Lung cancer in Europe:

the way forward

The
Health Policy
Partnership

Authors

This think piece has been written by The Health Policy Partnership along with the following co-authors:

Professor Tit Albreht
University of Ljubljana and National Institute of Public Health of Slovenia

Professor Silvia Novello
Women Against Lung Cancer in Europe (WALCE) and University of Turin

Dr Anne-Marie Baird
Lung Cancer Europe (LuCE) and Trinity College Dublin

Cornel Radu-Loghin
European Network for Smoking and Tobacco Prevention

Professor Jacek Jassem
Medical University of Gdańsk

Professor Dr Jan P. van Meerbeeck
European Cancer Organisation (ECO), European Respiratory Society (ERS) and Antwerp Univeristy

Aoife McNamara
Global Lung Cancer Coalition (GLCC) and Irish Cancer Society

Endorsements

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Executive summary

Lung cancer causes more deaths than any other cancer, but for too long, it has not been given the policy attention it deserves. Lung cancer is the main cause of cancer-related deaths in Europe,[1] and its burden will remain high for several decades to come. Even though smoking rates are gradually declining,[2] people who used to smoke remain at high risk of lung cancer for many years after quitting,[3] and environmental factors such as air pollution are a growing cause of lung cancer in the entire population.[4]

We have the means to reduce the burden of lung cancer on our society, but it will require a comprehensive and integrated approach. Importantly, we need to dispel the perception that lung cancer is a self-inflicted condition. We could start by treating smoking as an addiction and reducing stigma towards both smoking and lung cancer. Early detection needs to be enhanced by implementing large-scale screening programmes that target high-risk individuals, alongside smoking cessation programmes. The evidence is clear that screening high-risk individuals using low-dose computed tomography scans offers a safe and effective way to shift diagnosis to earlier stages and reduce mortality from lung cancer.[5 6] Complementary approaches, such as incidental pulmonary nodule identification, management protocols and rapid referral pathways from primary to secondary care, are also important to improve early detection.[7 8] Improvements to lung cancer care pathways are needed to ensure all people have access to multidisciplinary care that encompasses specialist diagnosis, personalised treatments, and palliative and survivorship care.[7 8] Finally, targeted efforts are required to reduce geographical and socioeconomic disparities in access and outcomes.[9 10]

Making these changes can deliver benefits beyond lung cancer. Targeted screening programmes offer the opportunity for early detection of other non-communicable diseases (NCDs), such as chronic obstructive pulmonary disease and some forms of heart disease.[11-13] Tackling lung cancer can help countries progress towards reducing the overall burden of NCDs on their societies and contribute to greater health system sustainability.

With the implementation of Europe's Beating Cancer Plan and as we look to post-COVID recovery, we have the opportunity to put in place what is needed to improve outcomes for people with lung cancer and reduce the burden the condition poses on our societies. Lung cancer has, for too long, been denied due attention as a public health priority. The time to act is now.

The case for change

Lung cancer is the main cause of cancer-related deaths in Europe. It accounts for approximately one fifth of all deaths from cancer, significantly more than breast and colorectal cancers combined.[1] It is also responsible for 15% of the total costs of cancer in Europe and approximately a quarter of productivity losses due to premature mortality – incurring a higher economic toll than any other cancer.[14]
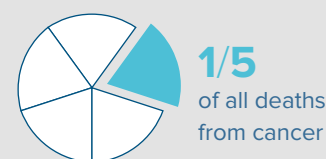
Despite significant advances in diagnosis and treatment, progress in lung cancer survival has been slow over the years. Precision diagnostics and personalised treatments are becoming prominent in lung cancer care.[15] There have also been considerable advances in immunotherapy, radiotherapy and surgical approaches. Yet survival continues to remain low. This is in large part because a high proportion of people with lung cancer are diagnosed at an advanced stage, when the chance of surviving five years is less than 10%.[16] By contrast, if lung cancer is detected early, 68% to 92% of people may survive at least five years (Figure 1).[16]

Incidence of and mortality from lung cancer are expected to continue to be high for years to come. Smoking is the main risk factor for lung cancer; other risk factors include environmental factors such as air pollution, occupational exposure (e.g. to asbestos)[2] and possibly genetic factors.[17] Europe has the highest prevalence of smoking among adults globally, with 29% of the population currently smoking.[18] Smoking rates are gradually declining in many European countries,[2] but people who used to smoke heavily remain at a high risk of developing lung cancer for up to 25 years after quitting.[3] In addition, 10% to 25% of all cases worldwide are diagnosed in people who have never smoked.[19] There are also gender differences to consider: while lung cancer mortality rates for men in Europe are in decline, they are on the rise for women.[20]

Significant disparities in availability and access to appropriate diagnosis and care remain across Europe. Progress in lung cancer has been significantly hampered by the COVID-19 pandemic,[21] owing to delays in and reduced access to diagnosis and care.[22-24] The resulting backlog of cases seen in several European countries will inevitably exacerbate the risk of late-stage presentation and delayed referrals to specialist care. Studies from

LUNG CANCER TOLL

LUNG CANCER ACCOUNTS for

1/5 of all deaths from cancer

Lung cancer has a **HIGHER ECONOMIC TOLL** than any other cancer

LATE DIAGNOSIS

Only **10**% of people with lung cancer survive 5 years after diagnosis at stage IV, but early diagnosis means 68–92% survive at least this long
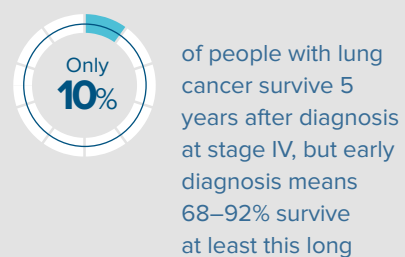
several countries show that there is a risk of thousands of excess deaths in people with cancer,[25][26] making the need for early detection that much more urgent.

The current prioritisation of cancer by the European Union (EU) presents a tangible opportunity to increase attention and action on lung cancer. *Europe's Beating Cancer Plan*, published by the European Commission in February 2021, proposes to tackle the entire disease pathway along four key action areas: prevention; early detection; diagnosis and treatment; and quality of life for people with cancer and survivors. The plan proposes a new, EU-supported Cancer Screening Scheme to assist Member States in expanding coverage for cancer screening in targeted populations for breast, cervical and colorectal cancers to 90% by 2025. Disappointingly, despite the strength of evidence behind lung cancer screening, the proposed scheme does not include lung cancer.[27] On a positive note, calls by various scientific societies to rectify this are increasing.

We are at a pivotal moment to make a difference for people affected by lung cancer. This will require a comprehensive approach, integrating efforts to strengthen anti-tobacco policies, early detection and underlying models of care. This think piece presents our vision for how to achieve this. We hope it will help ensure lung cancer is given the attention it deserves in evolving EU and national-level policies.

FIGURE 1. STAGE OF LUNG CANCER DETECTED IN SCREENING PROGRAMMES COMPARED WITH ROUTINE CARE

Adapted from Sands *et al.* (2021)[28]
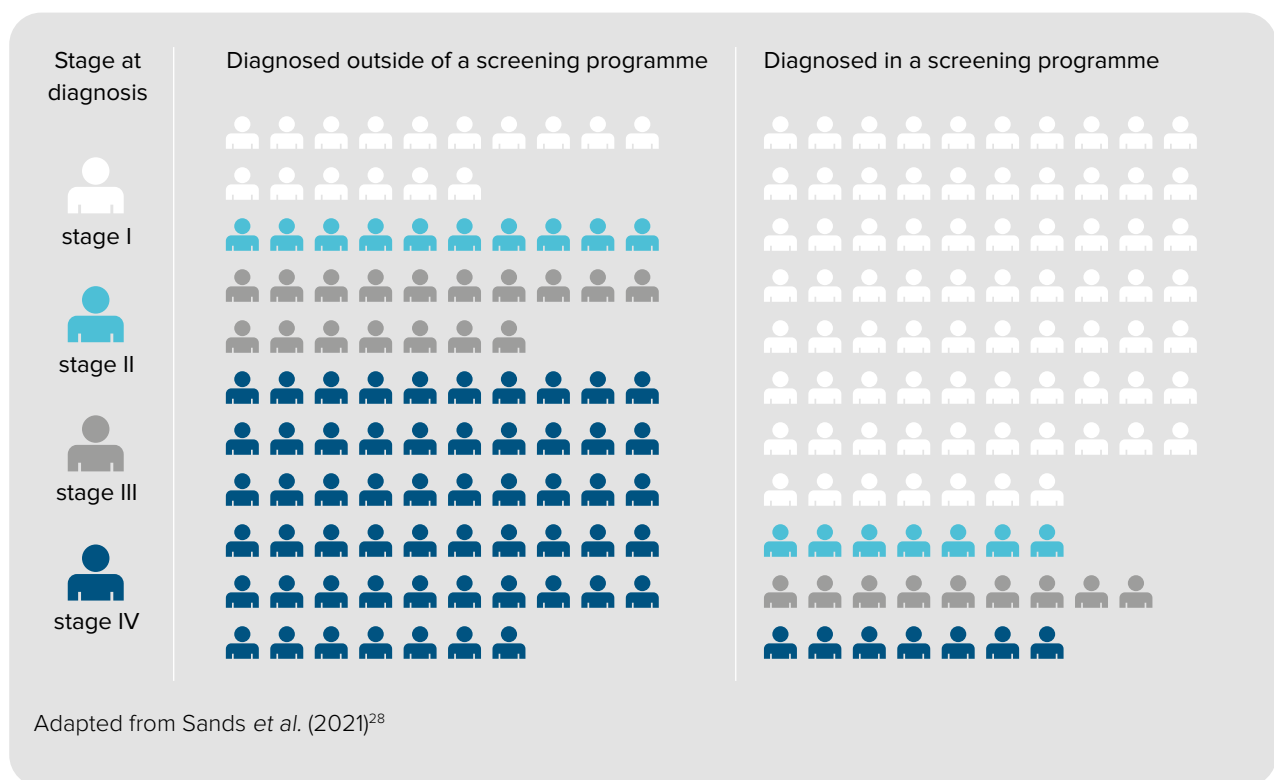
Building a comprehensive approach to lung cancer in Europe: strategic priorities

➜ Improve awareness, reduce stigma

Foster a better understanding of lung cancer

We need to improve the perception and understanding of lung cancer. Limited public awareness and low political prioritisation of lung cancer have translated into limited resources and research funding over the years compared with other types of cancer.[29 30] People are often unaware that their symptoms could be indicative of lung cancer, and delay seeking medical advice. Primary care physicians may not always be aware of the potential to diagnose lung cancer earlier. They may require further training to support them to spot the signs of lung cancer, particularly in high-risk groups, to avoid delays in diagnosis.[31] Many people may view lung cancer as a fatal condition; they may not be aware of all treatment options that might be available to them or understand the importance of early detection.[32] These informational barriers are more predominant among people in socioeconomically disadvantaged groups,[33] and could compound other barriers to appropriate diagnosis and care.[10] As well as delaying diagnosis, they have been shown to affect participation in lung cancer screening programmes.[34 35]

Reduce stigma towards smoking and, by association, lung cancer

Tobacco smoking is one of the most significant risk factors for lung cancer, so encouraging people not to smoke is key to prevention. Smoking must be widely recognised as an addiction, as opposed to a behavioural choice. All people who do smoke should be offered appropriate, easily accessible support and treatment to enable them to quit. Awareness campaigns and educational efforts are important to help combat general stigma towards smoking, as it has been shown to lead to a lack of empathy for people diagnosed with lung cancer.[36]

It is important to recognise that stigma around smoking can act as a powerful barrier to seeking appropriate care for lung cancer. Experiences of stigma, including discrimination and shame, are

reported equally by people with lung cancer who currently smoke, those who have smoked in the past, and those who have never smoked.[37] People with lung cancer reveal experiencing guilt and feeling responsible for becoming ill, and may delay consulting a physician as a result even if they are aware of their symptoms.[30 32] In some cases, stigma can make people feel 'undeserving' of treatment, while for healthcare professionals it can lead, however unconsciously, to perceiving and treating people with lung cancer differently.[29 32] Stigma is also a barrier to participation in lung cancer screening programmes ([Case study 1](#)).[38]

It is also important to recognise the limited research into the long-term safety of new tobacco and non-tobacco nicotine products, and to expand the evidence base for understanding these. Electronic cigarettes (a vapourised solution containing nicotine), heated tobacco products (containing real tobacco) and other tobacco substitutes are typically promoted as a less harmful alternative to cigarette smoking. However, the long-term effects of these products, including their role in lung cancer, are not yet known. Importantly, e-cigarettes contain nicotine, giving them the potential to be addictive. For these reasons, all non-tobacco nicotine products, including e-cigarettes, should be subjected to an appropriate regulatory framework which prioritises the safety of citizens and ensures the products are not marketed in a way that undermines public health. Until such time as independent research demonstrates their long-term safety, novel tobacco products should be effectively regulated as tobacco in order to limit uptake by new users.

Case study 1.

Targeted Lung Health Check: tackling stigma and other barriers to screening (UK)

The Targeted Lung Health Check model adopted in England uses a wellness approach to lung health: participants are assessed for all lung conditions and offered computed tomography scans if they meet the risk criteria, without specifically mentioning lung cancer.[39 40] Programmes employing this model are currently being extended across England.

Some of the programmes are designed to facilitate access for populations living in socially deprived areas, such as by placing mobile health check units near shopping centres.[41] This has been found to be an effective approach to improve engagement in screening. Participants are offered psychological support and smoking cessation advice, and are referred to smoking cessation services. In Liverpool, more than 95% of current smokers who took part in the study agreed to receive this advice.[42]

→ Enhance opportunities for early detection, with screening at its core

Accelerate the implementation of targeted lung cancer screening programmes

Earlier detection is a key priority to improve survival, as it offers the opportunity for patients to benefit from potentially curative treatments, such as surgery. The European Respiratory Society recently called on the European Commission to increase early diagnosis of lung cancer by 20% before 2030.[43] Screening is a core component of early detection and diagnosis. Targeted screening, using low-dose computed tomography (LDCT), among people defined as current or former heavy smokers has been shown to enable detection of lung cancer at an earlier stage and reduce mortality.[5 6] The impact of screening could be further enhanced by extending it to other groups of people at risk from lung cancer, including those from socioeconomically disadvantaged backgrounds, people with certain genetic predispositions and comorbidities, those with occupational exposure (e.g. to asbestos), and people from certain ethnic backgrounds.[44]
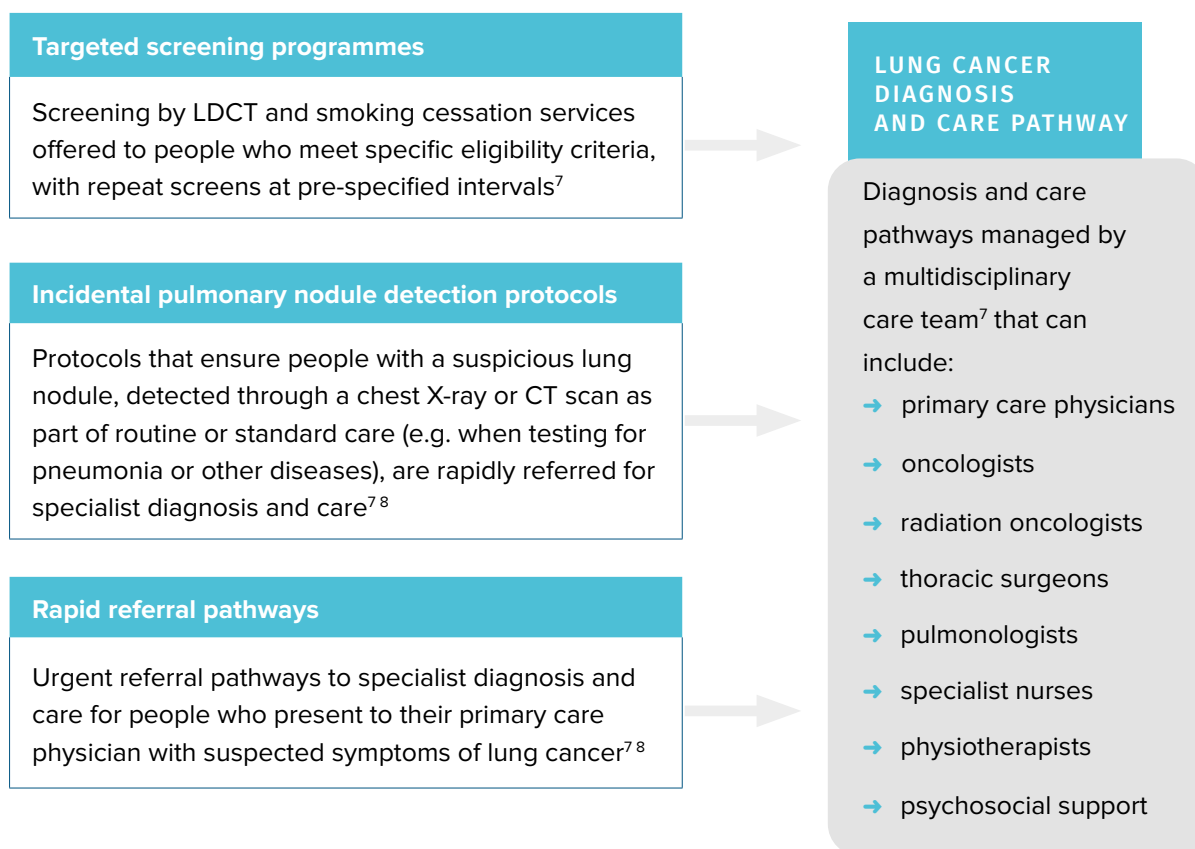
Despite evidence supporting the benefits of targeted lung cancer screening, its implementation in Europe has been patchy and slow. So far, only Croatia and Poland have formally committed to nationwide implementation of lung cancer screening programmes.[45 46] There have been multiple calls on the European Commission to include lung cancer screening in the upcoming update of the Council of the European Union's 2003 Recommendation on cancer screening in light of the current evidence base.[17 47-49] The EU was also called on to invest and support Member States in assessing the feasibility of implementing, as well as actual implementation of, national lung cancer screening programmes.[17 48 49]

Targeted LDCT screening confers an additional benefit – the opportunity to detect other non-communicable diseases (NCDs) at an early stage. LDCT scans can help detect the presence of respiratory diseases, such as chronic obstructive pulmonary disease (COPD), and cardiovascular disease, creating opportunities for joint actions aiming at risk reduction and early detection.[11-13] Taking part in lung cancer screening can help encourage people to stop smoking or modify other behaviours that may put them at greater risk of NCDs.[50 51]

Take a comprehensive approach to early detection

In addition to screening, it is also important to prioritise early detection for people who are not eligible for screening. Incidental pulmonary nodule identification and management as well as rapid referral pathways can help ensure that people with or without symptoms of lung cancer can rapidly access specialist diagnosis and multidisciplinary care ([Figure 2](#)).[7 8] However, few European countries have so far developed rapid referral pathways for lung cancer.[52 53]

FIGURE 2. COMPONENTS OF COMPREHENSIVE EARLY DETECTION OF LUNG CANCER

Targeted screening programmes

Screening by LDCT and smoking cessation services offered to people who meet specific eligibility criteria, with repeat screens at pre-specified intervals[7]

Incidental pulmonary nodule detection protocols

Protocols that ensure people with a suspicious lung nodule, detected through a chest X-ray or CT scan as part of routine or standard care (e.g. when testing for pneumonia or other diseases), are rapidly referred for specialist diagnosis and care[7 8]

Rapid referral pathways

Urgent referral pathways to specialist diagnosis and care for people who present to their primary care physician with suspected symptoms of lung cancer[7 8]

LUNG CANCER DIAGNOSIS AND CARE PATHWAY

Diagnosis and care pathways managed by a multidisciplinary care team[7] that can include:

➜ primary care physicians

➜ oncologists

➜ radiation oncologists

➜ thoracic surgeons

➜ pulmonologists

➜ specialist nurses

➜ physiotherapists

➜ psychosocial support

CT, computed tomography; LDCT, low-dose computed tomography

Recognise the complementarity of early detection and smoking cessation

Implementation of widespread screening programmes should happen alongside smoking cessation programmes, with the goals of both seen as complementary, not in conflict with one another. There is a lingering misconception that lung cancer screening gives people who smoke a 'licence' to continue smoking, when in fact smoking cessation programmes have been shown to be more successful when combined with screening programmes than when they are delivered alone.[17][54][55] It is also crucial to convey the message that there are significant benefits to stopping smoking even after a person has been diagnosed with lung cancer (Case study 2).

Case study 2.

Campaign for smoking cessation after a cancer diagnosis (Poland)

Continuing to smoke after any cancer diagnosis increases the risk of developing other cancers[56] and of postoperative complications.[57] It also decreases the efficacy of systemic lung cancer treatments.[58] Despite this, up to 50% of people with cancer continue to smoke following diagnosis, and many people who quit smoking relapse after their diagnosis, not having received adequate support.[59]

The Maria Skłodowska-Curie National Research Institute of Oncology in Warsaw initiated a pilot in 2019 to address this.[60] A questionnaire on smoking status and willingness to quit was provided along with a leaflet on the benefits of quitting smoking to all people with lung cancer admitted to the hospital. If a person declared that they wanted to stop smoking, they were offered tailored telephone counselling sessions. Those who declared they did not feel able to stop smoking received an anti-smoking minimal intervention conducted by a medical nurse on the ward. If the person subsequently decided that they were interested in support to stop smoking, they were referred for telephone counselling.

The preliminary data from September–December 2019 show that the majority of participants were reluctant to stop smoking.[60] The study coordinators suggest that one way to increase the effectiveness of smoking cessation would be to introduce additional health educators on hospital wards. This study conveys the importance of identifying the best ways to support people with lung cancer who wish to quit smoking.

➜ Take targeted approaches to reduce disparities in access and outcomes

Reduce inequalities in access to high-quality diagnosis and care

Lung cancer has seen many advances in diagnosis and treatment, but availability of high-quality diagnosis and care is often inconsistent. Access to personalised treatment for lung cancer can be hampered by, for example, limited access to biomarker tests.[30][61] Additionally, the limited availability of radiation oncologists, medical physicists, radiographers and equipment seen in many countries affects the ability to meet the demand for radiotherapy.[62] There are also gaps in the availability of palliative care,[63] despite its importance in improving quality of life for people with advanced-stage lung cancer.[64] Psychological support is often unavailable,[30] and in some areas there are chronic shortages of specialist cancer nurses, who can act as a central point of contact for people with lung cancer as they navigate through different stages of their care.[65] Lastly, support for carers, who often report a high level of distress and high workload,[66] is also frequently overlooked.

Address socioeconomic inequalities in lung cancer outcomes

Targeted efforts are needed to reduce socioeconomic inequalities in outcomes for lung cancer. There is a strong social inequality dimension to lung cancer. The risk of late-stage presentation is particularly prominent among groups experiencing social deprivation.[67] The same groups are not only most at risk of developing lung cancer;[67] they also face more barriers in access to screening,[68][69] diagnosis and care,[70] and have poorer survival.[67] Inequalities can be exacerbated by systemic issues such as a lack of reimbursement for medicines or diagnostic tests in some European countries.[71] Targeted efforts are needed to tackle these informational, financial, psychological and cultural barriers experienced by vulnerable populations at each stage of the care pathway.[9][10] Some early promise in the area is shown by a Europe-wide programme to increase access to biomarker tests and clinical trials (Case study 3).[71][72]

Adopt a gender-focused approach for women

Of particular concern is the growing rate of lung cancer among women.
Worldwide mortality rates from lung cancer are stabilising or decreasing for men, but they are increasing for women.[2] The causes are complex, but possibly include rising smoking rates – Europe currently has one of the highest levels of female smoking in the world[75] – and increased exposure to other carcinogens, as the incidence of non-smoking-related lung cancer is higher in women.[2 76] Gendered advertising and portrayals of smoking as a symbol of female empowerment commonly used by the tobacco industry to target women are additional contributing factors.[77] At the same time, however, women are more likely than men to engage in health behaviours that may mean better outcomes in lung cancer, for instance seeking out direct health interventions, such as screening.[17] Evidence also suggests that LDCT screening could bring more benefits for women than for men,[5 78] as lung cancer may progress more slowly in women.[79 80] All these factors call for a gender-focused approach to lung cancer risk reduction, screening and care.

Case study 3.

Improving access to tests and clinical trials across Europe: EPROPA programme (Italy)

Launched in December 2020 in Italy, the European Program for ROutine testing of Patients with Advanced lung cancer (EPROPA) was designed and promoted by Women Against Lung Cancer in Europe. Its aim is to improve access to molecular diagnostics and clinical trials for people with non-small-cell lung cancer.[73] The programme provides a free platform for access to molecular testing that helps define the type of lung cancer based on a person's genetic markers.[73 74]

Biological samples from people with lung cancer are sent to a central laboratory for molecular testing, and depending on results, biomarker-driven clinical trials in Europe may be recommended. The whole process takes no longer than ten days.[74] If a suitable clinical trial is identified and the person is able to participate, EPROPA covers transport and accommodation expenses for both the person and a carer, for the duration of treatment.[74]

Four countries are currently participating in the programme: Greece, Italy, Romania and Slovenia, with Poland, Portugal and Slovakia soon to join. As the programme is ongoing, data on its impact are not yet available, but if the outcomes do increase opportunities for molecular diagnostics and facilitate access to clinical trials, it could inform similar programmes elsewhere.

More information may be found at: www.epropa.eu/en

→ Improve availability of high-quality care
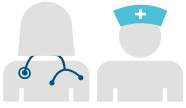
Make multidisciplinary care available to all people with lung cancer

Multidisciplinary care is a key component of high-quality lung cancer care, but it is not yet universally available. Management of lung cancer by a multidisciplinary team has been shown to result in rapid and more accurate diagnosis, better access to appropriate treatment, improved coordination and quality of care, and longer survival.[81-83] However, not all people with lung cancer have access to multidisciplinary care pathways. Many are left to navigate complex pathways unsupported, with fragmented access to different providers and poor coordination between them.[30] An ongoing monitoring of outcomes through centralised registries can help identify issues of concern in care pathways, and guide care improvement (Case study 4).

Ensure survivorship is given due attention

It is important not to forget the needs of people who live with lung cancer for many years. Given the historically poor prognosis associated with lung cancer, the importance of survivorship has often been sidelined. However, as outcomes evolve with advances in early detection and treatment, we must think about the needs of lung cancer 'survivors', people who live with and beyond lung cancer. This means ensuring appropriate services are available as part of a high-quality care pathway, spanning rehabilitation, psychological support, peer-support groups and follow-up care.[85]

Case study 4.

Improving quality metrics for lung cancer care through a cancer registry (the Netherlands)

The Dutch Lung Cancer Audit for Lung Oncology (DLCA-L) was set up in 2015. It tracks quality indicators, patient and tumour characteristics, and real-world use of immunotherapy.[84] Based on data from the audit, 15 quality indicators were established to improve processes and clinical outcomes in lung cancer.

The registry collects data on people with non-small-cell lung cancer and small-cell lung cancer, and by 2020 had been adopted by all hospitals in the Netherlands.[84] It has become a valuable and comprehensive data source, providing useful insights into hospital processes and outcomes of lung cancer care, as well as real-world information on the use of systemic therapies.[84] As it has been adopted by all hospitals in the country, it has also helped reduce variation in care between them.[84]

Optimise the use of data and digital health

We need to continuously optimise the use of data and digital innovations to improve the quality and efficiency of care for people with lung cancer. Some of the most advanced technologies enabled by artificial intelligence are being explored to optimise imaging and relieve workforce pressures for interpretation of scans, freeing up radiologists' time.[86 87] Advancements have also been possible thanks to remote web-based monitoring, which has been shown to improve overall survival, relapse detection and healthcare costs for people with lung cancer compared with standard follow-up care.[88-91] Data-sharing will continue to be vital to increase the efficiency and quality of lung cancer care, and help create opportunities for further data-driven improvements, part of a 'learning health system'[92] (Case study 5).

Case study 5.

Greater efficiency of diagnostic data-sharing for screening programmes: the East Midlands Radiology Consortium (UK)

The UK has among the lowest numbers of radiologists in Europe.[93] This shortage has resulted in delayed access to scans and cancer diagnosis. The East Midlands Radiology Consortium (EMRAD) was launched in 2013 to help address this challenge.[94]

EMRAD created a cloud-based radiology IT system, allowing for the full radiology imaging record for all patients to be shared remotely, including scans, reports and clinical evaluations.[93 94] This pioneering work saw the East Midlands become the first region in the UK where National Health Service (NHS) hospitals could quickly and easily share images needed for diagnosis.[94]

EMRAD has also been successful at harnessing the power of 'big data' in continuing to improve radiology services. It connects 11 hospitals, covering more than 5 million patients.[94] The consortium has set the national benchmark for a new model of clinical collaboration between NHS radiology services.[94]

The way forward

The burden of lung cancer on our society is unsustainable. It is time to act on the opportunities we have to tackle the disease and advocate for an integrated approach to its prevention, diagnosis and care. We cannot continue to ignore accumulating evidence supporting the benefits of screening and the need for its implementation at a national level. We cannot continue to ignore the fact that too many patients lack access to evidence-based diagnosis and care that could significantly improve their outcomes. And we must adopt targeted approaches to ensure outcomes are improved across the entire population, being mindful of existing socioeconomic inequalities.

With the prevalence of lung cancer set to remain high for decades to come, we need to take concrete steps to improve outcomes. By addressing the key strategic priorities outlined in this document, European governments could make a huge impact on the quality of life and outcomes of people currently living with lung cancer, as well as those who will be diagnosed in the future.

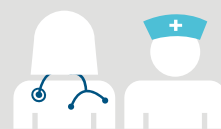We urge a focus on the following **strategic priorities**:

STRATEGIC PRIORITIES

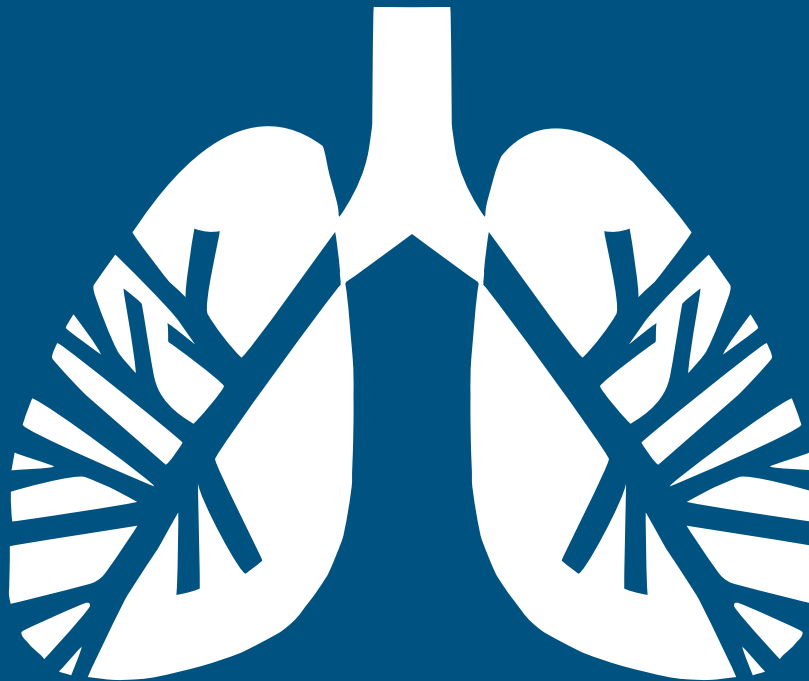|			
Improve awareness of lung cancer and reduce stigma linked to smoking, reversing perceptions of lung cancer as a self-inflicted condition	**Accelerate implementation of targeted LDCT screening programmes as a complement to smoking cessation efforts**	**Take a targeted approach to reduce inequalities in access and outcomes**	**Improve the availability of high-quality multidisciplinary care for lung cancer, reducing disparities in access both within and between countries**

Europe's Beating Cancer Plan declares that 'there should be no first- or second-class cancer patients in the EU'.[27] Lung cancer has, for too long, been relegated to second-class status. It is time that all stakeholders work together and take comprehensive action to change this.

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