Lung Cancer Screening: ‘Pro and Contra’

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ESMO Preceptorship on
Lung Cancer
06/03/2019
Disclosure

• Nil to declare
Agenda – 40 minutes

• Lung cancer
  • Is there a need for screening?

• Lung cancer screening background
  • Story so far (pro)
  • Concerns (contra)

• The Manchester ‘Lung Health Check’ Pilot

• Conclusions
Lung Cancer – The problem globally

• Leading cause of cancer related death worldwide – 1.6million
• Europe: 400,000 new cases; 270,000 death annually
• 1 in 5 all cancer deaths
• Commonest cancer death in men; second in women
• Incidence rising in some countries
• Significant economic burden

Lung Cancer – the need for screening

- 70% present at late stage – non-curable
  - 30% of these die within 3 months
- 35% diagnosed as an emergency presentation
- Europe: Mean 5-year survival 12%
  - Range from 5% - 15%

**VS**

- Surgical resections: 5-year survival 70% (stage I-II)
- 10-year survival in patients having resection within 1 month of diagnosis has been quoted as high as 92%
Lung Cancer – every millimeter counts
Lung Cancer Screening...

.....the story so far
Sputum Cytology and CXR

• ‘The National Cancer Institute’s Cooperative Early Lung Cancer Detection Program’
  • The Memorial Sloan-Kettering Cancer Centre in New York
  • The John Hopkins Lung Project
  • The Mayo Lung Project

• >30,000 male smokers

• Annual CXR vs Sputum Cytology/Annual CXR

• Increased incidence and resections

• But.....NO mortality benefit

• Berlin NI. Cancer 2000;89:2349-51.
So what about the Chest X-Ray?
Prostate Lung Colorectal and Ovarian (PLCO)

- 1993 to 2001
- > 154,000 subjects enrolled
- Aged 55-74. Men, women and never smokers.

- Annual CXR vs ‘usual care’ – 4 years
- Median follow up of 12 years

Prostate Lung Colorectal and Ovarian (PLCO)

- 1,213 lung cancer deaths in screening arm
- 1,230 lung cancer deaths in control arm

- **NO mortality benefit** with annual CXR

But....

• 1990s – the role of Low Dose CT (LDCT) described in detection of lung cancer

• No Contrast

• Less radiation (1.5-mSv vs 7-8-mSv)
What about LDCT for lung cancer screening?
Low Dose CT

• Kaneko et al, 1996
  • CXR & LDCT in 1,369 subjects – LDCT superior

• Sone et al, 1998
  • Mobile LDCT in 5,483 subjects previously screened – LDCT superior

• ELCAP, 1999
  • LDCT vs CXR in 1,000 subjects (60 years, >10 Pack years)
    • 2.7% vs 0.7% detection
    • 2.3% vs 0.4% early stage
Turn of the millennium...

Renewed interest in lung cancer screening!
<table>
<thead>
<tr>
<th>Trial (Recruitment)</th>
<th>Method</th>
<th>Number Enrolled</th>
<th>Age Criteria</th>
<th>Scan Positivity Rate</th>
<th>Baseline Cancer Detection</th>
<th>Early stage cancer</th>
</tr>
</thead>
<tbody>
<tr>
<td>LSS (2004)</td>
<td>Single LDCT vs CXR</td>
<td>3,318</td>
<td>55-74</td>
<td>20.5%</td>
<td>1.9%</td>
<td>53%</td>
</tr>
<tr>
<td>DEPISCAN (2002)</td>
<td>Annual LDCT vs CXR 2 years</td>
<td>765</td>
<td>50-75</td>
<td>24%</td>
<td>2.4%</td>
<td>37.5%</td>
</tr>
<tr>
<td>DANTE (2001)</td>
<td>Annual LDCT vs No Screen 5 years</td>
<td>2,472</td>
<td>60-74</td>
<td>15%</td>
<td>2.2%</td>
<td>57%</td>
</tr>
<tr>
<td>ITALUNG (2004)</td>
<td>Annual LDCT vs No Screen 5 years</td>
<td>3,206</td>
<td>55-69</td>
<td>30.3%</td>
<td>1.5%</td>
<td>47.6%</td>
</tr>
<tr>
<td>DLCST (2004)</td>
<td>Annual LDCT vs No Screen 5 years</td>
<td>4,104</td>
<td>50-70</td>
<td>8.7%</td>
<td>0.8%</td>
<td>53%</td>
</tr>
<tr>
<td>MILDE (2005)</td>
<td>Annual LDCT vs Biennial LDCT vs No Screen 5 years</td>
<td>4,479</td>
<td>≥ 49</td>
<td>15% annual 14% Biennial</td>
<td>0.8%</td>
<td>63%</td>
</tr>
<tr>
<td>LUSI (2007)</td>
<td>Annual LDCT vs No Screen 5 years</td>
<td>4,052</td>
<td>50-69</td>
<td>26.6%</td>
<td>1.1%</td>
<td>80%</td>
</tr>
<tr>
<td>NLST (2002)</td>
<td>Annual LDCT vs CXR 3 years</td>
<td>53,454</td>
<td>55-74</td>
<td>24.2%</td>
<td>1.0%</td>
<td>57.1%</td>
</tr>
<tr>
<td>UKLS (2011)</td>
<td>Single LDCT vs No Screen</td>
<td>4,055</td>
<td>50-75</td>
<td>47.7%</td>
<td>1.7%</td>
<td>85.7%</td>
</tr>
<tr>
<td>NELSON (2003)</td>
<td>Annual LDCT vs No Screen 5.5 years</td>
<td>15,792</td>
<td>50-75</td>
<td>6%</td>
<td>0.9%</td>
<td>70.8%</td>
</tr>
</tbody>
</table>
National Lung Screening Trial (NLST)
• 53,454 participants
  • Age 55-74
  • 30 pack years
  • Smoked within past 15 years
• Randomised to 3 yearly screening rounds:
  • Low dose CT scans vs. chest X-ray.

Outcome
• 20% reduction in lung cancer deaths in the CT scan group and
• 6.7% reduction in overall deaths
American College of Chest Physicians (ACCP)

**SCREENING RECOMMENDATIONS**

**CT SCREENING SHOULD BE OFFERED TO:**
- Smokers & former smokers, age 55-74, with more than 30 pack-years of smoking.
- Annual low-dose CT scanning should be offered in a setting that delivers the comprehensive care provided to National Lung Screening Trial participants.

**CT SCREENING NOT RECOMMENDED FOR INDIVIDUALS:**
- With fewer than 30 pack-years of smoking
- Younger than 55 or older than 74
- With severe comorbidities that would preclude potentially curative treatment or limit life expectancy
### Lung Cancer: Screening

**Release Date:** December 2013

#### Recommendation Summary

<table>
<thead>
<tr>
<th>Population</th>
<th>Recommendation</th>
<th>Grades (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 (PDF Version)
- Evidence Summary (PDF Version)
- Modeling Report (PDF Version)

#### Clinical Summary
Clinical summaries are one-page documents that provide guidance to clinical settings.
The NELSON trial – results

<table>
<thead>
<tr>
<th>Round</th>
<th>Screening uptake</th>
<th>Indeterminate results</th>
<th>Positives</th>
<th>Lung cancer</th>
<th>PPV</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>7,557 (95.6%)</td>
<td>1,451 (19.2%)</td>
<td>197 (2.6%)</td>
<td>70 (0.9%)</td>
<td>36%</td>
</tr>
<tr>
<td>2</td>
<td>7,295 (92.3%)</td>
<td>480 (6.6%)</td>
<td>131 (1.8%)</td>
<td>55 (0.8%)</td>
<td>42%</td>
</tr>
<tr>
<td>3</td>
<td>6,922 (87.6%)</td>
<td>471 (6.8%)</td>
<td>165 (2.4%)</td>
<td>75 (1.1%)</td>
<td>45%</td>
</tr>
<tr>
<td>4</td>
<td>5,279 (66.8%)</td>
<td>101 (1.9%)</td>
<td>105 (2.0%)</td>
<td>43 (0.8%)</td>
<td>41%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>27,053 (85.6%)</td>
<td>2,503 (9.3%)</td>
<td>598 (2.2%)</td>
<td>243 (0.9%)</td>
<td>41%</td>
</tr>
</tbody>
</table>

- Good uptake
- 94% successful 10 year F/U
- Indeterminate results 9.3%
- Positives 2.2%

• H. de Koning @WCLC2018
The NELSON trial – mortality results (men)

- Control arm
  - 214 lung cancer deaths
- Screen arm
  - 157 lung cancer deaths

- 26% reduction in lung cancer mortality in men
The NELSON trial – mortality results

- 26% reduction in lung cancer mortality in males (95% CI 9-40%)

- 39-61% reduction in females

<table>
<thead>
<tr>
<th>Lung cancer mortality rate ratio (95% CI)</th>
<th>Year 8</th>
<th>Year 9</th>
<th>Year 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>MALES</td>
<td>0.75 (0.59-0.95, p=0.015)</td>
<td>0.76 (0.60-0.95, p=0.012)</td>
<td>0.74 (0.60-0.91, p=0.003)</td>
</tr>
<tr>
<td>FEMALES</td>
<td>0.39 (0.18-0.78, p=0.0037)</td>
<td>0.47 (0.25-0.84, p=0.0069)</td>
<td>0.61 (0.35-1.04, p=0.0543)</td>
</tr>
</tbody>
</table>
Lung Cancer Screening...

.....so what’s the problem??
1. False Positives

- LDCT detects benign nodules
- Stress, anxiety and fear
- Potential complications from further investigations
  - Further imaging
  - Biopsy
  - Surgery!

- Rate varied between 1-30%

False Positives – Ix/surgery for benign disease

<table>
<thead>
<tr>
<th>Additional diagnostics</th>
<th>Benign resections</th>
</tr>
</thead>
<tbody>
<tr>
<td>• NLST 33%</td>
<td>• NLST 24%</td>
</tr>
<tr>
<td>• UKLS 5%</td>
<td>• UKLS 10%</td>
</tr>
<tr>
<td>• NELSON 34%</td>
<td>• NELSON 23%</td>
</tr>
<tr>
<td>• DANTE 10%</td>
<td>• DANTE 19%</td>
</tr>
<tr>
<td>• MILD 53%</td>
<td>• ELCAP 8.9%</td>
</tr>
<tr>
<td></td>
<td>• ITALUNG 10.5%</td>
</tr>
</tbody>
</table>
False Positives – Nodule Management

• Need to risk assess individual nodules

• Risks:
  • Age
  • Background emphysema
  • Gender
  • Family history
  • Size and location of nodule
  • Pattern (solid vs non-solid)

Lung CT Screening Reporting & Data System

Lung-RADS™ is a quality-assured system designed to standardize lung cancer screening CT reporting and management recommendations, reduce confusion in lung cancer screening CT interpretations, and facilitate outcome monitoring.

A complete inclusion and exclusion list will be developed. The atlas will include a description of a normal audit and outcome monitoring process. The level of lung cancer screening CT forms and the reporting format will standardize the language used.

The Lung-RADS Assessment Categories document below contains version 2.0 of Lung-RADS, including the assessment categories and management recommendations.

- Lung-RADS Version 2.0 Assessment Categories PDF
- Lung-RADS Summary PDF

Lung-RADS™

<table>
<thead>
<tr>
<th>Findings</th>
<th>Category</th>
<th>Description</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Composition</td>
<td>0</td>
<td>Incomplete</td>
<td>Additional images</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Negative</td>
<td>LDCT - 12m</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Benign</td>
<td>LDCT - 6m</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Probably Benign</td>
<td>LDCT - 6m</td>
</tr>
<tr>
<td></td>
<td>4A</td>
<td>Suspicious</td>
<td>PET-CT ± Bx</td>
</tr>
<tr>
<td></td>
<td>4B</td>
<td>Suspicious</td>
<td>PET-CT ± Bx</td>
</tr>
</tbody>
</table>

BTS Guidelines for the Investigation and Management of Pulmonary Nodules

British Thoracic Society
Pulmonary Nodule Guideline Development Group

- Clinical Information
- Lung Imaging Reporting and Data System
- Lung-RADS™ by American College of Radiology
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- Contact: rads@acr.org

Thorax

An International Journal of Respiratory Medicine

August 2015 Volume 76 Supplement 2
False Positives – Nodule Management

• LUNG-RADS applied to NLST:
  • ↓ false positives by 52%

• NELSON trial
  • 2-step algorithm
  • Sensitivity 84.6%; Specificity 98.6%; NPP 99.8%
  • Size matters!!
    • <5mm: 0.6% risk of malignancy
    • 5-10mm + VDT 400-600 days: 4% risk of malignancy
    • 5-10mm + VDT <400 days: 9.9% risk of malignancy


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2. Overdiagnosis

- Overdiagnosis is the finding of an indolent lung cancer through screening that would have never had any clinical impact on the patient in their lifetime.
Overdiagnosis

• Concern of overdiagnosis has existed since initial LDCT studies
• Non-cancer mortality is 10% in lung cancer sufferers
• Need to account for lead-time bias
• Rate of overdiagnosis in NLST estimated as 18%
  • Median FU only 6.5 years
  • Control arm received CXR
• Evidence in LDCT is limited – need longer follow-ups
Overdiagnosis

3. The ‘hard to reach’

- **Increased risk and less likely to participate in screening**
  - Age
  - Active smoking
  - Lower socio-economic status

- **Practical barriers**
  - Travel
  - Costs
  - Distance

- **Emotional barriers**
  - Fear of hospitals
  - Fear of doctors
  - Avoidance
  - Lack of understanding

4. Who should we screen? – Risk Models

• Kovalchik model
  • NLST data: 20% lowest risk subjects accounted for 1% of prevented deaths
  • NNS to prevent 1 death: 161 vs 5276

• Liverpool Lung Project (LLP) model
  • Smoking, Respiratory disease, Asbestos, Previous cancers, family history.
  • Used in UKLS

• PLCO_{m2012} model
  • Using logistical regression from PLCO trial cohort
  • Age, socioeconomic status, BMI, ethnicity, sex, family history, personal history of cancer and respiratory disease, detailed smoking history

Risk Models

Fig 6. Sensitivity, specificity, and risk thresholds for the investigated risk prediction models and the National Lung Screening Trial criteria for 6-y lung cancer incidence in the Prostate, Lung, Colorectal and Ovarian Cancer Screening Trial chest radiography arm. CPS, Cancer Prevention Study; HPFS, Health Professionals Follow-up Study; LLP, Liverpool Lung Project; NHS, Nurses’ Health Study; NLST, National Lung Screening Trial; TSCE, Two-Stage Cional Expansion.
Selection Criteria for Lung-Cancer Screening

Martin C. Tammemägi, Ph.D., Hormuzd A. Katki, Ph.D., William G. Hocking, M.D., Timothy R. Church, Ph.D., Neil Caporaso, M.D., Paul A. Kvale, M.D., Anil K. Chatuvedi, Ph.D., Gerard A. Silvestri, M.D., Tom L. Riley, B.Sc., John Commins, B.Sc., and Christine D. Berg, M.D.
Threshold of risk: 1.51%
How often should we screen?

• MILD study
  • Annual vs biennial – no statistical difference

• NELSON Study
  • 2.5 year interval is too long

• Microsimulation models have shown mixed results

How often should we screen?

| Stage | Round 1 | | Round 2 | | Round 3 | | Round 4 |
|-------|---------|---------|---------|---------|---------|---------|
|       | n  | Per cent | Cumulative % | n  | Per cent | Cumulative % | n  | Per cent | Cumulative % | n  | Per cent | Cumulative % |
| Ia    | 44 | 59.5 | 59.5 | 43 | 74.1 | 74.1 | 50 | 64.9 | 64.9 | 22 | 47.8 | 47.8 |
| Ib    | 4  | 5.4 | 64.9 | 1  | 1.7 | 75.9 | 6  | 7.8  | 72.7 | 6  | 13.0 | 60.9 |
| Ila   | 7  | 9.5 | 74.3 | 4  | 6.9 | 82.8 | –  | –  | 76.6 | 3  | 6.5 | 67.4 |
| Ilb   | –  | –  | –  | –  | –  | –  | 3  | 3.9 | –  | 4  | 8.7  | 76.1 |
| IIia  | 10 | 13.5 | 87.8 | 6  | 10.3 | 93.1 | 14 | 18.2 | 94.8 | 3  | 6.5  | 82.6 |
| IIlb  | 4  | 5.4 | 93.2 | 2  | 3.4 | 96.6 | 1  | 1.3  | 96.1 | 2  | 4.3  | 87.0 |
| IV    | 5  | 6.8 | 100 | 2  | 3.4 | 100 | 3  | 3.9  | 100 | 6  | 13.0 | 100 |
| Total | 74 | 100 | – | 58 | 100 | – | 77 | 100 | – | 46 | 100 | – |

*p Value: comparison of stage distribution of the screening-detected lung cancers of round 1 vs round 4.
†p Value: comparison of stage distribution of the screening-detected lung cancers of round 2 vs round 4.
‡p Value: comparison of stage distribution of the screening-detected lung cancers of round 3 vs round 4.

How often should we screen?

• ? Risk stratification is the key ?

• A new solid nodule on subsequent screening scans have a higher malignancy risk

• A negative first scan strongly predictive of a negative subsequent scan
  • Less true for very high risk individuals
  • Manchester pilot: mean VDT for those with true negative first scan was only 49 days!

• Yousaf-Khan U. et al. Thorax 2017;72:819-824
• Walter, J. et al. Lancet oncology 2016: 17; 907-16
5. Radiation Exposure

- LDCT uses less radiation: 1.5mSv vs 7-8-mSv
- Exposure from a single LDCT is less than the average exposure from natural sources

- Repeated scanning is a concern
- Additional tests (eg PET) a concern
- Estimated lifetime risk of radiation induced lung cancer in a 50 female smoker is 0.85%
- Risk models suggest risk > benefit in non-smokers and <50 years

- Brenner DJ. Radiology 2004;231:440-5
6. Cost effectiveness

• Most work so far based on estimation models – variable

• UKLS have estimated a cost of £8,466 per QALY (CI £5,542-£12,569)
  • Within NICE limits for screening

• Targeting high risk subjects improves costs
  • Less eligible
  • Higher prevalence

• Whynes DK. Cost Eff Resour Alloc 2008;6:5
Do we meet screening criteria?

The Wilson-Jungner criteria for appraising the validity of a screening program (1968)

• The condition being screened for should be an important health problem - YES
• The natural history of the condition should be well understood - YES
• There should be a detectable early stage - YES
• Treatment at an early stage should be of more benefit than at a later stage - YES
• A suitable test should be devised for the early stage - YES
• The test should be acceptable - YES
• The risks, both physical and psychological, should be less than the benefits - YES
• Intervals for repeating the test should be determined – Making progress
• The costs should be balanced against the benefits – Making progress
So, where are we?

‘Does it really work?’ → ‘How can we actually do this?’
Real world example

The Manchester ‘Lung Health Check’ Screening Pilot
Why Manchester?
Rates of premature death: Manchester
defined as deaths under age 75 per 100,000 (2012-14)

- Overall: 150th out of 150 local authorities (LA)
- All Cancer: 150th out of 150 LA
- Heart disease: 150th out of 150 LA
- Stroke: 150th out of 150 LA
- Lung disease: 149th out of 149 LA
- Lung cancer: 150th out of 150 LA

Public Health England
http://healthierlives.phe.org.uk/topic/mortality
Lung Cancer in Manchester

Lung cancer incidence:
England and Wales (2011-13)

Causes of premature death: Manchester
(2011-13)

Public Health England
http://healthierlives.phe.org.uk/topic/mortality
The Manchester Lung Health Check Pilot – Key Design Features

- UK’s first NHS lung cancer screening implemented service
  - June 2016 – January 2018
  - Two rounds of screening - annual

- Community based
  - Supermarket car parks

- ‘Lung Health Check’
  - Not cancer screening

- Targeted at those most at risk
  - Deprived areas
  - Scan only those with PLCO_{m2012} ≥1.51%

- Immediate access to mobile low dose CT scanner
- Use of 14 specialist thoracic radiologists
- Detailed 2-step nodule management algorithms

- Inclusion criteria
  - Age 55-74
  - Ever smokers
  - Registered with participating GPs

- Exclusion Criteria
  - Diagnosis of lung cancer with 5 years
  - Palliative care register
Engagement Approach

- **Co-designed well researched participant info:**
  - GP invite letter
  - Lung Health Check and LDCT scan leaflets

- **Grass roots community engagement**
  - Community networks and events
  - Leafleting and Macmillan bus
  - Awareness sessions e.g. Breathe Easy groups
  - Bookmakers, Vape/E-Cig shops
  - Posters in community venues

- **GP Engagement**
  - Briefing sessions/ staff encouragement
  - Waiting room posters
  - Messages on prescriptions
  - Practice staff answering queries
Broader communication

Core Messages:
- “Sooner rather than later”
- “Lung Health Check” or “MOT for your lungs”
- Free
- Time and places limited
- Not normally available

- Local voices - Lord Mayor Film
- Press release, Local radio and TV
- Social media
- Patient stories
The Lung Health Check

- 20 minute appointment
- Experienced respiratory nurse
  - Band 6/7
- History & symptoms
- Performance Status; MRC score
- Measurements
  - Spirometry
  - Height, Weight, BMI
- Non-judgemental stop smoking advice & signposting
- Lung cancer risk score
  - PLCO_{m2012}
- Consents
  - Research database (99.5%)
  - Data sharing

Lung Cancer Risk (6-year) PLCO_{m2012}

- ≥1.51%
  - Lung cancer screening - LDCT

- <1.51%
  - Back to GP
Results – attendance

- All appointments booked within few days
  - Demand > service capacity (~2,800 appointments)
- Low DNA rate
- 2,541 lung health checks carried out
  - 25.6% of invited eligible participants
- 1,384 LDCT scans (56%)

- Mean age 64 (SD 5.5)
- Male 49%:51% Female
Results - attendance

Deprivation (IMD):
Over half lowest decile (56%)
75% lowest quintile

Education:
82% left school by 16
62% without any ‘O’ levels

Additional Risk
22% FH Lung Cancer
12% Personal Hx of cancer
24% Exposed to Asbestos
35% Current Smokers
(53% in screened group)
22% Hx of COPD

(90% PS 0-1)
(90% MRC 1-2)

IMD = index of multiple deprivation 2015
Results – lung cancer screening
(baseline round – prevalence)

• 1,384 LDCT scans performed

• Lung cancer diagnosis: 3% (n=42)

• 80% early stage (I+II)

• 64% Surgical resection

• 89% received treatment with curative intent

• False positives: 2.8% of population screened; 48% of those seen in clinic

• No surgery for benign disease

• Interval imaging rate: 12.7%
Results – Lung cancer screening
(Second round – incidence)

• Screening adherence good: >90%
• 1,194 LDCTs performed

• Scan positivity rate: 2.4%
• Interval imaging rate: 6%
  • Significantly lower than baseline round (p=0.0001)

• 19 lung cancers diagnosed – incidence rate 1.6%
• 79% early stage (all stage I)
• 89% received treatment with curative intent
Results – Lung cancer screening
(second round – incidence)

• False positives: 0.8% of the population screened
• (or) False positives: 34.5% of positive scans
  • Significantly lower than baseline round (p=0.0001)

• No interval lung cancers diagnosed
Results – Lung cancer screening (cumulative)

- **Lung cancer detection rate 4.4%**
  - (3% prevalence round; 1.6% incidence round)

- 1 cancer detected for every 23 people screened
- 80% early stage (I+II)
- 89% offered curative intent

- False positive rate 3.5%
  - 0.8% in the second round
- Benign surgical resection rate 2.5%
  - One case only
- No Lepidic pattern predominant cancers
- Sensitivity 89.5%; specificity 97.1%

Second round results from the Manchester ‘Lung Health Check’ community-based targeted lung cancer screening pilot

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Cardiovascular risk assessment

- CVD a major cause of morbidity and mortality in populations eligible for lung cancer screening.

- QRISK2 is a widely used UK-validated CVD risk calculator (www.qrisk.org.2017)

- Those at high risk, defined as QRISK2 score of >10%, are recommended to have primary intervention including statin therapy by NICE
The cost-effectiveness of the Manchester ‘lung health checks’, a community-based lung cancer low-dose CT screening pilot

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Results: The Manchester programme cost £663,076, diagnosed 42 patients with lung cancer resulting in a gain in population health of 88.13 discounted life years, equivalent to 65.85 QALYs. This implied an incremental cost-effectiveness ratio of £10,069/QALY.

Conclusions: We found the Manchester programme to be a cost-effective use of limited NHS resources. The findings suggest that further research is now needed not as to whether LDCT screening is cost-effective but under what conditions can it improve patient health by the most while remaining cost-effective.
The Manchester screening pilot - what does it teach us?

• Implementation is possible (small scale)
• You can reach those at highest risk and most likely to benefit
• You can reduce the potential harms of screening
• You can find early stage lung cancer amenable to curative treatment
• It can be cost-effective

• You can incorporate CVD risk assessment
• You can incorporate COPD diagnosis
• You can influence smoking quit rates
NHS England action to save lives by catching more cancers early

NHS England Chief Executive, Simon Stevens, will today announce the scaling up of an innovative scheme that catches lung cancer early by scanning patients, along with new details of a more sensitive bowel cancer test that could save thousands of lives.

Speaking at the **Economist War on Cancer event** in London, he will highlight the success of the Manchester scanner scheme, where mobile scanners are detecting four out of five cases of lung cancer in the early stages when it is easier to treat. The mobile scanning trucks have picked up one cancer for every 33 patients scanned over the course of a year.

NHS England is now funding scanners in other areas as part of a national programme to diagnose cancer earlier, improve the care for those living with cancer and ensure each cancer patient gets the right care for them.
What is next...

3.56. **Over the next two years, we will extend the lung health checks that have already produced strong results in Liverpool and Manchester.** Patients will have a breath test and a discussion to assess their individual lung cancer risk. Any patient assessed as being at high risk of lung cancer will have an immediate low-dose CT scan, with an accuracy of 88% at stage 1 and 13% at stage 4. In 2019, we will deploy more mobile lung health checks to supermarket car parks – starting in parts of the country with the highest number of lung cancers quickly, pick up a range of other respiratory diseases such as chronic obstructive pulmonary disease (COPD), and help reduce health inequalities.
What do the experts think?

IASLC ISSUES STATEMENT ON LUNG CANCER SCREENING WITH LOW-DOSE COMPUTED TOMOGRAPHY

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IASLC Issues Statement on Lung Cancer Screening with Low-Dose Computed Tomography

DENVER, Colo. — The International Association for the Study of Lung Cancer (IASLC) today issued a statement on lung cancer screening with low-dose computed tomography (LDCT)* based on results from the Dutch-Belgian NELSON lung cancer screening trial presented at the IASLC 19th World Conference on Lung Cancer (WCLC) in Toronto, Canada. The IASLC Early Detection and Screening Committee, recognizing the importance of these results, now affirms the strength of evidence arising from two large, well designed and well executed randomized trials that LDCT screening in high risk individuals can significantly reduce lung cancer mortality.
Are we ready to implement in Europe?

Still have issues to overcome

• Resources: facilities, staff, money
• Radiology!
• Standardised protocols and quality assurance
• Planning requires collaboration between public health, commissioning, primary care and specialist centres
• Different countries and populations have different systems and different needs
Conclusions

• Evidence of lung cancer screening is now stronger than ever
  • Two RCTs showing significant lung cancer mortality reduction
  • Further evidence coming from the smaller European trials

• Pilot programmes already underway implementing screening for their local populations (inc. Manchester)

• Strong support from international associations

• Logistics of implementation remain a challenge – needs careful planning, standardised protocols and a likely phased approach
Thank you

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