ASPIRE
Asia Pacific Policy Review &
Engagement for Lung Cancer

BRIDGING THE GAP

Enhancing Lung Cancer Care and Access in the APAC Region

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About ASPIRE for Lung Cancer

ASPIRE
Asia Pacific Policy Review &
Engagement for Lung Cancer

ASPIRE (Asia Pacific Policy Review and Engagement) for Lung Cancer is a collaborative multilateral effort focused on improving lung cancer outcomes in the Asia-Pacific (APAC) region through policy reforms. We advocate for prioritising lung cancer in government action plans, aiming to drive transformative changes that enhance patient access and care.

Our focus is guided by a Charter outlining nine key pillars, with an initial emphasis on political action and funding, in turn leading to improved equitable access to screening, diagnosis and treatment and overall patient care.

We believe in the influence of collaboration and collective action to drive positive change. Therefore, we will work with governments, agencies, NGOs and patient groups, bringing together multi-disciplinary experts to improve health outcomes for lung cancer patients in the APAC region.

POLITICAL ACTION AND FUNDING

▶ Increasing political commitment
▶ Increasing the number of centralised lung cancer action plans
▶ Providing sufficient funding
▶ Amplifying the patient voice
▶ Fostering regional and international cooperation

PATIENT ACCESS AND CARE

▶ Raising public and patient awareness
▶ Implementing advanced health system-wide screening programmes
▶ Increasing access to companion diagnostics, NGS and serum tumour marker testing
▶ Increasing equitable access to treatment

To find out more about or get involved with the ASPIRE for Lung Cancer, please visit **www.aspirelungcancer.com** or **scan the QR code** to access the website.

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Glossary

ABBREVIATIONS	TERMS
AI	Artificial Intelligence
ALK	Anaplastic Lymphoma Kinase
APAC	Asia-Pacific
APCLC	Asia Pacific Coalition against Lung Cancer
ASPIRE	Asia Pacific Policy Review and Engagement for Lung Cancer
C/CAN	City Cancer Challenge
COPD	Chronic Obstructive Pulmonary Disease
CPG	Clinical Practice Guidelines
CT	Computed Tomography
DALY	Disability-Adjusted Life Year
EGFR	Epidermal Growth Factor Receptor
HTA	Health Technology Assessment
ILO	International Labour Organisation
LC-SCRUM	Lung Cancer Genomic Screening Project for Individualised Medicine
LDCT	Low-Dose Computed Tomography
LFA	Lung Foundation Australia
MOU	Memorandum of Understanding
MRI	Magnetic Resonance Imaging
NCCN	National Comprehensive Cancer Network
NGO	Non-Governmental Organisation
NGS	Next-Generation Sequencing
NSCLC	Non-Small Cell Lung Cancer
OOP	Out-Of-Pocket
Oncomine DxTT	Oncomine Dx Target Test Multi-CDx
PAP	Patient Assistance Programme
PBCR	Population-Based Cancer Registry
PET	Positron Emission Tomography
PM	Fine Particulate Matter
PSP	Patient Support Programme
ROS1	Ros Proto-Oncogene 1, Receptor Tyrosine Kinase
TALENT	Taiwan Lung Cancer Screening For Never Smoker Trial
TB	Tuberculosis
TNM	Tumour-Node-Metastasis
US	United States
WHO	World Health Organisation

Foreword

Assoc. Prof. Herbert Loong
Chair, Asia Pacific Coalition against Lung Cancer (APCLC)

Despite significant advancements in medical science and public health, lung cancer remains a major health challenge with serious socio-economic impacts across the APAC region. It continues to be a leading cause of cancer-related deaths and significantly contributes to global mortality.

To address this issue, ASPIRE's flagship White Paper on lung cancer identifies critical gaps in the current care landscape and offers a clear, actionable five-point strategy to address these shortcomings and improve lung cancer care throughout APAC.

ASPIRE, a multilateral effort focused on lung cancer care in APAC, is well-positioned to support these recommendations. Their work will be essential in implementing strategies that better connect public health efforts with lung cancer care, access, and management.

We at the Asia Pacific Coalition against Lung Cancer (APCLC) are committed to working together to enhance access to screening and treatment services and improve patient outcomes. We hope this White Paper will serve as a practical guide and encourage further collaboration to advance lung cancer care across the APAC region.

Executive summary

Lung cancer presents a critical public health challenge in the APAC region

Lung cancer accounts for

14% of all cancer cases,

exceeding the rates observed in Europe and the United States

The economic burden is equally concerning, with global costs approaching

US$4 trillion annually

While tobacco use remains a major risk factor, lung cancer in APAC is differentiated by unique factors, with a significant proportion of cases occurring among non-smokers, particularly women. Approximately two-thirds of Lung Cancer in Never-Smokers (LCINS) cases' occur in women, indicating that women who have never smoked are twice as likely as their male counterparts to develop lung cancer. A never-smoking status is more frequent among female patients in Asia than those in other regions and, interestingly, >55% of female Asian patients diagnosed with non-small-cell lung cancer (NSCLC) in the USA have never smoked. Notably, lung cancer rates are higher among non-smoking women in East Asia compared to other regions, indicating that genetic and environmental factors, beyond tobacco exposure, play a key role. This highlights the need for shifts in screening, diagnosis, and treatment approaches. Additionally, lung cancer often affects individuals at a younger age, during their prime working years, imposing severe financial and emotional strains on families.

While some progress has been made in addressing lung cancer care in the region, efforts have been sporadic, with health systems prioritising lung cancer as a national concern to varying degrees. Challenges across the region persist, compounded by several ongoing issues. Public health policies have seen difficulties in keeping up with the growing challenges, even in implementing effective prevention strategies. Combined with the low prioritisation of lung cancer, this has led to underfunding and insufficient focus on high-risk groups, resulting in disparities in healthcare access and outcomes. The lack of centralised, comprehensive policies and guidelines leads to fragmented care and inconsistent standards. Limited access to early detection and screening results in late-stage diagnoses, with current programmes often failing to address region-specific needs, such as the high incidence of lung cancer among non-smokers.

Furthermore, inadequate infrastructure, insufficient professional training, and affordability issues often hinder access to innovative therapies. Opportunities exist to enhance healthcare infrastructure and workforce development, which could help improve the timeliness of diagnosis, treatment initiation, and access to supportive care. Increasing public education and awareness about lung cancer risk factors and symptoms could further support earlier screening and diagnosis, positively influencing treatment outcomes.

To address the current challenges impeding advancements in lung cancer management in the APAC region, **five core factors** for successful lung cancer care have been identified:

1

**Well-implemented and comprehensive lung cancer-specific plans:**

These plans should be evidence-based, regularly updated, and properly funded to ensure a coordinated approach to lung cancer care. They should be comprehensive, focusing on risk factor (i.e. exposure to tobacco smoke, air pollution, occupational hazards, genetic predispositions, and fumes from household cooking) management across the entire care continuum.

2

Sufficient political will and coordination:

Governments should prioritise lung cancer prevention and care by strengthening prevention policies, endorsing updated clinical guidelines, and collaborating with civil societies and patient organisations. Current political commitment varies across the region, with some health systems making notable progress, while others are still developing comprehensive tobacco and air pollution control policies.

3
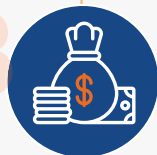
Comprehensive and sustainable funding:

To ensure sustainable and equitable access to early detection and treatment, funding should prioritise strengthening healthcare infrastructure, expanding the healthcare workforce, and improving service delivery across the region. In addition, innovative financing mechanisms should be considered to address the varying ability to provide comprehensive reimbursement for diagnostics and treatments.

4

Robust surveillance protocols and public education:

Accurate data on lung cancer trends and outcomes, coupled with public education programmes, are essential for improving awareness and care. However, only a few health systems in the region have dedicated lung cancer registries.

5

**Availability and access to effective screening, diagnostics, and treatments:**

Implementing a widespread population-based screening programme targeted at identifying high-risk populations, ensuring access to precision testing, and fostering multidisciplinary collaboration are crucial for improving lung cancer outcomes. While some health systems have begun to implement structured screening and early detection programmes, others rely on opportunistic screening or lack formal programmes altogether.

To improve lung cancer care in APAC, the white paper advocates for the following regional recommendations:

▶ **Governments must demonstrate greater political will** by implementing and updating health system-wide lung cancer plans with clear implementation strategies and clinical guidelines. Establishing centralised technical advisory groups can monitor progress and ensure accountability.

▶ **Enhance performance tracking through high-quality data** and dedicated lung cancer registries to enable effective policy-making and resource allocation.

▶ **Demonstrate the benefits of high-risk-population-based screening for early detection of high-risk individuals**, particularly by building robust evidence base tailored to the APAC region.

▶ **Tackle inequalities in access to care** by implementing standardised centralised screening programs and ensuring equitable access to advanced diagnostics and innovative therapies.

▶ **Consider holistic and integrated approaches to addressing resource and capacity challenges**, including strengthening healthcare infrastructure, expanding workforce training, fostering multidisciplinary collaboration and improving linkage to care.

By addressing these challenges and implementing the recommendations, stakeholders can work towards ensuring equitable access to comprehensive lung cancer care across the APAC region. Success will require sustained commitment, collaboration, and investment from all stakeholders involved in lung cancer care. This multifaceted approach, tailored to the unique characteristics of lung cancer in APAC, has the potential to significantly improve patient outcomes, enhance quality of life, reduce the economic burden of the disease, and ultimately decrease lung cancer mortality rates across the region.
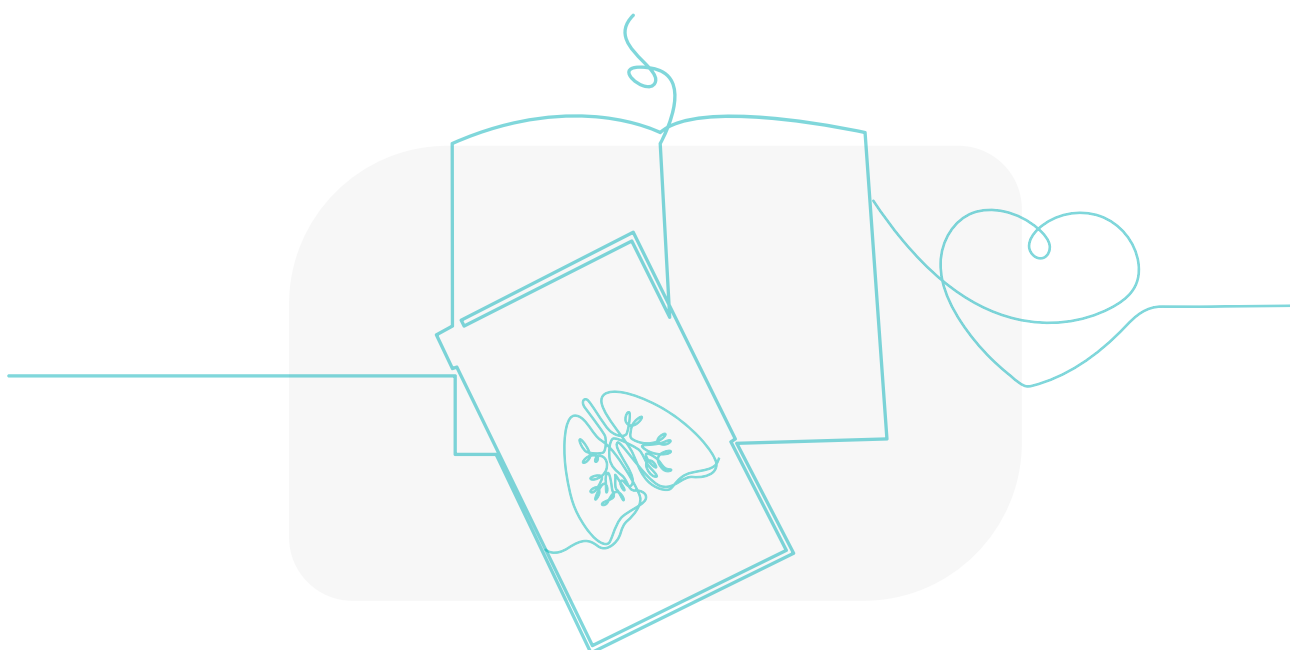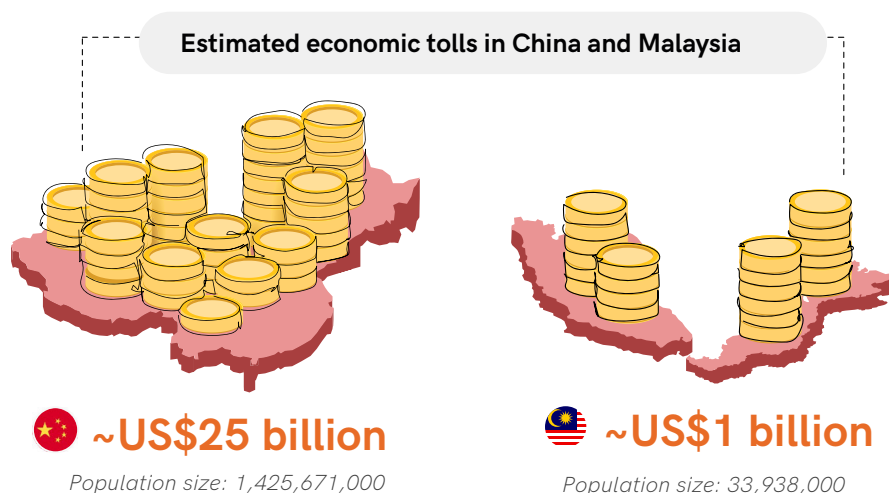
1. Introduction

1.1   Lung cancer poses a significant threat to public health in the APAC region

Lung cancer remains the most lethal form of cancer globally, responsible for approximately 1.8 million deaths each year – claiming more lives than breast, colorectal, and prostate cancers combined[1,2]. In the APAC region, lung cancer is the leading cause of cancer-related deaths, accounting for one in five cancer fatalities[1,2]. The prevalence of lung cancer is disproportionately high in the region, representing 14% of all cancer cases, compared to 11% in Europe and 10% in the United States[3].

Globally, lung cancer imposes the most substantial economic burden on healthcare systems, with an estimated annual cost nearing US$4 trillion[4]. Although data availability in the APAC region may be limited, the impact is notably significant in China and Malaysia, with estimated economic burdens of US$25 billion and US$1 billion, respectively. This translates to an economic burden of over US$30,000 per lung cancer patient, which can exceed several years' worth of earnings and poses a major challenge for many families.

Estimated economic tolls in China and Malaysia

🇨🇳 **~US$25 billion**
Population size: 1,425,671,000

🇲🇾 **~US$1 billion**
Population size: 33,938,000

1.2   Lung cancer in APAC presents unique challenges and characteristics compared to global trends, necessitating tailored considerations and strategies

While tobacco use remains the most prominent and modifiable risk factor responsible for lung cancer, contributing to almost 85% of all lung cancer-related deaths, the APAC region has seen a notable incidence of lung cancer among non-smokers, with nearly a third of cases occurring in this group—especially among women[5,6]. Lung cancer in never-smokers has a higher than 50% estimated frequency of actionable oncogenic drivers, such as epidermal growth factor receptor (EGFR) mutations[7,8]. These mutations, which drive lung adenocarcinoma, are found in 40-64% of lung cancer patients in Asian health systems compared to only 7-23% in Western counterparts[9,10].

This stark contrast underscores the significant genetic component of lung cancer in the APAC region, emphasising the need to add to traditional global strategies that predominantly target smoking as the primary risk factor, such as the World Health Organisation's (WHO) lung cancer response that emphasises tobacco control[11]. Instead, a more region-specific approach that addresses the unique genetic and environmental factors contributing to lung cancer in this population is warranted.

Consequently, it is essential to view lung cancer in APAC not merely as a lifestyle-related disease, but as one heavily influenced by genetic predisposition

Furthermore, the early onset of lung cancer in in APAC region, where many patients belong to the "sandwiched generation"—individuals in their prime working years who support multiple generations—adds another layer of complexity. These patients often face the burden of providing for children, spouses, and elderly relatives, amplifying the societal and economic impact of the disease[14].

These distinct characteristics underscore the need for tailored strategies that address both the lifestyle and genetic components of lung cancer in the APAC context to effectively combat the disease.

1.3   In APAC, various issues contribute to the complexities of lung cancer management across the health system including inconsistent access to screening, diagnosis, and treatment

The economic divide in the region is evident in the difficulties health systems face in rapidly diagnosing and referring lung cancer patients to specialised care. In some health systems covered in our research, lung cancer is generally detected at a later stage due to fragmented access to health coverage and the absence of a detailed strategic plan tailored specifically to address lung cancer across the care continuum[2].

Although novel agents such as targeted therapies and immunotherapies have revolutionised lung cancer treatment in recent years, access to these advancements is constrained in certain parts of the region[2]. Moreover, insufficient investment in infrastructure and workforce development further impedes the delivery of timely and quality care[12]. Addressing these multifaceted challenges requires coordinated efforts, strategic planning, increased investment, and tailored interventions to ensure equitable access to comprehensive lung cancer care across the APAC region.

1.4   Given the pressing need to address the devastating toll of lung cancer in APAC, our research aims to provide an in-depth analysis of the region's lung cancer landscape, highlighting current key challenges and proposing actionable recommendations

Drawing on expert interviews and extensive desk research, data was gathered and analysed from 9 health systems across the **APAC region – Australia, Chinese Taipei, South Korea, Japan, Hong Kong, Thailand, India, Indonesia and Vietnam.** These systems were carefully selected to represent a full spectrum of healthcare system maturities, funding approaches, and care pathways.

Australia	Chinese Taipei	South Korea	Japan	Hong Kong	Thailand	India	Indonesia	Vietnam

The analysis of China and Singapore is currently underway and will be included in the second edition, scheduled for release in 2025.

The desk research involved a thorough review of existing literature, policy documents, healthcare reports, and statistical data. Expert interviews provided qualitative insights from leading healthcare professionals, patient organisations, and advocates in the region. These interviews were instrumental in understanding the nuances of key challenges and best practices in lung cancer care, supporting and validating the findings from the desk research.

To further strengthen the paper's credibility and ensure alignment with government bodies and policymakers, we have proactively sought their review and input, where feasible, incorporating their feedback to ensure that the findings reflect aligned perspectives.

This White Paper aims to provide a comprehensive overview of the existing disparities and gaps in lung cancer care that need to be addressed, while also highlighting successful policies in certain health systems that can serve as models for others.

Key anticipated outcomes of the whitepaper

Advocate for necessary policy changes

Promote increased investment in lung cancer care

Highlight the important of patient advocacy

Our goal is to ensure that patients in the APAC region have access to timely and effective screening, diagnostic, and treatment modalities, receiving the care they deserve.

2. Epidemiological trends in lung cancer across APAC

2.1 **Lung cancer trends in APAC vary widely, with China facing high DALYs and mortality rates, while poor data quality in Indonesia, India, and Vietnam obscures the true impact of the disease**

Lung cancer epidemiological trends show significant variation across the APAC region. **Table 1** shows the estimates of age-standardised incidence, prevalence, disability-adjusted life years (DALYs) and mortality rates for lung cancer across the APAC health systems.

While some health systems have made encouraging progress in reducing the prevalence and incidence of lung cancer, others continue to struggle with high rates of the disease **(see Table 1)**.

Indonesia, India, and Vietnam appear to outperform other health systems on several metrics, however, this may reflect the relatively less robust data quality in these health systems[13]. On the other hand, Chinese Taipei's high lung cancer incidence and prevalence rates may be largely attributed to its comprehensive lung cancer registry and the recent expansion of its national screening programme. The programme now includes heavy smokers with a history of 20 or more pack-years and those with a family history of lung cancer[14]. These initiatives have likely led to an increase in both the incidence and prevalence of lung cancer, as more early-stage cases are being diagnosed through enhanced surveillance practices.

It is also important to note that while population-wide figures provide a useful reference point across the health systems, this approach risks masking significant inequalities in sub-populations within health systems. For example, in Australia, while the incidence and mortality rate for lung cancer has been relatively stable among the non-Indigenous population, the rates have been rising significantly among Indigenous Australians[15]. These variations can be attributed to differences in healthcare infrastructure, public health initiatives, and socio-economic factors.

Table 1: Comparative epidemiology of various APAC health systems (2021)[16-18]

Country	Incidence (per 100,000)	Prevalence (per 100,000)	DALYs (per 100,000)	Mortality (per 100,000)
China	44	58	878	39
Chinese Taipei	45	149	602	27
South Korea	33	68	464	24
Australia	30	64	480	22
Japan	30	71	421	21
Hong Kong	33	–	–	20
Thailand	24	27	589	25
Indonesia	21	21	542	23
Vietnam	22	24	562	21
India	6	6	164	6

Source: Global Burden of Disease (2021)
Source for Hong Kong: Hong Kong Cancer Registry, Hospital Authority (2021)
Source for Chinese Taipei: Taiwan Cancer Registry, Health Promotion Administration, Ministry of Health and Welfare (2024) and Taiwan Burden of Disease Centre (2024, unpublished data)
All numbers have been age-standardised to ensure cross-health system comparability. No prevalence or DALY data available for Hong Kong

2.2 **Key risk factors for lung cancer – Insights into smoking and non-smoking populations**

Several risk factors contribute to the high rates of lung cancer in the APAC region, including:

▶ **Exposure to tobacco smoke**

▶ **Air pollution**

▶ **Occupational hazards**

▶ **Genetic predispositions**

▶ **Fumes from household cooking**

Among these, tobacco smoking stands out as the most prominent and modifiable risk factor responsible for lung cancer[12]. Implementing effective lifestyle and prevention measures, particularly smoking cessation, is crucial to reducing the overall burden of the disease. However, prevention alone is insufficient—early detection and timely access to treatment and care are equally essential for reducing lung cancer mortality. A balanced approach that emphasises both prevention and early intervention is crucial to more effective lung cancer control in the region.

While some Asian health systems, such as Thailand, and Hong Kong, have made significant strides in tobacco prevention, others, including Japan and India, are still facing considerable challenges in addressing the tobacco smoking epidemic. In response, the WHO Framework Convention on Tobacco Control recommends that all Asian health systems implement comprehensive tobacco control policies, such as raising tobacco taxes and prices and enforcing smoke-free laws to reduce smoking prevalence[11.] Moreover, the region faces a burgeoning challenge with e-cigarettes due to the scant regulatory oversight, despite these products gaining widespread popularity, particularly among youths.

Although tobacco smoking remains the leading cause of lung cancer globally, there is a notable rise in lung cancer cases among non-smoking individuals, especially among Asian women[19]. Important risk factors for this population include age and genetic predisposition, as well as a history of pulmonary conditions such as tuberculosis (TB), chronic obstructive pulmonary disease (COPD), and fibrotic lung diseases[20-25]. Additionally, exposure to second-hand smoke, along with outdoor, ambient, and household air pollution, plays a significant role[26]. Environmental and occupational lung carcinogens such as asbestos, silica, and arsenic also substantially increase the risk of lung cancer for the non-smoking population[20-25].

Lung cancer patients in Asia are increasingly younger, non-smokers, and women, necessitating more personalised approaches to screening, diagnosis, and treatment

Furthermore, the higher prevalence of EGFR mutations in Asians compared to Western populations highlights the need for a distinct approach to lung cancer management in Asia. This calls for the development of specialised management guidelines and public health policies that account for these regional differences and are tailored accordingly[27].

3. The social and economic burden of lung cancer

3.1 **The social burden of lung cancer extends far beyond the individual patient and burdens families, communities, and societies at large**

The psychological impact of lung cancer is immense, with patients often experiencing heightened levels of anxiety, depression, and stress due to their diagnosis and the chronic nature of the disease[28].

ANXIETY · DEPRESSION · STRESS
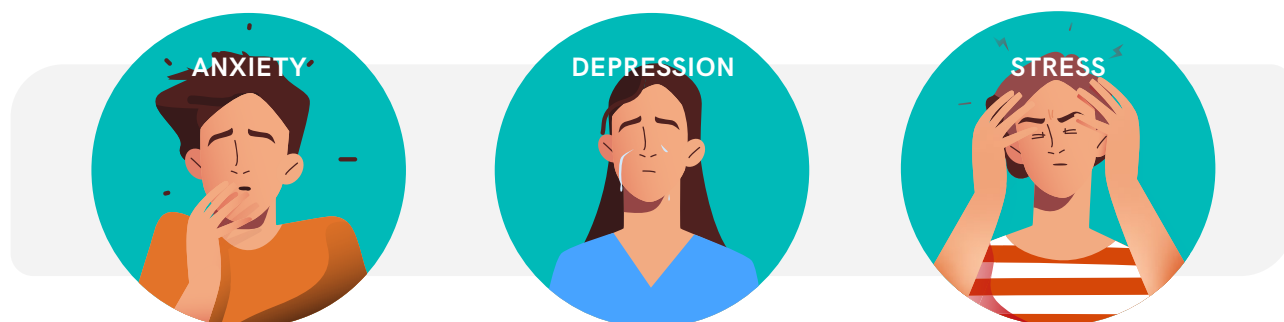
Research indicates that lung cancer patients endure greater psychological distress compared to those with other types of cancer[29,30]. For instance, a 2015 study in South Korea found the highest incidence rate of psychiatric disorders, including depression, is among lung cancer patients[30]. This burden is further compounded by the smoking-related stigma associated with lung cancer, affecting both smokers and non-smokers diagnosed with the disease. This stigma can lead to missed opportunities for early detection and better outcomes for patients[31].

Additionally, the rising trend of younger individuals being diagnosed with lung cancer in APAC creates unique challenges[32]. These younger patients, who are also financially responsible for their families, often must prioritise family responsibilities over their own health needs, leading to delays in diagnosis and suboptimal management of the disease[31]. Leaving the workforce for treatment can plunge them into financial distress, and the impact on their families can be profound, affecting their education, emotional well-being, and overall quality of life[33].

3.2 **Lung cancer also creates a significant economic burden on patients and their families, with both direct medical costs and indirect expenses impacting their financial stability**

Lung cancer disproportionately affects lower and middle income health systems, with approximately 60% of global cases occurring in these regions, particularly in Asia[34]. A 2021 study in China found that the weighted average annual total medical costs per lung cancer patient were US$5,360, with annual out-of-pocket (OOP) costs of US$1,630[35]. Given that the average annual per capita disposable income of households in China is approximately US$5,510, this represents a significant economic burden and financial toxicity for lung cancer patients and their families, as they spend more than 20% of their annual disposable income on lung cancer care[36].

>20% of annual disposable income spent on lung cancer care

Beyond these direct costs, lung cancer's economic impact extends to lost productivity. The disease often strikes individuals in their prime working years, leading to significant losses in lifetime employment and productivity due to both illness and premature death. Chinese Taipei's TALENT (Taiwan Lung Cancer Screening for Never Smoker Trial) study provided insights into the pathology and stage shift effects associated with lung cancer screening. These insights were used to simulate the impact of screening on the lifetime employment duration and productivity of lung cancer patients, indicating significant losses due to morbidity and premature mortality[37].

Healthcare systems across the APAC region also grapple with the high cost of lung cancer treatment, which consumes a significant portion of healthcare budgets. Even in a high-income health system like Australia's, lung cancer ranks as the third most expensive cancer to treat[38]. This financial burden forces the government into difficult resource allocation decisions, potentially neglecting other essential healthcare services and preventive measures. The ability to manage these costs varies dramatically across the region, and inconsistencies in insurance coverage for lung cancer treatment leave many patients vulnerable. OOP payments can be crippling, pushing families towards catastrophic health expenditures. For example, patients in India are often required to pay more than half of their total cancer care costs OOP[39].
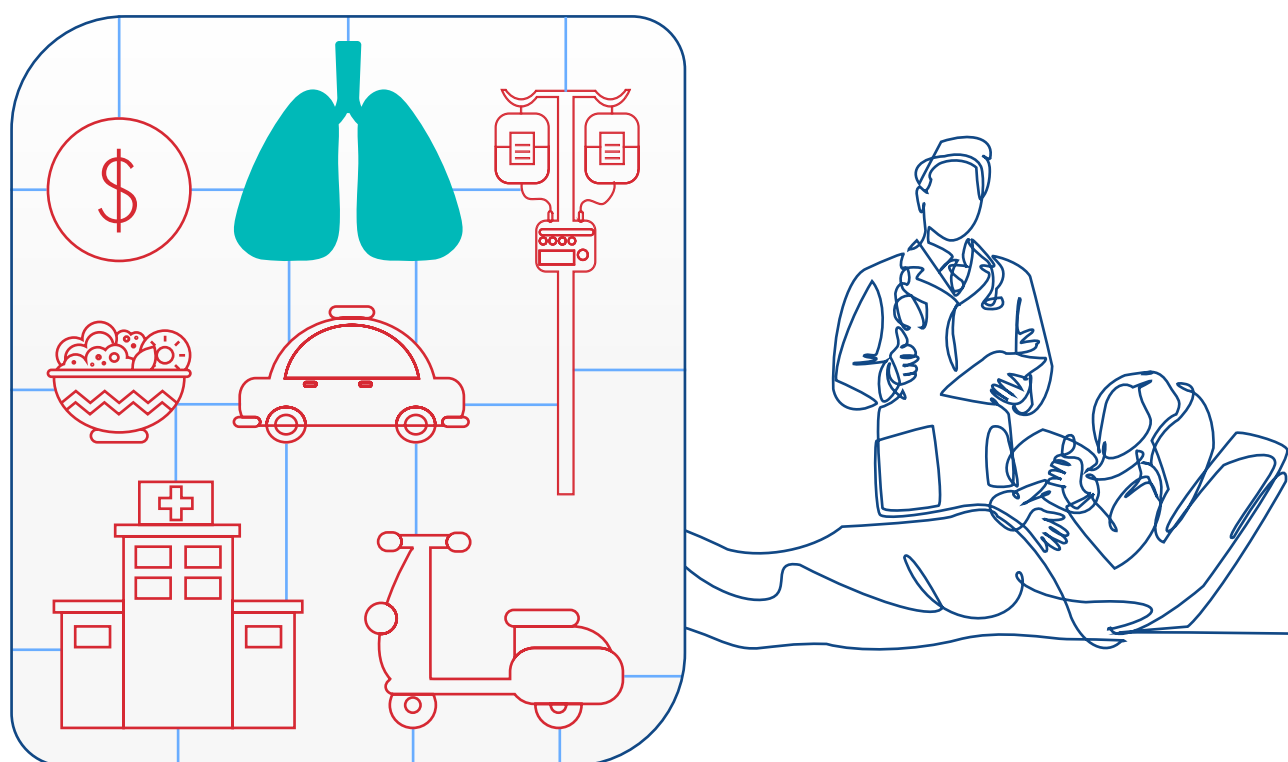
Often overlooked but no less significant are other indirect costs associated with lung cancer treatment. These include transportation, food, and accommodation expenses, which can be substantial. Often in low- and middle-income health systems, advanced cancer treatments are restricted to secondary and tertiary centres in cities and large towns, meaning patients from rural areas must travel long distances, incurring additional costs for food and accommodation and requiring extended time off work[40]. A study in India found that travel and lodging expenses for lung cancer patients significantly exceeded their overall medical costs[40].

Given that advanced-stage cancer is typically associated with much higher direct costs, shifting towards prevention and early detection is imperative. Studies exploring the cost-effectiveness of screening and prevention, including risk-based screening in LMICs and resource-limited settings, show that it is possible to implement these measures effectively even in such contexts[41].

4. Lung cancer landscape assessment of select APAC health systems

4.1 **Key challenges in lung cancer patient journeys**

CHALLENGES	ELABORATION
Ineffective public health policies	▶ Current public health efforts, including tobacco and environmental policies, workplace interventions and awareness campaigns falter due to under-prioritisation, inadequate funding, and neglect of high-risk/ vulnerable populations and social determinants of health, leading to disparities in healthcare access and outcomes[42]
Lack of a centralised guideline/ plan for lung cancer	▶ The absence of a detailed strategic plan specifically tailored to address lung cancer across the care continuum results in fragmented approaches, with varying standards of practice across regions and healthcare facilities[2]
Limited access to early detection, screening, diagnosis & precision testing	▶ Health systems in APAC lack access to widespread lung cancer screening, leading to late-stage diagnoses and poorer outcomes. Existing programmes, if any, also often fail to consider Asian-specific drivers and patient populations, such as the high lung cancer incidence among non-smokers[43,44]
Limited access & availability of innovative therapies	▶ Targeted therapies and immunotherapies have revolutionised lung cancer treatment; however, access remains constrained in certain parts of APAC. Factors such as insufficient region- or health system-specific clinical benefit and cost-effectiveness evidence hinder decision-making by reimbursement authorities, ultimately leading to affordability issues[2]
Limited resources for lung cancer care	▶ The lack of investment in infrastructure and workforce development hinders the delivery of timely and quality care resulting in delays in diagnosis, treatment initiation, and access to supportive care services[12]
Lack of public education & awareness	▶ The lack of public education on lung cancer risk factors and symptoms, coupled with limited access to effective community outreach, leads to a population unaware of the importance of screening and early diagnosis, resulting in treatment delays and poorer prognoses[45]

4.2 **Core factors for health systems to advance lung cancer care**

Before we look at the individual gaps in selected health systems, it is helpful to frame what a successful strategy and implementation for lung cancer control looks like. Based on our research and discussions with experts, we believe the following 5 factors are the key to improving the current landscape of lung cancer care.

01 **Presence of a well-implemented & comprehensive lung cancer-specific plan**

▶ Effective lung cancer care begins with robust policy and strategic planning. This provides a framework for all stakeholders by setting clear and common time-limited quantitative targets, detailing the programmes and funding required to achieve these targets

02 **Sufficient political will & coordination**

▶ It is crucial to secure the buy-in of all relevant stakeholders for effective implementation (including government funding and budgeting) of programmes within the framework of centralised plans

03 **Comprehensive & sustainable funding for lung cancer care**

▶ Comprehensive and sustainable insurance coverage for testing and treatment of lung cancer to minimise OOP costs and maximise equitable access to testing and treatment

04 **Robust surveillance protocols & public education**

▶ Ensures rigorous lung cancer surveillance is consistently applied across a target population that knows where, when and why to test for lung cancer

05 **Availability and access to effective screening programmes, precise diagnostics & innovative treatments**

▶ Ensures that lung cancer patients receive screening, timely and accurate diagnosis, and targeted treatment, maximising their chances of a cure or, at the very least, maximising their survival rates
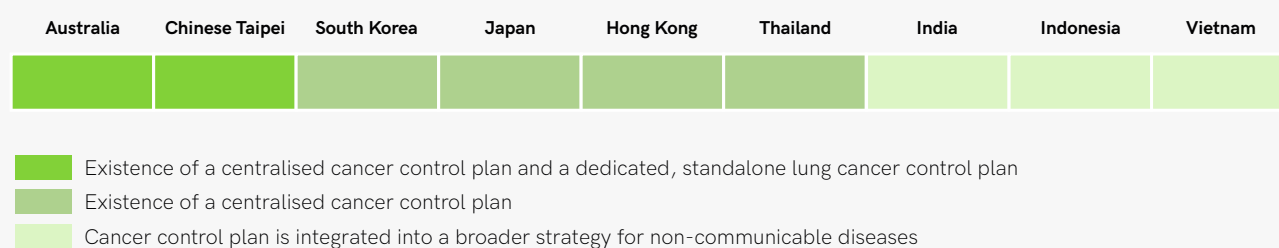
4.3   Existing gaps in lung cancer policy, funding, and care continuum

4.3.1 Presence of a well-implemented & comprehensive lung cancer-specific plan

Among the 9 studied APAC health systems, only Australia and Chinese Taipei have dedicated standalone lung cancer control plans **(see Figure 1)**. While an increasing number of health systems, including South Korea, Japan, Hong Kong and Thailand, have implemented broader centralised cancer control plans—a positive development—none of these plans specifically focus on lung cancer. This highlights a critical need for the development of dedicated lung cancer control plans to effectively address the disease's burden. For health systems with comparatively constrained resources, such as India, Indonesia, and Vietnam, the initial priority should be to establish broader centralised cancer control plans before developing specific lung cancer strategies.

Figure 1: Presence or absence of centralised lung cancer control plan

Australia	Chinese Taipei	South Korea	Japan	Hong Kong	Thailand	India	Indonesia	Vietnam

Existence of a centralised cancer control plan and a dedicated, standalone lung cancer control plan

Existence of a centralised cancer control plan

Cancer control plan is integrated into a broader strategy for non-communicable diseases

Scoring is relative and determined through desk research and expert validation. More details can be found in the appendix.

A comprehensive centralised lung cancer control plan is key for effectively addressing the burden of lung cancer within a health system.

Such a plan should outline strategies for awareness, prevention, early detection, and treatment, with a focus on managing key risk factors throughout the entire care continuum. It is essential to ensure a coordinated and prioritised approach[46]. These plans must be evidence-based, regularly updated, realistic, and goal-oriented. Additionally, they should include a detailed implementation strategy along with clearly identified, sufficient, and appropriate sources of funding[47].

Of the 9 health systems included in our research, only 6 have had their centralised cancer control plans published or updated within the past 5 years

The lack of specific lung cancer control plans in the region is concerning, given that they have been shown to significantly enhance early detection, patient outcomes, and reduce mortality rates.

Australia's strategic action plan for lung conditions: Advancing early detection and comprehensive care in lung cancer[48,49]

Australia's Strategic Action Plan for Lung Conditions presents a well-structured approach to combating lung cancer. The plan outlines six priority areas: prevention and risk reduction, awareness and stigma, diagnosis, management and care, partners in health, equitable access, and research and monitoring. It also includes evidence-based actions and an evaluation framework to ensure progress is tracked and goals are met. The implementation of this plan has significantly improved early detection, patient outcomes, and mortality rates.

The plan's focus on early detection and patient management has shaped governmental policy, leading to the creation of a new centralised Lung Cancer Screening Programme. This programme, guided by the strategic plan, will use low-dose computed tomography (LDCT) to screen high-risk, asymptomatic individuals. The goal is to detect lung cancer early and reduce mortality rates. Starting in July 2025, eligible individuals will have access to these screening services.
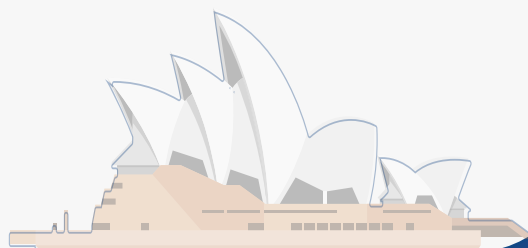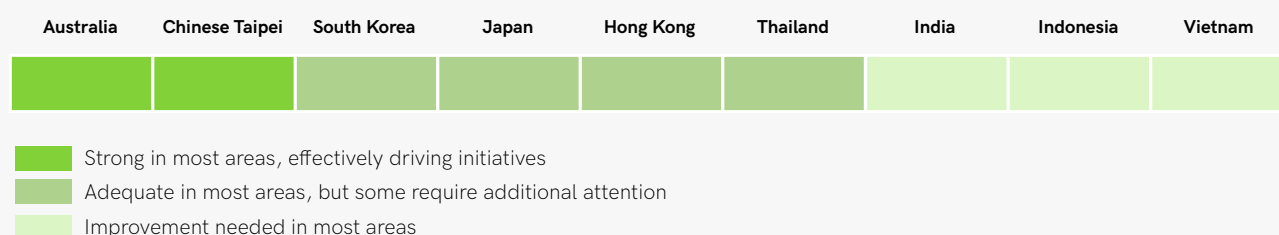
In addition to having a dedicated lung cancer control plan, it is crucial to establish a formal budget allocation for implementation. This ensures transparency, adequate funding, and long-term sustainability and effectiveness of the plan. Strategic planning behind a centralised lung cancer control plan should be viewed as an investment in a health system, its people, and its economy. Properly budgeted and well-funded plans can lead to sustained impact and the ultimate realisation of the plan's goals.

4.3.2 Sufficient political will & coordination

Political will and commitment (see Figure 2) are assessed based on the extent of institutional commitment and coordinated efforts from various stakeholders. This is represented by the endorsement of updated clinical practice guidelines (CPGs), government support for lung cancer control through prevention policies, and partnerships with civil societies and patient organisations.

Figure 2: Level of political will and coordination

Australia	Chinese Taipei	South Korea	Japan	Hong Kong	Thailand	India	Indonesia	Vietnam

- Strong in most areas, effectively driving initiatives
- Adequate in most areas, but some require additional attention
- Improvement needed in most areas

Scoring is relative and determined through desk research and expert validation. More details can be found in the appendix.

The fight against lung cancer in APAC demands strong governmental leadership and concerted intersectoral collaboration.

Governments must collaborate with public health agencies, Non-Governmental Organisations (NGOs), and the private sector to ensure a comprehensive and sustainable cancer response covering prevention, early detection, treatment, and palliative care.

While political commitment levels vary across APAC health systems, some are making gradual progress through intersectoral collaboration and proactive governmental leadership.

Thailand's tobacco control model: Demonstrating effective political commitment[50,51]

Thailand exemplifies political dedication through a distinctive tobacco control model, marked by close collaboration among the Ministry of Public Health, the Thai Health Promotion Foundation, and a coalition of tobacco control NGOs led by civil society leaders.

These initiatives include stringent measures such as:
▶ Increased taxation
▶ Plain packaging
▶ Advertising bans
▶ Smoke-free public areas

Thailand was the first Asian upper-middle income health system to adopt plain packaging for tobacco products, a stringent tobacco control measure. Thailand also played a pivotal role in drafting the World Health Organisation (WHO) Framework Convention on Tobacco Control, underscoring its commitment to protecting current and future generations from the dire health and socio-economic impacts of tobacco use. These initiatives have contributed to a gradual decline in smoking rates and reduced second-hand smoke exposure in households.

This exemplifies a compelling case for other health systems in the region, demonstrating that such actions are within reach, even for LMICs, given the presence of strong political determination and leadership.

The existence and currency of lung cancer CPGs are essential for guiding the treatment of lung cancer and formalising standards of care.

CPGs help minimise discrepancies within the region by establishing standardised benchmarks when developed at a health-system level[44,49]. High-quality, evidence-based CPGs should encompass the entire continuum of care—from screening and early detection to diagnosis, treatment, psychological support, and palliative care. Ideally, these guidelines would outline the roles of multidisciplinary care teams and emphasise patient involvement through shared decision-making.

Our analysis of centralised lung cancer CPGs across APAC revealed notable variation in both quality and coverage. Guidelines, whether developed locally or adapted from international standards, address screening, diagnosis, treatment, and palliative care to differing extents.

Despite these inconsistencies, some health systems are making notable progress in enhancing lung cancer care. Vietnam's efforts in developing and updating its lung cancer CPGs demonstrate strong political commitment and effective coordination, illustrating how focused initiatives can enhance the consistency and quality of care within the region.

Vietnam's commitment to advancing lung cancer care through CPG development and effective coordination[52]

In 2023, the National Comprehensive Cancer Network (NCCN) signed a Memorandum of Understanding (MoU) with the Vietnam National Cancer Hospital ("K Hospital") and the Vietnam Cancer Association. This partnership aims to elevate cancer care standards across the health system.

Through this collaboration, leading oncology experts from Vietnam and the United States have co-developed and published evidence-based, harmonised clinical practice guidelines specifically tailored to the Vietnamese context. Lung cancer is selected for the first harmonisation. This effort ensures that treatment protocols for lung cancer are both relevant and practical for local healthcare settings.

This concerted effort underscores Vietnam's commitment to improving cancer care by integrating international expertise with local needs and ensuring that its CPGs meet high standards of quality and relevance.
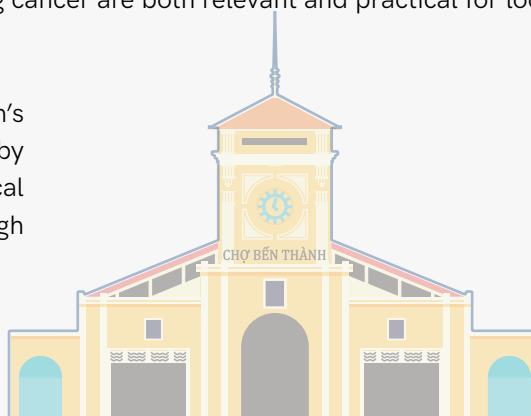
A stronger patient voice is crucial for more effective shared decision-making, policymaking, and treatment strategies.

To ensure a comprehensive response to lung cancer, governments must actively collaborate with NGOs and patient organisations. Integrating patient perspectives into the decision-making process helps identify issues that may be overlooked by health professionals and fosters recommendations that are more aligned with patient and caregiver needs.

Effective advocacy for lung cancer care depends on patient organisations and civil societies that serve as champions to promote awareness, drive public education, and emphasise early detection and prevention. These organisations often require initial support from government or institutional sources to establish themselves. Government endorsement and partnerships can enhance visibility and credibility, fostering trust within the community. Connections with healthcare organisations, policymakers, and stakeholders can further support early growth and effectiveness. Therefore, government bodies should provide initial support to help patient organisations build a strong foundation and eventually become self-sustaining and impactful in their advocacy efforts.

Regarding the role of patient organisations and civil societies in policymaking and decision-making bodies, the health systems studied reveal a mixed landscape. Only Japan and Australia have dedicated lung cancer-specific patient organisations that contribute to CPG development. Furthermore, less than half of the health systems reviewed (i.e., Australia, Chinese Taipei, Thailand, and Indonesia) provide opportunities for civil society to comment on Health Technology Assessment (HTA) recommendations. This limited engagement reflects the slower adoption of HTA processes in the region.

Australia is a notable example of a health system's government making efforts to involve patient perspectives in decision-making and policymaking. However, there have been calls for greater transparency and clarity regarding how patient comments and perspectives are utilised in HTA processes[55]. Strengthening these collaborations and improving transparency will be essential for developing effective and patient-centred cancer care strategies.

Effective lung cancer prevention policies and programmes are critical in reducing the incidence of lung cancer, but the level and extent of these policies vary significantly across the region.
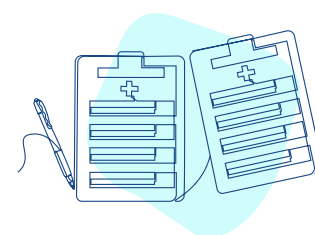
All governments from the health systems studied have implemented some form of lung cancer prevention policies to reduce the burden of lung cancer in the region. The key areas of such policies include tobacco control, e-cigarette regulation, occupational hazard reduction, and environmental pollution control. While multifaceted tobacco control policies and public health measures exist and some health systems have implemented robust lung cancer prevention policies, significant gaps remain in others.

Japan and Indonesia illustrate the challenges governments face in implementing effective tobacco policies while managing tobacco industry pushback and interference. Japan, despite its advanced economy, struggles with a fragmented approach to anti-tobacco efforts, lacking a centralised mass media campaign and relying on self-regulation by tobacco companies for advertising. Additionally, Japan has yet to implement comprehensive smoke-free legislation for public spaces[55,56]. Conversely, Indonesia, with one of the highest tobacco use rates globally, has not ratified the WHO Framework Convention on Tobacco Control and has yet to enforce a centralised ban on tobacco advertising[57]. These examples highlight the need for a stronger anti-tobacco strategy. Even if this involves a phased, stepwise approach, it is crucial to develop policies that effectively phase out tobacco use to protect future generations while balancing the impact on the tobacco industry.

Navigating the tobacco endgame strategy overcoming industry interference to protect future generations[58–61]

The tobacco 'endgame' strategy aims to phase out tobacco products entirely, a necessary but challenging approach crucial to safeguard future generations from tobacco harms and mitigating significant interference from the tobacco industry, which often involves intense political and industry-driven resistance.

In the APAC region, Hong Kong has made notable progress with stringent tobacco control measures such as the enforcement of a comprehensive ban on e-cigarettes while Thailand was the first Asian upper middle-income health system to introduce plain packaging in 2019, serving as an inspiration to other similar health systems.

Malaysia also announced a bold generational endgame policy in 2022, intending to ban tobacco products for those born after January 1, 2007. However, the latest version of the bill, presented in 2023, removed this clause due to intense lobbying by the tobacco industry. This highlights the ongoing struggle between public health goals and industry resistance.

The situation underscores the critical need for governments to demonstrate strong political will and leadership to overcome industry interference and advance effective tobacco and lung cancer control strategies.

Although tobacco use may be the leading risk factor for lung cancer, the impact of air pollution on lung cancer, via particulate matter and radon, is clear and also warrants action. In APAC, the expanding population density in rapidly urbanising cities has caused air pollution to become an increasing problem, arising from poor waste management, industrialisation, construction, intensive agriculture, large volumes of vehicles, and the combustion of dirty energy sources.

*Only 2.7% of Southeast Asia cities
met the WHO's guideline for PM2.5 in 2022[62]*

This is particularly concerning given the specific challenges faced by Asia populations in lung cancer, with a high proportion of non-smokers. Studies have shown that environmental carcinogens, including PM2.5, may play a crucial role in this[63]. On a broader note, air pollution has generally been perceived to be another major cause of lung cancer in non-smokers, particularly in developing health systems where it is more challenging to manage[27].

In terms of public policies and programmes to control environmental exposure, all the health systems in our study have air quality strategies in place. However, only 4 have programmes to control radon exposure: Australia, Japan, Hong Kong and South Korea.

In terms of occupational hazard reduction, health systems such as Indonesia face significant challenges. The International Labour Organisation (ILO) estimates that about 21.1% of tracheal, bronchial, and lung cancer deaths among men in Indonesia were attributable to workplace hazardous substances. The enforcement of occupational safety regulations is often weak, leading to higher risks for workers in industries such as agriculture and construction[66]. This lack of stringent enforcement contributes to a higher incidence of occupational lung cancer, calling for improved policy, monitoring, and control of occupational exposure.

4.3.3 Comprehensive & sustainable funding for lung cancer care

Comprehensive funding is crucial for the effective management of lung cancer, particularly through government reimbursement mechanisms that offset financial burdens, enabling access to early detection, prompt treatment initiation, and comprehensive care management. Ensuring that this funding is sustainable will maintain long-term availability of resources, supporting continuous advancements and consistent patient care.

Figure 3: Funding for comprehensive lung cancer care
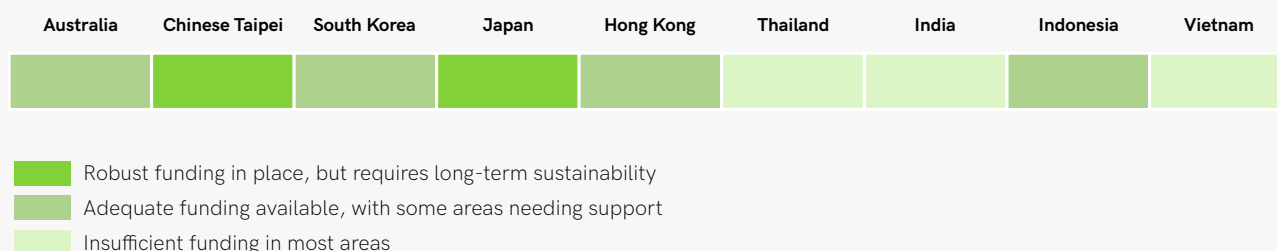
Australia	Chinese Taipei	South Korea	Japan	Hong Kong	Thailand	India	Indonesia	Vietnam

- Robust funding in place, but requires long-term sustainability
- Adequate funding available, with some areas needing support
- Insufficient funding in most areas

Scoring is relative and determined through desk research and expert validation. More details can be found in the appendix.

The economic divide in the region significantly hampers health systems' capacity to detect and treat lung cancer, with slow reimbursement processes and inconsistent HTA provisions exacerbating the issue[47].

Stark disparities between the quality and availability of care in public and private health services have even created a two-tier system in some health systems. The APAC region often lags behind others in oncology drug development, approval, reimbursement, and access to advanced diagnostics and therapies[67].

With the exception of Japan, which has an advanced drug development landscape, many APAC health systems are slow to launch new treatments, including securing approval for reimbursement. For instance, between 2012 and 2021, G20 health systems launched 16% of new medicines within one year, while India launched only 2% and Indonesia 1%[68].The average delay in launching new medicines was 40 months in Indonesia and 42 months in India, compared to 27 months in G20 health systems and 15 months in Japan[68].

This delay puts India and Indonesia almost a year and a half behind the average and two and a half years behind leading health systems in securing news drugs

Our research highlights that the ability of health systems to provide comprehensive reimbursement for diagnostics and treatments largely depends on the wealth of each health system and the adequacy of government funding allocated for lung cancer care.

(Vietnam's case study to be continued in the next page)

Vietnam's private sector collaboration to address lung cancer challenges[69]

As a LMIC, Vietnam faces significant obstacles, including limited access and financial constraints related to screening, diagnostic, and treatment modalities.

Implementing LDCT screening for lung cancer is currently infeasible in Vietnam due to a lack of equipment, infrastructure, expertise, logistical difficulties, and financing. The public health insurance does not cover LDCT lung cancer screening, which is only available on an ad hoc basis in some private and level I hospitals.

Although guidelines recommend biomarker testing, testing for EGFR, Anaplastic Lymphoma Kinase (ALK), and ROS1 is only partially covered by public health insurance, with few laboratories in Vietnam performing these tests, leading patients to pay OOP for other recommended biomarker tests.

Financial access to lung cancer treatments is suboptimal in Vietnam, only 22% of eligible lung cancer patients receiving targeted therapy and 0.2% receiving immunotherapy from 2016 to 2018.

To address these challenges, Vietnam has increasingly turned to private sector collaborations. The Bright Future Fund, supported by pharmaceutical companies through Patient Support Programmes (PSPs), has been instrumental in advancing lung cancer care and promoting healthcare equity. The fund provides critical support in several areas:

▶ **Medicine Support:**
   It offers assistance through Patient Assistance Programmes (PAP), ensuring access to essential medications for lung cancer patients.

▶ **Screening and Awareness:**
   The fund runs awareness campaigns and a community-based lung cancer screening programme to improve early detection and public knowledge.

▶ **Psychosocial Support:**
   It provides psychosocial support to help patients manage the emotional and social impacts of lung cancer.

▶ **Policy and Advocacy:**
   The Bright Future Fund collaborates with the government and the National Cancer Institute to organise forums on cancer prevention.

Through these private sector initiatives, Vietnam is making strides in overcoming its lung cancer care challenges. The collaboration underscores the critical role of industry partnerships in bridging gaps and moving towards a more effective and equitable cancer care system.

(Japan case study to be continued in the next page)

Japan's comprehensive approach to lung cancer care: universal coverage, advanced diagnostics, and prompt therapy reimbursement[70]

In contrast, Japan's universal health insurance system ensures that all citizens are covered by public medical insurance, allowing patients access to a wide range of hospitals, including cancer centres, at a low cost.

The government provides funds from the public budget to cover medical expenses…

Resulting in medical care costs being:

▶ **30%**
for patients < 70 years old

▶ **20%**
for patients aged 70 to 75

▶ **10%**
for patients > 75 years old

Screening measures in Japan include publicly available chest radiography for individuals over 40 and sputum cytologic testing for high-risk patients. Japan boasts one of the highest availabilities of diagnostic imaging equipment such as Computed Tomography (CT), Magnetic Resonance Imaging (MRI), and Positron Emission Tomography (PET), with many tools covered by public health insurance. Over 80% of advanced lung cancer patients undergo molecular testing before starting first-line treatment, supported by reimbursement for the Oncomine Dx Target Test (Oncomine DxTT) and genetic tests for EGFR and ALK mutations.

Japan ensures quick availability and reimbursement of systemic cancer therapies approved overseas within an average of six months. There is also no restriction on the re-administration of anticancer drugs, which has been highlighted as a reason for better post-progression survival in Japan.

While Japan's extensive financial access to healthcare has provided exceptional coverage for lung cancer, it also underscores a critical challenge for the future – sustainability. The high costs associated with maintaining such a comprehensive health insurance system are becoming increasingly burdensome, risking financial strain on the government[70]. This scenario highlights the necessity for a balanced approach in healthcare funding. Ensuring broad access to care must be weighed against the need for financial sustainability. Other health systems can learn from Japan's experience by striving for a model that delivers effective care while managing costs prudently, avoiding extremes that can either lead to inadequate coverage or unsustainable financial pressures.

Enhancing financial access to innovative therapies for lung cancer patients in the APAC region requires significant investment. To tackle this challenge, it is essential to explore innovative financing mechanisms. This funding model is distinguished by a dynamic, two-way relationship among multiple stakeholders—including governments, the general public, industry, private insurance, and NGOs—creating a unique approach to financing. Unlike traditional models that rely on a single source, this innovative model utilises partnerships to address complex funding and service gaps that no single entity can resolve alone[67].

Approaches such as public-private partnerships, multi-party contribution funds, multi-source crowdfunding, and social impact bonds can help distribute financial risks and improve resource allocation. These methods are crucial for navigating and bridging intricate financial access challenges[71,72].

In Indonesia, where both lung cancer and TB present significant public health challenges, the potential integration of lung cancer screening into existing TB programmes offers a promising approach to enhancing healthcare outcomes while achieving cost savings.

Indonesia's cost-effective approach to integrating lung cancer screening with TB programmes[73,74]

From expert discussions, the Indonesian Society of Respirology is actively exploring the integration of lung cancer screening into existing TB programmes. This strategy involves screening individuals who do not respond to TB treatment within two weeks for lung cancer.

By utilising Indonesia's established TB infrastructure—such as clinics, trained personnel, and diagnostic equipment—this approach aims to efficiently incorporate lung cancer screening. Combining these screenings optimises resource use and reduces the need for separate facilities and appointments, leading to cost savings that can be reinvested into both TB and lung cancer programmes.

This integrated approach represents a significant step towards developing a comprehensive lung cancer screening programme tailored to Indonesia's specific needs. It facilitates a gradual build-up of capacity and expertise in lung cancer detection while continuing effective TB control. By enhancing healthcare delivery efficiency and improving early disease detection, this strategy supports more sustainable healthcare practices and advances Indonesia's efforts toward better health outcomes for its population.
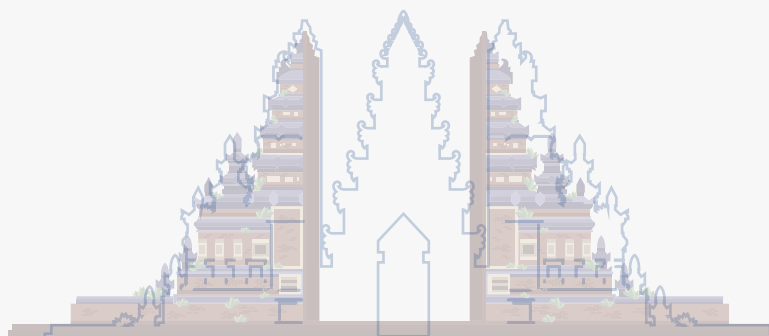
4.3.4 Robust surveillance protocols & public education

Robust surveillance protocols allow for precise tracking of lung cancer cases, trends, and outcomes, which is essential for developing targeted interventions and allocating resources effectively[75]. Comprehensive public education, on the other hand, empowers individuals with the knowledge needed to recognise early symptoms, seek timely medical advice, and understand the importance of preventive measures[76]. Ensuring rigorous lung cancer surveillance is consistently applied across a well-informed target population helps individuals know where, when, and why to test for lung cancer, forming a critical component of an effective lung cancer management strategy.

Figure 4: Presence of surveillance protocols and public education
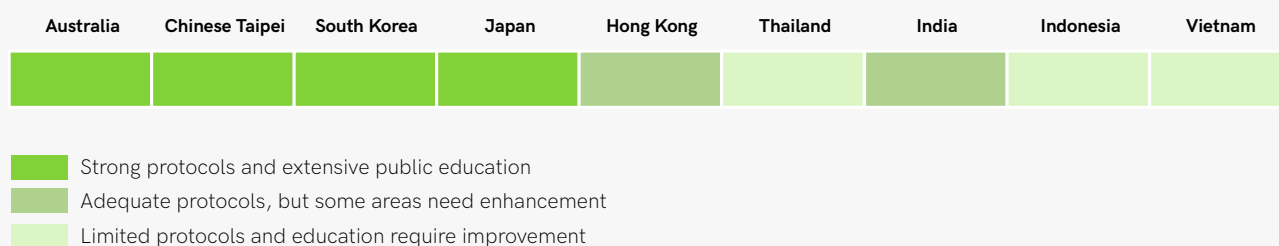
Australia	Chinese Taipei	South Korea	Japan	Hong Kong	Thailand	India	Indonesia	Vietnam

- Strong protocols and extensive public education
- Adequate protocols, but some areas need enhancement
- Limited protocols and education require improvement

Scoring is relative and determined through desk research and expert validation. More details can be found in the appendix.

Robust standardised surveillance protocols are essential for capturing the full landscape of lung cancer epidemiological patterns, guiding effective policy implementation and clinical practice from the outset.

Population-based cancer registries (PBCR) ensure consistency and reliability within a health system, enabling accurate analysis of disease trends and outcomes. A specialised lung cancer registry is crucial as it provides a dedicated platform for collecting detailed data on lung cancer cases[47,77]. However, the effectiveness of these registries depends on several factors, including the completeness, accuracy, and timeliness of data, as well as their integration with broader health information systems.

When implemented effectively, these registries play a critical role in addressing disparities in care by systematically capturing data on patient demographics, treatment modalities, and outcomes[44]. This data-driven approach can enable more equitable resource allocation and improve access to high-quality care across diverse healthcare settings in the region.

In the APAC region, only Australia, Japan, South Korea, and Chinese Taipei have dedicated population-based lung cancer registries. In contrast, many other health systems rely on general centralised or regional population-based cancer registries that may lack specificity and focus **(see Figure 4)**. For instance, Thailand, Indonesia, and Vietnam primarily maintain regional or state-based PBCRs, which limit comprehensive data capture and analysis specific to lung cancer.

For Australia, Japan, South Korea, and Chinese Taipei, implementing a dedicated lung cancer registry enabled the guidance of current and future lung screening programmes by identifying high-risk populations. These databases offer valuable insights into the effectiveness of screening programmes by tracking outcomes, early detection rates, and follow-up care. The approach of these four health systems has led to improved early detection and management of lung cancer, as evidenced by their enhanced 5-year survival rates **(see Figure 5)**.

Japan's lung cancer registry enhanced early diagnosis and survival rates[70,78-80]

The establishment of the Japanese Joint Committee of Lung Cancer Registry, developed via a joint effort of three major local lung cancer medical societies, conducts periodic health system-wide surveys of surgical cases. This registry has had a positive impact on disease management and treatment outcomes.

This registry systematically collects and integrates data on lung cancer cases, including incidence rates, treatment modalities, and patient outcomes, across the health system. With the registry in place, healthcare providers gained access to comprehensive, real-time data that facilitated early diagnosis and personalised treatment approaches. These studies have also been crucial in integrating up-to-date statistics on lung cancer treatment into the Tumour, Node, Metastasis (TNM) classification. Compared to other health systems, Japan currently has a higher percentage of early-stage diagnoses, particularly in stage I, and achieves better survival rates for lung cancer patients.

This shift towards data-driven healthcare practices has significantly contributed to the improvement of 5-year survival rates among lung cancer patients in Japan.

Figure 5: Lung Cancer 5-year Survival Rates in APAC[78] (%)
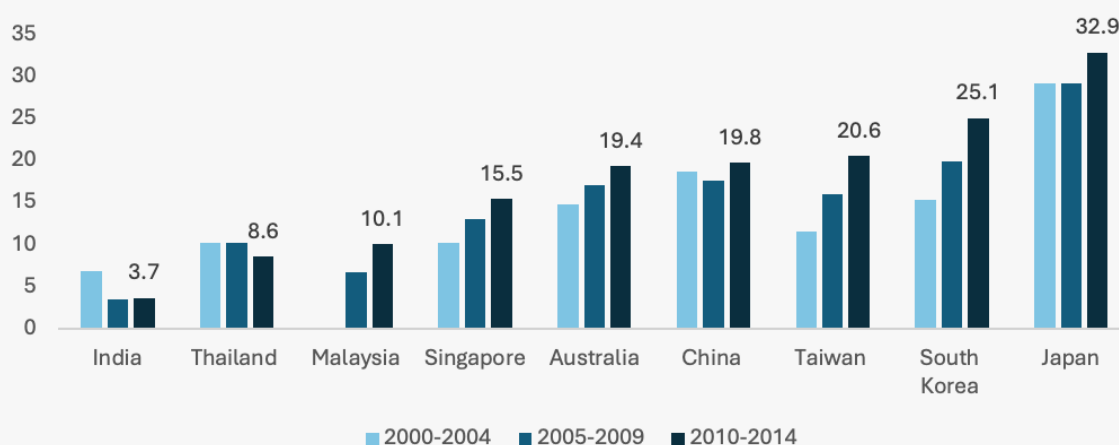
The data is age-standardised. Survival rates are depicted for individuals aged 15-99 years.
There is no data available for Hong Kong, Indonesia and Vietnam.

NGOs including patient organisations and civil societies, play a crucial role in enhancing lung cancer awareness and care.

These organisations advocate for policy changes, lobby for increased funding, and push for better access to advanced diagnostic tools and treatments[44]. This helps to reduce disparities and improve care pathways across regions. In Japan and Australia, these organisations amplify patient voices and influence government policies to prioritise lung cancer as a public health concern. Notably, Australia is recognised for its lung cancer advocacy in the APAC region.

Lung Foundation Australia drives lung cancer care improvement through strategic government partnership[81]

Lung Foundation Australia (LFA) exemplifies effective NGO engagement in enhancing lung cancer awareness and care.

LFA collaborated with the Australian Government Department of Health to develop the first-ever centralised Strategic Action Plan for Lung Conditions. This included the government's AU$4 million (US$2.7 million) funding for training health professionals, public awareness campaigns, and supporting high-risk groups, alongside LFA's advocacy and educational initiatives.

This has led to improvements in:
▶ Early diagnosis
▶ Treatment
▶ Public knowledge

This partnership highlights how NGOs can drive policy changes, secure funding, and enhance healthcare delivery, ultimately leading to better health outcomes.

Additionally, in less developed health systems such as India, the influence of lung cancer-specific patient advocacy and support groups has grown significantly over the last five years[82].

Lung Connect India Foundation demonstrates the impact of strong patient advocacy in LMICs[82]

The Lung Connect India Foundation stands out as one of the most established lung cancer patient advocacy groups in India. It has evolved from an offline support group into a digital network.

To date, at least 100 online support group meetings have been conducted, benefiting almost 18,000 patients.

Positive outcomes have resulted from their advocacy efforts. For instance, economically vulnerable patients in the state of Jharkhand, India, can now receive ₹25 lakhs (US$30,000) for their lung cancer treatment, following the success of cancer being listed as a notifiable disease in the state. Additionally, several advocacy efforts are also ongoing, such as lobbying for the inclusion of molecular testing in India's public health protection scheme, the Ayushman Bharat scheme, and insurance policies.
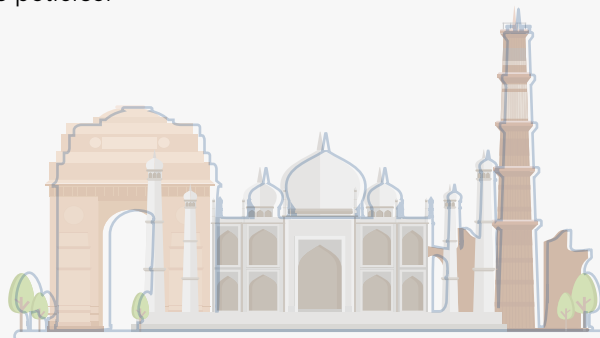
Apart from lobbying efforts, civil societies and patient groups drive public awareness campaigns, providing targeted education on lung cancer prevention and early detection. This includes focusing on populations such as non-smokers, who may be overlooked as potential high-risk groups for lung cancer due to the predominant attention on smokers. Additionally, these organisations also target rural communities, recognising their limited access to lung cancer awareness programmes and care[83].

Through grassroots outreach, they aim to bridge gaps in healthcare access and understanding. This approach contributes to improved outcomes for lung cancer patients by ensuring broader awareness and proactive healthcare engagement across diverse populations.

By leveraging their networks and expertise, these organisations support government initiatives, advocate for sustainable improvements in healthcare delivery, and promote long-term support mechanisms for patients and caregivers. Their efforts contribute to equitable access to quality care in diverse healthcare settings.

Public education and awareness programmes, coupled with healthcare provider training, are crucial for enhancing lung cancer care, particularly in educating non-smokers about their risks and equipping healthcare professionals to detect early symptoms in this prevalent demographic among Asian populations.
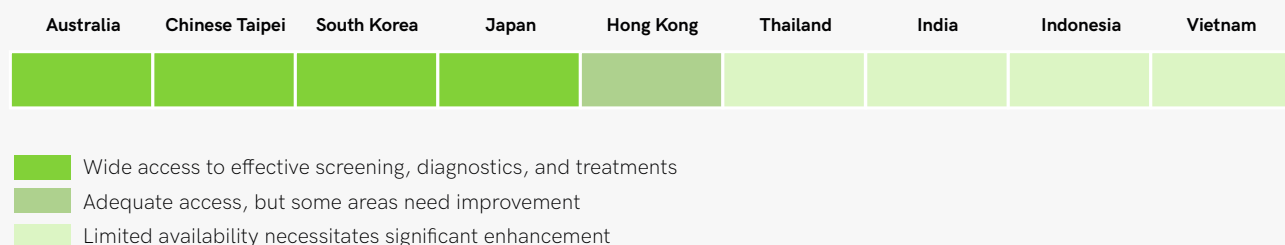
In the APAC region, community-based outreach programmes, often led by civil societies with government support, play a crucial role in amplifying public awareness through targeted campaigns and services. These initiatives are designed to reach diverse populations and educate them on the importance of early detection and preventive measures for lung cancer.

Australia stands out among the 9 health systems with initiatives like the Find Cancer Early Campaign by the Cancer Council Western Australia and Lung Cancer Search & Rescue by the Lung Cancer Foundation. These programmes not only target rural and underserved communities but also engage in grassroots efforts to promote proactive health management[84,85]. By educating the public comprehensively, they generate evidence that supports advocacy for policy changes aimed at ensuring equitable access to lung cancer screening and treatment resources across the region.

Moreover, educating healthcare providers, especially those in primary healthcare settings, is crucial for improving early detection and effective management of lung cancer cases. Training programmes should focus on recognising risk factors and symptoms, in non-smokers, which are often less readily recognised or acknowledged[86]. Emphasising the use of advanced screening and diagnostic tools, especially for non-smokers at higher risk due to oncogenic mutations, is essential[43]. By implementing these best practices, healthcare providers can ensure that patients receive timely and appropriate interventions, thereby contributing to improved health outcomes.

4.3.5 Availability & access to effective screening programmes, precise diagnostics & innovative treatments

Figure 6: Availability and access to effective screening programmes and precise diagnostics and treatment

Australia	Chinese Taipei	South Korea	Japan	Hong Kong	Thailand	India	Indonesia	Vietnam

Wide access to effective screening, diagnostics, and treatments

Adequate access, but some areas need improvement

Limited availability necessitates significant enhancement

Scoring is relative and determined through desk research and expert validation. More details can be found in the appendix.

Early detection through effective screening programme significantly improves survival rates by enabling timely intervention before cancer progresses to advanced stages[87]. Key considerations for evaluating screening programme effectiveness include programme scale, choice of screening tools, and coverage across different geographical and demographic groups.

In terms of diagnosis, establishing a robust diagnostic infrastructure with state-of-the-art imaging services, serum biomarker testing, genomic analysis, and molecular profiling is crucial. These capabilities enable precise disease characterisation and staging, and personalised treatment strategies tailored to each patient's genetic and molecular profile[88]. Advanced therapeutics, such as targeted therapies and immunotherapies, offer promising outcomes and contribute to increased survival rates in lung cancer treatment[89].

Beyond ensuring the availability of comprehensive services, it is crucial to ensure equitable access to these services so that they reach the right people at the right time. Across the 9 assessed APAC health systems, disparities in access to screening, diagnostic, and treatment modalities are evident. While high-income health systems generally perform better, widespread challenges persist, including financial constraints, inadequate healthcare infrastructure, and workforce shortages **(see Figure 6)**. Addressing these barriers is essential for achieving equitable access to lung cancer care across diverse populations in the region.

Australia's disparities in aboriginal healthcare access[15,90]

Australia demonstrates robust frameworks for lung cancer management and care, characterised by its centralised lung cancer programme. However, the health system still faces significant challenges, particularly in addressing disparities among Aboriginal populations.

Aboriginal Australians are disproportionately represented in the lowest socioeconomic quintiles, impacting their access to timely healthcare services, including cancer screening and treatment. Studies reveal higher rates of advanced cancer diagnoses among Aboriginal populations, leading to poorer prognoses compared to non-Aboriginal counterparts. Factors such as lower participation rates in screening programmes, higher comorbidities, and systemic barriers like language and cultural differences further exacerbate these disparities.

Realising the potential of early detection through widespread population-based screening has proven to effectively improve patient outcomes, thereby enhancing survival rates.
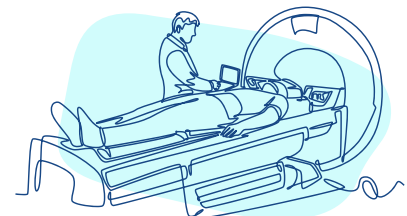
Japan, South Korea, Chinese Taipei, and soon, Australia, have implemented LDCT screening through a centrally organised population-based lung cancer screening programme. In contrast, many other APAC health systems rely primarily on opportunistic screening programmes, or lack formal screening programmes altogether, leading to uneven access and coverage.

Despite LDCT being widely recognised as the gold standard screening tool for lung cancer, offering clear benefits in mortality reduction, its routine implementation remains limited across much of Asia, particularly in LMIC health systems[91]. Various challenges such as economic constraints, reimbursement issues, and lack of infrastructure and trained human resources hinder the establishment of organised screening programmes. Additionally, practical considerations, such as defining high-risk populations, standardising screening protocols and guidelines, and addressing exposure to radiation risks, pose significant challenges to effective implementation[91].

Despite these challenges, early diagnosis is critical and should be promoted. Research underscores the crucial impact of early diagnosis on lung cancer prognosis, where survival rates drastically differ based on the stage of diagnosis[92]. For instance, individuals diagnosed with Stage IV have significantly lower survival rates (10%) compared to those diagnosed with Stage I (68-92%), highlighting the urgent need for early detection strategies[92]. Among the challenges to the effective implementation of LDCT screening, concerns about radiation exposure often arise as a key point. Conventional CT has faced scrutiny for its high radiation dose and potential cancer risks, making it unsuitable for large-scale lung cancer screening. LDCT mitigates this by reducing radiation while maintaining screening effectiveness, establishing it as a critical screening tool. Although residual risks with LDCT remain, studies indicate these risks are generally considered acceptable, given the substantial mortality reduction associated with screening. This demonstrates how LDCT, as an early detection tool, not only mitigates prior technological limitations but also offers significant clinical benefits[93,94].

Chinese Taipei's comprehensive lung cancer screening initiative exemplifies early detection and targeted care[14,95]

Chinese Taipei's comprehensive, health system-wide lung cancer screening initiative demonstrates a positive example of effective lung cancer control, particularly in targeting high-risk populations. The centrally coordinated Lung Cancer Early Detection Programme leverages LDCT to identify 85% of lung cancers at early stages (Phase 0 or Phase 1). This early detection significantly enhances the effectiveness of treatment, resulting in improved survival rates.

Additionally, Chinese Taipei's programme is the first centralised screening initiative to incorporate family history, enhancing its ability to not only focus on individuals with significant smoking histories but also extend to those with a genetic predisposition to lung cancer. This strategic targeting has elevated the programme's effectiveness, ensuring that resources are directed toward those most at risk. The programme's success is further amplified by its commitment to continuous improvement.

In July 2024, Chinese Taipei updated its screening criteria, backed by an increase in the cancer screening budget of US$125 million. The coverage was expanded to include heavy smokers with a history of 20 or more packs per year and those with a family history of lung cancer.

Beyond the core screening programme, Chinese Taipei has continually been screening never-smokers, who represent a significant portion of lung cancer cases in Asia. The TALENT study, government-sponsored research initiated in 2015, explores the efficacy of screening never-smokers to ensure that all at-risk populations are appropriately screened and receive the best possible care.
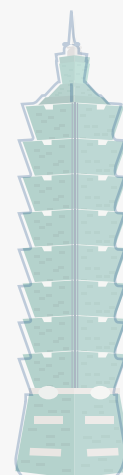
While efforts are underway in some APAC health systems, such as Hong Kong, to gather cost-effectiveness data supporting population-based LDCT screening programmes for both smokers and high-risk non-smokers, the general lack of robust evidence across the region remains a barrier to advocating for the widespread adoption of screening programmes[96]. Addressing challenges such as the scarcity of APAC-specific evidence on the benefits and cost-effectiveness of screening programmes, along with expanding access to high-quality screening tools, are critical steps toward achieving better lung cancer outcomes and reducing the disease's burden in the region.

The unique demographic profile of non-smokers affected by lung cancer in APAC underscores the critical need for precision testing and personalised treatment planning tailored to genetic profiles.

Non-smokers, who constitute a significant proportion of lung cancer patients in APAC, often have distinct genetic predispositions. This highlights the necessity for precision testing to detect these high-risk populations and link them to appropriate targeted therapies for improved patient outcomes. Among the health systems studied, Japan has paved the way in adopting and integrating precision testing into standard protocols and infrastructure.

Japan's LC-SCRUM initiative advances precision lung cancer testing[97,98]

Japan's pioneering efforts through initiatives such as Lung Cancer Genomic Screening Project for Individualised Medicine in Japan (LC-SCRUM-Japan) have demonstrated significant advancements in precision testing for lung cancer.

LC-SCRUM-Japan, launched in 2018, established a health system-wide genomic screening platform that has successfully identified Non-Small Cell Lung Cancer (NSCLC) patients with rare oncogenes.

This initiative has not only facilitated the collection of crucial patient data for potential drug clinical trials but also set a precedent for integrating advanced genomic technologies into clinical practice.

The success of LC-SCRUM-Japan has extended beyond the borders of Japan, influencing the establishment of LC-SCRUM-APAC. This regional collaboration spans multiple health systems including Thailand, Malaysia, Vietnam, Singapore, Indonesia, Australia, and Chinese Taipei. By centralising clinical and genomic data, LC-SCRUM-APAC aims to accelerate the development of precision oncology therapies across the region.

Precision oncology, powered by Next Generation Sequencing (NGS), has also emerged as a pivotal tool in identifying mutations driving lung cancer. By pinpointing these mutations, physicians can optimise treatment strategies, potentially shifting from traditional chemotherapy to more effective, targeted therapies and immune checkpoint inhibitors[99]. Studies have shown that this personalised approach significantly improves survival outcomes and treatment responses[99].

Despite these advancements, the actual adoption of NGS and precision medicine in APAC still faces significant barriers, especially among LMICs. Challenges related to policy, clinical practices, reimbursement mechanisms, and regulatory frameworks pose obstacles to the widespread integration of precision testing and advanced therapeutics[99]. Despite the implementation of LC-SCRUM-APAC and numerous studies demonstrating the benefits of precision oncology for better-informed treatment decisions, these methods are not yet fully utilised in the region. Addressing these barriers is crucial to ensure that all patients in APAC can benefit from the advancements in precision medicine and personalised treatment strategies.

Optimising care pathways through seamless linkage and multidisciplinary collaboration enhances patient journeys by ensuring timely referrals and collaborative treatment decisions.

Effective management of lung cancer relies on establishing robust linkage to care, facilitating seamless transitions from screening and diagnosis through to treatment and survivorship[100]. This coordination is crucial for delivering timely interventions and comprehensive support across the patient journey. Among the 9 health systems assessed, Australia, Chinese Taipei, and Thailand stand out for their clinical guidelines that include fast-track referral pathways or specific targets for prompt diagnosis of suspected lung cancer patients. For confirmed cases, Australia and Thailand emphasise rapid referrals for treatment and set intervals between diagnosis and initiation of treatment. Patient navigation programmes, as seen in Australia, South Korea and Hong Kong, further enhance timely access to diagnosis and treatment.

*A multidisciplinary team approach
is crucial for optimising care delivery*

This involves not only collaboration among oncologists and other specialists but also improved integration across primary, secondary, and tertiary care levels. Lung cancer management requires more than vertical integration through referrals; it necessitates horizontal integration to incorporate primary care, social services, and allied health professionals. While guidelines in Australia, Chinese Taipei, and Thailand explicitly promote shared decision-making and multidisciplinary involvement, the practical application of these guidelines can vary. Adopting a holistic, integrated approach enhances treatment outcomes and addresses the complex challenges of lung cancer, ensuring that patients receive well-rounded and effective care.

Strengthening healthcare infrastructure and manpower is crucial for ensuring access and equity in healthcare delivery, forming the backbone of any effective healthcare system and enabling access to quality care and equitable health outcomes.

Adequate healthcare infrastructure is crucial for efficient service delivery, reducing wait times, and improving patient access to essential treatments. Well-equipped facilities with advanced medical technologies enable precise diagnoses and effective treatments[89]. Similarly, a well-trained and adequately sized healthcare workforce ensures that patients receive competent care across various medical specialties, thereby enhancing treatment outcomes and patient satisfaction[101]. Together, these factors play a pivotal role in meeting the healthcare needs of populations, particularly in reaching underserved and vulnerable communities and addressing disparities in healthcare access.

However, across APAC, significant challenges persist due to a shortage of healthcare manpower dedicated to lung cancer care. This shortage is particularly acute in health systems such as Vietnam, where cancer centres face overcrowding and struggle to meet the high demand for services[102].

Currently, the healthcare system in Vietnam can only accommodate between 30% to 40% of the overall demand for cancer care, forcing manage patients to seek treatment at private hospitals[102]

This shortage underscores the urgent need to not only strengthen healthcare infrastructure but also to expand the healthcare workforce specialised in lung cancer care. Addressing these gaps is essential for improving access to and equity in lung cancer care delivery throughout the region[69].

Emerging technologies are rapidly transforming lung cancer care, offering new hope for early detection, precision diagnosis, and effective treatment.
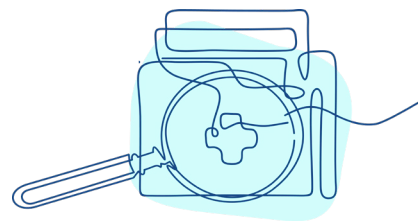
These advancements have the potential to bring immense benefits to patients and ensuring that healthcare systems are equipped to embrace them will be critical to improving outcomes across the care continuum.

Innovations such as artificial intelligence (AI)-powered screening tools, blood-based biomarkers, lung cancer vaccines, and advanced immunotherapies are paving the way for more effective intervention across the care continuum

AI-powered screening technologies, for example, have shown promise in enhancing early detection through more accurate interpretation of imaging data, potentially addressing limitations in resource-constrained settings[103]. Similarly, the use of blood-based biomarkers is opening new avenues for non-invasive diagnostics, allowing for earlier and more precise identification of cancer even before symptoms manifest[104].

On the treatment front, advancements in immunotherapy, particularly immune checkpoint inhibitors, are redefining the standard of care by harnessing the body's own immune system to target and destroy cancer cells[105]. Emerging therapies such as lung cancer vaccines also hold significant promise in potentially preventing recurrence and improving long-term survival rates.

Despite these technological advancements, equitable access remains a significant challenge in the APAC region. Disparities in healthcare infrastructure, professional training, and financial resources create barriers that prevent these innovative solutions from reaching the populations that need them most. Ensuring that healthcare systems are equipped to provide equitable access to these advanced modalities will be critical to transforming lung cancer outcomes.

Addressing these gaps requires concerted efforts to strengthen healthcare infrastructure, expand workforce training, and implement policies that promote inclusive access to screening, diagnostics, and innovative therapies. By integrating these technologies effectively and equitably, the APAC region can work towards a future where all patients benefit from the full spectrum of innovations in lung cancer care.

5. Key recommendations for improving patient access and lung cancer care

INVESTING IN THE FIGHT AGAINST LUNG CANCER BENEFITS ALL STAKEHOLDERS ACROSS THE CARE CONTINUUM

GOVERNMENT AND THE ECONOMY

Economic Savings:
Reducing lung cancer incidence and mortality can decrease healthcare costs associated with long-term treatment and care, leading to significant savings that can be allocated to other priority areas

Increased Productivity:
Improving lung cancer outcomes can help maintain a healthier workforce, thereby enhancing productivity and economic output

PATIENTS AND THEIR CAREGIVERS

Better Health Outcomes:
Early diagnosis and access to effective treatment can significantly improve survival rates and quality of life for lung cancer patients

Reduced Financial Burden:
Comprehensive insurance coverage and government support can alleviate the financial strain on patients and their families, making treatment more accessible

Strong Support Systems:
Enhanced support services, including psychological and palliative care, can provide emotional and practical assistance to patients and their families throughout the care journey

HEALTHCARE PROVIDERS

Optimised Resource Allocation:
Efficient management of lung cancer cases can lead to better use of healthcare resources, reducing the strain on healthcare facilities and personnel

HEALTHCARE PROFESSIONALS

Innovative Practices:
Adoption of new technologies and treatments can foster a culture of innovation within the healthcare sector, keeping providers at the forefront of medical advancements

Enhanced Skills and Knowledge:
Regular training and updates on the latest lung cancer treatments and protocols improve the expertise and confidence in screening and diagnostic results

ACTION POINT 1

5.1
Governments must demonstrate greater political will and leadership by implementing and updating lung cancer plans and strategies

Governments in the APAC region should prioritise lung cancer by developing comprehensive, evidence-based lung cancer control plans that incorporate health system-wide approaches. These plans should be fully costed and funded, with detailed implementation frameworks to ensure systematic tracking of progress and achievement of goals. Critical to success is the establishment of clear performance metrics and centralised technical advisory groups, such as a steering committee or technical working group, to monitor each health system's implementation efforts.

These lung cancer control plans should include all essential components across the continuum of care—spanning prevention, screening and early detection, diagnosis, treatment, survivorship, and palliative care. Prevention efforts, for example, should be foundational and include tobacco control initiatives, environmental policies to reduce air pollution, and workplace safety regulations to minimise exposure to carcinogens.

Furthermore, diagnostic referral and treatment pathways must be clear and well-defined within these plans and associated clinical guidelines. Once a diagnosis is made, processes for referral, linkage to care, and treatment services should be timely and organised. Clearly outlining roles, responsibilities, referral tools and navigation support help ensure early access and appropriate support, fostering trust and improving outcomes. Moreover, integrating survivorship and palliative care into these pathways is crucial for providing comprehensive support throughout the patient journey. This holistic approach enhances the quality of care and ensures that all aspects of the patient's needs are addressed.

ACTION POINT 2

5.2
Performance tracking should be enhanced by leveraging high-quality data and establishing dedicated interoperable lung cancer registries

Formalising patient data and making it available in interoperable registries is crucial for providing stakeholders with a complete and accurate picture of the lung cancer landscape[107]. Currently, while some health systems have cancer registries, they often lack comprehensive coverage and contain limited data. Critical cancer-specific variables, such as tumour characteristics and staging, along with treatment variables, including modalities and adherence, as well as outcomes data like progression and survival rates, are often missing or incomplete[108]. This incomplete data landscape leaves healthcare providers, researchers, and policymakers without the information necessary to fully understand and address the lung cancer situation.

Beyond establishing registries, it is imperative to improve the quality of broader epidemiological data on lung cancer monitoring[109]. For example, in India, the lower reported incidence, prevalence, and mortality rates can be attributed to poor data quality and surveillance systems[110]. Issues such as the lack of a formal screening programme and concerns about high false-positive rates further complicate accurate monitoring and reporting[111].

Addressing these gaps by improving data quality and establishing comprehensive interoperable registries will enable health systems to significantly advance their lung cancer control efforts and improve patient outcomes.

ACTION POINT 3

5.3
Demonstrate the benefits of widespread population-based screening for early detection of high-risk individuals in the APAC region

The benefits of implementing widespread, population-based screening programmes targeting high-risk individuals for lung cancer in the APAC region cannot be overstated. Lung cancer survival hinges significantly on early detection and timely treatment access[112]. While the debate over screening programmes persists, extensive studies in Europe and the United States have unequivocally demonstrated reduced lung cancer mortality rates through systematic screening efforts[113]. However, the cost-effectiveness of such programmes remains a critical consideration, as the benefits must be balanced with economic feasibility to ensure the best overall approach.

To catalyse progress in APAC, it is imperative to build a robust evidence base tailored to this region. Such evidence would be pivotal in persuading health policymakers, particularly in less affluent health systems, where initiating large-scale screening programmes may seem daunting initially. Currently, there is limited evidence on comprehensive lung cancer screening within most health systems studied in APAC, underscoring the need for locally tailored screening trials across the region. By advocating for and investing in locally tailored initiatives, APAC health systems can make informed policy decisions, enhancing lung cancer prevention and care through early detection and timely interventions. Guided by localised evidence and empowered by successes both regionally and internationally, this approach presents a meaningful opportunity to advance lung cancer outcomes across the region.

ACTION POINT 4

5.4
Tackle inequalities in access to care by implementing standardised centralised screening programmes and ensuring equitable access to advanced diagnostics and innovative therapies

Despite significant advancements in medical technology and treatment modalities, the burden of lung cancer remains disproportionately high, exacerbated by delays in diagnosis and disparities in healthcare access across different demographics and geographical regions.

Timely diagnosis is pivotal in improving lung cancer outcomes. Healthcare systems across APAC should work towards implementing standardised, advanced screening programmes tailored for high-risk populations, with a focus on cost-effective diagnostic pathways that may include options like LDCT and, where appropriate, biomarker testing.

Access to effective lung cancer treatment should also not be contingent upon geographical location, socioeconomic status, or other disparities. Policymakers and healthcare stakeholders must prioritise the development of inclusive healthcare policies that ensure equitable access to innovative therapies, including targeted therapies and immunotherapies. This includes bolstering infrastructure in underserved areas, reducing financial barriers through subsidised treatment programmes, and fostering collaboration between public and private sectors to optimise resource allocation.

ACTION POINT 5

5.5
Consider holistic and integrated approaches to tackling resource and capacity challenges

To improve lung cancer care in the APAC region, strengthening healthcare infrastructure is a foundational step. This may include investing in healthcare facilities, particularly by establishing large, well-resourced centres in underserved and rural areas, and exploring cost-effective solutions such as mobile or transportation services to ensure comprehensive lung cancer care is accessible. Key areas of focus include enhancing diagnostic capabilities, treatment options, and follow-up services.

Expanding workforce training and development is equally critical. By developing targeted training programmes, healthcare professionals can stay abreast of the latest lung cancer treatment protocols and technologies.

Multidisciplinary collaboration is another key element. Encouraging cooperation among oncologists, pulmonologists, radiologists, pathologists, and other healthcare providers can significantly enhance patient outcomes. Establishing multidisciplinary tumour boards to discuss complex cases and develop personalised treatment plans will foster a more coordinated and patient-centric approach to care.

Integrating community and support services ensures that patients receive comprehensive care. Collaborating with community organisations to provide patient education, support services, and navigation assistance is vital. Programmes addressing the psychosocial aspects of lung cancer care, such as mental health support and palliative care, are also crucial components of a holistic approach.

Public-private partnerships can be a powerful tool in overcoming resource and capacity challenges. Engaging with private sector partners, including pharmaceutical companies, technology firms, and NGOs, can bring in additional resources and expertise to support innovative solutions and funding opportunities.

6. Conclusion

This paper has underscored the profound challenges and disparities in lung cancer care across the APAC region, from economic barriers to uneven access to advanced diagnostics and treatments. The economic divide exacerbates these issues, with slow reimbursement processes and inconsistent health technology assessment provisions hindering timely care delivery.

We have outlined five key action points to enhance patient access and lung cancer care in the APAC region. First, governments must take bolder steps, demonstrating greater political will and leadership by implementing and prioritising centralised lung cancer plans and strategies. Enhanced performance tracking is essential, requiring high-quality data and the establishment of centralised lung cancer registries. Additionally, illustrating the benefits of widespread population-based screening for early detection can drive policy changes and significantly improve outcomes.

Ensuring rapid diagnosis and addressing inequalities in access to care are vital for achieving equitable healthcare. Finally, adopting holistic and integrated approaches to tackle resource and capacity challenges will ensure sustainable progress in lung cancer care across the region.

If these actions are taken, we can expect to see health systems making sustainable progress in the fight against lung cancer. Every stakeholder in the ecosystem, from Ministries of Health, policymakers, and industry to physicians, caregivers and patients, has something to offer and something to gain. These stakeholders must work together to tackle the problems faced, especially in low- and middle-income health systems where resources are sparse.

ASPIRE, a collaborative multilateral effort, stands at the forefront of this mission. Dedicated to enhancing lung cancer outcomes through policy reforms in APAC, ASPIRE brings together stakeholders across governments, healthcare sectors, and civil society to drive meaningful change. Through strategic partnerships and evidence-based advocacy, ASPIRE aims to transform the landscape of lung cancer care, ensuring equitable access and improved outcomes for all.

To find out more about our work, please visit our website and connect with us on LinkedIn

Website
www.aspirelungcancer.com

Linkedin
https://www.linkedin.com/showcase/aspire-for-lung-cancer

Investing in these efforts goes beyond reducing the burden of lung cancer; it is about creating a future where every individual has access to timely, effective care. Together, let's bridge the gap and forge a path towards better lung cancer care and outcomes.

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Appendix

Methodology

This White Paper does not aim to provide an exhaustive review of all health systems in the APAC region; rather, the goal is to highlight the current landscape and showcase best practices from selected health systems to benefit stakeholders across the region. To accomplish this, we have drawn upon a diverse range of sources, including international and national journal publications, policy documents, healthcare reports, and statistical data. Our search was limited to medical journal articles, authoritative websites, and symposiums published or held within the last five years. Additionally, expert interviews were conducted with lung cancer specialists who have in-depth knowledge of local clinical practices and policy landscapes.

Given the wide variety and number of health systems in the APAC region, covering every system in a single paper is not feasible. Therefore, our focus is on 9 health systems **(see Figure 7)** to reflect the broad spectrum of healthcare system maturities, funding models, and lung cancer management approaches across APAC. However, we have also considered best practices from other health systems, both within and beyond APAC, when formulating key policy recommendations

Figure 7: 9 Health systems focused within the APAC region

Australia	Chinese Taipei	South Korea	Japan	Hong Kong	Thailand	India	Indonesia	Vietnam

The challenges and recommendations presented in this White Paper were developed through collaborative efforts with leading lung cancer experts. This process involved a thorough review of Health System Profiles, scorecards, and the final White Paper itself. Online interviews with these expert contributors were conducted to validate and ensure the accuracy of the findings. The insights gathered from these discussions informed our landscape assessment and policy recommendations, ensuring that our conclusions are grounded in the latest research and expert opinions.

To evaluate the lung cancer landscape, ASPIRE developed a scorecard using indicators to measure policy and implementation factors linked to better outcomes. Leading lung cancer experts contributed to the development of the scorecard through interviews and email correspondence. As a result, a comprehensive scorecard (detailed below) was developed to evaluate each territory across the five key success factors outlined in **Section 4** of the White Paper.

We analysed the most relevant sources identified through our targeted literature review and derived a set of indicators to benchmark lung cancer control policies and programmes in the 9 APAC health systems. The aim was to identify the policy and programme components associated with progress in lung cancer management, high-quality care, and positive patient outcomes. These indicators were then clustered into domains, and scoring schemas were developed based on these indicators. Secondary research was conducted using a range of international and national sources to assess and score each of the 9 APAC territories, with scoring judgments made based on the best available information.

01 Presence of a well-implemented & comprehensive lung cancer-specific plan

Domain	Indicator		Scoring Criteria
Operational & Up-to-Date National Cancer Control Plan	1	Existence of an operational national cancer control plan	**2** = operational national cancer control plan exists **1** = national cancer control plan exists but is embedded within a broader plan for non-communicable disease
	2	Currency of national cancer control plan	**2** = cancer control plan was updated/ in force within last 2 years **1** = cancer control plan was updated/ in force within last 5 years
Comprehensive National Cancer Control Plan	3	Prevention is a component of the national cancer control plan	**1** = prevention is listed as a strategic priority / focus area of the plan with clear strategies/ interventions/ activities outlined to achieve its goals/ objectives
	4	Screening/ early detection is a component of the national cancer control plan	**1** = screening/ early detection is listed as a strategic priority / focus area of the plan with clear strategies/ interventions/ activities outlined to achieve its goals/ objectives
	5	Diagnosis is a component of the national cancer control plan	**1** = diagnosis is listed as a strategic priority / focus area of the plan with clear strategies/ interventions/ activities outlined to achieve its goals/ objectives
	6	Treatment is a component of the national cancer control plan	**1** = treatment is listed as a strategic priority / focus area of the plan with clear strategies/ interventions/ activities outlined to achieve its goals/ objectives
	7	Palliative care is a component of the national cancer control plan	**1** = palliative care is listed as a strategic priority / focus area of the plan with clear strategies/ interventions/ activities outlined to achieve its goals/ objectives
	8	Survivorship support is a component of the national cancer control plan	**1** = survivorship support is listed as a strategic priority / focus area of the plan with clear strategies/ interventions/ activities outlined to achieve its goals/ objectives
	9	Inclusion of an implementation plan for cancer control	**2** = cancer control plan includes a detailed implementation/ action plan for cancer control to achieve its goals/ objectives (e.g. including specific actions with timelines, responsible stakeholders, resource allocation, targets and performance indicators) **1** = cancer control plan includes a broad plan to achieve its goals/ objectives
	10	Definition of overarching goals/ specific objectives for cancer control	**1** = cancer control plan includes broad goals with short, medium and long-term objectives
	11	Inclusion of a budget/ financing plan for cancer control	**2** = cancer control plan details funding sources/ budget allocations for each implementation/ action plan **1** = cancer control plan identifies broad funding sources
Operational & Up-to-Date Dedicated Lung Cancer Control Plan	12	Existence of dedicated lung cancer plan/ strategy in the national cancer control plan	**3** = lung cancer is clearly identified as a priority area with a dedicated (standalone) national lung cancer control policy/ plan/ strategy targeting the continuum of care, and well-defined details outlined (e.g. clear goals/ objectives, measurable outcome/ targets, evaluation system etc) **2** = lung cancer is identified as a priority area with some details outlined on strategies/ initiatives/ actions, goals/ objectives. and outcomes/ targets **1** = lung cancer has been briefly mentioned as one of the focus areas in the cancer control plan
Comprehensive Dedicated Lung Cancer Control Plan	13	Definition of goals / specific objectives for lung cancer control	**1** = cancer control plan includes specific goals and objectives for lung cancer control
	14	Inclusion of desired outcomes/ targets for lung cancer control	**1** = cancer control plan outlines specific, measurable outcomes/targets within a specific timeframe specifically for lung cancer control
	15	Monitoring and evaluation of lung cancer control initiatives	**2** = a national or subnational system to monitor and evaluate progress and impact of broad interventions and activities implemented for lung cancer control exists **1** = plans are in place to establish a national/ sub-national/ small-scale monitoring system to monitor and evaluate progress and impact of interventions and activities implemented for lung cancer control
	16	Existence of a budget/ financing plan for lung cancer control	**1** = funding sources/ budget allocations/ investment for lung cancer control strategies/ initiatives/ actions are clearly stated

02
Sufficient political will and coordination

Domain	Indicator		Scoring Criteria
Lung Cancer Policy and Planning	**1**	Government bodies involvement and coordination in lung cancer control	**2** = centralised coordination of lung cancer control driven by a dedicated task force, ministry, agency, or organisation with clear roles and responsibilities **1** = decentralised involvement in lung cancer control across multiple sectors through various task forces, ministries, agencies, or organisations
	2	Government collaboration and partnerships in lung cancer control	**2** = government has led and implemented large-scale national partnerships/initiatives for lung cancer in past 2 years **1** = government has supported provincial/ regional partnerships/ initiatives for lung cancer in past 2 years
	3	Existence and comprehensiveness of tobacco control public health policies/ laws	**Tobacco control as a government priority:** **1** = government objectives on tobacco control exist **1** = national agency responsible for tobacco control exist **Tobacco advertising and promotion restrictions:** **1** = ban on tobacco advertisement/ promotion/ sponsorship in various media channels (e.g., TV, radio, print) **1** = prohibition of tobacco product displays at point of sale **Tobacco taxation:** **1** = excise tax rate on tobacco products relative to the retail price **1** = presence of regular increases in tobacco taxes **Access to tobacco products:** **1** = age restrictions on the sale of tobacco products to minors **Health warnings and packaging:** **1** = law mandates strict restrictions on tobacco packaging (e.g., health warnings) **1** = requirements for plain packaging of tobacco products **Enforcement and compliance:** **1** = adequacy of enforcement measures to ensure compliance with tobacco control laws [Internal Note: Defined by compliance rate] **1** = existence of penalties for violations of tobacco control regulations International tobacco control commitments: **1** = territory is a party to the WHO Framework Convention on tobacco control **Funding for tobacco control:** **1** = allocation of government funds for tobacco control programmes and initiatives **1** = existence of partnerships (such as launch of awareness campaigns) with non-governmental organisations or private sectors to support tobacco control efforts in the past 2 years
	4	Existence and comprehensiveness of smoking cessation policies/ initiatives	**1** = at least one public campaign on smoking cessation has been recently launched in the past 2 years **1** = smoking cessation initiatives/ programmes for vulnerable populations are widely available and accessible (including counselling services, support groups and other tailored interventions) **1** = tobacco cessation services/ tools/ resources in the community (e.g., quitlines, counseling) are widely available and accessible **1** = high success rates of smoking cessation services
	5	Existence and comprehensiveness of smoke-free environment policies	**1** = existence of smoke-free laws in indoor public places (e.g., workplaces, restaurants, bars) **1** = coverage of outdoor public places under smoke-free regulations (e.g., parks, beaches, outdoor dining areas) **1** = presence of public awareness campaigns to educate the public about smoke-free policies and the dangers of second-hand smoke exposure

Domain	Indicator		Scoring Criteria
Lung Cancer Policy and Planning	6	Policies addressing environmental/ air pollution in reducing respiratory health risks	1 = national radon control programme / policy exist 1 = an air quality strategy exists that includes urban planning policies/ measures targeting pollutants in densely populated areas 1 = promotion of clean energy sources 1 = regulations in place to reduce or control industrial / vehicle emissions of pollutants known to affect respiratory health 1 = presence of vehicle emission standards aimed at reducing pollutants that contribute to respiratory health risks 1 = presence of public awareness campaigns/ educational initiatives aimed at informing the public about the health risks associated with air pollution and mitigating exposure
	7	Existence and comprehensiveness of occupational hazard reduction efforts	1 = occupational health and safety regulations exists 1 = systems in place for identifying workplace hazards and conducting regular risk assessments to evaluate and mitigate risks to workers' health and safety 1 = systems in place for health surveillance and monitoring of workers exposed to occupational hazards, including regular health checks and monitoring of exposure levels 1 = training and education programmes aimed at raising awareness about occupational hazards, promoting safe work practices, and providing workers with the necessary skills and knowledge to protect themselves
	8	E-cigarettes regulation	1 = regulation for e-cigarettes exist 1 = e-cigarette sales subject to an age limit 1 = e-cigarette advertising is banned 1 = e-cigarettes are banned in public areas (e.g. public transport, civic buildings, restaurants, cafes, pubs and/or bars)
	9	Lung cancer patient organisation and/or civil society collaborations / participation in joint programmes with government	1 = collaborations and joint programmes/ initiatives, including lobbying efforts, exist between patient groups and policy groups/ ministries/ government bodies
Lung cancer guidelines for screening, diagnosis, treatment and management	10	Existence of patient organisations	2 = a lung cancer dedicated patient organisation/ patient advocacy group exist 1 = one or more patient organisations/ patient advocacy groups which cover lung cancer exist
	11	Existence of civil society	3 = multiple dedicated lung cancer civil society exists 2 = a lung cancer dedicated civil society exist 1 = one or more civil societies which cover lung cancer exist
	12	Lung cancer patient/ Civil Society representation in decision-making bodies	2 = formal inclusion of lung cancer patients/ patient advocacy groups or civil societies/ associations in decision-making bodies related to lung cancer policy and healthcare delivery, promoting patient-centred care practices and shared decision-making 1 = established mechanisms for systematically gathering feedback, preferences, and experiences from lung cancer patients on healthcare policies/ guidelines/ initiatives, ensuring their perspectives/ priorities are incorporated into decision-making processes
	13	Patient organisation contributions towards clinical guidelines development	1 = one or more patient organisations which cover lung cancer are listed as contributors in clinical guidelines
	14	Patient organisation participation in cancer control plan development	1 = one or more patient organisations and or/ civil societies which cover lung cancer participate in developing the National Cancer Control Plan
	15	Civil society contribution towards health technology assessment recommendations	1 = civil society has the opportunity to comment on Health Technology Assessment (HTA) recommendations
	16	Civil society collaborations / participation in joint programmes with the private sector	1 = collaborations and joint programmes/ initiatives, including lobbying efforts, exist between civil societies and the private sector
	17	Community engagement and empowerment	2 = strong community engagement and empowerment initiatives, involving underserved communities in cancer awareness campaigns and advocacy efforts to address their specific needs and priorities 1 = limited community engagement and empowerment efforts, with underserved populations lacking opportunities for meaningful participation in cancer-related activities and decision-making processes

Domain	Indicator		Scoring Criteria
Lung cancer guidelines for screening, diagnosis, treatment and management	18	Existence of clinical guidelines for lung cancer	2 = national evidence based lung cancer guidelines exist 1 = lung cancer guidelines adopting/ referencing international/ regional guidelines exist
	19	Currency of clinical guidelines for lung cancer	2 = guidelines were updated within last 2 years 1 = guidelines were updated within last 5 years
	20	Lung cancer clinical guidelines coverage for lung cancer screening	1= Covers screening for lung cancer
	21	Type of lung cancer screening tool recommended in screening guidelines	3 = Screening guidelines recommend the use of serum biomarker testing as an adjunctive screening tool in combination with LDCT screening for lung cancer detection as a comprehensive approach to screening 2 = Screening guidelines recommend LDCT as the primary screening tool for lung cancer detection, aligning with current standard practice and evidence-based recommendation 1 = Screening guidelines recommend chest X-ray as the primary screening tool for lung cancer detection
	22	Inclusion of biomarker testing in screening guidelines	3 = Specific biomarkers (e.g.,EGFR, ALK, ROS1 and PD-L1) are explicitly identified in lung cancer screening guidelines/ pathways for lung cancer screening, with clear guidance on their use/ interpretation 2 = Biomarker testing is recommended or mentioned as an adjunctive screening tool in national lung cancer screening guidelines, particularly for specific sub-populations identified as high risk, with clear indications on its incorporation into screening protocols 1 = Biomarker testing is recommended for specific populations, either as part of broader screening recommendations or for targeted screening approaches
	23	Inclusion of NGS in screening guidelines	3 = Clear and detailed recommendations outlined for utilising NGS as an integral component of lung cancer screening 2 = Basic discussion of the potential utility of NGS in lung cancer screening, with lack of specific recommendations 1 = Minimal or no mention of NGS technology in the screening guidelines
	24	Lung cancer clinical guidelines coverage for lung cancer diagnosis	1 = covers diagnosis for lung cancer
	25	Diagnosis timeframe	2 = guidelines mention a fast-track referral pathway for diagnosis for suspected lung cancer patients 1 = guidelines include recommendation and/or a target for a specific timeframe for diagnostic referral in suspected lung cancer patients
	26	Post-diagnosis referral intervals	2 = guidelines / pathways for rapid referral for lung cancer patients exist 1 = guidelines include recommendation and/or a target for the interval between diagnosis and initial treatment for confirmed lung cancer patients
	27	Lung cancer clinical guidelines coverage for lung cancer treatment	1= Covers treatment for lung cancer
	28	Patient navigation programme	1 = guidelines include patient navigation programme to help promote access to timely diagnosis and treatment
	29	Referral system	1 = guidelines include clearly defined referral system exists from primary care to secondary and tertiary care
	30	Established programmes for further care management	1 = established programmes exist sourcing individuals who have been diagnosed with lung cancer with prevention, treatment, and care resources
	31	Shared decision making	1 = guidelines cover shared decision making
	32	Involvement of multi-disciplinary team	1 = guidelines recommend treatment by multidisciplinary team
	33	Referral pathway to supportive/ palliative care	1 = guidelines include referral pathway to supportive / palliative care services
	34	Psychological burden	1 = guidelines mention and address psychological burden of lung cancer

03

Comprehensive & sustainable funding for lung cancer care

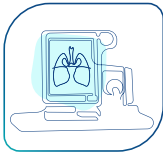| Domain		Indicator	Scoring Criteria
Existence of public reimbursement for lung cancer screening, diagnosis and treatment	1	Existence of publicly funded/ reimbursed screening test for lung cancer	4 = lung cancer screening is fully funded/ reimbursed at a national level 3 = lung cancer screening is partially funded/ reimbursed at a national level 2 = lung cancer screening is fully funded/ reimbursed at provincial levels 1 = lung cancer screening is partially funded/ reimbursed at provincial levels
	2	Existence of publicly funded/ reimbursed testing/diagnostic services for lung cancer	3 = Most diagnostic tests are publicly funded health system-wide either with minimal restrictions/ included within universal healthcare 2 = Subsidised testing provided/ free testing provided at selected regions 1 = Predominantly OOP health system-wide, with free testing only provided as part of programmatic/ community based pilots (i.e. for selected sites/ sub-populations)
	3	Existence of publicly funded/ reimbursed drug therapy for lung cancer	3 = Most lung cancer drugs, including targeted therapy, are predominantly government-funded/ reimbursed, either on a national level as part of UHC or in selected states 2 = Most lung cancer drugs included in the WHO NEDL are predominantly government-funded/ reimbursed, either on a national level as part of UHC or in selected states 1 = Some lung cancer drugs included in the WHO NEDL, are partially government-funded/ reimbursed, either on a national level as part of UHC or in selected states
Equitable Allocation of Funding and Resources	4	Allocation of funding/ resources	2 = substantial proportion (at least X%) of the national cancer budget allocated to equity-promoting initiatives, addressing access disparities faced by underserved populations and geographically marginalised areas: 1 = limited budget allocated to equity-promoting initiatives, where funding primarily support mainstream cancer care services without specific efforts to reach vulnerable populations or underserved regions
Patient Financial Support and Access to Lung Cancer Care	5	Existence of patient financial support programmes for lung cancer screening	3 = A comprehensive programme exists to aid patients with the financial costs of screening, ensuring access for a wide range of individuals, including those who are uninsured or have limited financial resources 2 = Limited assistance is available for patients, with some initiatives in place, but significant gaps remain in coverage and eligibility criteria 1 = There are no dedicated financial support programmes for lung cancer screening, however, financial support for general cancer care is available
	6	Existence of patient financial support programmes and associated out of pocket expenses for lung cancer diagnosis	3 = Comprehensive health system-wide programmes ensure minimal out-of-pocket expenses and extensive financial assistance for lung cancer diagnosis, supported by insurance mandates and government-funded initiatives, accessible to most/all, including the uninsured and financially challenged 2 = Some financial assistance and awareness initiatives to reduce moderate out-of-pocket expenses for lung cancer diagnosis are available, with efforts made/ mechanisms to reduce gaps in coverage and eligibility criteria 1 = Lack of adequate/ dedicated national financial support programmes result in significant out-of-pocket expenses for lung cancer diagnosis, limiting access to treatments
	7	Existence of patient financial support programmes for lung cancer treatment	3 = A comprehensive programme exists to aid patients with the financial costs of treatment, ensuring access for a wide range of individuals, including those who are uninsured or have limited financial resources 2 = Limited assistance is available for patients, with some initiatives in place, but significant gaps remain in coverage and eligibility criteria 1 = There are no dedicated financial support programmes for lung cancer treatment, leaving patients to bear the full burden of associated costs
	8	Out-of-pocket expenses and availability of mechanisms to improve access to lung cancer treatment	3 = Patients encounter low out-of-pocket expenses and comprehensive financial assistance programmes, coupled with robust mechanisms to enhance access such as insurance coverage mandates and government-funded treatment initiatives 2 = Patients encounter moderate out-of-pocket expenses for lung cancer treatment, efforts to reduce barriers to access include the implementation of financial assistance programmes and initiatives aimed at improving awareness of available resources and support services 1 = Patients face significant financial burdens due to high out-of-pocket expenses for lung cancer treatment, compounded by a lack of available financial assistance programmes, leading to limited access to necessary treatments

04
Robust surveillance protocols and public education

Domain	Indicator		Scoring Criteria
Existence and operational status of a PBCR	1	Existence of a population based cancer registry	2 = a national PBCR exists 1 = a regional/ state PBCR exists
	2	Registry integration and linkage	3 = high level of data linkage with other health databases/ health information system (e.g., hospital records, mortality data etc) 2 = moderate level of data linkage (e.g., limited to specific data sources) 1 = limited to no data linkage
	3	Registry population coverage	2 = High coverage of (>50%) of the national population 1 = Low coverage of (<50%) the national population
	4	Operational status of registry	3 = cancer registry is well developed, with high level of completeness, accuracy, as well as timeliness in data submission, analysis and reporting 2 = cancer registry is developing with moderate level of completeness, accuracy, as well as timeliness in data submission, analysis and reporting 1 = cancer registry is nascent/ emerging with low level of completeness, accuracy as well as timeliness in data submission, analysis and reporting
Existence and operational status of a specialized lung-cancer PBCR	5	Presence of a specialised lung-cancer PBCR	3 = a specialised PBCR for lung cancer currently exists 2 = efforts to establish a specialised PBCR for lung cancer are currently underway 1 = previous initiatives to establish a specialised PBCR for lung cancer have been observed
Presence of education programmes for providers and the general public	6	Availability of patient education programmes and support resources	2 = educative programmes/ resources for lung cancer exist run by the government 1 = educative programmes/ resources for lung cancer exist run by civil society
	7	Existence of community-based outreach programmes	3 = existence of at least one community based outreach services programme/ public awareness campaign for lung cancer led/ driven and funded by the government in the past 2 years 2 = existence of at least one community based outreach services programme/ public awareness campaign for lung cancer led/driven by civil society and supported by government in the past 2 years 1 = existence of at least one community based outreach services programme/ public awareness campaign for lung cancer led/driven by international/ regional partners in collaboration with the government the past 2 years
	8	Existence of clinical associations	3 = multiple clincial associations dedicated to lung cancer exist 2 = a lung cancer dedicated clinical association exists 1 = one or more clinical association(s) which cover lung cancer exist
	9	Educational programmes for providers	1 = clinical lung cancer educational programmes targeted towards providers exist

5th factor scorecard to be continued on the next page

05
Availability and access to effective screening programmes, precise diagnostics and innovative treatments

Domain	Indicator		Scoring Criteria
Capacity and equity of distribution of workforce / trained healthcare specialists	1	Healthcare provider and infrastructure distribution	2 = cancer care providers and healthcare facilities are distributed across regions/ populations in a manner that ensures relatively equal access for all populations 1 = uneven distribution of cancer care providers and healthcare facilities, with significant disparities in access between regions/ populations, leading to barriers in accessing timely and quality cancer care services
	2	Fairness and equality in the delivery of healthcare services for lung cancer	3 = Commitment to fairness is evident through policies and initiatives that aim to ensure equal access to lung cancer control services, with proactive measures to eliminate disparities 2 = Efforts are made to address existing disparities, but there are still gaps in ensuring equal access to healthcare services for all population 1 = Significant disparities exist in resource distribution, particularly affecting marginalised communities, with limited efforts to address these disparities
	3	Number of radiologists	Per 10,000 population
	4	Number of radiation oncologist	Per 10,000 population
	5	Number of surgeons	Per 10,000 population
	6	Number of thoracic surgeons	Per 10,000 population
	7	Number of medical oncologist	Per 10,000 population
	8	Number of pathologist	Per 10,000 population
Availability and access to lung cancer screening programmes	9	Lung cancer screening programme scale and existence status	5 = A centrally organised, population-based screening programme is established and operational, covering the entire target population with standardised protocols and guidelines 4 = Organised, population-based screening programmes exist at sub-national levels (provincial/state/local), with comprehensive implementation and coordination, generally adhering to established protocols and guidelines 3 = National-level opportunistic screening programmes are in place, providing screening services to eligible (high-risk) individuals 2 = Opportunistic screening programmes are implemented at sub-national levels (provincial/state/local), offering screening services on a more limited scale, possibly with variations in protocols and accessibility 1 = Small-scale feasibility studies or pilot/demonstration projects are underway or planned at the national or sub-national levels to assess the viability and effectiveness of implementing population-based screening programmes for lung cancer
	10	Level of screening uptake	2 = screening uptake is >50% 1 = screening uptake is between 20-50%
Availability and Accessibility of Health System Infrastructure	11	Number of CT scanners	Per 10,000 population
	12	Number of PET scanners	Per 10,000 population
	13	Number of MRI scanner	Per 10,000 population
	14	Availability of/ access to diagnostic imaging modalities (i.e. CT, PET, CT-PET, MRI scan)	2 = mid-high level of access in the public sector 1 = low-mid level of access in the public sector
	15	Availability of/ access to Biopsy	2 = mid-high level of access in the public sector 1 = low-mid level of access in the public sector
	16	Availability of/ access to Serum biomarker testing lab facilities	2 = presence of well-equipped clinical laboratories equipped with advanced instrumentation capable of processing blood samples for serum biomarker testing 1 = existence of clinical laboratories with basic equipment for processing blood samples and conducting routine tests
	17	Availability of/ access to Serum biomarker/ tumour marker testing	2 = mid-high level of access in the public sector 1 = low-mid level of access in the public sector

Domain	Indicator		Scoring Criteria
Capacity and equity of distribution of workforce / trained healthcare specialists	18	Availability of/ access to Next generation sequencing facilities	2 = availability of fully equipped molecular diagnostic laboratories with advanced NGS platforms for genetic testing and molecular profiling for lung cancer diagnosis and personalised treatment 1 = existence of molecular diagnostic laboratories with basic NGS capabilities for genetic testing
	19	Availability of/ access to Molecular profiling facilities	2 = presence of state-of-the-art molecular profiling laboratories equipped with a wide range of advanced instrumentation (i.e. Digital Pathology and Digital PCR, Tissue Diagnostics IHC) for comprehensive genomic analysis and highly trained personnel 1 = presence of basic/ adequate molecular biology or genetics laboratories capable of conducting limited/ specific molecular profiling tests (i.e. PCR)
	20	Availability of/ access to Companion diagnostics	2 = mid-high level of access in the public sector 1 = low-mid level of access in the public sector
	21	Availability of/ access to Next generation sequencing/ comprehensive genomic profiling	2 = mid-high level of access in the public sector 1 = low-mid level of access in the public sector
	22	Availability of/ access to Genetic testing/ molecular profiling	2 = mid-high level of access in the public sector 1 = low-mid level of access in the public sector
	23	Number of thoracic surgeons	2 = mid-high level of access in the public sector 1 = low-mid level of access in the public sector
	24	Number of medical oncologist	2 = mid-high level of access in the public sector 1 = low-mid level of access in the public sector
	25	Number of pathologist	2 = mid-high level of access in the public sector 1 = low-mid level of access in the public sector
	26	Lung cancer screening programme scale and existence status	2 = mid-high level of access in the public sector 1 = low-mid level of access in the public sector
	27	Level of screening uptake	2 = mid-high level of access in the public sector 1 = low-mid level of access in the public sector
	28	Number of CT scanners	3 = Access to innovative/ biologic drugs (e.g. targeted therapy, immunotherapy etc) beyond the WHO list 2 = Access to drugs (e.g., chemotherapy) beyond the WHO list 1 = Access to drugs on the WHO list
	29	Number of PET scanners	3 = Obtaining access to lung cancer treatments takes less than 3 months from the global first launch. 2 = Obtaining access to lung cancer treatments takes between 3 to 6 months from the global first launch. 1 = Obtaining access to lung cancer treatments takes more than 6 months from the global first launch.