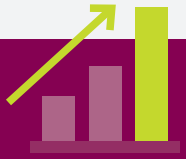
Streamlining Cancer Service Capacity

Optimising referrals and triage: Case studies report



The NHS Long Term Plan (2019) set a target to diagnose 75% of cancers at stage I or II by 2028.[1] In September 2024, 58.7% of cancer cases in England were diagnosed at stage I or II, with the remaining 41.3% diagnosed at stage III, IV or unknown.[2]

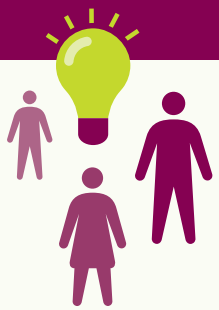
In order to achieve a stage shift in cancer diagnosis, and meet NHS England's target, the NHS will need to refer more people for diagnostic investigation at an earlier stage, when symptoms can be vague and non-specific. This short case study report explores the challenges facing the NHS in managing a potential increase in suspected cancer referrals, possible solutions and two case studies demonstrating innovation in action. This report was initiated, funded and developed by AstraZeneca.



The challenge

Early diagnoses of cancer are increasing, albeit slowly. Stage I and II diagnoses are currently around 2% higher than before the pandemic.[3] A contributing factor to this increase has been an increase in urgent referrals for suspected cancer – the number of urgent suspected cancer referrals was at 128% of pre-pandemic levels in January 2024.[3]

The current cancer conversion rate for suspected referrals via England's urgent two-week wait pathway is 7%,[4] with an average full-time GP making about 65 referrals per annum.[5] An increase in referrals of the magnitude required to meaningfully impact the target will likely have a significant impact on primary care workload. In order to manage this impact whilst striving to meet the early diagnosis target by 2028, both the quality of referrals and the diversity of referral routes should be optimised.



Possible solutions

There are a number of ways in which the NHS and local system leaders are seeking to address this challenge through either national or local pilots:

1. Diversifying the routes to referral such as pharmacist referrals to either specialist consultation or diagnostic test and patient self-referral pilots[6]
2. Improving the quality and speed of referrals to specialist follow up, for example through Advice & Guidance or by prioritising triage of referred cases[7]
3. Reducing the steps from referral to diagnostic test such as GP direct access to diagnostic tests[8]
4. Increasing diagnostics capacity through the establishment of Community Diagnostics Centres (CDCs)[9]

The two case studies below, both funded by AstraZeneca UK, focus on driving a stage shift in the diagnosis of lung cancer. Lung cancer is the third most common cancer in the UK,[10] and the majority of cases are diagnosed at a late stage: only 39% of cases were diagnosed at stage I or II on average between July 2023 to July 2024.[11] The UK Government has recently committed to rolling out a national targeted lung cancer screening programme, following a recommendation from the UK National Screening Committee and the success of the Targeted Lung Health Check pilot programme.[12]

However, whilst a critical step in driving earlier diagnosis of lung cancer in high-risk populations, not all people who go on to develop lung cancer are eligible for lung cancer screening – for example, around 14% of lung cancers are non-smoking related.[13] It is vital that both symptomatic and opportunistic routes to diagnosis are also optimised.

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Case study 1
Greater Manchester Self-Referral Chest X-Ray Pilot Project

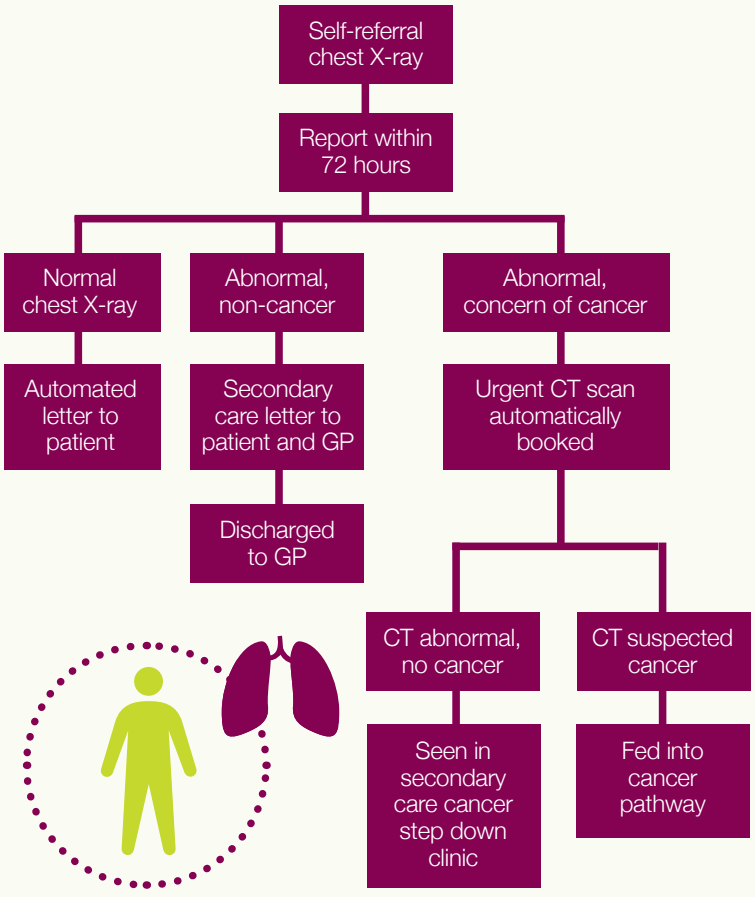
In 2022, Greater Manchester Cancer Alliance (GM Cancer) delivered a Self-Referral Chest X-Ray pilot (SRCXR) in collaboration with Northern Care Alliance NHS Foundation Trust and primary care services. The project was undertaken with a joint-working agreement with AstraZeneca, and was intended to find evidence on the impact of SRCXR on early diagnosis of lung cancer.

Members of the public aged 40 years and over across Bury & Heywood and Middleton & Rochdale were able to attend pilot centres without the need for a primary care appointment or referral for a chest X-ray if they had one or more of the symptoms listed in NICE guidance for chest X-rays in suspected lung cancer (e.g. cough, chest pain, shortness of breath etc) for three weeks or more. A chest X-ray would be carried out on the spot if the patient had not had another chest X-ray or CT scan within the previous three months. Unlike current NICE guidance, smoking status was not considered in patient eligibility, in order to avoid perpetuating the barriers non-smokers already experience in accessing a lung cancer investigation; viewed as a smoker's disease, non-smokers can be hesitant to come forward for a potential lung cancer diagnosis given this stigma, despite the fact 14% of lung cancers diagnosed in the UK are non-smoking related.[14] This change also aligns with national lung cancer symptom awareness campaigns that advise a cough for 3 weeks or more requires action, regardless of smoking status.[15]

Once X-rays were completed, images were outsourced to an external reporting service with a contracted turnaround of 72 hours to completion. Results were categorised as either:

- **Normal X-ray:** patient and GP receive letter informing them of the result, along with advice that any persistent or concerning symptoms require consultation with a GP
- **Abnormal X-ray, non-cancer:** image and report are reviewed by the secondary care team, who then provide:
  either written advice to the patient and GP;
  or actions a referral to an appropriate secondary care service if needed, e.g. respiratory outpatient clinic
- **Abnormal X-ray, suspicious for cancer:** activates a direct-to-CT pathway, arranged by the radiology department. If the CT scan is consistent with lung cancer, the patient is immediately referred into the lung cancer clinic, but, if no evidence is found, a letter to the GP or referral to an appropriate secondary care service is actioned

Figure 1: Clinical pathways for the SRCXR pilot



Between July 2022 to March 2023, a total of **1,444 eligible patients presented for a self-referral** – the highest peaks of attendance followed social media advertisements, pointing to the importance of communication campaigns in ensuring awareness of novel NHS services. 95% of SRCXRs were normal, 3% were abnormal non-cancer and 2% (27 total) were suspicious for lung cancer, triggering the direct to CT pathway, consistent with rates from GP initiated urgent referrals. **Six of these patients were diagnosed with primary lung cancer** – two with stage I / II lung cancer, three diagnosed with stage III and one undefined. Additionally, **45% of participants fell into the lowest three deciles of the Index of Multiple Deprivation,** suggesting self-referral could be an avenue to reach groups who traditionally interact less with primary care.

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Case study capacity impact

The SRCXR service broke down multiple barriers to accessing chest X-rays for patients, while relieving the load on primary care. **When surveyed, one in ten patients had tried unsuccessfully to contact primary care about their symptoms previously,** and one quarter of patients believed they were unlikey to ever contact primary care about these symptoms. Instead, diverting patients to the self-referral service gave patients who are eligible for testing in NICE guidance peace of mind about their symptoms – in the pilot 95% of chest X-rays were normal – without the need to engage with primary care.

Case study 2

Harnessing AI technology to support chest X-ray reporting efficiencies across an Imaging Network

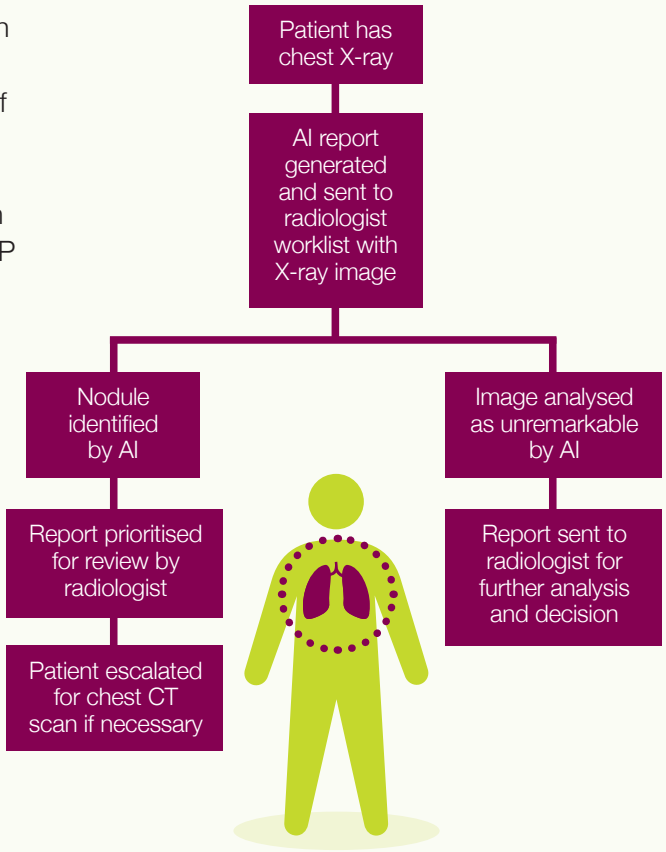
The National Optimal Lung Cancer Pathway (NOLCP) sets best-practice guidance for ensuring patients have cancer either ruled out or diagnosed within 28 days of referral for diagnostic tests.[16] The pathway sets out how diagnosis within 28 days can be achieved for the suspected lung cancer pathway, which starts for the vast majority of patients with a chest X-ray. Immediate reporting of chest X-ray results can reduce the time to diagnosis of lung cancer by half, as patients can be rapidly progressed to CT scans. This is particularly important when investigating potential lung cancer, given the high speed at which the disease can develop – some non-small cell lung cancer tumours may double in size within 3 weeks.[17]

The use of chest X-rays requires the time of radiologists to interpret results, but this workforce is facing an increasing workload. As of 2022, the NHS is short of 1,939 radiologists on a full-time equivalent basis and the shortfall is projected to hit 44% by 2025.[18] There are, however, opportunities to utilise technologies to support radiologists to prioritise their workloads. One such example is the introduction of artificial intelligence (AI), which has the potential to largely automate certain tasks and assist radiologists in prioritising higher risk scans for follow up. This could, therefore, contribute to improving the speed of diagnoses and help to optimise the referral pathway.

Greater Manchester Cancer Alliance, as part of a project developed under a collaborative working initiative with Qure.ai and AstraZeneca, has undertaken a pilot, covering five of the seven acute hospital trusts in Greater Manchester, exploring the implementation of AI-assisted chest X-ray services to assess the impact of deploying AI at scale on the lung cancer diagnostic pathway. Prior to the pilot, only 10% of lung cancers in the GM Cancer region were reported within the NOLCP metric of 24 hours turnaround time for X-rays that are abnormal and suspicious for lung cancer.

In the pilot scheme, AI was utilised to read over 250,000 ‘normal’ or ‘abnormal’ chest X-rays of people in the region, in order to evaluate whether the technology can support radiologists in making faster and more accurate diagnoses of lung cancer. Utilising deep-learning algorithms that have been trained on a large database of chest X-rays, the AI technology supports radiologists by classifying chest X-rays as either ‘remarkable’ or ‘unremarkable’, and highlights abnormal findings on the X-ray for the radiologist to analyse.
The pilot represents the largest implementation of AI-assisted chest X-rays in the NHS to date.

Figure 2: Qure.ai pilot pathway



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Case study capacity impact

The pilot demonstrated that AI can play an important role in supporting radiologists to spend their time efficiently, while delivering improved report turnaround times. For example, in prioritised cases in Salford **a 43% improvement in report turnaround times was recorded.** This resulted in a 20% improvement in the achievement of the NOLCP target, **saving a total of 373 pathway days** for the 266 patients prioritised by AI in the area. Given current shortfalls within the clinical radiology workforce, the pilot underlines the role AI can play in optimising the use of limited capacity by supporting with the prioritisation of abnormal cases for review.

Recommendations

1. NHS England's Cancer Programme should establish a workstream to determine a clear vision for the role of AI in optimising cancer referrals and diagnosis pathways
2. NHS England should work with cancer alliances to identify high-impact interventions that streamline primary care cancer referrals for national roll out
3. Cancer alliances should work with integrated care boards to integrate plans for improving diversity of cancer referral routes in primary care into existing 2024/2025 delivery plans
4. Policymakers should implement the recommendations of the Capacity to Deliver report



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