically Significant or Potentially Clinically Significant Findings (non lung cancer) | 5        | modifier - may add on to category 0-4 coding | As appropriate to the specific finding | n/a | |
| Prior Lung Cancer | Modifier for patients with a prior diagnosis of lung cancer who return to screening | C        | modifier - may add on to category 0-4 coding | | | |
# Lung-RADS™ Version 1.0 Assessment Categories

**Release date:** April 28, 2014

<table>
<thead>
<tr>
<th>Category</th>
<th>Category Descriptor</th>
<th>Category</th>
<th>Findings</th>
<th>Management</th>
<th>Probability of Malignancy</th>
<th>Estimated Population Prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incomplete</td>
<td>-</td>
<td>0</td>
<td>prior chest CT examination(s) being located for comparison</td>
<td>Additional lung cancer screening CT images and/or comparison to prior chest CT examinations is needed</td>
<td>n/a</td>
<td>1%</td>
</tr>
<tr>
<td>Negative</td>
<td>No nodules and definitely benign nodules</td>
<td>1</td>
<td>no lung nodules</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>nodule(s) with specific calcifications: complete, central, popcorn, concentric rings and fat containing nodules</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benign Appearance or Behavior</td>
<td>Nodules with a very low likelihood of becoming a clinically active cancer due to size or lack of growth</td>
<td>2</td>
<td>solid nodule(s):</td>
<td>Continue annual screening with LDCT in 12 months</td>
<td>&lt; 1%</td>
<td>90%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>&lt; 6 mm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>new &lt; 4 mm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>part solid nodule(s):</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>&lt; 6 mm total diameter on baseline screening</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>non solid nodule(s) (GGN):</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>&lt; 20 mm OR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>≥ 20 mm and unchanged or slowly growing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>category 3 or 4 nodules unchanged for ≥ 3 months</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Lung RADS 1
Lung RADS 2

- <6mm
Lung RADS 2

• <6mm
<table>
<thead>
<tr>
<th>Category</th>
<th>Category Descriptor</th>
<th>Findings</th>
<th>Management</th>
<th>Probability of Malignancy</th>
<th>Estimated Population Prevalence</th>
</tr>
</thead>
</table>
| Probably Benign| Finding(s) - short term follow up suggested; includes nodules with a low likelihood of becoming a clinically active cancer | solid nodule(s):  
≥ 6 to < 8 mm at baseline OR  
new 4 mm to < 6 mm  
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 | 6 month LDCT                                                              | 1-2%                                      | 5%                           |
| Suspicious    | Findings for which additional diagnostic testing and/or tissue sampling is recommended | solid nodule(s):  
≥ 8 to < 15 mm at baseline OR  
growing < 8 mm OR  
new 6 to < 8 mm  
part solid nodule(s):  
≥ 6 mm with solid component ≥ 6 mm to < 8 mm OR  
with a new or growing < 4 mm solid component  
endobronchial nodule | 3 month LDCT; PET/CT may be used when there is a ≥ 8 mm solid component | 5-15%                                     | 2%                           |
|               |                                                                                     | solid nodule(s)  
≥ 15 mm OR  
new or growing, and ≥ 8 mm  
part solid nodule(s) with:  
a solid component ≥ 8 mm OR  
a new or growing ≥ 4 mm solid component | chest CT with or without contrast, PET/CT and/or tissue sampling depending on the probability of malignancy and comorbidities. PET/CT may be used when there is a ≥ 8 mm solid component. | > 15%                                     | 2%                           |
|               |                                                                                     | Category 3 or 4 nodules with additional features or imaging findings that increases the suspicion of malignancy |                                                                |                           |                               |
Lung RADS 3

- 6 - 8mm
Lung RADS 4a

- 8-15mm

Non-small cell- Squamous
Lung RADS 4b

- >15mm
Lung RADS 4b

• >15mm
Lung RADS 4b

• New >8mm (not baseline)
Lung RADS 4b
• New >8mm (not baseline)
Lung RADS 4x
### Lung-RADS™ Version 1.0 Assessment Categories Release date: April 28, 2014

<table>
<thead>
<tr>
<th>Category</th>
<th>Category Descriptor</th>
<th>Findings</th>
<th>Management</th>
<th>Probability of Malignancy</th>
<th>Estimated Population Prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other</td>
<td>Clinically Significant or Potentially Clinically Significant Findings (non lung cancer)</td>
<td>S modifier - may add on to category 0-4 coding</td>
<td>As appropriate to the specific finding</td>
<td>n/a</td>
<td></td>
</tr>
<tr>
<td>Prior Lung Cancer</td>
<td>Modifier for patients with a prior diagnosis of lung cancer who return to screening</td>
<td>C modifier - may add on to category 0-4 coding</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**IMPORTANT NOTES FOR USE:**

1) Negative screen: does not mean that an individual does not have lung cancer
2) Size: nodules should be measured on lung windows and reported as the average diameter rounded to the nearest whole number; for round nodules only a single diameter measurement is necessary
3) Size Thresholds: apply to nodules at first detection, and that grow and reach a higher size category
4) Growth: an increase in size of > 1.5 mm
5) Exam Category: each exam should be coded 0-4 based on the nodule(s) with the highest degree of suspicion
6) Exam Modifiers: S and C modifiers may be added to the 0-4 category
7) Lung Cancer Diagnosis: Once a patient is diagnosed with lung cancer, further management (including additional imaging such as PET/CT) may be performed for purposes of lung cancer staging; this is no longer screening
8) Practice audit definitions: a negative screen is defined as categories 1 and 2; a positive screen is defined as categories 3 and 4
9) Category 4B Management: this is predicated on the probability of malignancy based on patient evaluation, patient preference and risk of malignancy; radiologists are encouraged to use the McWilliams et al assessment tool when making recommendations
10) Category 4X: nodules with additional imaging findings that increase the suspicion of lung cancer, such as spiculation, GGN that doubles in size in 1 year, enlarged lymph nodes etc
11) Nodules with features of an intrapulmonary lymph node should be managed by mean diameter and the 0-4 numerical category classification
12) Category 3 and 4A nodules that are unchanged on interval CT should be coded as category 2, and individuals returned to screening in 12 months
13) LDCT: low dose chest CT

*Link to McWilliams Lung Cancer Risk Calculator*

Upon request from the authors at: http://www.brooku.ca/lung-cancer-risk-calculator

CONTROVERSIES OF LDCT
Lung Cancer Screening Controversies

- Cost
- Radiation exposure
- False positives
  - Over diagnosis bias
  - Unnecessary invasive diagnostic procedures
Lung Cancer Screening Controversies

- **Cost effectiveness**
  - Cost per life-yr saved would be $19,000
  - Cervical cancer $15,600 per life saved
  - Breast cancer screening with mammography $24,100 per life-year saved
  - Colon cancer with screening colonoscopy $19,000--$29,000 per life-year saved
- Lung cancer screening would cost $1 per insured member per month in 2012
Lung Cancer Screening Controversies

• **Radiation Dose**
  • LDCT in trial 1.5 mSv ave (conventional CT 8 mSv ave)
  • Strict adherence to scanning range
  • Dose optimization
  • Potential risk for radiation induced cancer from accumulation of repeat scans continues to be undefined

6,7,8
Controversies

• Management of Small nodules
  • Lung RADS
  • Threshold for follow up 6mm
• Over diagnosis Bias
  • No reliable method to distinguish nonlethal and indolent lung cancer from cancers that are most likely to metastasis
  • Screening can help identify slow growing cancers and assess their growth by serial imaging
    • Assessment can by combined with patient’s performance status and comorbidities
• Refuted by Prostate, Lung, Colon, Ovarian Trial [5] and Henschke et al [4]

6,7,8
Possible changes in Future

• Expanding the High risk population eligible for screening

• A single-center retrospective study comparing LDCT lung cancer screening between NCCN high risk groups 1 and 2

• January 2012 -- December 2013
  • NCCN High risk group 1
    • 55-74 years of age
    • ≥ 30 pack-year smoking history
    • Current of former smokers who quit within past 15 years
Possible changes in Future

- NCCN High-risk group 2
  - >50 years of age
  - >20 pack-year smoking history
  - Current of former smokers who quit for any length of time
  - At least one additional lung cancer risk factor, excluding secondhand smoke exposure
    - Personal history of smoking-related cancer
    - Family history of lung cancer in a first-degree relative
    - Chronic lung disease, including emphysema and pulmonary fibrosis
    - Known pulmonary carcinogens
Possible changes in Future

• 2,079 patients total
  • 1,541 in high risk group 1
  • 538 in high risk group 2
• Percentage rates of positive CT findings and cancer detection were similar between both groups
• Conclusion of study: By including NCCN high risk group 2 an additional 2 million people would be eligible for screening
• There is the potential to save thousands of more lives by including patients that meet group 2 high risk criteria into LDCT lung screening
• LDCT Lung Screening Program
• Sept 2014 – Present
• 76 scans on 65 patients
  • 5 positive for cancer (7%)
  • 12 currently being followed by the Pulmonary Clinic for lung nodules (17%)
Conclusion

• Early diagnosis and treatment of lung cancer with LDCT is cost effect and decreases mortality
• Lung RADS increases PPV without increasing false negatives
• Smoking Cessation is a key component of Lung Cancer Screening
• Despite the controversies there is convincing evidence in support of LDCT Screening
• In the future including more people in the screening group will save thousands of more lives
Thank You!

Any Questions?
References
