Lung screening:

The Plan in Wales & Roundtable Discussion

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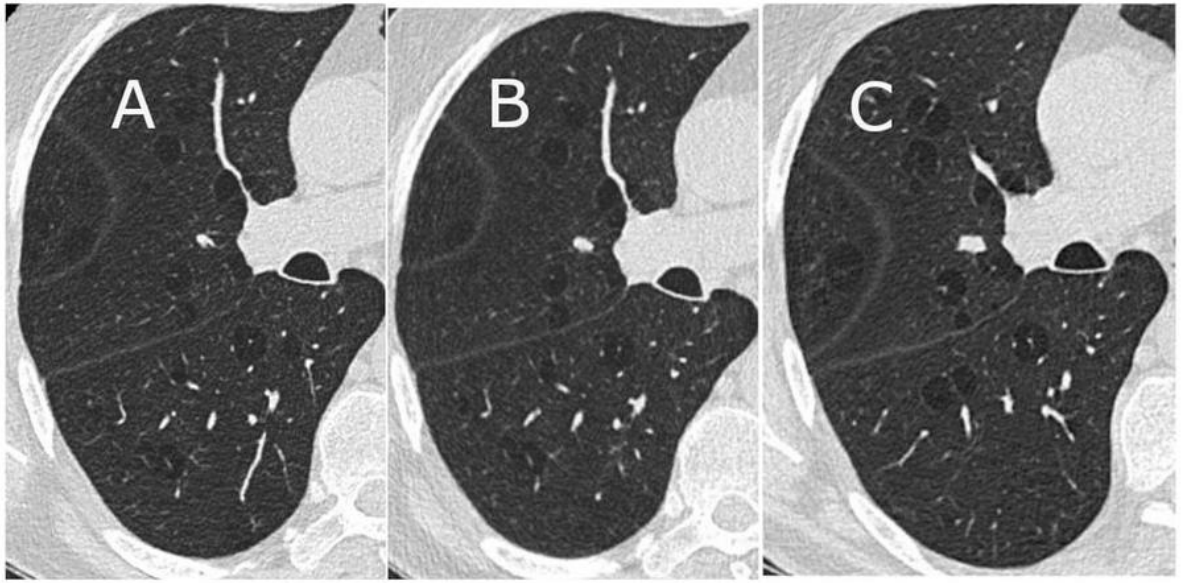


Interests

- I have no interests to declare
- Opinions are my own

Lung screening Primer

- Lung Cancer is the leading cause of cancer death globally.
- Those between the ages 55-74 who are deemed to be a high risk of Lung cancer will be offered Low dose CT scans.
- Participants will be scanned at varying intervals depending upon findings of initial scans.
- The screening biomarker is the growth rate of nodules, measured through the volume doubling time.
- To measure nodule volume, segmentation or volumetry is used which is typically machine learning based.
- Clinical trials (particularly the NELSON) have demonstrated reduction in mortality through screening.



Source: https://thorax.bmj.com/content/78/2/202

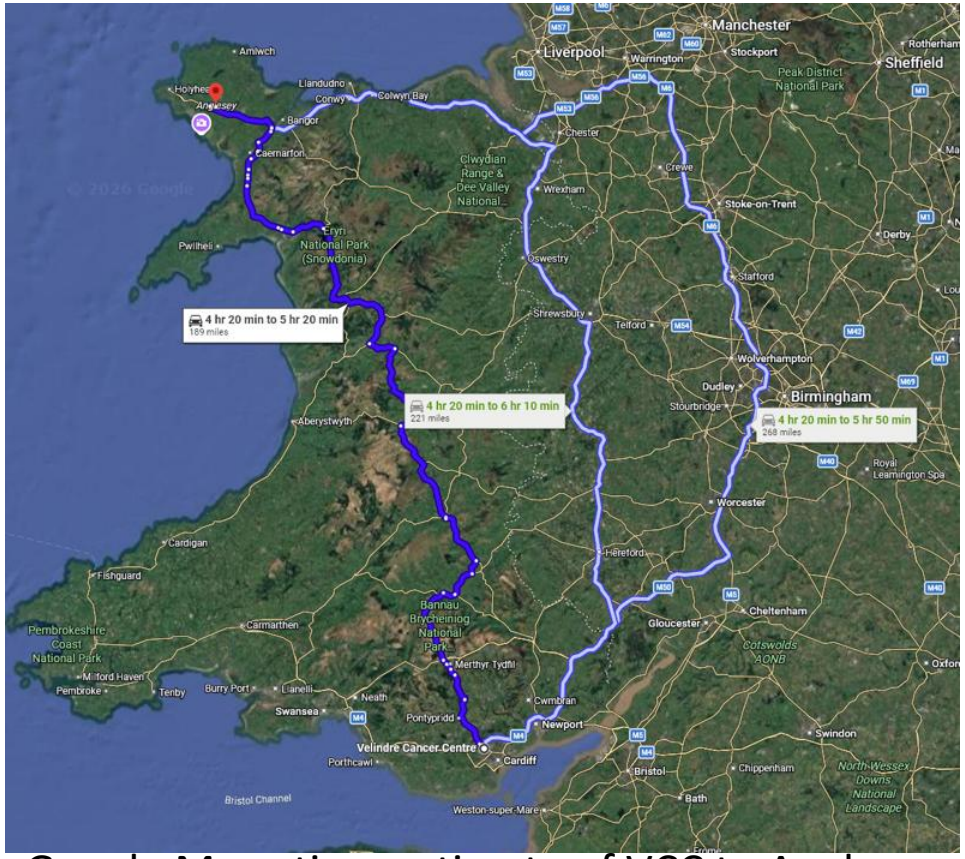
Lung screening in Wales

- Centralised Screening programme run by Public Health Wales (PHW).
- Lung screening scans will be performed on purpose built mobile screening units distributed throughout the country.
- The scanners will move around regularly to increase accessibility.
- The NHSE protocol is being used as guidance, but we may diverge if appropriate.
- 4 mobile screening units are being procured initially, with 2 additional to follow.
- Intention is to scan the first participant in April 28.

GIG CYMRU NHS WALES
Iechyd Cyhoeddus Cymru
Public Health Wales

Area Monitoring

- We will perform area monitoring for the vans after every move; This may be as often as every two weeks.
  - not viable for Medical Physics to perform this…
  - So, we will have to train radiographers to perform area monitoring.



Google Maps time estimate of VCC to Anglesey (starting from 9am)

Protocol Optimisation

- We've procured a Kyoto Kagaku Lung man for optimising the screening protocol.
- We would like to have a single screening protocol which uses TCM to adapt for patient habitus.
- We will take into account radiologist opinion and the impact on the Volumetry.
  - Previous studies suggest volumetry will work with a wide range of image noise but that the selected recon kernel will have an impact.
- We don't want to chase the lowest possible dose at the expense of image quality so it's plausible that we might be higher in dose than some centres.

Discussion – CT QA & Optimisation

- Who's department is directly supporting a lung screening service?
  - What challenges have you faced?
  - Do your tailor your QC for Lung screening?
- If you have, how did you optimise your scanner protocols?

Discussion – Practicalities of Lung screening CT

- What role do you think Medical Physicists should have in testing of volumetry/AI?
  1. None
  2. Advice on operator-based testing only
  3. Hands on testing

If 1, why?

If 3, what testing do you think is appropriate?

My opinion - Testing of Volumetry/AI

- I have proposed we are involved the initial evaluation, commissioning and routine testing of the volumetry.
- I would like our testing to consist of:
  - A standardised sample of patient images
  - Lung man scanned yearly

My opinion - Testing of Volumetry/AI

- Patient image data
  - No ground truth but can compare to baseline
  - Responsibility of clinical staff?
- Lung man scanned yearly:
  - End-to-end test of the imaging chain which might detect:
    - changes to scanner performance &/OR
    - changes in AI performance

Any comments?

Challenges with standardisation:

We know image quality and the volumetry software varies in England:

- How do we start to correct this?
- Where should Medical Physicists have input into guidance/standards for lung screening?

Questions/comments from the audience?