Vanguard Presentation June 2016

Implementing CT Screening in London Cancer: Finding an evidence base for practical strategies

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Lung Cancer – the problem

• Most common cancer with 1.59 million deaths worldwide

• 19.4% of all cancer deaths

• 5 year survival in the UK 12.9% and slow to improve

Source: cruks.org/cancerstats
Lung Cancer Survival and Stage

Screening : From CXR to LDCT

• Early trials- no benefit from CXR or sputum cytology

• Advances in CT processing: 7mSv to 1mSv

• Ultra Low dose CT

• Much higher sensitivity than CXR for lung cancer and other diseases
Reduced Lung-Cancer Mortality with Low-Dose Computed Tomographic Screening

The New England Journal of Medicine

A Landmark Study

CT Screening benefits a 20% decrease in lung cancer mortality and 7% overall mortality
Canadian Experience Courtesy of Stephen Lam and Colleagues

CT Screening in British Columbia has created an unprecedented stage shift moving Stage 1 and 2 curable cancers from 30% to 72% of lung cancers in the population.

Approximately 220 CT scans needed to save a life.

Screening for Lung Cancer: U.S. Preventive Services Task Force Recommendation Statement

Virginia A. Moyer, MD, MPH, on behalf of the U.S. Preventive Services Task Force

**Recommendation:** The USPSTF recommends annual screening for lung cancer with low-dose computed tomography 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. (B recommendation)
CRUK NAEDI Funded: Lung Screen Uptake Trial

Exploring attitudes to screening in high risk groups → Qualitative work

Pre pilot testing of materials

Development/ testing of invitation materials → Content of invitation materials

Identification, recruitment and randomisation via GP surgery administrator (n≈32)

Anonymised data collection age, sex, ethnicity, deprivation scores

Randomisation into Control & Intervention

Sending of invitation ± reminder letters
TARGETED INVITATION STRATEGY

Reduce fear, fatalism and stigma
- emphasise support
- early treatment
- avoid mention of smoking at invitation stage

Stepped provision of information
engage → consider → decide

Low burden: low literacy and numeracy
- difficulties communicating risk, uncertainty, overdiagnosis
- informed decision-making approach

Social marketing:
creative and engaging design
WHAT YOU’LL GET

First you’ll be asked some questions about your breathing and how you feel to find out about your overall lung health.

Then by blowing into two hand-held machines, you’ll be told whether there are any problems that need taking care of.

The nurse may also talk to you about having a lung scan to check for any early signs of lung cancer, and will ask if they can take samples of blood, breath, sputum and cheek cells (by rubbing a swab along the inside of the cheek). You can decide about this on the day or later.

You’ll have plenty of time to chat to the nurse and ask any questions.

Bring a friend, family member or partner with you on the day if you want to.

LUNG HEALTH CHECKS

GPs in the local area are inviting people aged 60 to 75 for the Lung Health Check.

Look out for an invitation in the post.

For more information call our freephone advice service on 0808 281 9525 or call/text 07469 118 308 or email us at lungscreen@ucl.ac.uk

“These lung checks are a brilliant idea - a great way to give hard-working lungs a service”

Bernie, Nurse
University College Hospital

M.O.T. FOR YOUR LUNGS

A new NHS Lung Health Check for people aged 60 to 75

Please read if you are aged 60-75
M.O.T. FOR YOUR LUNGS

People aged 60 to 75 are being offered a new LUNG HEALTH CHECK.

Run by specially trained nurses, they are an easy way to find out how well your lungs are working.

And, if needed, you'll get care and treatment to help breathe new life into your lungs.

The checks are for people aged 60 to 75 who have ever smoked. You are invited whether you feel fine or not, and whether or not you have any lung problems.

“*If they can give me some extra years with my grandkids, I might even be lucky enough to be able to walk them down the aisle.*”

Bernard, 69, London

You can bring a friend, family member or partner with you, if you'd like.

“*I started smoking when I was 14. When you go back 40-odd years, we didn’t know that cigarettes caused all these problems. It’s good to know no one is going to give me a hard time at the Lung Health Check.*”

Maggie, 60, London

BENEFITS OF THE LUNG HEALTH CHECK

- Free
- Local and easy to get to (at either the Homerton or University College Hospital)
- Talk through your questions over a cup of tea
- Find out about having a lung scan
- No judgements on smoking

LOOKING AFTER YOUR LUNGS

HOW THE NHS CAN HELP

Your lungs work hard every minute of your life.

As you get older, it’s worth checking things out.

GOOD IDEA

The Lung Health Check can spot problems early - often before you notice anything, when treatment could be simpler and more successful.

YOUR LUNGS COULD BE EASIER TO FIX THAN YOU THINK

You have two lungs, made up of 5 sections called lobes.

Each lobe is made up of thousands of tiny grape-like sacs, called alveoli.

If there is a problem on one bit of the lung, early treatment can focus just on the bit that is affected.
Lung Health Check:

Information on what’s involved

What is lung cancer?

Lung cancer begins when cells in the lungs, windpipe (trachea) or airways (bronchi) start to grow abnormally. The cells form a cluster (known as a nodule), which grows bigger and turns into a tumour. In most cases this happens slowly and without screening can take up to five years before it is diagnosed.

How common is it?

Lung cancer is the second most common cancer in the UK. Survival from lung cancer improves the earlier it is found. Over 85% of lung cancers are caused by smoking. Risk of lung cancer is also increased in those who are older, have been exposed to other people’s smoke, have been exposed to asbestos, or have been diagnosed with a lung problem like COPD (which includes chronic bronchitis and emphysema).

What can I do to reduce my risk?

The single best thing you can do to prevent lung cancer is not smoke. If you do smoke and would like to stop there is lots of help out there.

Ask your GP about free local support available, or contact NHS smokefree on 0800 022 4332 or visit www.nhs.uk/smokefree

What is a lung health check?

Lung health checks test for the early signs of lung conditions. Lung conditions and lung cancer are easier to treat when found early, and there is new good evidence that screening for early stage lung cancer using CT scans saves lives.

Why am I being invited?

Lung health checks are being offered to people aged 60 to 75 who smoke or used to smoke. These people are most likely to benefit because they are more at risk of lung disease. Medical records indicate that you are either a smoker or have smoked in the past. It does not matter if you already have a lung problem. Please let the nurse know about this at your appointment.

What happens when I arrive at the appointment?

A nurse will greet you, discuss all the different tests and answer any questions. The nurse will help you choose which tests you would like by explaining how you might benefit from them. You can choose when you want to have the tests - then or at a later date. You may not be offered a CT scan if it is not suitable for you and the nurse will discuss this with you.
What are the different tests?

Lung function test
This is a simple test (called spirometry) for which you blow into a hand-held machine. The test checks for problems with the lungs that may be caused by conditions like asthma, lung tissue scarring, sarcoidosis and COPD (which includes chronic bronchitis and emphysema). It measures:
- How much air you can take into and blow out of your lungs
- How strong your breathing muscles are

CO (carbon monoxide) test
The nurse will ask you to hold your breath for 10 seconds (or as long as you can) and then blow into a hand-held machine. It measures the level of carbon monoxide in your breath, to find out how much there is in your blood. Carbon monoxide is a poisonous gas produced by tobacco smoke, unsafe gas boilers and pollution.

Samples of blood, breath, sputum and cheek cells
We are carrying out research to see whether the early signs of lung disease can be found in the blood, breath, cells from the lining of the cheek and sputum samples. These tests are not part of your lung health check and it is completely up to you if you want to have them.

Samples of breath are taken by breathing normally into a machine.

Cheek cells are collected by rubbing a swab (which looks a bit like a large cotton wool bud) against the inside of the cheek.

Any sputum brought up by an existing cough is collected in a pot.

How reliable is lung cancer screening?
Like all cancer screening tests, lung cancer screening is not completely accurate and some cancers will be missed. Nodules found in the middle of the chest and some small cancers are harder to see. Some cancers start to grow after screening.

Out of 100 people scanned...
- 75 normal scans
- 25 repeat scans
- 2 cancers (usually diagnosed after further scans or tests)

What is a chest CT scan like?
The CT scan will take about 10 minutes. You will be asked to lie flat on the bed of the scanner. The bed will move slowly backwards and forwards while the scanner circles your chest. Specially trained staff will sit on the other side of a screen where they can talk to you and control the scanner.

Only your chest will be scanned and you will not go into a tunnel (this is for a different scan called an MRI scan). The scan is pain free and you will not need an injection. If you do have any concerns about the scan then please contact the lung clinic or speak to the nurse at your appointment.

RESULTS WILL BE SENT TO YOU & YOUR GP IN 2 WEEKS

Normal result: This means that no signs of lung cancer or other abnormalities could be seen on the scan. Approximately three quarters of people will have a normal result. While this is good news, it is still possible that lung cancer could develop in the future or that the scan may have missed it. It is important to be aware of the symptoms of lung cancer and to go to your GP quickly if you have any concerns.

Unclear result: This usually means the scan has shown a small area of white shadowing in the lung. This is probably something harmless but there is a chance it might be something serious. You will be invited to an appointment with a specialist doctor to discuss the result. The best way to make sure that there is nothing to worry about is to have another scan after an interval to make sure there are no signs of lung cancer. Most people with an unclear result will not have lung cancer.

Abnormal result: This means there is something abnormal on the scan that needs more tests to find out what it is. It could be cancerous or it could be harmless. You will be invited to an appointment with a specialist doctor who will discuss the results and arrange further tests.

Incidental finding: This means there are signs of other problems on the scan that may need treatment or medical advice. If you already have a lung problem, this might be why and you may not need any extra care. You may be advised to make contact with your GP to make an appointment to find out more.
Consent + lung health check appointment

Smoking cessation intervention

Eligibility for CT scan

Primary: Attendance

Secondary: Demographics, comorbidities, CT eligibility, spirometry, smoking history, other risk scoring, etc.
Eligible for CT scan

Normal scan
Vs.
Nodules/ Suspected cancer
Vs.
Incidental findings

Write to patient & GP

Radiology data (reading times, nodule data, assessment of outcomes using CAD/ radiographer; incidental finding data)

Result letter includes psychological impact and informed decision making assessment questionnaire

Follow up for 1 year:
Post-hoc analysis on impact to services, cost effectiveness, follow up of nodules and other incidental findings
Further assessment of psychological impact further along pathway

Discharge to GP or internal 2WW referral or GP referral to respiratory or other services
Preliminary data: Recruitment via primary care

On average: 1.5% of GP population is invited for screening

![Graph showing uptake and recruitment data]

- Did not attend
- Recruited
- Attended but not recruited

UCLH and HUH recruitment data for the months of November 2015 to April 2016.
## Preliminary data:
### Eligibility and attendance to CT

<table>
<thead>
<tr>
<th>Description</th>
<th>Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Had CT</td>
<td>173 (75.2%)</td>
</tr>
<tr>
<td>Not had CT</td>
<td>57 (24.8%)</td>
</tr>
<tr>
<td>Declined CT</td>
<td>5 (2.2%)</td>
</tr>
<tr>
<td>CT in past year</td>
<td>6 (2.6%)</td>
</tr>
<tr>
<td>Insufficient smoking history/ risk scores</td>
<td>19 (8.2%)</td>
</tr>
<tr>
<td>Physical limitation</td>
<td>1 (0.4%)</td>
</tr>
<tr>
<td>CT outstanding</td>
<td>8 (3.5%)</td>
</tr>
<tr>
<td>Was considering choice and decided not to</td>
<td>10 (4.4%)</td>
</tr>
<tr>
<td>Was due to attend but DNAd/ changed mind</td>
<td>8 (3.5%)</td>
</tr>
</tbody>
</table>
Benefits to GPs and patients

- Spirometry (QOF)
- BP check, BMI (QOF)
- Smoking cessation intervention delivered (QOF)

- CT scan may detect other relevant findings and improve early diagnosis

- Following results, the process can act as a trigger for smoking cessation
Screening outcomes

- **Normal scan (around 25%)**
  - This includes mild emphysema

- **Indeterminate Nodule (around 10%)**
  - We will contact the patients and arrange any further scans and relevant follow up.

- **Suspicious Finding (around 4%)**
  - We will refer patients to the local Thoracic (or relevant) MDT and 2WW outpatient service.
  - You will be kept informed throughout the process.
  - So far our cancer detection rate is around 1.3%
Screening outcomes

- **Incidental Finding**
  - Around 40% of patients will be noted to have COPD and/or bronchiectasis. Patients are asked to consider seeing their GP for a one-off appointments to discuss smoking cessation, pulmonary rehabilitation and inhaler therapy.
  
  - About 7% will have incidental findings that require secondary care input and we will arrange this.
  
  - About 15% have non pulmonary incidental findings and are asked to see their GP. Examples include a renal cyst, or thyroid nodule that may need further investigation.
Acknowledgements

Prof Sam Janes
Professor Jane Wardle
Mamta Ruparel
Samantha Quaife
Dr Jo Waller
Dr Neal Navani
Professor David Baldwin
Marc Van der Schee

Professor Stephen Duffy
Dr Andy McEwen
Dr Anand Devraj
Dr Penny Shaw
Dr Magali Taylor
Dr Asia Ahmed
Dr Angshu Bhowmik
Dr Stephen Burke