The Health Policy Partnership
[research, people, action]

Lung cancer: the cost of inaction in Latin America

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1 Executive summary

Lung cancer is currently the leading cause of cancer-related deaths in the world, and this is an increasing reality in Latin America. Lung cancer accounts for 12% of all cancer deaths in the region and causes more deaths than any other cancer in both men and women.[1-3]

Despite its huge public health and economic burden, lung cancer has traditionally been poorly recognised as a policy priority. Few Latin American countries have specific targets for lung cancer, and targets that do exist are not necessarily monitored for progress over time. There is limited awareness in the general public and policymakers of treatment advances made in the past few years – lung cancer is still often seen as a death sentence and is typically surrounded by a culture of silence and stigma.[4] And most importantly, lung cancer is often detected at later stages when prognosis is poor.

The most effective way of reducing the burden of lung cancer is through effective smoking cessation and anti-tobacco policies, but early detection is also essential. Tobacco consumption in Latin America fell significantly from 28% in 2000 to 16% in 2020, in part due to successful tobacco control policies in many countries.[5] However, people who previously smoked remain at high risk of lung cancer for several years after quitting, therefore the prevalence of lung cancer will remain high for many years yet.[4 6 7] In addition, lung cancer can affect people who have never previously smoked. Early detection is thus an important complement to smoking cessation to optimise outcomes for those whose cancers could not be prevented.

Establishing well-planned early detection pathways for lung cancer care is crucial to reduce mortality. Early detection can take several approaches, but the most effective and evidence-based route is through targeted screening of high-risk individuals using low-dose computed tomography (LDCT). However, this may not be feasible in many countries given the scale of investment and capacity required. Thus, a gradual and comprehensive approach to implementation is needed with solutions tailored to locally available resources, and improvements made across the entire lung cancer care pathway.

Any approach to early detection must also take into consideration the underlying epidemiology and health context in each country. Latin America is a region of significant socioeconomic and ethnic diversity. The epidemiology of lung cancer varies considerably between countries, as does the underlying health context and availability of health resources.[4] All these factors must be carefully weighed in to ensure the implementation of early detection is feasible, appropriate and equitable, achieving the best impact possible across the entire population.

As the major cause of cancer deaths in Latin America, lung cancer must be recognised as a policy priority. Targeted goals to reduce the burden of lung cancer must be built into national cancer control plans. The benefits of early detection, including large-scale screening programmes, have been seen in cervical cancer, breast cancer, and growingly, colorectal cancer.[8] Now it is time to turn our attention to driving progress in lung cancer.

2 Lung cancer: the need for urgent action

Cancer is a major and increasing public health concern in Latin America and the Caribbean.[1 3] Over the past decades, health systems have experienced a shift in disease burden from infectious diseases to non-communicable diseases (NCDs) such as cardiovascular disease, diabetes and cancer.[9] The majority of NCD deaths could be prevented or delayed with appropriate policies focusing on NCD prevention and treatment,[10] with early detection as a core component. Recognising this, the Pan American Health Organization (PAHO) is working with other countries in the region to reduce premature deaths from NCDs, including cancer, by 25% by 2025. Within its NCD plan of action, PAHO supports the introduction of human papillomavirus (HPV) vaccines and HPV testing to prevent cervical cancer, promotes improvements in quality and access to early diagnosis of breast cancer, and promotes the reduction of tobacco and alcohol use.[11]

Among NCDs, cancer is the leading cause of death in Latin America and lung cancer causes more deaths than any other cancer in both men and women.[1 2] There are over 1.4 million new cases of cancer and 600,000 deaths from cancer per year (2020 data).[1] Lung cancer accounts for 12% of all cancer deaths[3] with 80,000 deaths per year – and this figure is expected to double in the next decade.[12] The cost of lung cancer to our societies is considerable[4 13 14] – in terms of lives lost prematurely, high costs of care, impaired quality of life and lost productivity for people affected as well as their carers.[15]

Despite its considerable burden, lung cancer has traditionally been poorly recognised as a policy priority. Only some Latin American countries (Argentina, Colombia, Costa Rica, Panama, Peru and Uruguay) have specific targets for lung cancer in their national cancer plans.[16-20] In Colombia for example, the government's public health plan (Plan Decenal de Salud Pública 2022-2031) included lung cancer as a strategic health problem and set the aim to reduce its mortality to 7% by 2031.[21 22] A common issue, however, is that progress against stated targets is not routinely monitored due to lags in availability of lung cancer data compared to other cancers.[4]

Attitudes towards lung cancer are also an issue. Lung cancer is often perceived as a self-inflicted condition, and international data suggest this has invariably limited the political will to act.[4 23] Its association with smoking causes widespread stigma towards people with

lung cancer,[24 25] and stigma is felt equally by people who have smoked and those who have not.[26] There is also limited awareness of treatment advances made in the past few years: lung cancer is often seen as a death sentence and is typically surrounded by a culture of silence.[4]

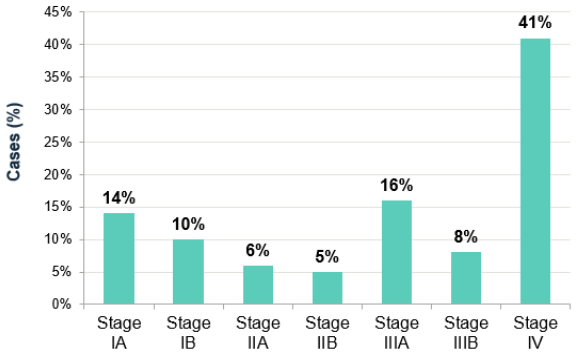
The most effective way of reducing the burden of lung cancer is through actions oriented towards smoking cessation – but early detection is also essential to optimise outcomes for those whose cancers could not be prevented. Smoking cessation efforts are not an option for people who no longer smoke, or for people whose lung cancer was not caused by smoking. People who used to smoke remain at a three times greater risk of developing lung cancer for up to 25 years after quitting, compared with people who have never smoked.[6 7]

Early detection must thus be seen as a necessary complement to existing smoking cessation programmes. If detected early, lung cancer is treatable and even curable. Based on international data, a person diagnosed with stage IV (highly advanced) lung cancer has less than a 10% chance of surviving five years after diagnosis; but if diagnosed at stage I (early stage), this increases to between 68% and 92% (Figure 1).[27] Early detection could also reduce the costs of lung cancer, as costs are much higher for advanced stage disease. In Mexico, for example, the estimated cost of stage IV lung cancer with targeted therapy is between 1.5 and 2 times higher than the cost of treatment for stages II or III.[28a] The indirect costs of lung cancer, in terms of productivity losses and informal care, are also particularly high at advanced stages of disease.[15 29]

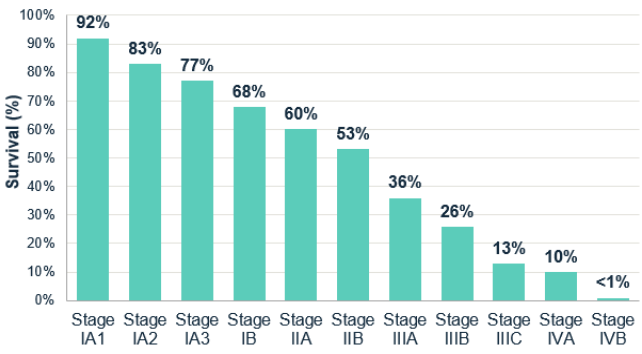
[a] The estimated cost of lung cancer treatment in Mexico for stage II was $9 441.6 vs. $13 419 for stage IV (2000-2016).

Figure 1. Non-small-cell lung cancer (NSCLC)* is commonly diagnosed at an advanced stage, which is associated with poor prognosis

Diagnosed cases of NSCLC by stage (%)[30]



5-year survival for NSCLC patients[27]



* Non-small-cell lung cancer accounts for 80–85% of global lung cancer cases.[31 32]

The need to invest in early detection of lung cancer is significant as most cases of lung cancer are detected late. Across the region, up to 85% of lung cancer cases are found at stage III or IV;[4] In Brazil, the percentage of people presenting with stage IV lung cancer is estimated at 70%,[33] and this figure is 76% in Colombia[34] and 90% in Mexico.[35] Reasons behind late presentation are complex and include lack of awareness of lung cancer symptoms, fragmented health systems, and limited resources.[4 8 36]

The benefits of early detection, including large-scale screening programmes have been seen in other cancers. The current evidence suggests that breast cancer screening reduces the number of deaths from breast cancer by about 1,300 a year in the UK for example.[37] Data from different studies suggest the impact of lung cancer screening could be even greater, as fewer screens are required to prevent one lung cancer death compared to breast or colorectal cancer.[38 39 40] It is estimated that 320 people needed to be screened by low-dose computed tomography to prevent one death from lung cancer, [38] compared to 645–1,724 people need to be screened by mammography to prevent one death from breast cancer. [39] Additionally, PAHO has worked with the Alliance for the Prevention of Cervical Cancer (ACCP) and with the global coalition Cervical Cancer Action to promote and strengthen the prevention and control of cervical cancer. Now it is time to turn our attention to driving similar progress in lung cancer.

The purpose of this document is to look at how early detection of lung cancer could feasibly be implemented in Latin American countries. Latin America is a socioeconomically and ethnically diverse region, encompassing 650 million people spread across 42 countries and territories,[41] many with limited resources. Any proposed action plan must be grounded in the context of each country, keeping in mind local epidemiology, health system capacity and available resources. Drawing on case studies of implementation from across the region, this report presents proven approaches for early detection of lung cancer. We hope it can serve as a starting point for policymakers to build effective early detection programmes into locally appropriate plans and take concrete steps to reduce the burden of lung cancer across the region.

3 Lung cancer in Latin America: understanding the challenge

3.1 Significant disparities in incidence and mortality

The epidemiology of lung cancer varies considerably between countries, affecting people differently across the region. Uruguay, Cuba and Argentina have the highest rates of incidence and mortality, and Central American countries and Guyana have the lowest rates (Appendix 1 and Table 1).[3] Lung cancer cases are also increasing in some countries, such as Colombia where the prevalence increased by 10% between 2015 and 2021.[34]Socioeconomic, ethnic and environmental factors vary considerably across Central, South and Caribbean regions, as well as urban and rural populations;[41] [42] in Mexico for instance, 80% of all lung cancer deaths occur in urban regions. [28] These factors all influence clinical presentation, diagnosis and lung cancer management, manifesting in significant disparities in outcomes for people with lung cancer across the region.[1] [43]

Table 1. The public health impact of lung cancer: incidence and mortality[44]

	Estimated number of new cases per year	Percentage of new cases of lung cancer in relation to all cancers (%)	Estimated number of deaths per year	Percentage of lung cancer deaths in relation to all cancer deaths (%)
Central America	NA	NA	9.236	7.3
South America	76.609	7	67.312	12.9

Latin America and the Caribbean	97.601	6.6	86.627	12.1

The molecular epidemiology of lung cancer also varies between countries. Understanding the molecular epidemiology of lung cancer provides further understanding and contextual information that is important when developing diagnostic guidelines and treatment plans.[42] Compared with other regions, Latin America has a particularly high prevalence of two genetic mutations that are associated with a higher risk of NSCLC: epidermal growth factor receptor (EGFR) and Kirsten Rat Sarcoma viral oncogene (KRAS).[45] Their presence varies considerably: Peru has higher frequency of EGFR mutations than Argentina for instance (see Appendix 2).[45] Groups such as the Latin American Consortium for the Investigation of Lung Cancer (CLICaP) are working to improve understanding of such region-specific differences in the molecular epidemiology of lung cancer.[45] This research is important as it can support efforts to improve the availability of biomarkers for diagnostic testing and targeted treatments to make sure they are most likely to have a positive impact in local populations. For example, people with EGFR mutations are most likely to respond to tyrosine kinase inhibitors (TKI), an important class of treatments for lung cancer.[42]

3.2 Smoking and other risk factors

Tobacco is the main risk factor for lung cancer and anti-tobacco policies are the most effective way to reduce the burden of lung cancer.[1] Smoking is thought to be responsible for 64% of lung cancer cases in the region,[4] 79% of deaths and 80% of medical costs due to lung cancer (based on data from 12 countries[b]).[46] Second-hand smoking accounts for nearly 40,000 lung cancer deaths.[46] Latin America saw a decrease in the prevalence of tobacco consumption from 28% in 2000 to 16% in 2020, and now has the second lowest prevalence of tobacco consumption globally,[5] in great part due to successful tobacco control policies in many countries[42] following the pillars of the WHO Framework Convention on

[b] Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, Mexico, Panama, Paraguay, Peru and Uruguay.

Tobacco Control. [47] In Chile for example, new laws on limiting tobacco led to a decrease in smoking from 42% in 2003 to 33% in 2017.[48]

Despite this progress, the prevalence of lung cancer will remain high for many years yet. Smoking rates are still increasing in adolescents, and as mentioned previously, people who used to smoke remain at high risk of lung cancer for several years after quitting. [4 6 7 49] It follows that the highest lung cancer incidence rates are seen in countries with high past and present smoking rates, namely Argentina, Chile and Uruguay and Argentina.[50]

Smoking is also not the only risk for lung cancer – and lung cancer does not only affect people who smoke. Other risk factors, responsible for over a third (36%) of lung cancer cases, remain a public health concern in their own right. These include residential radon gas, arsenic in groundwater, indoor and outdoor air pollution.[4] Pollution from wood smoke used as an energy source is a particular concern; in Mexico, for example, 1.5 million homes use wood for cooking and heating.[4 51] The combined prevalence of these risk factors, along with the presence of EGFR and KRAS mutations, suggests that, even with optimal tobacco control and smoking cessation policies, the burden of lung cancer in Latin America will remain significant in years to come.[42]

3.3 Shifting trends for men and women

Though smoking prevalence is decreasing, the rising prevalence and mortality from lung cancer in women is a particular concern. Although the last 10 years have seen a general decrease in lung cancer mortality rates in men, mortality rates are rising among women in many Latin American countries.[3 24 42 52] This is thought to reflect in part different smoking trends between the sexes: in most countries, smoking rates have declined among men, whereas in women they have either remained stable or decreased at a slower rate.[42 53] In addition, the international literature suggests that lung cancer develops differently in women compared with men.[54]

3.4 The underlying health system context

It is also important to be mindful of the underlying context for cancer care in each country. Of the 42 countries and territories in the region, 25 are classified as low- and middle-income countries (LMICs), with limited resources and capacity in primary care, specialist cancer care and palliative care.[4 42] In many countries, cancer control is challenged

by fragmented and poorly joined-up health systems;[8 55] underdeveloped cancer registries and limited local data and research;[36] underfinancing of the public sector, with investment often favouring the private sector;[8] and significant disparities in access to high-quality diagnosis and care,[4] with poor outcomes as a result.[12 36] These factors need to be taken into consideration when assessing the readiness of different countries to implement early detection programmes for lung cancer, and addressed appropriately to ensure their feasibility and successful outcomes.

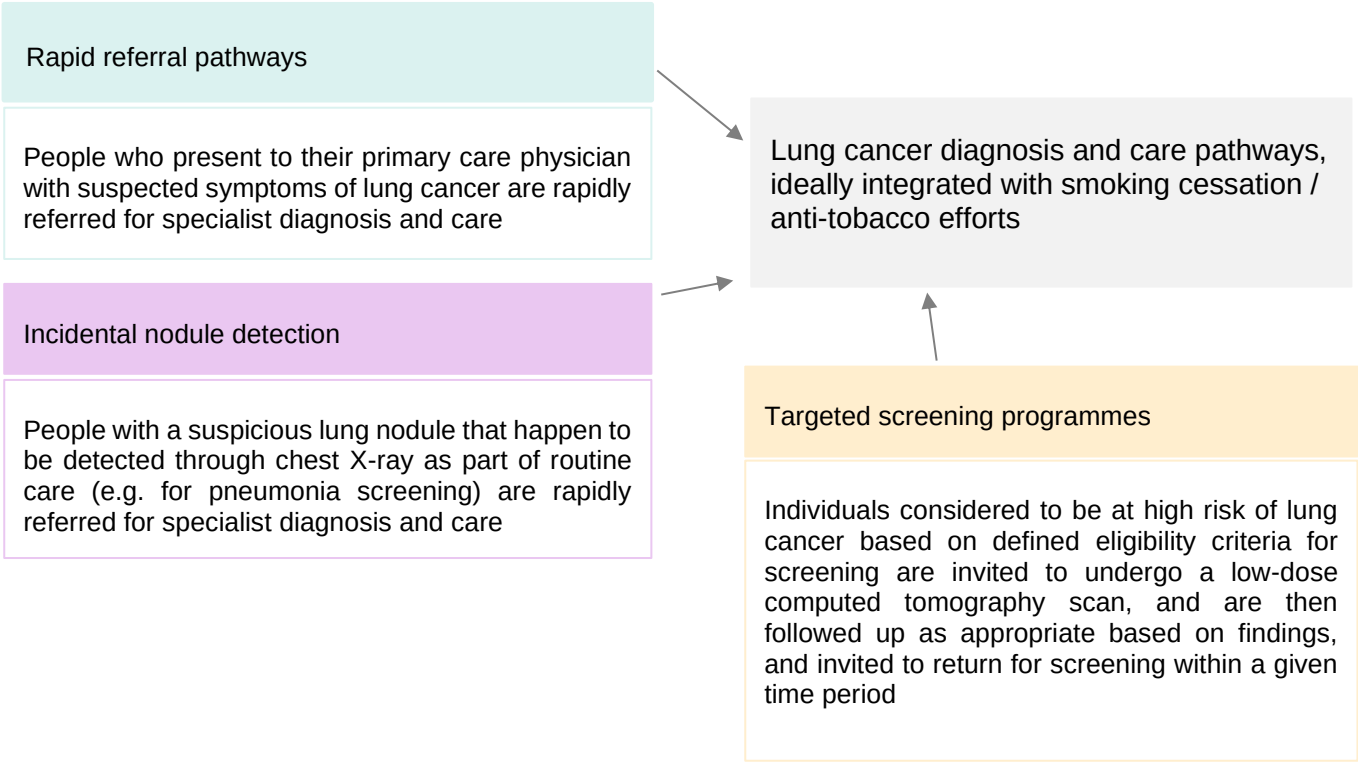
4 Implementing early detection in Latin America

4.1 The need for a comprehensive approach

Early detection of lung cancer can take several approaches. The most effective means of shifting detection to an earlier stage is through targeted screening of high-risk individuals using low-dose computed tomography (LDCT) – and this is supported by evidence from international randomised clinical trials.[38 56] However, large-scale implementation of LDCT screening programmes may not be feasible in many countries given the scale of investment and capacity needed – and a combination of approaches should be considered to foster early detection across the entire population (Figure 2). This being said, there are available guidelines that can be adapted in countries depending on local contexts and health systems; for example, the Mexican Society of Oncology (SMEO) and the Mexican Center of Clinical Excellence (Cenetec) developed a Clinical Practice Guideline to support clinicians, patients, policymakers and other stakeholders in the diagnosis and management of NSCLC.[35]

It is also important that early detection programmes are integrated into all facets of health systems to ensure the best outcomes. They need to work in parallel with smoking cessation and anti-tobacco policies to be optimally effective.[6 57-61] They also need to be accompanied by appropriate investment into high-quality lung cancer pathways, so that every person in whom lung cancer is detected has the chance to achieve the best outcomes possible.[23 61-63] Implementation of available local clinical guidelines is also essential.[35]

Figure 2. A comprehensive approach to early detection of lung cancer



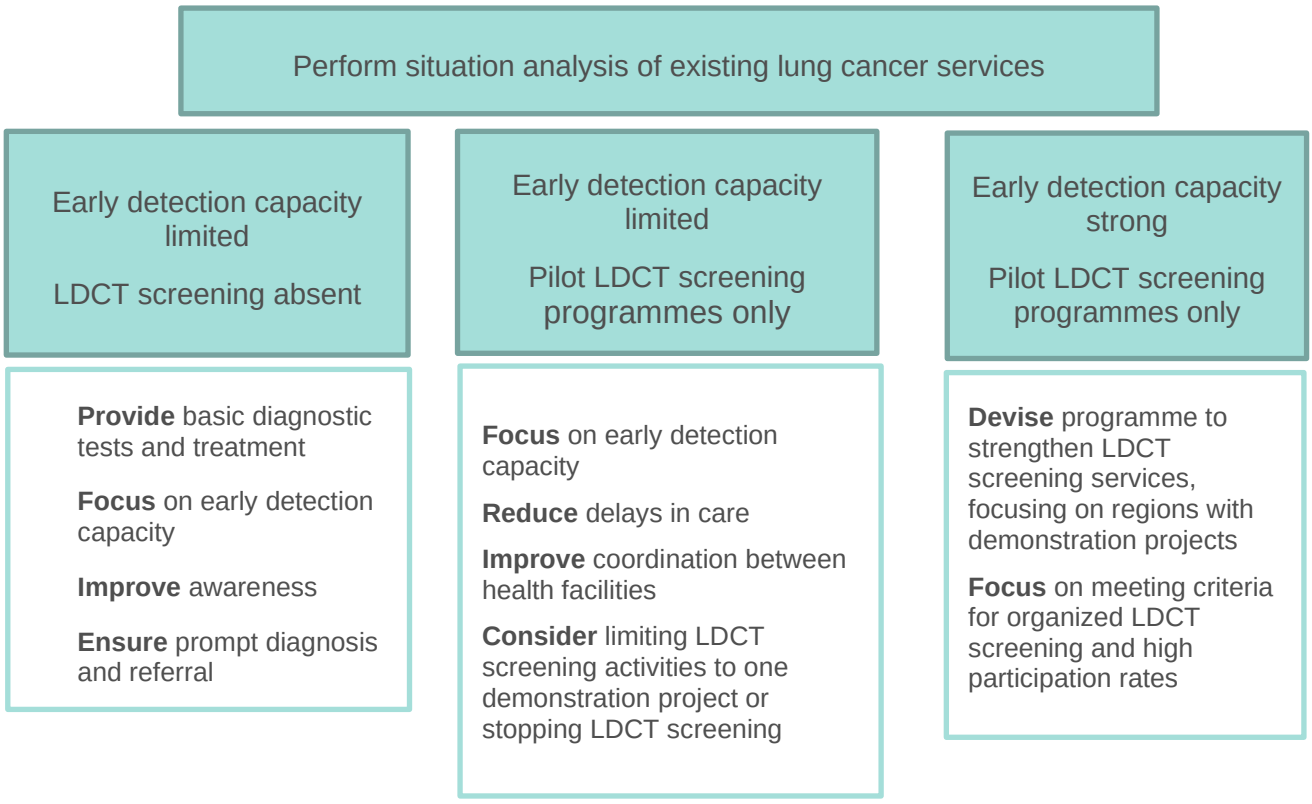
4.2 Targeted screening in high-risk individuals using low-dose computed tomography

Screening of lung cancer takes a targeted approach, focused on high-risk individuals. There is now cumulative evidence from large-scale clinical trials conducted internationally that targeted LDCT screening can reduce lung cancer deaths by nearly one quarter in high-risk individuals.[38 56] In the Dutch–Belgian lung cancer screening (NELSON) trial, 18.4% of 868 deaths in the screened group were because of lung cancer, compared with 24.4% of 860 deaths in the control group, who were not offered screening. This equated to a reduction in lung cancer mortality in men of 24% over 10 years.[56] LDCT screening also resulted in a significant shift to earlier diagnosis, with 59% of cases of lung cancer among people in the screening arm detected at an early stage, compared with 14% in the control group.[56]

In light of these data, there is growing momentum around the world towards implementation of LDCT screening. Several countries are exploring the feasibility of implementing large-scale LDCT screening programmes, and a growing number of governments have committed to national-level programmes. However, Latin American countries have generally been reluctant to adopt LDCT screening owing to a number of

concerns.[c] These include: limited and fragmented health system capacity and resources, lack of trained personnel (e.g. radiologists), existing inequities in access to services, gaps in appropriate and timely referral for treatment, and enhanced risk of false positives due to high rates of tuberculosis.[4 13 36 64] Another issue is limited awareness of lung cancer symptoms and understanding of the benefits of early detection among the population,[64] which points to the need for government-sponsored public awareness campaigns aimed at communicating key facts about lung cancer and conveying hope if it is detected early. In light of these concerns, a gradual approach to implementing LDCT screening within a broader focus on improving early detection may be envisaged, focused initially on building suitable local capacity and lung cancer services and gradually progressing towards adoption of screening programmes (Figure 3).

Figure 3. Planning early diagnosis and screening according to current capacity[62]



* Adapted from WHO (2017). *Guide to cancer early diagnosis*.

[c] References and local commentaries to be added following meeting on 27th of October.

There are already some promising pilot LDCT screening programmes underway in the region. Local LDCT screening programmes are currently being piloted in Brazil (Case study 1)[65] and in 2018 Mexico announced the intended launch of a national screening programme for people with tobacco or wood smoke exposure, though its status is currently unknown.[28] Localised adaptations of eligibility criteria for screening can also ensure that only people at highest risk of lung cancer are invited to participate.[61] These localised efforts may help build knowledge about how to implement screening programmes as effectively and cost-effectively as possible, and expand these efforts to wider segments of the population and other regions.

Case study 1[d]. Lung cancer screening in Brazil and use of mobile units

The benefits of LDCT screening were recently illustrated in the Second Brazilian Early Lung Cancer Screening Trial (BRELT2). Of the 74 people found to have lung cancer, 70% were diagnosed at stage I or II.[65] However, there are still many barriers to overcome before an organised screening programme can be implemented nationwide, including inequitable access to screening equipment between the public and private sector. To address this challenge, as part of the Propulmão Mobile Project, the municipal health office in Barretos (São Paulo) partnered with the local cancer hospital to pilot delivery of a smoking cessation interventions and mobile LDCT screening in the community.[2 66] Over 3,300 people were estimated to be at high risk of lung cancer in the city and 19 teams were established in primary healthcare centres to deliver interventions. Screening data were shared via an online platform and a direct line of communication was established between the participating clinics and a multidisciplinary team to discuss individual cases for diagnosis and treatment. Both participants and primary care teams reported positive feedback on the pilot,[66] and as a result, it has recently been expanded to three municipalities in remote areas of the Northeast Region (Bahia and Paraíba).

[d] This case study is from *Lung cancer screening: learning from implementation* report.

4.3 Incidental nodule detection through chest X-rays, aided by artificial intelligence

The identification of lung cancer nodules through chest X-rays performed as part of usual care is an important avenue to find people who may be at risk of lung cancer. There is currently insufficient evidence to advocate for the use of chest X-rays as a population-wide screening tool for lung cancer.[67] However, often chest X-rays may be used for another purpose, such as to screen for tuberculosis. Artificial intelligence (AI) algorithms can be used to assist radiologists or other healthcare professionals reviewing them to identify incidental pulmonary nodules (IPNs),[68] and refer them for further diagnostic tests, such as CT scans, to rule out a diagnosis of lung cancer. Case study 2 presents early findings of an AI-assisted tool currently being investigated in Latin America and other areas of the world for the evaluation of chest X-rays in primary care.[68]

Case study 2: Incidental pulmonary nodules in primary care settings[68]

A pilot programme in Argentina, Brazil, Chile, Colombia, Costa Rica, Mexico and Panama tested an AI-assisted tool to evaluate chest X-rays in primary care settings in order to identify lung nodules. Chest X-rays were uploaded to an AI framework on the cloud and people with suspected lung cancer cases or suspicious nodules were referred to a pulmonologist, radiologist or surgeon as part of a multidisciplinary care team. There were 20 clinics involved in the pilot and data about health resource utilisation, time to diagnosis, and stages for the positive cases were recorded. The pilot's long-term goals are to implement prospective data collection, expand into further primary care settings and potentially develop a mobile app to assist with diagnosis.

4.4 Rapid referral pathways

Another important way to foster earlier detection of lung cancer is by increasing the speed of referrals to specialist diagnosis. Ensuring rapid diagnosis for lung cancer is essential to allow lung cancer cases to be detected at an early stage,[69] yet delays in diagnosis are commonplace. [28 33 42] Regional data also suggest people often wait up to six

months for treatment after an initial diagnosis of lung cancer.[42] Rapid referral pathways allow people who present to their primary care physician with suspected symptoms of lung cancer to be rapidly referred for specialist diagnosis and care.[70] Such pathways are already being explored in different countries in the region and internationally (Case studies 3 and 4).[70-74] Additionally, Mexico has suggested to create dedicated centres that allow early and adequate referral of people with suspected lung cancer to tertiary facilities.[36 75]

Case study 3. Rapid referral pathway in Costa Rica[71]

In Costa Rica, a fast-track route between levels of care in the country was established to allow for people with suspected lung cancer to be rapidly referred to appropriate diagnostic testing and treatment. The referral pathway also includes counselling on smoking cessation.

Case study 4: Timed pathways to ensure rapid diagnosis and access to lung cancer treatment in Chile

In 2005 in Chile, the AUGE-GES law was passed by the Ministry of Health, legally enforcing timed targets for access to diagnosis and treatment. The law guarantees that people who are diagnosed with one or more of the health problems included in the AUGE-GES have access to timely, high quality healthcare without discrimination and with adequate financial protection.[76] Lung cancer is covered by the AUGE-GES: any person aged 15 and over with suspicion of lung cancer must have access to appropriate diagnostic services; people with confirmed cases have access to treatment and follow-up care. Timed targets are also specified: diagnosis must be made within 60 days following initial consultation, treatment must be provided within 45 days of confirmation of lung cancer, and a follow up appointment must be guaranteed 30 days after the end of treatment.[74]

5 Making it happen: key success factors for implementation

Action is urgently needed to reduce mortality from lung cancer in Latin America – and early detection must be a central pillar of these efforts. Governments need to be ready to invest in cancer control if the burden of cancer is to be lessened. This investment will reap dividends in the long term: in terms of lives saved, health system resource-use reduced, and productivity losses avoided. A gradual approach to implementation can help ensure screening programmes are feasible, equitable, and make the most efficient use of existing resources.

To be successful, early detection efforts need to be inscribed in a comprehensive commitment to improving outcomes for people with lung cancer. Targets for lung cancer and mechanisms to ensure regular monitoring of progress against them must be integrated in national cancer plans, research agendas, health system reforms, data collection efforts, workforce planning, and health promotion initiatives – and the entire lung cancer pathway needs to be optimised. (Figure 4). Actions on lung cancer should build on the success of cancer control programmes more broadly – including early detection efforts targeting other cancers – as well as strides made by lung cancer groups (such as CLICaP) to boost research and strengthen cancer registries.[4 8]

Figure 4[e]: Key factors for successful implementation of early detection programmes for lung cancer in Latin America

- **Inscribe commitments** to reduce lung cancer mortality and increase early detection in national cancer control plans and overall public health strategies.
- **Create public awareness campaigns** to improve understanding of lung cancer and convey hope that it can often be treated if detected early.
- **Strengthen data, research, and data systems** to improve understanding of local genetic, environmental and other risk factors within different populations, and build this knowledge into cancer registries.

[e] To be designed following meeting on 27th of October.

- **Build this understanding of risk into early detection approaches**, including eligibility criteria for targeted LDCT screening programmes, to ensure they reach those at highest risk of lung cancer.
- **Strengthen smoking cessation provision**, and continue to implement all pillars of the Framework Convention on Tobacco Control.
- **Address existing gaps and inequities in access** to high-quality diagnosis, treatment and care, tackling disparities that arise due to location (urban vs. rural settings), coverage (private vs. public funding), social disadvantage and ethnicity.
- **Explore use of artificial intelligence** to improve the effectiveness of X-rays and other imagining, which can also help address workforce shortages.
- **Improve integration of care** for patients, bridging across different disciplines and settings to offer them multidisciplinary, coordinated care that meets the entirety of patients' needs.
- **Engage all stakeholders** to co-develop feasible, effective and equitable approaches to early detection for lung cancer – including all relevant health professionals involved in treating lung cancer, spanning primary care, public health and smoking cessation specialists, as well as the lung cancer patient community.

In conclusion, advancing early detection of lung cancer should be a key public health goal in Latin America. Although LDCT screening combined with smoking cessation remains the optimal strategy, this may not be feasible in many countries and a more gradual approach may be needed. A combination of different approaches should be used to ensure lung cancer is detected earlier in the population, and factors contributing to late presentation are addressed. The equity dimension should never be forgotten: we need to engage people at the highest risk, which includes all underserved populations regardless of socioeconomic status, so we do not inadvertently exacerbate existing inequalities in lung cancer. Instead, we must aim to shift the detection of lung cancer to an earlier stage across the entire population, leading to a reduction in the number of lives lost over years to come.

6 Appendices

Appendix 1. Lung cancer incidence and deaths by country[44]

Country	Number of new cases	Percentage of new lung cancer cases in relation to all new cancers (%)	Mortality per 100,000 adults	Percentage of lung cancer deaths in relation to deaths from all cancers (%)
Argentina	12.110	9.3	10.729	15.3
Bolivia	971	6.1	874	8.8
Brazil	40.409	6.8	35.160	13.5
Chile	3.969	7.3	3.550	12.4
Colombia	6.876	6.1	6.090	11.1
Costa Rica	408	3.1	374	6.2
Cuba	6.689	14.3	6.173	2.7
Ecuador	1.185	4	1.069	3
Mexico	7.588	3.9	7.100	7.9
Paraguay	936	7.2	854	13
Peru	2.888	4.1	2.595	7.4
Uruguay	1.796	11.4	1.530	17.8
Venezuela	5.276	9	4.694	15.1

Appendix 2. EGFR mutations in non-small-cell lung cancer in seven Latin American countries[45f]

Country	Number	Frequency (%)
Argentina[45]	1.713	247 (14.4)
Brazil[33]	NA	NA (25)
Colombia[45]	1.939	456 (25.2)
Costa Rica[45]	102	32 (32.7)
Mexico[45]	1.417	472 (36.7)
Panama[45]	174	41 (25.5)
Peru[45]	393	201 (51.1)

[f] Using available data for EGFR mutations in Latin America

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