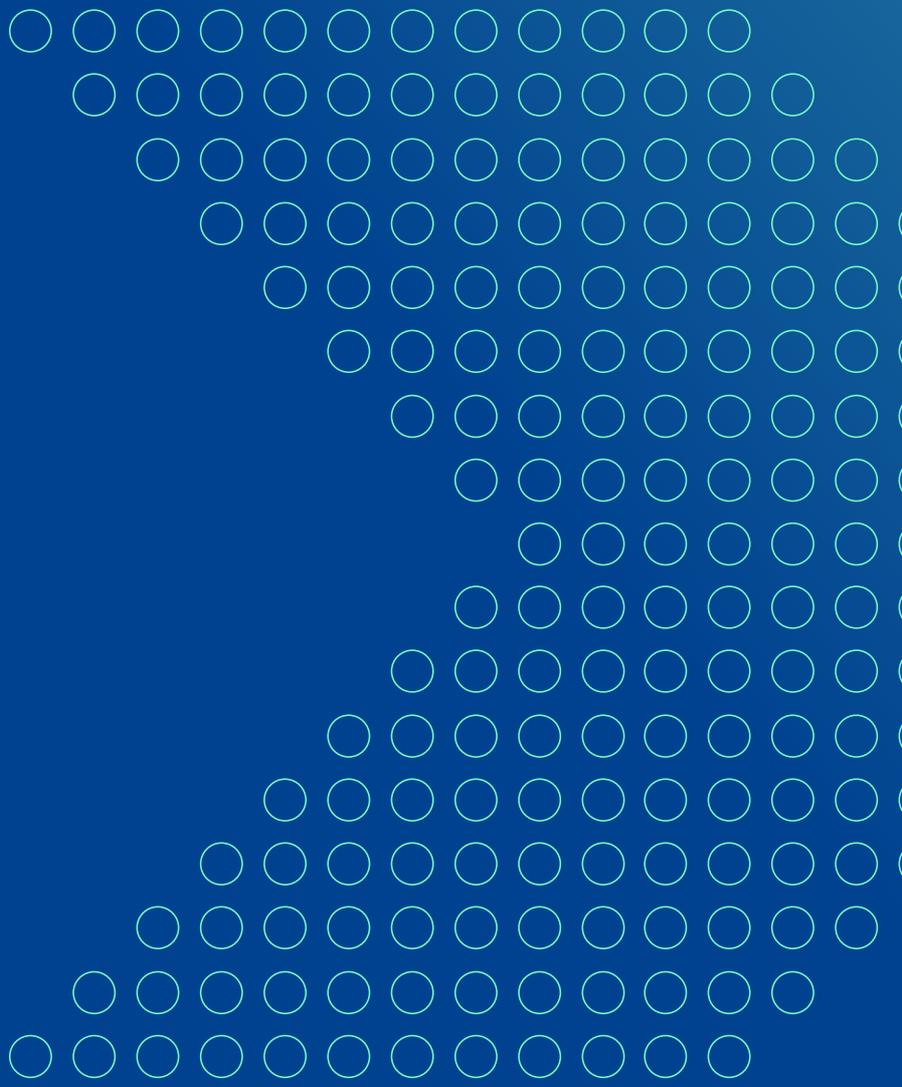


Transformation of the lung cancer pathway in the UK: an opportunity for innovation

Monday 18th December 2023



Note to the reader

This thought piece is based on a roundtable held by Newmarket Strategy on the *Transformation of the Lung Cancer Pathway in the NHS: An Opportunity for Innovation* in November 2023, chaired by Professor Sir Mike Richards, Chair of the UK National Screening Committee.

Attendees heard presentations from:

- Professor Peter Johnson, National Clinical Director for Cancer at NHS England
- Ben Peregrine, Head of Development at InHealth
- Carrie Pett, Director at Intuitive Ion
- Prashant Warier, Chief Executive Officer at Qure.ai
- Lucy George, Head of Business Innovation, Oncology (UK) at AstraZeneca

The event was held under Chatham House Rules.

Newmarket Strategy has summarised the main points discussion points in this thought piece.

Context

Lung cancer outcomes in the UK are lagging behind those of other countries.¹ This is, in significant part, because of the resource pressures that the NHS faces, particularly with its workforce.² The diagnosing and treatment of cancer heavily relies on the availability of the workforce and “patients in the UK with cancer are at risk from “devastating” effects of shortfalls of key radiology and oncology staff”.³ A focus on training more staff is essential, therefore, in improving outcomes. However, training staff takes years and will not help with the workforce shortage in the short to medium term. It is, therefore, equally important to find more efficient ways of working with technology so that the existing staff base can be more productive.

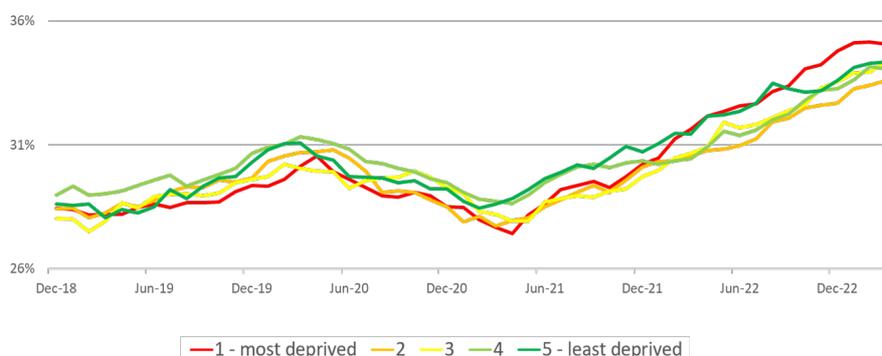
Harnessing the potential of new innovations such as Artificial Intelligence (AI) or advances in robotic assisted surgery will be key to the improvement of patient outcomes. The NHS should prepare to embrace the potential of new technologies to transform the lung cancer pathway.

Cause for optimism

It is important to recognise the progress that has been made in the recent years in improving the Lung Cancer Pathway. The roundtable discussed the fact that NHS England’s Targeted Lung Health Check programme has shown demonstrable results. It has completed 485,000 lung health checks and carried out 270,000 scans to date. This has translated to over 2,700 lung cancers diagnosed, and most importantly 74 per cent of these cancers have been detected at an earlier stage. 60 per cent of these cancers are being picked up at stage one and approximately another 15 per cent at stage two.

The National Cancer Programme was designed to target healthcare inequalities as the Targeted Lung Health Checks (TLHCs) rollout prioritised areas of highest deprivation first, which has significantly improved health disparities – as shown by **Figure 1** below. As a result, the early diagnosis of lung cancer increased in the most deprived quintile and with the highest proportion across all quintiles.

Figure 1: Twelve month moving average of the rate of early diagnosis of lung cancer by deprivation quintile.



Source: Professor Peter Johnson, National Clinical Director for Cancer at NHS England’s roundtable presentation on Targeted Lung Health Checks – (Rapid Registration Data).

¹ Charlotte Lynch, ‘Measuring up: How Does the UK Compare Internationally on Cancer Survival?’, Webpage, Cancer Research UK, 11 September 2019.

² Ibid.

³ Matthew Limb, ‘Shortages of Radiology and Oncology Staff Putting Cancer Patients at Risk, College Warns’, *BMJ* 377 (10 June 2022): o1430.

Roundtable attendees noted that there has also been a positive shift away from palliative care to disease management and even curative interventions, which is encouraging. However, better detection of lung cancer inevitably results in an increased workload further along the patient pathway. It is why, despite these large improvements, the NHS cannot rely on screening programmes alone if it is to make a sustained impact on lung cancer outcomes.

What follows are seven areas where roundtable participants felt that the NHS should focus its efforts:

1. Moving spending upstream

There was a consensus that the NHS should shift part of its spending towards prevention. Early detection is key to the improvement of lung cancer outcomes, as it is an aggressive form of cancer where stage shifting can occur quite rapidly. This means that more resources should be focused on targeted screening programmes and raising patient awareness of the risks factors for developing lung cancer.

2. Patient outreach, awareness, and activation

The NHS should build on the successful outreach achieved by the Targeted Lung Health Check, which is currently issuing around 50,000 invitations per month to citizens. People are sent an invitation through the post and then invited to speak to a health advisor, usually by telephone, who assesses lung cancer risk. If the risk is deemed sufficient, the patient is invited for a CT scan, usually in mobile units in community centres, supermarket car parks, sometimes in fixed sites in the relevant locations. This type of patient outreach has proven successful.

However, more could be done by the NHS to raise awareness and reach out to patients in the community. Certain private providers, like InHealth, work in partnership with the NHS to provide the Targeted Lung Health Check programme and have outcomes that surpass the national average – with 3.5 times as many cancers detected.⁴ This is because InHealth focuses on an inclusive approach to booking appointments and harnessing the power of primary care data to support targeted engagement strategies with the aim of raising awareness of the opportunity to participate in the programme.

Roundtable attendees agreed that more patients should be included as part of the screening programme as the current criteria only capture a minority of patients. In the UK, approximately 20-25 per cent of lung cancer cases were not eligible for lung cancer screening as many of those patients were non-smokers and would not qualify for the screening programme. Furthermore, opportunities to cast the net wider than pure CT-based screening, such as the use of chest X-ray, could be explored. X-ray is currently the most requested cancer diagnostic imaging test by GPs and could be used for triaging patient cases for lung abnormalities.

The NHS should continue investing in strategies to boost patient engagement and raise awareness of symptoms as these are known to have an impact on survival rates. Proactive measures should be taken to target specific communities and ensure that educational videos are made available in various languages. Innovative examples to raise awareness

⁴ InHealth Group, 'In Partnership with the NHS', *InHealth Group* (blog), n.d.

and educate families about cancer were mentioned during the roundtable – for example using of video games like a Minecraft to educate children about what might be happening to a family member affected by cancer.

3. Addressing regional variation

Roundtable attendees commended the Targeted Lung Check Programme for its impact on addressing health inequalities. The programme was deliberately set up to focus on parts of the country with the highest mortality and late-stage diagnosis rates for lung cancer. By making a concerted effort to target populations most at risk, and by targeting investment and organising it in the appropriate way, the programme has made a difference. As reflected by an attendee “we are not helpless hostages to the situation” of healthcare inequalities.

The NHS needs to further support effort to address these regional variations in outcomes. Roundtable attendees recognised that innovations, such as AI, have the potential to address variations and inequalities both at local and regional levels. Nevertheless, some attendees warned against the potential risk of implementing new technologies in high-risk settings, which could exacerbate existing inequalities, emphasising the need to consider the broader impact on disparities when introducing advanced technologies.

4. Embracing evidence-based innovations

New technologies for both diagnosis and treatment, as well as innovative approaches to patient outreach (as highlighted in section 2), will be pivotal to the transformation of the lung cancer pathway. The use of technologies like AI to perform cancer risk predictions based on symptoms provide a more targeted approach to prioritising patients. Providers, like Qure.ai, use medical imaging AI to detect nodules from chest X-rays or via CT to determine malignancy risk and monitor growth of lung nodules. In partnership with Cancer Alliances or NHS Trusts, it enables the fast-track of patients with X-ray abnormalities to the CT pathway. Roundtable attendees emphasised the potential of AI in aiding the identification and measurement of nodules, crucial for both lung screenings.

The NHS is already running programmes to trial new life saving innovation – such as the AI in Health and Care Award or the DART programme – where several AI technologies are being tested to improve lung cancer detection. The AI in Health and Care Award committed £123 million to accelerate the testing and evaluation of technologies most likely to meet the goals enshrined in the NHS’s Long-Term Plan, with several technologies in the lung cancer detection space. The DART programme is also using AI to analyse the CT scans of patients and has been integrated in the targeted Lung Health Checks programme. However, it is important to acknowledge that not all AI tools are created equal and there are limitations to their performance of some products – as they can “produced more false-positive findings than radiology reports”.⁵

As highlighted by the Royal College of Radiologists, AI should be seen as one of the tools to help address capacity issues.⁶ Roundtable attendees agreed that the NHS will need to start thinking differently about how it best utilises its workforce and makes the most of technologies that can support workforce efficiency. Increasing workforce capacity was seen

⁵ Louis Lind Plesner et al., ‘Commercially Available Chest Radiograph AI Tools for Detecting Airspace Disease, Pneumothorax, and Pleural Effusion’, *Radiology* 308, no. 3 (September 2023): e231236.

⁶ Royal College of Radiologists, *Overcoming Barriers to AI Implementation in Imaging*, 2023.

as an important part of the equation, but embracing a different way of doing things is just as important.

Innovation and improvements in the diagnosis and treatment of cancer will also be crucial to the improvement of patient outcomes and could help deal with the increased patient flow caused by greater and earlier detection of cancer. Intuitive Surgical, for example, has developed the Ion robotic-assisted bronchoscopy platform for minimally invasive peripheral lung biopsy. This allows clinicians to biopsy small, peripheral, and harder to reach nodules with a greater diagnostic yield.

5. (Re) designing the lung cancer pathway

Roundtable attendees highlighted the collective responsibility of the various stakeholders within the lung cancer pathway to integrate technology into existing NHS pathways or – more likely – to begin re-engineering pathways to reap the full benefit of technology. Understanding where a given technology fits in the pathway, and its impact, will be key to the successful implementation of these technologies.

Innovations are not implemented in a vacuum, and they necessitate good clinical and managerial leadership to be successful, along with stringent certifications and controls. This could include developing long-term radiology workflow efficiency enhancements to support workforces such as auto-normal reporting facilitated by AI.

The responsibility for integrating new technologies does not just fall on clinicians or commissioners; companies need to be mindful of how their products are integrated into existing pathways. As roundtable participants agreed, solving one problem in the pathway but creating bottlenecks elsewhere in the system is not a sustainable solution. Innovations must be seen as part of a wider socio-technical system.

There are several operational challenges within the current patient pathways, and roundtable attendees expressed concerns about how convoluted these can be for patients. Implementing new technologies should be seen as an opportunity to streamline existing processes. For example, a partnership between AstraZeneca and Qure.ai has reached a 1-million patient milestone. The AI-powered chest X-ray deployment for the incidental detection of high-risk nodules that can be indicative of lung cancer, looks to innovate beyond traditional lung cancer screening profiles such as age and smoking history.

6. Providing evidence to support reimbursement

The National Institute for Health and Care Excellence (NICE) has developed an Evidence Standard Framework for digital health technologies. However, roundtable attendees felt that more detail and direction was needed to understand what good evidence looks like for reimbursement in the lung cancer field. Scientific and health economic rigour needs to be front and centre of technological deployment in the NHS, involving NICE to ensure clinical confidence.

Roundtable attendees supported a shift from retrospective evaluations to real-world evidence generation and emphasised the role of programs like the Target Lung Task Force in identifying evidence thresholds. They agreed that industry input would also be an important factor to consider.

Demonstrating a strong health economic case for a medical technology of digital health innovation does not currently guarantee reimbursement or uptake. Roundtable attendees agreed that the NHS needs to start moving away from creating a fertile ground for pilot studies and move towards providing financial support for evidence-based and cost-effective innovative technologies that can improve lung cancer outcomes.

7. Spreading best practice

Roundtable attendees unanimously agreed on the importance of sharing and spread best practice. Success will rely upon the alignment of national-level programmes, such as NHS England's Targeted Lung Check Programme and the recently announced AI Diagnostic Fund, to incentivise best practice, share learnings and track benefits across various outcome measures.

Key recommendations:

1. Integrated Care Systems and NHS England should work on ways to share and spread best practice regionally and nationally for lung cancer diagnosis and treatment. This could be done by pairing up cancer alliances with lower rates of responses to lung screening invitations with those with a higher to learn from best practice and drive uptake.
2. Integrated Care Systems – including relevant diagnostic networks – and NHS England should focus on developing innovative approaches to patient outreach for lung cancer detection, beyond pure 'at-risk' CT screening initiatives.
3. The National Institute for Health and Care Excellence should publish further guidance and case studies to help innovators understand what good evidence looks like, particularly when it comes to establishing the health-economic case for reimbursement.
4. NHS England in conjunction with the National Institute for Health and Care Excellence should establish clear evidence thresholds for medical and digital health technologies in lung cancer and reimbursement pathways for these technologies, with a particular focus on improving workforce productivity as well as patient outcomes.
5. The National Lung Cancer Screening Committee should explore how long-term changes to imaging reporting processes, which could maximise patient outcomes and support the existing workforce, should be safely integrated as part of the lung cancer pathway.



Newmarket Strategy Ltd

Niddry Lodge
51 Holland Street
London, W8 7JB
+44 (0) 207 368 1611

www.newmarket-strategy.com
Follow: @newmarket-strategy

© 2023 Newmarket Strategy Ltd

