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Supporting the implementation of lung cancer screening: **a focus on eligibility and recruitment**

Policy brief

LUNG CANCER POLICY NETWORK

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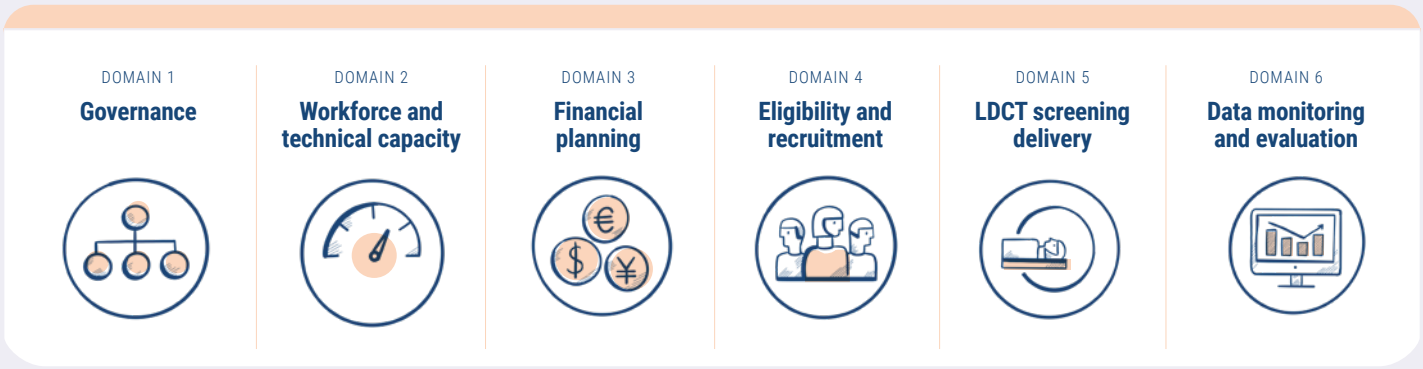
INTRODUCTION

The momentum for implementing targeted low-dose computed tomography (LDCT) screening programmes for lung cancer has gained pace over recent years, calling for careful consideration of how to optimise these programmes in terms of feasibility and public health impact. Setting up a lung cancer screening programme is complex, but a wealth of implementation research and a growing number of large-scale programmes continue to provide important lessons on how to optimise design and implementation.[1]

The Lung Cancer Policy Network has developed an implementation toolkit, which includes a framework to support those involved in the planning and delivery of lung cancer screening programmes. The framework follows a health systems approach and is organised into six domains, each consisting of a series of metrics. The metrics help users assess whether key requirements for screening are in place and identify any gaps that may need addressing (*Figure 1*).

Figure 1. Six domains for assessing health system readiness for the implementation of lung cancer screening



This series of policy briefs explores the six core domains underpinning the implementation framework, with this brief focused on eligibility and recruitment. This brief provides key insights on eligibility and recruitment, presenting case studies from countries where implementation is underway. It also offers recommendations on how stakeholders and policymakers can support successful implementation.

ENSURING TARGETED ELIGIBILITY CRITERIA AND RECRUITMENT METHODS FOR LDCT SCREENING PROGRAMMES: WHY IS THIS IMPORTANT?

To have an optimal public health impact, targeted screening programmes for lung cancer must secure participation from those who are at high risk of lung cancer and would benefit most from screening. Appropriate eligibility criteria and effective, equity-oriented approaches to engagement and recruitment are fundamental to secure attendance from those at highest risk of lung cancer. The engagement of healthcare professionals is also essential to the success of the programme, as they have a significant role in the recruitment and referral of those eligible for screening.

Targeted approaches to help mitigate inequities in lung cancer and remove barriers to participation should be embedded throughout the screening programme. Many of the people at high risk of lung cancer are also underserved by health systems and public health programmes. To avoid exacerbating existing inequities, recruitment strategies must therefore use outreach methods that address potential barriers to participation.

This policy brief highlights some of the key issues that health system leaders must consider in relation to the eligibility and recruitment of participants so that they can ensure the effective, equitable and sustainable implementation of a lung cancer screening programme.

Health system decision-makers must:

- **establish how the eligible population for screening will be assessed** – to deliver programmes that target those most at risk of lung cancer
- **engage healthcare professionals with the screening programme** – to facilitate a high uptake of screening
- **co-design screening programmes with high-risk communities** – to deliver tailored approaches to recruitment that help address inequities in lung cancer.

Establish how eligibility for screening will be assessed

To define the eligible population, local epidemiological data are needed to determine who is at high risk of lung cancer and may benefit most from screening. Lung cancer is associated with many risk factors – for example, smoking history, exposure to air pollution, occupational exposure (e.g. asbestos) and genetic factors.[2-4] Population-level trends in risk factors must be appropriately considered and used to inform suitable eligibility criteria within each local context, as these will influence the cost-effectiveness of the programme.[5] This information can also be used to estimate how many people are likely to attend screening and to anticipate the practical requirements for implementation.[6]

Risk prediction models are an important statistical tool to help determine the eligible population, but their limitations should be acknowledged. Such models must be properly validated and applied to ensure that only the people who could benefit most from screening are invited to participate (*Case study 1*).[7] These models should also help address known disparities in lung cancer incidence and outcomes, rather than exacerbate them. Selecting the most appropriate model according to population demographics is therefore important (*Case study 2*). The ongoing implementation of screening programmes provides an opportunity for models to be refined with additional data that can improve risk prediction.[8]

Case study 1

Targeted Lung Health Check screening programme[9]

England

As part of the Targeted Lung Health Check (TLHC) programme, NHS England classifies people as eligible for lung cancer screening using two risk prediction models: $PLCO_{m2012}$ and the Liverpool Lung Project, version 2 (LLPv2).[7 10] The TLHC programme was initially implemented in locations with high lung cancer incidence and mortality, using local data such as incidence and rates of smoking, which are also correlated with socioeconomic disadvantage in England.[11] These data were used to target where programmes should be established in the initial pilot and roll-out phases, ensuring that barriers to screening – including transport costs or time off work – were mitigated through strategies such as mobile CT units.[10 12 13]

Following several pilots, the TLHC is being expanded on an ongoing basis. The programme has achieved early detection of lung cancer at the anticipated rates based on findings from clinical trials.[14 15]

Case study 2

Evolving guidelines to reflect emerging evidence and updated risk models

USA

The United States Preventive Services Task Force (USPSTF) 2013 guidelines used eligibility criteria for LDCT lung cancer screening that were based on inclusion criteria in the US National Lung Screening Trial (NLST).[16] However, this garnered some criticism as these criteria were found to lead to sex and race disparities in the eligible population.

The USPSTF responded by producing updated guidelines in 2021, broadening some of the eligibility criteria related to age and smoking history.[17 18]

The 2021 updated criteria 'help[ed] partially ameliorate racial disparities in screening eligibility'.[18] The eligible population for LDCT screening for lung cancer approximately doubled following this expansion of the eligibility criteria.[19–21]

There is still potential for expanded or alternative risk prediction models to address the remaining inequities. However, there is mixed evidence for the effectiveness of these models in reducing disparities in, for example, sex and race.[22–24] While models must be robustly validated before being incorporated into guidelines and practice, these findings emphasise the importance of regularly evaluating the best available evidence on how to assess eligibility to optimise the identification of high-risk populations.

Engage healthcare professionals with the screening programme

Efforts to engage healthcare professionals across primary and secondary care are needed to ensure that they recruit or refer eligible people to screening. Specific pathways for recruitment and referral should be tailored to each health system and the chosen model of screening (centralised, decentralised or hybrid).[25-28] Many types of healthcare professionals can have important roles in engaging prospective participants, optimising the reach and impact of the programme (*Figure 2*).

If general practitioners (GPs) and other primary care professionals are to play a key part in recruitment, time and resources for recruitment should be appropriately allocated and relevant training provided. A common concern among primary care professionals regarding the implementation of screening programmes is the potential additional workload.[34] Strategies to address this should therefore be implemented within the screening programme. For example, in Croatia, GPs are financially incentivised through full reimbursement for their role in referrals to the programme.[35 36] In other programmes, electronic forms have been found to reduce the administrative burden of eligibility assessment.[37] Providing resources, guidelines and training for healthcare professionals involved in the screening programme can also improve engagement.

Developing specific roles, such as for patient navigators,* can facilitate engagement and enrolment in the programme and help address health inequities. Patient navigators for lung cancer screening are available in Ontario, Canada, where they work closely with healthcare professionals to apply risk models to people who are referred to the service.[33] Navigators can promote adherence to screening programmes as they remain involved in a participant's care throughout the pathway, even if referral for further services is required.[33 38]

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* Navigators are representatives who support and guide people through their journey in the health system. They may help people attend screening and any follow-up appointments that are needed. Navigators can also facilitate communication with other healthcare professionals so that people get the information they need to make decisions about their care.[39 40]

Figure 2. Examples of how healthcare professionals engage the eligible population with screening

Role	Country-specific examples of involvement in recruitment and referral
 Secondary care teams	In the **UK**, primary or secondary care teams may conduct the initial assessment of suitability for LDCT screening.[10]
 General practitioners	In **Croatia** and **Poland**, GPs have an intrinsic role in referral to the screening programme, providing information to those at high risk in order to promote the uptake of screening.[29 30]
 Nurse practitioners	In Ontario, **Canada**, nurse practitioners were responsible for 6% of recruitment into a 2018 screening pilot.[31]
 Community pharmacists	The **UK** has a pilot service planned in which community pharmacists will begin directly referring people with possible signs of cancer for scans. It is set to begin in 2023.[32]
 Patient navigators	In Ontario, **Canada**, patient navigators play a key part in triage by using age and smoking history to identify eligible populations and then applying the $PLCO_{m2012}$ risk model to confirm eligibility for screening.[33]
 Administrators	In the **UK**, trained administrative staff can populate risk calculator data. The decision to proceed to LDCT requires review by a doctor or nurse with experience of conducting lung health checks.[10]

Co-design screening programmes with high-risk communities

The recruitment and engagement of communities that experience greater barriers to attending screening must be carefully planned and conducted to promote health equity and avoid stigma. Such activities should be informed by the best available local data that help those designing the programme understand relevant factors, including subgroups within the eligible population, barriers to participating in screening, and the influence of sex, socioeconomic position and other characteristics on screening attendance. Engagement with representatives from communities that typically have lower rates of attendance is also essential to develop acceptable and effective recruitment approaches (*Case study 3*).

Participant information should also be tailored to the needs of different communities. Once an eligible person is engaged with the programme, they must receive sufficient information to facilitate an informed choice on whether to participate. It is thought that the decision by eligible people to decline screening is largely attributable to a lack of appropriate information.[5] It is also important to consider that the information needs of people of different backgrounds may vary. As a result, developing tailored materials may support higher uptake, particularly among groups less likely to attend (*Case study 4*).[41]

Case study 3

Co-creating recruitment approaches through community-based research

Aotearoa New Zealand

In Aotearoa New Zealand, Māori experience higher rates of and worse outcomes from lung cancer. There is also substantial inequity, with Māori developing lung cancer about eight years earlier than the general population, on average.[42,43] Evidence from other cancer screening programmes also suggests lower rates of attendance among this population.[44] To help narrow these inequities, collaboration with Māori communities to support engagement with lung cancer screening is essential.

A research programme is underway to determine the impact of different screening invitation methods on the uptake of screening among Māori. The programme is being conducted with Māori communities and will compare the outcomes of delivering invitations through primary care professionals and centralised screening centres.[45,46]

It is hoped that the findings from this research will inform the implementation of any future lung cancer screening programmes in the country.

Case study 4

Securing screening attendance among under-screened, high-risk population groups

Canada

In the three Canadian provinces where pilot programmes are taking place (British Columbia, Ontario and Québec), various strategies have been adopted to increase population outreach among people at high risk of lung cancer. Targeted groups include First Nations, Inuit and Métis people, underserved populations and rural/remote populations:[47]

- Strategies to increase participation in screening among First Nations, Inuit and Métis people include engagement in decision-making, the co-creation of approaches to culturally appropriate screening, the development of culturally appropriate material and coverage of medical transportation.[47]
- A pilot in Ontario trialled various strategies, including the use of patient navigators, Indigenous identifiers, and a hub-and-spoke model for Ottawa Hospital to allow screening closer to home. The researchers also adopted multi-component recruitment strategies. The leading methods of recruitment were physician referrals (81%), newspaper advertisements (11%), word of mouth (6%) and nurse practitioners (6%).[31]

KEY CONSIDERATIONS

to ensure targeted eligibility criteria and recruitment methods for screening implementation

Establish how the eligible population for screening will be assessed

- Integrate the best available local data and consider the most appropriate risk models according to the population demographics to reduce the risk of exacerbating disparities.

Engage healthcare professionals with the screening programme

- Establish clear roles for how healthcare professionals will be involved in the recruitment of the eligible population and consider using patient navigators to foster equitable delivery.
- Support healthcare professionals through appropriate training and consider the use of incentives.

Co-design screening programmes with high-risk communities

- Co-design recruitment strategies with communities less engaged with the health service.
- Tailor participant information to communities at risk of lower screening uptake, responding appropriately to expressed informational needs.

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