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Should low-dose CT be used instead of chest X-ray to screen patients for lung cancer when they have possible symptoms?

Submission date
30/01/2025

Recruitment status
Recruiting

Registration date
12/02/2025

Overall study status
Ongoing

Last Edited
26/01/2026

Condition category
Cancer

[X] Prospectively registered
[_] Protocol
[_] Statistical analysis plan
[_] Results
[_] Individual participant data
[X] Record updated in last year

Plain English summary of protocol

Background and study aims
The chances of surviving lung cancer are much better if it is picked up early. Currently, lung cancer is diagnosed using a chest X-ray (CXR). These are cheap and convenient for patients. However, chest X-ray misses about 20% of lung cancers, which can delay diagnosis. Low-dose computed tomography (LDCT) can be used. These are more expensive, but the images have more detail. This means patients could have extra tests and treatments for findings that may not have caused them problems. There is also a shortage of CT scanners.
We don't know how much more accurate LDCT is compared with CXR for symptomatic people, so we don't know if switching to LDCT is worth the extra cost and downsides. This project is trying to collect information to find out if a larger study comparing LDCT and CXR in diagnosing lung cancer in symptomatic people is feasible, and if the costs are worth the extra information it would provide. This project will also factor in the opinions of patients and healthcare professionals through interviews.

Who can participate?
Adult patients over the age of 40 years who have been referred from primary care for a chest X-ray at a secondary care centre, because of symptoms of possible lung cancer.

What does the study involve?
The study will involve 900 participants from approximately five hospitals in the UK who have been referred from primary care for a chest X-ray at a secondary care hospital. Patients will be registered and receive a low-dose CT scan and a chest X-ray.

What are the possible benefits and risks of participating?
We do not know if each participant will personally benefit from the research but it is possible that;
1. A low-dose CT scan could detect lung cancer when it is smaller, or detect a disease which would not be picked up on a chest X-ray, and the avoidance of delay may result in earlier treatments and better outcomes.
2. When participants do not receive a cancer diagnosis, they may feel more reassured and less

worried.
There are minimal risks to participants as low-dose CT scans are routinely administered within the NHS, but they do include these low risks;
1. Increased exposure to ionising radiation from The CT scan which is additional to standard of care. Ionising radiation can cause cancer which manifests itself many years or decades after exposure. The risk of developing cancer as a consequence of taking part in this study is approximately 0.009%, which is low. For comparison, the natural lifetime cancer incidence in the general population is about 50%.
2. Incidental findings. Low-dose CT scans give more detailed images and participants may end up having tests and treatments for incidental findings that would not have caused them problems. This might be for benign findings (such as lung nodules) or cancers that would not have caused harm during the patient's lifetime (this is called overdiagnosis). These tests or treatments may occasionally cause harm or worry for patients.

Where is the study run from?
The study is centrally coordinated by the Leeds Clinical Trials Research Unit (CTRU) based at the University of Leeds (UK)

When is the study starting and how long is it expected to run for?
August 2024 to January 2027

Who is funding the study?
National Institute for Health and Care Research (NIHR) (UK)

Who is the main contact?
Medley@leeds.ac.uk

Contact information

Type(s)
Scientific

Contact name
Miss Steph Kuunal

Contact details
Clinical Trials Research Unit
Leeds Institute of Clinical Trials Research
University of Leeds
Leeds
United Kingdom
LS2 9JT
+44 (0)113 343 1454
medley@leeds.ac.uk

Additional identifiers

Clinical Trials Information System (CTIS)
Nil known

Integrated Research Application System (IRAS)
327612

ClinicalTrials.gov (NCT)
Nil known

Central Portfolio Management System (CPMS)
55848

National Institute for Health and Care Research (NIHR)
155952

Study information

Scientific Title
Methods of Early Detection of Lung cancEr in primarY care: the MEDLEY study

Acronym
MEDLEY

Study objectives
1. Is a large definitive study comparing low-dose CT (LDCT) with chest X-ray (CXR) feasible?
2. Would a large definitive study provide 'value of information' i.e. would the cost be worth the extra information it would provide?
3. Would changing the pathway of initial investigation for patients with suspected lung cancer from CXR to LDCT be deliverable, feasible and acceptable from a patient, clinician and policymaker perspective?

Ethics approval required
Old ethics approval format

Ethics approval(s)
Approved 31/01/2025, West of Scotland REC (Ethics Committee 5) (West of Scotland Research Ethics Service, Gartnavel Royal Hospital, 1055 Great Western Road, Glasgow, G12 0XH, UK; +44 (0)141 314 0213; ggc.WoSREC5@nhs.scot), ref: 25/WS/0008

Study design
Non-randomized; Both; Design type: Diagnosis, Imaging, Qualitative

Primary study design
Interventional

Study type(s)
Treatment

Health condition(s) or problem(s) studied
Lung cancer

Interventions

Screening (Work Package 1):
Adults over 40 who have been referred for a chest X-ray by their GP will be reviewed by the radiology clinical team. They will phone potential patients to discuss the study with them, or if they cannot contact the patient after two phone calls, they will send an invite text, asking patients to call them back if they are interested. Assenting patients will receive the patient information sheet by email or post, and then the research nurse will call them back the same or the following day. On this call, the research nurse will introduce the study and answer questions with the patient's consent. If the patient wants to progress, they will either:
1. Eligibility check, consent, and baseline information collection on that current call.
2. Call back at a time agreed with the patient if they want to consider, then repeat the above on that call.
3. Arrange a face-to-face hospital appointment, then collect the above at that appointment.

Consent (WP1):
Patients will take as long as they want to consider participating, but consent can be taken on the same day as the first contact about the study. This is because patients referred for a chest X-ray from their GP usually attend an appointment reasonably quickly, and we wouldn't want study participation to hold this up. Consent can be done by:
1. Remote e-consent. The participant will receive a link to the eConsent system prior to the remote eConsent phone call. During the call the patient will complete all questions, add a signature (by clicking a button) and submit the form. The participant will receive an electronic copy of the completed form, or the researcher may print and post a copy if requested. The eConsent system is hosted by the CTRU, it is password protected. A copy of the eConsent can be seen by CTRU staff but the CTRU does not save a printed/downloaded copy. Sites can access a copy for their records.
2. Remote verbal consent. For participants unable to complete remote e-consent (e.g. electronic device accessibility), the researcher will read each statement on the consent form to the patient, initialling and signing the paper consent form on behalf of the patient. A copy of the consent form signed on behalf of the patient will then be posted/emailed to the patient.
3. In person. This can be done using a paper copy of the consent form, or via eConsent (on a tablet/electronic device, depending upon availability)

Low-dose CT and chest X-ray appointments (WP1):
The patient should have their low-dose CT scan appointment first, and then their chest X-ray appointment afterwards. These will ideally be completed on the same day unless the patient has a preference otherwise. These appointments are arranged with the patient, slightly differently depending on if the patient wants to consent via remote verbal/remote e-consent or in person. Patients will have a low-dose CT scan and a chest X-ray in the hospital radiology department or at a community diagnostic hub. They will take 10-15 minutes each. If they do not have their chest X-ray on the same day this must be done within 5 working days of the initial low-dose CT scan. If the patient opts for remote verbal/remote e-consent, the baseline and clinical information are taken over the phone after consent. They will then liaise with the patient to arrange an appointment for their low-dose CT and chest X-ray. If the patient opts for in-person consent, the appointments are arranged with the patient on the phone. The patient then has their eligibility checks, consent, and baseline information collected on the day before these appointments, and then goes to have their imaging.

The low-dose CT and chest-X ray images will be sent to a third-party provider (Heart&Lung Health) to allow a robust, blinded review. They already work with the NHS. The research staff will push the low-dose CT and chest-X ray images to Heart&Lung Health for their radiologists to review. This will be blinded, so there will be 2 radiologists for every 1 patient. They will then create assign a category and write a free text report which is downloaded back onto the hospital

system. The respiratory clinical team will review and action the results from this as per local standard care practice. The low-dose CT will be used to guide clinical management unless a patient only has a chest X-ray or has findings that only show up on the chest X-ray. Actions for secondary care will be arranged by the PI or delegated team, as per local standard practice and actions for primary care will be stated in the results letter sent to the participant's GP. The GP will receive this results letter, with the free text report from the patient's low-dose CT scan, and the actions for clinical management for secondary and primary care. If a patient only has a chest X-ray, this letter will include the same content, but the free text report will be from the patient's chest X-ray.

Baseline data collection (WP1):
Baseline data collection includes; demographic information, relevant medical history, clinical assessments, BMI, index of multiple deprivation, ethnicity, mental health diagnoses, smoking status and history, symptom(s) prompting imaging and duration, other parameters needed for lung cancer risk scores (PLCOM2012/LLPv2), name of General Practitioner who referred patient for chest X-ray and name of practice.

Questionnaires (WP1):
Participants will be asked to complete one short questionnaire at baseline and at month 4 (validated EQ-5D-5L). These will be sent to the participant by their preferred methods (electronic, postal or telephone administration). Participants can opt out of completing these. Baseline questionnaires will be administered by the research team if in person or by telephone (prior to registration) and will be administered by CTRU if electronic (after registration). Non-responders to the electronic questionnaire will receive 1 reminder. At 4 months, CTRU will administer postal or electronic, and the research team will administer if completed over the phone. Non-responders will receive 1 reminder.

Follow-up and data collection (WP1):
There are no in-person visits after the imaging appointments are completed. Participants will have their medical records checked at month 4 and month 12 by the study team, but the participant does not need to do anything for this. Follow-up data collection includes investigations, diagnoses (lung cancer (including stage), indeterminate nodules, and incidental findings) and date, treatments, and possible harms.

Optional participant interview (Work Package 3):
30 participants who agreed to be approached on the main study consent form (20) or who declined the main study but consented (10), may be contacted to take part in patient interviews. This will be investigated using qualitative methods, carried out by qualitative researchers. They will collect information on participants' experiences and views on the recruitment process, the acceptability of the trial interventions (low-dose CT scan and chest X-ray), and what they think about the trade-offs between low-dose CT and chest X-ray (e.g. accuracy of imaging versus radiation exposure, logistics of imaging).

Participants who took part in WP1 will have indicated on the main study consent form they wanted to be contacted in the future about an interview. For those who declined WP1, whilst recording details of their non-registration, these participants can consent to receive further information about WP3 and their preferred method of receiving this (post or electronic). The qualitative researcher will contact these patients, provide them with a separate information sheet and ask them to sign a separate verbal consent form. They will agree on an interview date, and this can be conducted by telephone or video. Verbal consent to be interviewed will be taken

by the qualitative researcher at the start of the call using a separate verbal consent form and recorded. Recording will stop after verbal consent and restart for the formal interview. Interviews will then be transcribed from the audio recording.

GP interview (WP3):
15 GPs will take part in semi-structured interviews. GP practices will be set up as participating sites and will have relevant approvals in place prior to contacting them. This will be investigated using qualitative methods, carried out by qualitative researchers. They will collect information on GP perspectives on the implementation of low-dose CT, risk-based patient selection and the impact on their workload. This will involve vignettes. GPs will have either specifically referred a patient into the MEDLEY study (preferred), or will have referred any patient for a chest X-ray in secondary care. The latter may be identified using the Clinical Research Network to identify research active GPs. GPs will be sent an invitation letter/email from the qualitative researcher, followed by a phone call a week later. There will be no more than two follow-up calls at least 1 week apart. If no response is received no further contact will be made. If the GP does agree to take part, the qualitative researcher will provide them with an information sheet and ask them to complete a verbal consent form. They will agree on an interview date, and this can be conducted by telephone or video. Verbal consent to be interviewed will be taken by the qualitative researcher at the start of the call using a separate verbal consent form and recorded. Recording will stop after verbal consent and restart for the formal interview. Interviews will then be transcribed from the audio recording.

Stakeholder event (WP3):
Stakeholders will be contacted via existing relevant mailing lists and will contact the qualitative researchers for further information and will be provided with an information sheet. It is clearly stated in this, that consent is assumed if an individual turns up to the event. This will be an in-person event, held in an appropriate location. The stakeholder event will use the 'World Café' methodology, where guests are split into smaller tables with a host to facilitate discussions. Details of the discussions will be recorded as written notes, which do not mention the participant by name.

Intervention Type
Other

Primary outcome(s)
The primary aim of this study is to establish the feasibility of a future definitive trial. As such the below aims will inform the decision to proceed to, and/or inform the design of a definitive trial:

WP1 quantitative outcomes relating to feasibility and deliverability of a definitive trial:
1. Recruitment rate is measured by the number of participants recruited per centre per month
2. Proportions of eligible patients who consent/do not consent to participate is measured using the numbers recorded on the non-registration log throughout the recruitment period
3. Time from site approach to opening, from opening to recruiting first participant, and duration of site recruitment. Measured using the dates recorded in spreadsheet site setup/recruitment logs

Estimates of diagnostic accuracy listed below are all measured using medical record review at months 4 and 12:
1. To inform sample size calculation for a definitive trial:

1.1. Sensitivity and specificity of CXR using contemporaneous LDCT as a reference standard
1.2. Correlation/discordance between LDCT and CXR test results: proportions of paired tests that agree/disagree on the presence of lung cancer

Imaging logistics listed below are measured using the data recorded in spreadsheet logs and in imaging eCRFs
1. Proportions of recruited participants not undergoing imaging with LDCT and CXR

Clinical outcomes listed below are all measured using medical record review at months 4 and 12
1. Prevalence of lung cancer among recruited patients

WP2 economic outcomes measured using information from participant questionnaires and medical record review at month 4 and month 12:
1. Value of information assessment for a definitive trial.

Key secondary outcome(s))

The outcome measures that will be evaluated within this feasibility study are as follows:

Estimates of diagnostic accuracy listed below are all measured using medical record review at months 4 and 12:
1. To inform sample size calculation for a definitive trial:
1.1. Comparative sensitivity and specificity of LDCT and CXR using lung cancer diagnoses within one year (given the shorter follow-up this being a feasibility study) as reference standard
1.2. Sensitivity of CXR reported by cancer stage using contemporaneous LDCT as a reference standard

Imaging logistics listed below are measured using the data recorded in spreadsheet logs and in imaging eCRFs:
1. Time from CXR request to imaging & report, and reporting time by radiologist
2. Incidences of unblinding (CXR)
3. Total number of CT examinations (chest and other) undertaken per week
4. Total number of CXR examinations (GP requested and total) undertaken per week
5. Number of full-time equivalent radiographers and radiologists on rota per week
6. Proportion of CXR requests received that fulfil NG12 criteria on 1 day per week (week 1 = Monday, week 2 = Tuesday etc)

Clinical outcomes listed below are all measured using medical record review at months 4 and 12:
1. Stage and histology of lung cancer at diagnosis
2. Prevalence of indeterminate pulmonary nodules requiring CT surveillance
3. Prevalence of incidental findings
4. Subsequent investigations because of imaging (lung cancer and incidental findings)
5. Eventual treatments for diagnoses resulting from imaging (lung cancer and incidental findings)
6. Harms of investigation or treatment (including but not limited to invasive investigations or surgery for benign disease)
7. Prospective validation (discrimination and calibration) of risk stratification to select patients for LDCT

WP2 economic outcomes measured using information from participant questionnaires and medical record review at months 4 and 12:
1. Cost-effectiveness analysis of LDCT versus CXR using an adapted model from the recent UK NSC evaluation of lung cancer screening evaluating strategies
2. Quality of life measured using EQ-5D-5L at baseline and 4 months

WP3 qualitative outcomes listed below are all measured using qualitative interviews with patients, GPs, and key stakeholders. Participants and GPs will have one interview during the study, and stakeholders will take part in one event:
1. Reasons for participating/not participating, barriers to participation and whether these contribute to disparities in recruitment
2. Acceptability from the patient perspective of:
2.1. Recruitment strategy
2.2. Trial design and imaging requirements
2.3. Proposed risk stratification of patients to receive LDCT instead of CXR
3. Acceptability from GP perspectives including identifying site-level barriers and considering the impact of further investigations, treatments and additional diagnoses resulting from LDCT
4. Perspectives and priorities of key stakeholders on post-trial implementation of instituting LDCT instead of CXR for lung cancer detection in routine primary care across the health system

Completion date
31/01/2027

Eligibility

Key inclusion criteria
Added 23/01/2026: Please note, patients cannot be referred directly into the study by their GP, or volunteer themselves. The only way to participate is if a patient is invited by a member of the MEDLEY team from one of the participating centres.

Patients meeting ALL the following criteria will be considered for enrolment into the study for Work Package 1:
1. Age 40 years or more at the time the consent form is signed
2. Have had a CXR requested in general practice which fulfils NICE NG12 criteria
3. Consent to participate in WP1 (written/verbal/eConsent)

Eligibility for Work Package 3 is split for patients, GPs and stakeholders:
For patients:
1. Met the first two inclusion criteria listed above for WP1
2. Consent to participate in WP3 (written/verbal/e-consent informed consent)
Note: patients who decline to participate in WP1 will still be given the opportunity to take part in WP3
3. Do not meet exclusion criteria 1, 2, 4, or 5 of WP1 exclusion criteria

For GPs:
1. Consent to participate in WP3 (written/verbal/e-consent informed consent)
2. Current practicing General Practitioner
3. Either
3.1. Has referred a patient for a chest X-ray who was subsequently consented to WP1
OR
3.2. Has referred a patient meeting NG12 criteria for CXR

For stakeholders:
1. Consent to participate in WP3 (written/verbal/e-consent informed consent).
2. Relevant professional background, including:
2.1. Clinician in respiratory medicine, radiology and radiography

2.2. Senior leaders invited from professional organisations (e.g. Royal College of Radiologists, UK Lung Cancer Coalition)
2.3. Commissioners (e.g. Integrated Care Boards)
2.4. Policy makers (e.g. NHS England)
2.5. Patient advocacy groups

Participant type(s)
Patient

Healthy volunteers allowed
No

Age group
Mixed

Lower age limit
40 years

Upper age limit
100 years

Sex
All

Total final enrolment
0

Key exclusion criteria
Patients will be excluded from Work Package 1 of this study for ANY of the following reasons:
1. Present with haemoptysis and/or have a pending urgent suspected cancer referral
2. Have had thoracic CT or LDCT within the last year
3. Unable to, or chooses not to, receive a LDCT
4. Currently undergoing anti-cancer treatment
5. Is pregnant* or currently breastfeeding
6. Previously registered in the MEDLEY study
*Assessment of pregnancy potential (or exemption) completed as per national guidelines and/or local Trust policy

Date of first enrolment
01/08/2025

Date of final enrolment
30/09/2026

Locations

Countries of recruitment
United Kingdom

England

Study participating centre
Leeds Teaching Hospitals NHS Trust
St. James's University Hospital
Beckett Street
Leeds
England
LS9 7TF

Study participating centre
Royal United Hospitals Bath NHS Foundation Trust
Combe Park
Bath
England
BA1 3NG

Study participating centre
Manchester University NHS Foundation Trust
Cobbett House
Oxford Road
Manchester
England
M13 9WL

Study participating centre
Hull University Teaching Hospitals NHS Trust
Hull Royal Infirmary
Anlaby Road
Hull
England
HU3 2JZ

Study participating centre
Queen Mary University of London
Wolfson Institute of Population Health
Charterhouse Square
Barbican
London
England
EC1M 6BQ

Sponsor information

Organisation
University of Leeds

ROR
https://ror.org/024mrxd33

Funder(s)

Funder type
Government

Funder Name
National Institute for Health and Care Research

Alternative Name(s)
National Institute for Health Research, NIHR Research, NIHRresearch, NIHR - National Institute for Health Research, NIHR (The National Institute for Health and Care Research), NIHR

Funding Body Type
Government organisation

Funding Body Subtype
National government

Location
United Kingdom

Results and Publications

Individual participant data (IPD) sharing plan
De-identified individual participant data datasets generated and/or analysed during the current study will be available upon request from the Clinical Trials Research Unit, University of Leeds (contact CTRU-DataAccess@leeds.ac.uk in the first instance). Data will be made available at the end of the study, i.e. usually when all primary and secondary endpoints have been met and all key analyses are complete. Data will remain available from then on for as long as CTRU retains the data.

IPD sharing plan summary
Available on request

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Participant information sheet	Participant information sheet	11/11/2025	11/11/2025	No	Yes
Study website	Study website	11/11/2025	11/11/2025	No	Yes