CHIEF SCIENTIST OFFICE

CODE: HIPS/19/52

RESEARCH PROJECT BRIEFING

LUNGSCOT. How should Scotland respond to the challenge of lung cancer screening: A mixed methods feasibility study

AIMS

The LungScot study set out to explore how risk-based lung cancer screening using low dose computed tomography (LDCT; a scanning technique using a lower does of radiation) could be implemented in Scotland. In doing so, we sought to map out the lung screening process and describe the resources required, from identification of eligible individuals in primary care through to screening, diagnostics and follow-up. We also aimed to examine the feasibility and acceptability of lung screening to those involved and identify barriers and facilitators to screening uptake.

KEY FINDINGS

- Of the patients invited from the seven GP practices in Lothian who took part, the response rate varied from 18-35%, with an average of 24.6%.
- ~ 75% of responders identified from their primary care records were eligible for a scan, assessed using a combination of three existing risk prediction tools developed for this purpose (USPSTF criteria, PLCOm2012, LLPv2).
- Around three quarters of those scanned had something of clinical significance picked up on the scan (considered an abnormal finding), with coronary artery calcification by far the most common incidental finding, and nodules detected on a quarter of scans.
- Screening was widely acceptable to participants, with respondents reporting a straightforward and easy process, and a willingness to overcome challenges to access and participation for the perceived benefit of having their lungs checked.
- Response rates were lower in deprived practices; non-responders typically reported more barriers preventing them from taking part - living with chronic ill health was a commonly-reported factor in non-participation
- Primary care professionals were similarly positive, identifying the potential to benefit patients and the healthcare system in the long term.
- Managing incidental findings, particularly coronary artery disease, was an important issue for primary care, as it potentially places extra burden on already-stretched GP practices.

WHAT DID THE STUDY INVOLVE?

The study involved:

- Recruitment of patients to take part via primary care practices, supported by the National Research Scotland Primary Care Network.
- Telephone consent and risk/ eligibility assessment using three risk prediction tools
- One-off low dose computerised tomography scan (LDCT) for those at an increased lung cancer risk.
- Working with research nurses who book scans and follow up with patients.
- Radiologist to read and report on scans and respiratory consultant to interpret findings and formulate letters for patients, GPs and arrange referrals to clinical teams where relevant.
- Qualitative study – patient, professional and non-responder interviews.
- A patient advisory group was convened to advise on all aspects of the project and members were invited to a dissemination event at the end of the project.

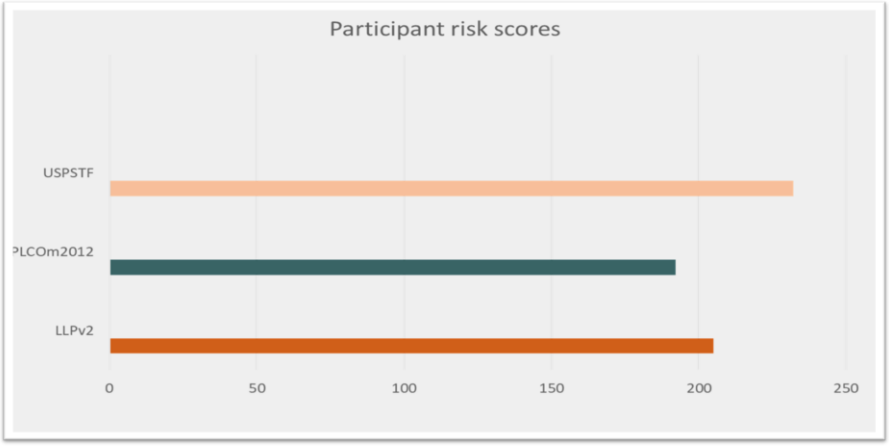
WHAT WERE THE RESULTS AND WHAT DO THEY MEAN?

- Recruitment is now complete in NHS Lothian, with 1528 individuals invited across seven GP practices and 377 responding. The response rate varied from 16-34%, averaging 24.7%. Response varied according to location and socio-economic deprivation, with practices in more deprived areas observing a lower response rate.
- 182 females were recruited, and 195 males, median age 62 years.
- Years smoked ranged from 10-60 years.
- From patient records,195 were current smokers and 181 were ever* smokers (missing data=1)
- More than 75% of participants identified from their primary care records were eligible for screening: High risk=272 **(77.5%),** Low risk=79 **(22.5%)**, (missing data=9).
- 100% of those offered a scan were willing to proceed (though there were many who could not be reached to confirm a scan appointment or did not attend their appointment at this stage); n=243 scans carried out.

*ever smokers are defined as people who have smoked more than 100 cigarettes in their lifetime.

Participants were eligible for a scan if they met the criteria for any of the three risk tools related to smoking history, family history, existing health conditions, and environmental exposures.

Participants were most likely to meet the USPSTF criteria, followed by the LLPv2 and then PLCOm2012.



Results (continued):

- Normal scan n=50; 23.3%
- Abnormal findings in n=165 scans; 76.7%
- 3 lung cancers, 1 breast cancer
- CAD (total n=114; 52.8%)
  - Mild n=44
  - Moderate/moderate-severe n=29
  - Severe n=3
  - CAD unclassified n= 35
- Emphysema n=41; 19.1%
- Nodules n=52; 24.2%
  - <6mm n=23
  - 6-7.9mm n=7
  - >8mm n=5
  - Other (e.g. benign pertifussal, multiple nodules) n=17
- Other incidental findings n=58 (27.1%), including scarring, pleural plaques, thoracic aneurism, and fibrosis.

Scan images showing lung cancer

Scanner used for the study

Scan images showing lung cancer

Qualitative findings:

- Semi-structured (interviews which have guided topics and questions but are participant-led) interviews were undertaken with 13 screening participants, 14 non-responders, and 4 primary care professionals.
- Findings suggest the intervention is widely acceptable and eligible individuals are motivated to take part in screening for early detection
- Perceived risk and lung cancer 'candidacy' related to smoking behaviour and family history drives participation (some indicated self-blame for smoking reduced their candidacy)
- For many, participation was based on self-efficacy, health literacy and an orientation to the future (preserving health, preventing illness)
- This motivation allowed them to overcome practical (e.g. travel, work) and psychological (e.g. fatalism, fear of cancer) barriers
- Among non-responders, the perceived benefits of screening were outweighed by practical concerns, competing demands, and existing chronic health conditions impacting the physical and psychological accessibility of screening
- Primary care professionals noticed an increased workload related to managing the outcomes of patient lung screening, particularly in relation to incidental findings requiring follow-up and addressing patient concerns.
- There was a recognition among professionals that early detection and prevention of more serious illness developing (e.g. through management of cardiovascular health) had the potential to benefit primary care in the long term.

"To be honest, I was elated. I thought, brilliant, someone's doing something." (Agnes, age 63, high risk, existing COPD)

"I think being a smoker and, again, my dad died of cancer." (Arnold, high risk, 64)

"I think most of the population, if there's a medical issue, I think most people want to address it." (Moira, 57, emphysema, 2mm nodule)

CHIEF SCIENTIST OFFICE

CODE: HIPS/19/52

RESEARCH PROJECT BRIEFING

WHAT IMPACT COULD THE FINDINGS HAVE?

- This study identified barriers and facilitators to lung screening uptake, with the potential to influence patient-focused developments using behavioural science to inform interventions to promote awareness of lung screening and overcome barriers to uptake.
- This study adds to the evidence base supporting the implementation of lung screening across the UK; showing it is feasible and acceptable to run using existing infrastructure, and in identifying how these would need to expand to upscale screening at population level.
- The National Screening Research and Innovation Group has established a Scottish Expert Advisory Group (SEAG) for targeted lung cancer screening to prepare a business case for lung cancer screening. LungScot has featured strongly in the SEAG's deliberations, as it is the only direct experience of lung cancer screening in Scotland to date.

HOW WILL THE OUTCOMES BE DISSEMINATED?

Findings from the study have already been shared at national and international conferences including the primary care, respiratory and psychosocial oncology communities. Two peer-reviewed papers have been published to date and further publications are planned to disseminate up to date findings. The study prompted further SG and NHS funding to expand to 3 other health boards in Scotland, focusing further in areas of rurality and deprivation. It has also informed the development of a further application to CSO to test a new algorithm for identifying at-risk patients from their primary care records alone.

CONCLUSION

This is the first pilot risk-based lung screening study using risk using LDCT in Scotland. Evidence from this study suggests that lung screening in Scotland is feasible and acceptable. It has demonstrated that participants can be identified from their primary care records and that screening processes are approved by screening participants. Uptake rates and screening outcomes are similar to those reported in English lung screening pilots of NHS roll out, with evidence for variation by deprivation. Qualitative work has identified challenges to participation. Insight from this pilot study can inform further work to answer questions of optimal implementation of lung screening in Scotland.

RESEARCH TEAM & CONTACT

Professor David Weller (PI)
Dr Debbie Cavers (Project Manager)
Usher Institute, Medical School
University of Edinburgh
Teviot Place, Edinburgh, EH8 9AG

david.weller@ed.ac.uk

0131 650 2807

Additional Information

This work was completed in August 2023 and was based on a £308,689.58 CSO grant. LungScot subsequently expanded to GGC, Grampian and Highlands & Islands through SG/NHS funding