

REVIEW

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The 3E Framework Analysis of Indonesia's Cancer Control Strategy

Kevin Dyck*

Abstract

Objective: This paper is a 3E framework analysis of Indonesia's cancer control strategy, focusing on four indicators identified as needing attention in the World Cancer Preparedness Index, to determine whether implementation efforts are efficient, effective, and equitable. **Methods:** Examining each of the four selected indicators, we will analyze the cancer control strategy using a variety of primary sources, peer-reviewed articles, media sources, and in-country content. We will assess whether implementation efforts will be efficient, effective, and equitable with the help of a Likert scale scoring model and a resource-constrained weighted-average SWOT analysis. **Result:** In terms of policy suggestions, four goals suggested to help improve Indonesians' lives are the following: 1) Early Detection - Continuous improvement built into the implementation of the cancer control strategy regarding early detection, including a broad strategy for cancers not currently prioritized that is responsive to the various regions and ethnic groups. 2) Healthcare Workforce - A comprehensive review of workforce management is needed, including how to task shift and increase the use of lower levels of healthcare professionals to help reduce the routine healthcare needs away from doctors. 3) Health Infrastructure - An enhanced interministerial governance body would be necessary to help strengthen anti-corruption efforts and infrastructure in health care management and ensure appropriate evaluation, audit and quality control mechanisms are in place as healthcare facilities and workforces expand. 4) Tobacco Control - Prioritize advocacy and awareness of cancer health issues to help increase knowledge sharing and fundraising efforts, especially tobacco control. **Conclusion:** Implementation can only be as efficient, effective, and equitable as the resources available and leadership buy-in at the national and regional levels. Particularly with support from countries with expertise in the cancer community, in knowledge sharing, research, and advocacy.

Keywords: early detection- healthcare workforce- health infrastructure- tobacco control

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Introduction

Cancer has historically been a leading cause of death, resulting in both direct and indirect economic costs of over \$1 trillion globally [1]. Indonesia released their National Cancer Control Plan for 2024-2034 in 2024, a national strategy to fight cancer [2]. This paper analyzes Indonesia's national cancer control strategy using the 3E framework approach, reviewing the efficiency, effectiveness, & equity of the strategy to get a more complete picture of the policy's impact, moving beyond just cost to see if it works, if it's fair and serving the citizens it's meant to serve. It has been noted that Indonesia has a health care system in transition, and it's not just cancer that they are concerned about improving, but rather their entire primary health care system. One resource that provides a good overview and background on Indonesia's healthcare system is "The Republic of Indonesia Health System Review," published in 2017. However, by 2025, much has changed, given the country's rapid development [3]. This paper will analyze

Indonesia's cancer control strategy using an evidence-based approach against indicators identified as needing attention in the 2020 World Cancer Preparedness Index to assess whether implementation efforts are efficient, effective, and equitable. It addresses the research question of which goals will improve the implementation of the national cancer control strategy, specifically in the four key areas of weakness identified in the 2020 World Cancer Preparedness Index.

Materials and Methods

Overall, the research methodology is both qualitative and quantitative. It was determined that for this study, the relevant comparative countries, in addition to Indonesia, would be Malaysia and the Philippines, given their proximity and regional connection. Malaysia shares a border with Indonesia and is a fellow key member of ASEAN. The Philippines is also a fellow key member in ASEAN and handles regional referrals for cancer

care. The analysis uses the World Cancer Preparedness Index, developed by three pharmaceutical companies Novartis, Pfizer, and Roche and supported by the Economist Intelligence Unit. The study measured the cancer preparedness of 28 countries using 45 indicators [1]. This was done in March 2019. The same study was redone in January 2020, focusing specifically on countries in the Asia-Pacific region. Refer to Figure 1 for Indonesia's specific results from the January 2020 study [4]. In terms of the four critical indicators identified as needing attention, they were noted as follows: 1) increasing early detection screening, 2) increasing service availability and cancer care workforce, 3) infrastructure, and 4) implementing tobacco control. Refer to Table 1 for a regional comparison of the four critical indicators. Examining each of the four selected indicators, we'll analyze the new cancer control strategy using a variety of primary sources, peer-reviewed articles, media sources and in-country content and assess whether implementation efforts will be efficient, effective, and equitable. Efficient, meaning the optimal use of financial, human and system resources. Effective, meaning the ability to detect cancer early and reduce mortality. And, equity, meaning fair access across geographic, socioeconomic and gender groups. There are different weighting systems one could use when looking at the equation of efficient + effective + equitable, or (Ex + Ey + Ez). The common ones are the equal-weight model (33.3%, 33.3% & 33.3%), the health equity-focused model (30%, 30% & 40%), and the resource-constrained model (40%, 40% & 20%). This paper uses a resource-constrained model because of the limited budget for cancer-related care within the overall health budget in Indonesia. The scoring method for each of the four SWOT categories is a Likert scale of 0 = exceptionally poor, 1 = very poor, 2 = poor, 3 = fair, 4 = good & 5 = very good, totalling across the four categories to 20. A weighted SWOT analysis is then conducted to guide scoring for the resource-constrained model. This is the 3E framework policy analysis used in this paper. Two other approaches have been considered: both the 3 I + E framework (institutions, interests, ideas and external factors) and the IAEA's self-assessment. It was determined that the 3E framework approach would be the most suitable given the focus on a more complete picture of the policy's impact, moving beyond just cost to see if it works and if it's fair, rather than explaining the politics and processes behind the health policy. The IAEA's self-assessment is designed to help countries assess and strengthen their strategies and was already used in developing the strategy [5]. Refer to Appendix 1 for a glossary of local terms and acronyms.

Results

Prevention & Early Detection Screening Discussion

The strategy notes explicitly in its objectives that it wants to prioritize the five priority cancers in its early screening efforts. Their five priority cancers are breast, cervical, colorectal, lung and childhood cancer. Key statistics by gender on cancer types in the country are as

follows [6]. The top 5 cancers for males make up over 51.5% of the cancers in men; lung cancer is the highest at 15.4%, followed by colorectal cancer at 11.6%. The top 5 cancers affecting females account for over 64.4% of all cancers. Breast cancer is the most common identified cancer at 30.1%, followed by cervix uteri at 16.8%. Some progress was made in 2023 with the release of the National Cervical Cancer Elimination Plan for Indonesia (2023-2030), which is now being implemented [7]. When reviewing risk stratification one recent study using cancer epidemiological data from 2008 to 2012 based on Hospital-Based Cancer Registry (HBCR) data from Cipto Mangunkusumo Hospital in Indonesia found that in 18,216 cancer cases a total of 12,438 patients were older than 39 years of age (68.3%), with a female-to-male ratio of 9:5, and most patients have cancers at advanced stages (stages III and IV) [8]. Another key point on prevention is: what is the country's budget for health and cancer care? While Indonesia doesn't have a mandatory fixed percentage of the budget allocated to health, it historically spends around 1.45% of GDP on government health spending, according to 2023 World Bank statistics, which is well below the WHO's informal threshold of 5% of GDP [9].

Analysis

	Strengths	Weaknesses	Opportunities	Threats	Total Score
Efficiency	Strong cervical cancer screening programs and ongoing HPV vaccination scale-up.	Significant urban-rural disparities in access to screening and referral services [10]	Expand international collaborations led by major hospitals and academic institutions.	Inefficiencies and bottlenecks in referral pathways.	0.40
Score	2	2	2	1	7
Effectiveness	Community-based outreach through Posyandu supports early contact with families [11]	Approximately 70% of cancers are detected at advanced stages [12]	Deploy mobile screening units to reach underserved and remote populations.	Many patients disengage from care until the disease has significantly progressed.	0.40
Score	2	0	2	0	4
Equity	The nationwide free health screening initiative (Pemeriksaan Kesehatan Gratis - PKG) demonstrates a strong government commitment [13]	Poorer populations experience longer hospital stays and higher mortality [14]	A national digital screening registry to improve access, tracking, and continuity of care. Ongoing PKG evaluation offers scope for adaptive policy refinement [13]	Persistently low awareness in DTPK regions. [10] Socioeconomic disparities within the national insurance system risk widening inequities [14]	0.20
Score	2	1	3	1	7
Total Score					5.8/20 =29%

Table 1. Index of Cancer Preparedness 2020. Comparison of Select Indicators and Scores for Indonesia, Malaysia, & Philippines [4]

Indicator	Indonesia (2020)	Malaysia (2020)	Philippines (2020)
Overall Rating	57.4	80.3	42.6
Early Detection	40.0	100.0	30.0
Workforce	19.0	54.2	31.7
Infrastructure	0.0	22.7	4.5
Tobacco Control	40.0	70.0	80.0

The Index of Cancer Preparedness 2020: Asia-Pacific Extension was used for Indonesia, Malaysia, and the Philippines.

Index of Cancer Preparedness 2020: Asia-Pacific Extension

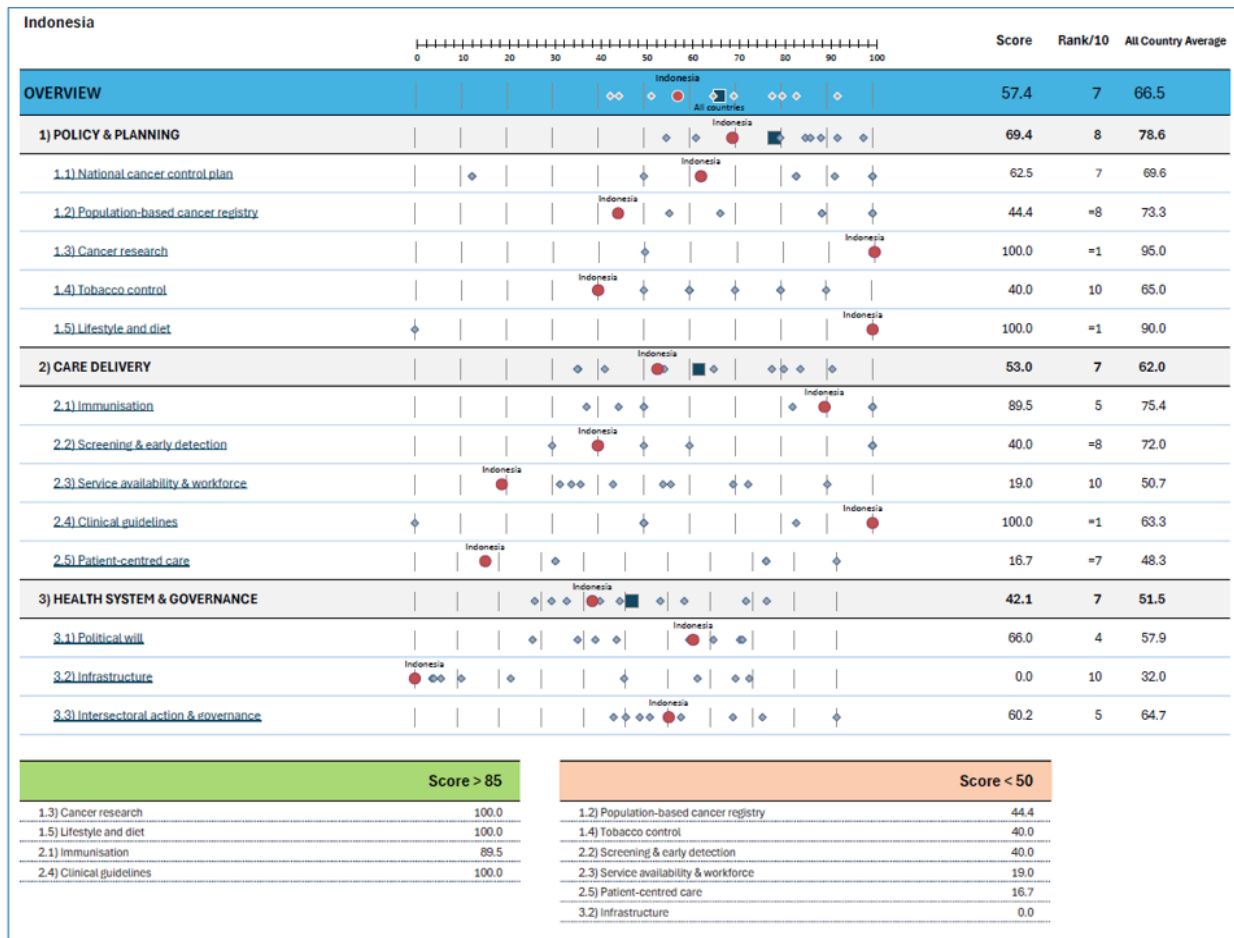


Figure 1. Index of Cancer Preparedness 2020: Indonesia Score [4]

Policy Suggestion

The concept of continuous improvement needs to be built into the implementation of the cancer control strategy regarding early detection. The strategy should also be responsive to the unique needs and leverage the cultural diversity of the various regions and ethnic groups, rather than a one-size-fits-all approach for the whole country. The strategic use of the annual preventive health screening program needs to be reviewed and continuously improved to ensure it's useful and that linkages to referral facilities are actually feasible and not out of the patient's financial or travel reach.

Healthcare Workforce

Discussion

The country's healthcare workforce faces challenges as the healthcare system expands. In Indonesia, nurses are often perceived as assistants to doctors rather than as respected professionals, unlike in many other countries. A study using a sample of employees from a private university in urban Tangerang City (Greater Jakarta area) found that public education campaigns are needed to improve nurses' professional image in Indonesia [15]. However, other countries, such as Japan, Kuwait, Saudi Arabia, and Taiwan, have long turned to Indonesia to help address global nursing workforce gaps in the healthcare

industry and have found it a reliable source of healthcare workers [16]. This represents a paradox of a surplus and a shortage of nurses that requires robust local policies to ensure Indonesia has sufficient supply in its home country [17]. In a recent study conducted by the Global Fund and the Bill & Melinda Gates Foundation, Indonesia's health workforce density was about 2.47 health workers per 1,000 people, below the WHO threshold of 2.5 per 1,000 and the MOH of Indonesia's target of 3.0 per 1,000 [18]. The MOH also has a minimum staffing requirement for puskesmas of 1 physician, 5 nurses, and 4 midwives per regular puskesmas, and not a single province had at least 1 physician per 1,000 population [18]. One policy option is to examine further the relative/absolute distributions of nurses, doctors, and specialist doctors, and to propose a strategy for task-shifting several bottlenecked key procedures [19]. The idea is to task-shift from doctors to nurses. This strategy has been demonstrated in other LMICs to be an effective interim strategy when carefully planned and implemented. It is not a permanent solution, and without actual effort to scale up health professional education, the workforce deficit will persist.

Analysis

	Strengths	Weaknesses	Opportunities	Threats	Total Score
Efficiency	Emerging use of tele-oncology and tele-mentoring to extend specialist expertise.	Limited implementation of task-shifting and telemedicine across many provinces.	Strengthen Oncology Nurses Association to formalize nursing pathways and expand nurse-led models of care.	Physician density remains low (approximately 7 per 10,000) due to urban bias in workforce distribution [20]	0.40
Score	2	1	2	1	6
Effectiveness	Large national nursing workforce capable of supporting expanded service delivery.	Training pipelines and continuing professional development (CPD) systems remain fragmented.	Strengthen workforce capacity at 'puskesmas' to enhance diagnostic literacy, patient education, and early referral.	Inconsistent training quality and specialist gaps limit the effectiveness of diagnostics and treatment.	0.40
Score	2	2	2	1	7
Equity	The new Samur Special Economic Zone in Bali, Indonesia, aims to create a premier medical tourism destination. [21]	Regional groups and smaller ethnicities continue to hold Jamu practitioners in high regard [22] Statistics from the 2023 Indonesian Health Survey indicate that 34% of the urban and 29% of the rural use traditional medicine [23]	Tie funding and incentives to placements in DTPK regions to strengthen rural workforce distribution.	Significant rural-urban disparities in specialist density and retention challenges in DTPK areas. Indonesians' seek treatment abroad, due to lack of trust in the healthcare system and lower costs [24]	0.20
Score	2	2	2	2	8
Total Score					6.8/20 =34%

Policy Suggestion

A comprehensive review of workforce management is needed to enable more alternative service delivery models, increase the use of allied health care professionals, including suitable task shifts, and reduce routine healthcare needs away from doctors. Mobile health clinics and the use of digital health technologies for more telehealth for remote health care would also be encouraged.

Healthcare Infrastructure Discussion

The Asian Development Bank is involved in the country and recently approved a \$650 million investment loan to upgrade and enhance primary health facilities and public health laboratories nationwide. This initiative aims to improve the prevention, detection, and treatment of communicable and noncommunicable diseases, as well as other health conditions [25]. This is part of a larger \$4 billion project co-financed by three other multilateral banks: the Asian Infrastructure Investment Bank, the Islamic Development Bank, and the World Bank. It is called the PLUS project, Primary Healthcare and Public Health Laboratories Upgrading and Strengthening (PLUS). It is intended to fully equip more than 10,000 primary healthcare facilities and over 500 public health laboratories nationwide to meet the government-stipulated minimum service standards [25]. This seems promising; however, completion isn't scheduled for about 5 years, and it appears to be a very ambitious project given the size of the implementation targets. The redesign of referral hubs and patient flows as facilities come online must be carefully managed. This is essentially macro-level triage, which must be continually considered as new facilities are built. This currently describes Cipto Mangunkusumo General Hospital, which serves as a national referral center and residency training center in collaboration

with Universitas Indonesia. The new strategy involves appointing Dharmas National Cancer Center to fulfil multiple roles: as a national centre of excellence providing advanced clinical care; as the coordinator of the national cancer network; and as an implementation focal point for several projects, including cancer registry, patient navigation, and planning of new cancer facilities. Learning from India's National Cancer Grid, multiple centers of excellence from various sectors should be invited to lead key initiatives. This should help ensure effective cross-sectoral collaborations, with clear accountability and transparency. In this arrangement, the coordinating central hub will play a more convening role, ensuring overall strategic alignment with the national cancer control strategy and plan. Regional institutions should be properly engaged in this network to enable strategies that deliver efficient, effective, and equitable nationwide care, avoiding Jakarta- or elite-centric outcomes.

Analysis

	Strengths	Weaknesses	Opportunities	Threats	Total Score
Efficiency	Expansion of the Dharmas National Cancer Center to improve referral capacity, particularly for women and children [26]	Pathology delays and high capital expenditures are persistent challenges.	Better utilize the 'puskesmas' (community health centers, several in outlying areas. [27]	Maintenance constraints may limit the sustainability of new facilities.	0.40
Score	2	2	2	2	8
Effectiveness	BPJS health insurance coverage has expanded access to care.	Limited availability of pathology and imaging services at the district level hampers diagnostic capabilities.	Strengthening links with the SEACan Grid will promote regional collaboration for complex cases [28]	High capital costs associated with developing and maintaining specialized infrastructure.	0.40
Score	3	2	2	2	9
Equity	International funding support for new healthcare facilities.	Imaging and radiotherapy services are concentrated in Java.	Development of regional oncology hubs could improve access to specialized care outside major urban centers.	Disparities between urban and rural areas, particularly in remote regions.	0.20
Score	2	2	2	1	7
Total Score					8.2/20 =41%

Policy Suggestion

Regarding health system & governance, an enhanced governance body would be necessary to help strengthen anti-corruption in health care management and ensure appropriate evaluation, audit and quality control mechanisms as health care facilities and workforces expand. Strengthening ties with India's National Cancer Grid (NCG) and the WHO's SEACanGrid is also crucial for improving cancer care through shared knowledge, standardized treatment, and coordinated patient referrals. These initiatives allow for collaboration on resource-adapted guidelines, research, capacity building, and potentially even pooled procurement of essential drugs to enhance accessibility and affordability across member institutions.

Tobacco Control Discussion

Indonesia has one of the highest smoking rates

globally, and it is specifically among men, given the strong presence of the tobacco company and its influence nationwide. There is a recording of a televised public debate involving the Ministry of Health, the Parliament Representative, the Indonesian Medical Association, an Economist, and Lawyer [29]. As context, this is a follow-up to a previous debate in which the Indonesian Medical Association was effectively rendered speechless in a very unintelligent and unstructured “debate”. It is also observed that the parliament side places more emphasis on the immediate budgetary impact rather than the more abstract well-being of citizens, repeatedly using the term “The desires of the Ministry of Health” versus “the welfare of the population” [30]. Tobacco control, however, lacks buy-in from the elites due to its commercial value, the assistance these companies provide to the Ministry of Social Welfare, and the approximately 200 trillion IDR contribution to the national budget through tax and excise. The Ministry of Health and the health community’s initiatives have been viewed as “selfish” and cannot be included in the president’s agenda to address these issues [30]. It is well known that Indonesia has neither ratified the WHO Framework Convention on Tobacco Control nor the WHO Illicit Trade Protocol. It is currently the only country in the Asia Pacific that has not ratified it. Smoking and the Kretek is a part of the identity of Indonesian men who smoke. Kretek are clove cigarettes and are considered the cigarettes of Indonesia. According to Professor Dr. Norrwati Sutandyo PHD, Dharmas National Cancer Center, Jakarta, Indonesia; « Most people with lung cancer in Indonesia are misdiagnosed with lung infections or other respiratory diseases [31]. » Of those that are diagnosed 70-80% are diagnosed in the late stages of the disease. Although oncology centers exist, there are only 3 national referral hospitals for lung cancer and they are all in Jakarta, other large hospitals offering comprehensive services are typically located in major cities [31].

Analysis

	Strengths	Weaknesses	Opportunities	Threats	Total Score
Efficiency	Smoke-free zones have been introduced in urban areas, as per Joint Directives (MoH / Monia) No. 188/MENKES/PB.1/2011, 441 districts have implemented these zones, with a target of 514 districts by 2027 [32]	Low tax rates and insufficient enforcement hinder the overall impact of tobacco control efforts.	Smoking cessation programs present a significant opportunity to reduce tobacco use across various demographics.	Tobacco industry lobbying poses a substantial challenge to implementing stricter controls.	0.40
Score	2	2	1	0	5
Effectiveness	Restrictions on tobacco advertising, including limiting ads to late-night hours, curbing radio ad duration to one minute, and banning online social media advertising, aim to reduce exposure [33]	Current measures, such as age and sales restrictions, are piecemeal and lack the comprehensive scope needed to fully address the problem.	There is potential to implement a complete ban on tobacco advertising, promote plain packaging, and increase tobacco taxes and prices to reduce consumption [33]	The normalization of smoking within cultural contexts remains a barrier to effective control.	0.40
Score	2	2	2	1	7
Equity	Youth-focused prevention initiatives are in place to combat rising smoking rates among younger populations.	High smoking prevalence, particularly among men, undermines efforts to achieve equitable public health outcomes.	There is potential to leverage cancer advocacy campaigns, such as the Terry Fox Movement introduced in Jakarta in 2019, to further the cause of tobacco control.	Tobacco use disproportionately impacts lower-income communities, exacerbating health disparities.	0.20
Score	2	1	2	1	6
Total Score					6.0/20 =30%

Policy Suggestion

Prioritizing advocacy and awareness of cancer health issues will help increase education, knowledge sharing, and fundraising efforts, especially for tobacco control. This could be developed with culturally appropriate heroes from the country. A champion for the cause, and one that the people of Indonesia will rally around to help the community increase efforts to improve cancer care and fundraise for research specific to cancer care efforts and infrastructure in Indonesia.

In conclusion, this has been a brief, strategic 3E framework analysis of the four areas examined in this paper. It has been shown that little progress has been made on each of the four indicators over the last 5 years. This analysis has been further corroborated by the International Cancer Control Partnerships’ comparative analysis on the topic from 2025; although the same indicators were not used, it still shows that much work is needed on indicators similar to those noted. Refer to Table 2 for a quick summary [34]. Developed countries have found that advancements in cancer care and treatment require expensive equipment, a skilled workforce, and research. Countries like Indonesia should look at low-cost, high-impact goals & strategies that can significantly improve the population’s health more than the promoted high-cost, low-impact ones. They are simple yet ambitious goals that, if achieved, will improve life for all and future generations. This strategic 3E framework analysis has identified a few policy suggestions throughout the paper that could serve as goals for Indonesia to integrate and implement. Leveraging connections and bilateral relations from countries with expertise in the cancer community, in knowledge sharing, research, advocacy, and building on existing arrangements. However, implementation of the cancer control strategy can only be as efficient,

Table 2. International Cancer Control Partnership: 2025. Comparison of Select Indicators and Scores for Indonesia, Malaysia, & Philippines [34]

Indicator	Indonesia	Malaysia	Philippines
Introduction & Overview	22.2	63.9	30.6
Data	25.0	64.3	21.4
Prevention	36.8	28.9	21.1
Early detection, diagnosis and screening	27.8	79.2	33.3
Treatment	14.3	47.6	14.3
Palliative and supportive care	33.3	88.9	44.4
Service delivery	60.0	70.0	20.0
Health workforce	0.0	46.7	13.3
Research	0.0	75.0	25.0
Finance	0.0	25.0	0.0
Health equity and special populations	5.6	30.0	5.0
Emergency preparedness	0.0	50.0	0.0
Governance and implementation	46.7	33.3	6.7
Total	27.7	51.4	20.4

effective, and equitable as the resources available and the buy-in from leadership at both national and regional levels. Continued buy-in by those in leadership, both at the national and regional levels, for the strategy is necessary to improve the quality of life of those affected by cancer and to reduce the mortality rates in the country due to cancer.

Author Contribution Statement

Conception or design of the work, Data collection, Data analysis and interpretation, Drafting of the article, Critical revision of the article, Approval of final paper: K.D.

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General

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Ethical Declaration

The author notes that no ethical considerations are required in conducting the research for this article.

Data Availability

The “EIU-Cancer-Preparedness-Index-Asia-Pacific” dated January 2020, both from The Economist Intelligence Unit, was public information at the time of writing the paper and available on their website.

Conflict of Interest

The author declares that there are no conflicts of interest.

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