Uptake and long-term psychosocial outcomes of the UK Lung Screening trial

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Lung cancer is an area of unmet need

Lung cancer statistics

- Most common cause of cancer mortality in the UK
- Five year survival rate <10%

Lung cancer early detection strategies are essential

Low dose computed tomography (CT) screening

- 20% reduction in mortality in a high risk US trial (Aberle et al, 2011)
- High false positive rate
Psychosocial effects of lung screening

- Wilson & Jungner criteria: acceptability, benefit/harm ratio

- Barriers to lung screening uptake include smoking and fearful/fatalistic beliefs

- Minimal effect of trial allocation or CT screening result in Dutch-Belgian, Danish and US trials

- Effects in the UK context?
UKLS Methods

- Population-based pilot RCT in high risk individuals

- Random sample of N≈250,000 (50-75 yrs) approached from six PCTs in Liverpool and Cambridge

- Questionnaire to identify those at >5% risk over 5 years (Liverpool Lung Project risk criteria)
Information packs sent to 247,354 individuals (50-75 yrs)

Individuals agreed to participate 75,958 (30.7%)

High-risk individuals sent second information pack 8729 (11.5%)

Positive response 5967 (68.4%)
Non-uptake 2756 (31.6%)

Invited to recruitment centre

Trial uptake 4061 (68.0%)

CT screening arm 2028
No screening control 2027
Barriers to UKLS uptake in high risk individuals

<table>
<thead>
<tr>
<th></th>
<th>Non uptake N=2756</th>
<th>Uptake N=4061</th>
<th>multivariable OR (95% CI)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>986 (36%)</td>
<td>1020 (25%)</td>
<td>0.64 (0.58-0.71)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Older age (&gt;71 yrs)</td>
<td>831 (30%)</td>
<td>1070 (26%)</td>
<td>0.73 (0.64-0.80)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Current smokers</td>
<td>1334 (48%)</td>
<td>1568 (39%)</td>
<td>0.70 (0.63-0.78)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Lowest IMD quintile</td>
<td>924 (34%)</td>
<td>1090 (27%)</td>
<td>0.56 (0.49-0.65)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Higher affective risk</td>
<td>329 (44%)</td>
<td>1478 (36%)</td>
<td>0.52 (0.42-0.65)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Effect of socioeconomic group on UKLS uptake

Odds ratio (95% CI)

Deprivation quintile

1 (most deprived) 2 3 4 5 (least deprived)

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Odds ratio
Lower CI
Upper CI
## Qualitative analysis of barriers to uptake

<table>
<thead>
<tr>
<th>Main themes</th>
<th>Subcategory</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Practical Barriers</strong></td>
<td>Travel</td>
<td>138</td>
</tr>
<tr>
<td></td>
<td>Comorbidities</td>
<td>120</td>
</tr>
<tr>
<td></td>
<td>Carer responsibilities</td>
<td>43</td>
</tr>
<tr>
<td></td>
<td>Already receiving scans</td>
<td>41</td>
</tr>
<tr>
<td></td>
<td>Work and other commitments</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>Not in area</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Taking part in other research</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Language or literacy problems</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Cannot be scanned</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Prior exposure to radiation</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Effort required</td>
<td>5</td>
</tr>
<tr>
<td><strong>Emotional Barriers</strong></td>
<td>Avoidance of LC information</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>Fear</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Anxiety from taking part or results</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Mistrust of medical system</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Recent bereavement</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Anxiety of family member</td>
<td>1</td>
</tr>
</tbody>
</table>
Impact of trial allocation (primary outcome)

† T0 baseline score included as covariate in ANCOVAs, using log transformations
Cancer Worry Scale score >12.5 corresponds to a clinically significant threshold score on GHQ-28 (Brain et al. Psycho-Oncology, 2011)

**Lung cancer worry scores**

- **T1 one month**
  - Intervention (N=1653): 8.8
  - Control (N=1579): 8.6

- **T2 up to two years**
  - Intervention (N=1653): 8.4
  - Control (N=1579): 8.2
Impact of trial allocation (primary outcome)

‡ T0 baseline score included as covariate in ANCOVAs, using log transformations

Cancer Worry Scale score >12.5 corresponds to a clinically significant threshold score on GHQ-28 (Brain et al. Psycho-Oncology, 2011)
Short-term impact of CT screening result

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HADS Anxiety and Depression score range 0-21 (0-7 ‘normal’, 8-10 ‘mild’, ≥11 ‘moderate to severe’)

Psychosocial scores at 1 month

- Positive – MDT referral (n = 48)
- Positive – repeat scan (n = 788)
- Normal result (n = 763)
Long-term impact of CT screening result

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HADS Anxiety and Depression score range 0-21 (0-7 ‘normal’, 8-10 ‘mild’, ≥11 ‘moderate to severe’)
Conclusions

• Minimal psychosocial impact of CT lung screening – in those who take part

• Under-representation of women, older people, smokers and low socioeconomic groups

• Strategies for engaging high risk, harder to reach groups

• Targeted interventions could ‘prepare the ground’ for routine lung screening
Thanks to UKLS researchers and collaborators

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