

Cancer disparities in Southeast Asia: intersectionality and a call to action



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Introduction

Southeast Asia has a population of over 680 million people—approximately half the population of India and twice the population of the United States—and is a region marked by rich and complex histories and cultures, dynamic growth, and unique and evolving health challenges.¹ Despite the momentum of economic development, health inequalities persist. These inequities have been aggravated since the COVID-19 pandemic, which pushed millions further into poverty, possibly exacerbating health disparities, especially among populations who suffer vulnerabilities.² Particularly salient are the challenges associated with providing adequate care for people with cancer, a leading cause of morbidity and

mortality in the region.^{1,2} Cancer incidence and mortality in the region are projected to rise in the coming decades, given population growth and rapidly changing socioeconomic and geopolitical factors, as well as a host of interrelated and dynamic environmental, behavioral, and occupational risk factors.^{1–3}

Large epidemiologic studies have demonstrated differences among Southeast Asian countries in terms of cancer incidence and mortality.³ Epidemiologic patterns can be attributed to variations in complex risk factors, access to screening and cancer care, and likely genetic predisposition.^{1–3} However, these differences also underscore that within each country exist richly diverse populations that experience disparities in cancer risk, screening, care access, outcomes, and survivorship in ways that require further examination. We draw attention to disparities in cancer in Southeast Asian countries. We highlight the need to study cancer disparities affecting minoritised groups in Southeast Asia—not only along lines of race/ethnicity, but also people minoritised along lines

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of sex/gender, socioeconomic status, religion, geography, and others.

We highlight the intersectionality of elements of an individual's identity. Intersectionality, developed by critical race theorist Professor Kimberlé Crenshaw in 1989, is an analytic framework borne out of Black American feminist scholarship, that examines how a person's sociopolitical identities lead to disparate balances of privilege and discrimination.⁴ An intersectional approach would demonstrate that an individual or a community does not only experience economic poverty as the sole barrier to improved health; such an approach would examine how other identities such as religion or immigration status affect access to care. These different social determinants of health are not mutually exclusive; their interrelationships are complex, with consequences for health.⁵ We leverage the intersectional approach, which parallels the inherently syncretic cultures and histories of Southeast Asian nations, and explore how these identities impact access to cancer care. Meaningful cancer research focusing on peoples of Southeast Asia could present many opportunities for intervention and improvement.

Intersecting disparities

Geographic and socioeconomic disparities

The geography of many countries in Southeast Asia remains heterogeneous, posing significant barriers to the delivery of surgery, radiation, and systemic therapy. From the Philippine and Indonesian archipelagos to the hilly and mountainous Laos PDR and Vietnam, health-care resources, cancer treatment centers, and cancer registry data are often concentrated in large, urbanized cities, with far less access in remote and/or rural areas.⁶ In 2017, the 146 cities among 81 provinces of the Philippines shared only 40 linear accelerators, 22 of which were found in metropolitan Manila, with the rest in a small number of major cities.⁷ Furthermore, the only established population-based cancer registries that serve the Philippines also only cover a small number of areas, leaving gaps of knowledge concerning other smaller cities, provinces, and regions in the country.

In Lao PDR, cancer treatment is limited to the extent that many patients travel to neighboring Thailand for care; among these patients, half may present with metastatic disease.⁸ In Malaysia in 2017, there were only 117 oncologists for a population of 32 million; Sarawak, the largest state in Malaysia by geographical size, had only six oncologists for a population of 2.5 million.⁹ In much of Southeast Asia, many provinces still lack facilities for radiotherapy, with few patients from these areas able to meet the costs of treatment in major cities.^{1,7}

This pattern reflects the broader tendency of already scarce health services to gravitate toward urban and affluent areas in mixed public-private health systems, as

are prevalent in Southeast Asia.^{1,6,7} Additionally, for many populations in the region, inadequate Internet connectivity and low availability of mobile healthcare delivery services hamper efforts to deliver quality services to the population in rural and remote areas. Many patients who need to traverse bodies of water or mountain ranges to access cancer care are unlikely to access adequate cancer care, if at all.

Minority racial and ethnic groups

Worse health outcomes have historically been observed among many minority racial and ethnic groups and indigenous peoples within Southeast Asia. The life expectancies of people from groups such as the *Moro* in the Philippines' Autonomous Region of Muslim Mindanao, the *Orang Asli* in Malaysia, and the *Rohingya* in Myanmar are significantly lower than those of the majority groups. In Malaysia, the *Orang Asli*, considered one of the country's Aboriginal groups, experience life expectancies almost 20 years shorter than the majority ethnic groups, due to a complex mix of poverty and lack of access to care.¹⁰ The *Rohingya* people of Myanmar similarly face severely limited access to healthcare, and primarily receive healthcare from humanitarian agencies—efforts that are drastically limited by political pressure.¹¹ A study from Singapore and Malaysia examined cancer outcomes amongst over 5000 patients diagnosed with breast cancer. Compared with people of Chinese ethnicity, individuals with Malay ethnicity were found to have increased risk of all-cause mortality.¹²

Indeed, many members of these minoritised groups live in geographic regions with limited access to healthcare, underscoring the intersection of geography and race/ethnicity. Although much more needs to be learned about cancer disparities for many minority ethnic groups, we can infer that these populations also suffer from poor cancer care access.

Sex and gender minorities

Although relatively little is known about cancer disparities among people minoritised on lines of sex and gender in Southeast Asia, evidence from other aspects of healthcare suggests that these groups exhibit diverse epidemiology of disease and often experience poor access to healthcare.¹³ Sexual minorities in Southeast Asia often face societal stigma: homosexuality is currently criminalized in countries (or regions of countries) such as Indonesia and Malaysia. In Thailand, individuals who identify as *Kathoey* (transgender), often experience poor access to medical care because of the stigma associated with their gender identity.¹⁴ These groups are at high risk for oncogenic sexually-transmitted infections (i.e. HPV, hepatitis B, hepatitis C).¹⁵ One study of men who have sex with men and transgender women in Indonesia, Thailand, and Malaysia found that over half (and over three quarters of those with comorbid HIV) tested positive for anal high-risk HPV, putting them at

risk for related cancers.¹⁵ Scant data also suggest high rates of HIV and other oncogenic infections in transgender women, although exclusion of transgender populations in research remains prevalent.^{13,15} Due to epidemiologic variations, differential access to screening and treatment, and both covert and overt discrimination, sexual and gender minority groups in the region suffer disparities in cancer care. Further work must explore cancer care delivery for sex and gender minorities in Southeast Asia, and importantly, must develop strategies to mitigate these disparities.

Disparities across religious lines

Different religious groups—recognizing that religion, culture, ethnicity, and geography are often deeply intertwined—also often experience cancer disparities. For example, Muslim Thai women with breast cancer were found to have lower survival than their Buddhist Thai counterparts.¹⁶ In addition to socioeconomic barriers to care, factors such as differential awareness of screening methods, fatalistic beliefs, and health literacy influence access.¹⁶ Healthcare disparities associated with religion may also be partly mediated by preferences among some groups for faith healers (e.g., the Philippine *albularyo* or the Cambodian *kru boramei*) over modern cancer therapy and its side effects.¹⁷ A study in Myanmar found that patients are often open to the receipt of palliative care if conducted in conjunction with their appropriate spiritual and religious traditions.¹⁸ Possibly linked with the role of traditional belief systems in medicine is the use of complementary and alternative medicine in the region.¹⁷ Although decisions to pursue complementary and alternative medicine for cancer may stem from cultural and religious preferences, inequitable access to care, disparate health literacy, and devastating costs of care may all similarly contribute, leading to delayed diagnosis and up-staging of tumors.¹⁷ Work is needed to understand how religious and cultural belief systems can be leveraged to improve access to cancer care.

Differences in immigration histories

Different racial groups and immigrant communities in wealthier Asian economies such as those of Malaysia, Singapore, and Hong Kong also face cancer care inequities. For instance, South Asian minority ethnic groups in Hong Kong have been shown to have lower rates of cancer screening; underlying reasons likely include systemic barriers to access, health literacy, and perceptions of preventive healthcare.¹⁹ Older immigrant communities in Malaysia also demonstrate cancer disparities: their epidemiologic studies demonstrated that Chinese, Malay, or Indian ethnicity is independently associated with rates of prostate cancer.²⁰ In Singapore, the Malay community was shown to have a lower likelihood of cancer screening compared to the ethnic Chinese population in the country. Moreover, studies

have also recognized that the city-state's migrant workers, who comprise one fifth of the population, experience barriers to accessing general healthcare which in turn hinders access to cancer care.²¹

An amalgam of sociological and possibly biological factors likely underlies these disparities, highlighting that cancer disparities exist among people in the same country with different ancestral and sociocultural backgrounds.

System-wide variables

These disparities are compounded by the largely out-of-pocket payment systems that account for the majority of healthcare expenditure in Southeast Asia, further disadvantaging already minoritized groups.²² Despite government efforts to redistribute healthcare access and financing to those in need, inequity remains rife when such programs are inaccessible to the most marginalized communities. A review of Philippine health sector performance found that affluent patients are better able to avail of social health insurance than poorer patients.²³ Similarly, in Malaysia, despite increased healthcare expenditure of RM23.3 billion in 2015 to RM29 billion in 2020 by the Ministry of Health, public healthcare facilities and services in urban areas are still inadequate to meet the health needs of the population, particularly for low-income households.⁹ And even in Vietnam where 80% of cancer services are covered by health insurance, high costs of treatment still pushed a third of households into poverty.²⁴

Scarce healthcare resources further lower accessibility, which may drive up demand and subsequently, out-of-pocket costs. Although there is nearly universal access to radiotherapy for patients in Brunei and Singapore, estimates of radiotherapy availability suggest that less than half the required radiation fractions are available in Cambodia, Indonesia, Laos, Myanmar, Philippines, Timor-Leste, and Vietnam.²⁵ In the Philippines, an additional 15 linear accelerators are needed in metropolitan Manila alone, and more than 150 nationally, just to meet the demand for radiotherapy.⁷ The experience of these disparities in access to cancer care are likely magnified among people who belong to multiple disadvantaged groups.

Evidence that supports the persistence of cancer disparities within Southeast Asian nations, particularly those affecting minoritised groups, underscore our call to action.

Call to action

First, it is important to recognize and study diversity within these countries. Disparities are intersectional, crossing lines not only of race/ethnicity, religion, sex and gender identity, but also of geography, language, and ancestry. Within Southeast Asian nations, socio-demographic factors and genetic ancestry interact in

complex ways to produce disparities, much in the way that cancer disparities are complex in etiology in other parts of the world.²⁶ Recognizing and uplifting voices of these diverse groups in research, clinical practice, and health policy are critical.

Second, given the general lack of data on cancer disparities in Southeast Asia, work is needed to study these disparities further. Research dedicated to the study of cancer outcomes among marginalized and minoritized groups may reveal nuances underlying the unique challenges of delivering cancer care in Southeast Asia and importantly, how best to address them. Studies examining cancer disparities in neighboring Asian countries have begun to elucidate risk factors that may be amenable to public health interventions.^{12,13,20,22} What we glean from the mechanisms underlying these disparities, in conversation with discoveries from other countries, may point towards ways to improve cancer equity globally. Importantly, health services and disparities research must promote the voices of those who know and work in the local setting.¹ Moreover, sampling for research within and among these countries would benefit greatly from nationally representative datasets and more granular data. Strong regional collaborations are needed to improve cancer surveillance, to share best practices, and to further our understanding of how to mitigate complex cancer disparities.

Lastly, these findings must be translated into action. Partnership with medicine, academia, community leaders, religious leaders, the private sector, and policymakers should prioritize the mitigation of cancer disparities, throughout the continuum of cancer care. Efforts are needed to increase awareness about modifiable risk factors (e.g., alcohol and tobacco use), to encourage screening, and to facilitate access to timely and high-quality care, while decreasing the risk of financial toxicity. Comprehensive cancer centers and academic medical centers in the region should expand focus to disadvantaged populations.²⁷ Efforts are needed to strengthen primary care and local health systems; in the Philippines, for example, strengthening *barangay* health centers, the first point of contact between patients and healthcare, may improve access to early detection. Equitable care should go beyond the clinic, and should consider culture, sexual/gender identity, religion, socioeconomic status, geography, which contribute in myriad ways to persistent inequities. It is through a lens cognizant of the intersectionality of the cancer disparities experienced by patients that these disparities might be mitigated.

The work has begun. As of July 2023, Singapore has required employers to provide medical insurance for migrant workers, a landmark move that emerged from extensive cross-sectoral efforts to promote health equity. This step is evidence not just of the importance of promoting health access for individual minoritized based on migration status, but also evidence for the

value of work involving migrant worker advocacy organizations, non-governmental organizations, and policymakers, to effect concrete policy change. In the Philippines, the National Integrated Cancer Control Act of 2019 explicitly provides for the creation of comprehensive cancer centers throughout the country as public-private partnerships, implicitly seeking cross-subsidy across socioeconomic strata and risk transfer across sectors to effect redistribution of access to specialist care.²⁸ Myanmar elected to participate in the City Cancer Challenge, a global initiative aimed to strengthen cancer care in low-to middle income countries through locally developed solutions. This process engages and supports leaders of the city of Yangon to lead and develop their own unique city-wide changes to meet the needs of cancer patients, families and caregivers, and healthcare providers.²⁹

In Malaysia, interventions such as the Beat Prostate Cancer campaign were initiated to educate the public about prostate cancer screening through mass media and social media; to empower general practitioners to support early detection of prostate cancer; and to provide prostate-specific antigen testing to community members, especially to the underprivileged, in partnership with various community organizations. In Thailand, the Ministry of Public Health together with the National Health Security Office initiated the “Cancer Anywhere” project to effectively ensure cancer patients access to multimodality cancer treatments, focusing on individuals with limited access due to geography or rural status. This project allows patients with cancer under the Universal Coverage Scheme to request treatment at any public hospital regardless of their registry hospitals—an innovation completing the Thai National Cancer Control Program, which aims to set policies acting on the need for cancer care around the country.³⁰

While significant strides have been made, there is still a long way to go. Cancer affects all social strata, such that research studying inequities in cancer care—and their potential solutions—is broadly applicable to healthcare system strengthening. Beyond merely identifying gaps in access, the work must spotlight and learn from best practices among Southeast Asian nations, and encourage regional collaboration and exchange. These insights not only have the potential to advance cancer care but also contribute to fostering health equity in the region and on a global scale.

Contributors

EJF and ECD wrote the original draft. All authors contributed to literature search, supervision, writing review, and writing editing.

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References

- 1 Chongsuvivatwong V, Phua KH, Yap MT, et al. Health and health-care systems in southeast Asia: diversity and transitions. *Lancet*. 2011;377(9763):429–437. [https://doi.org/10.1016/S0140-6736\(10\)61507-3](https://doi.org/10.1016/S0140-6736(10)61507-3).
- 2 Alberto NRI, Alberto IRI, Puyat CVM, et al. Disparities in access to cancer diagnostics in ASEAN member countries. *Lancet Reg Health West Pac*. 2023;32:100667. <https://doi.org/10.1016/j.lanwpc.2022.100667>.
- 3 Sung H, Ferlay J, Siegel RL, et al. Global cancer statistics 2020: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA A Cancer J Clin*. 2021;71(3):209–249. <https://doi.org/10.3322/caac.21660>.
- 4 Crenshaw K. Demarginalizing the Intersection of Race and Sex: A Black Feminist Critique of Antidiscrimination Doctrine, Feminist Theory and Antiracist Politics. University of Chicago Legal Forum: Vol. 1989: Iss. 1, Article 8. <http://chicagounbound.uchicago.edu/uclf/vol1989/iss1/8>.
- 5 Kapilashrami A, Hankivsky O. Intersectionality and why it matters to global health. *Lancet*. 2018;391(10140):2589–2591. [https://doi.org/10.1016/S0140-6736\(18\)31431-4](https://doi.org/10.1016/S0140-6736(18)31431-4).
- 6 Eala MAB, Maslog EAS, Dee EC, et al. Geographic distribution of cancer care providers in the Philippines. *JCO Glob Oncol*. 2022;8:e2200138.
- 7 Calaguas MJC, Gubat JA. South East Asia, differing socioeconomic factors, differing access to radiotherapy: the Philippines, a Microcosm. *Semin Radiat Oncol*. 2017;27(2):176–183. <https://doi.org/10.1016/j.semradonc.2016.11.010>.
- 8 Chaleunvong K, Kamsa-Ard S, Suwanrungruang K, et al. Retrospective appraisal of cancer patients from Vientiane Capital City, Lao people's Democratic Republic (PDR), seeking treatment in Thailand. *Asian Pac J Cancer Prev*. 2013;14(9):5435–5440. <https://doi.org/10.7314/apjcp.2013.14.9.5435>.
- 9 Azizah A, Hashimah B, Nirmal K, et al. Malaysia national cancer registry report (MNCR) 2012-2016. 2019. [https://www.moh.gov.my/moh/resources/Penerbitan/Laporan/Umum/2012-2016%20\(MNCR\)/MNCR_2012-2016_FINAL_\(PUBLISHED_2019\).pdf](https://www.moh.gov.my/moh/resources/Penerbitan/Laporan/Umum/2012-2016%20(MNCR)/MNCR_2012-2016_FINAL_(PUBLISHED_2019).pdf)
- 10 Tuan Abdul Aziz TA, Teh LK, Md Idris MH, et al. Increased risks of cardiovascular diseases and insulin resistance among the Orang Asli in Peninsular Malaysia. *BMC Publ Health*. 2016;16:284. <https://doi.org/10.1186/s12889-016-2848-9>.
- 11 Mahmood SS, Wroe E, Fuller A, Leaning J. The Rohingya people of Myanmar: health, human rights, and identity. *Lancet*. 2017;389(10081):1841–1850. [https://doi.org/10.1016/S0140-6736\(16\)00646-2](https://doi.org/10.1016/S0140-6736(16)00646-2).
- 12 Bhoo-Pathy N, Hartman M, Yip CH, et al. Ethnic differences in survival after breast cancer in South East Asia. *PLoS One*. 2012;7(2):e30995. <https://doi.org/10.1371/journal.pone.0030995>.
- 13 Arevalo MVPN, Maslog EAS, Manlongat KD, et al. Social determinants of sex disparities in cancer in Southeast Asia. *iScience*. 2023;26(7):107110. <https://doi.org/10.1016/j.isci.2023.107110>.
- 14 Guadamuz TE, Wimonasate W, Varangrat A, et al. HIV prevalence, risk behavior, hormone use and surgical history among transgender persons in Thailand. *AIDS Behav*. 2011;15(3):650–658. <https://doi.org/10.1007/s10461-010-9850-5>.
- 15 Somia IKA, Teeratakulpisarn N, Jeo WS, et al. Prevalence of and risk factors for anal high-risk HPV among HIV-negative and HIV-positive MSM and transgender women in three countries at South-East Asia. *Medicine (Baltim)*. 2018;97(10):e9898. <https://doi.org/10.1097/MD.0000000000009898>.
- 16 Virani S, Wetzel EC, Laohawiriyakamol S, et al. Ethnic disparity in breast cancer survival in southern Thai women. *Cancer Epidemiol*. 2018;54:82–89. <https://doi.org/10.1016/j.canep.2018.02.007>.
- 17 Arevalo MVPN, Robredo JPG, Valenzuela S, et al. The role of traditional, complementary, and alternative medicine in cancer care in the Philippines. *Chin Clin Oncol*. 2022;11(6):49. <https://doi.org/10.21037/cco-22-91>.
- 18 Myint AT, Tiraphat S, Jayasvasti I, Hong SA, Kasemsup V. Factors influencing the willingness of palliative care utilization among the older population with active cancers: a case study in Mandalay, Myanmar. *Int J Environ Res Public Health*. 2021;18(15):7887. <https://doi.org/10.3390/ijerph18157887>.
- 19 So WKW, Wong CL, Chow KM, et al. The uptake of cervical cancer screening among South Asians and the general population in Hong Kong: a comparative study. *J Cancer Policy*. 2017;12:90–96. <https://doi.org/10.1016/j.jcpo.2017.03.015>.
- 20 Lim J, Bhoo-Pathy N, Sothilingam S, et al. Ethnicity is an independent determinant of age-specific PSA level: findings from a multiethnic Asian setting. *PLoS One*. 2014;9(8):e104917. <https://doi.org/10.1371/journal.pone.0104917>.
- 21 Ang JW, Chia C, Koh CJ, et al. Healthcare-seeking behaviour, barriers and mental health of non-domestic migrant workers in Singapore. *BMJ Glob Health*. 2017;2(2):e000213. <https://doi.org/10.1136/bmjgh-2016-000213>.
- 22 Eala MAB, Dee EC, Ginsburg O, Chua MLK, Bhoo-Pathy N. Financial toxicities of cancer in low- and middle-income countries: perspectives from Southeast Asia. *Cancer*. 2022;128(16):3013–3015. <https://doi.org/10.1002/cncr.34353>.
- 23 Panelo CIA, Solon OJC, Ramos RM, Herrin AN. The challenge of Reaching the poor with a continuum of care: a 25-Year assessment of philippine health sector performance. http://www.upecon.org.ph/wp-content/uploads/2018/03/HSR_061818.pdf.
- 24 Pham T, Bui L, Kim G, Hoang D, Tran T, Hoang M. Cancers in Vietnam-burden and Control efforts: a narrative scoping review. *Cancer Control*. 2019;26(1):1073274819863802. <https://doi.org/10.1177/1073274819863802>.
- 25 Yahya N, Roslan N. Estimating radiotherapy demands in South East Asia countries in 2025 and 2035 using evidence-based optimal radiotherapy fractions. *Asia Pac J Clin Oncol*. 2018;14(5):e543–e547. <https://doi.org/10.1111/ajco.12831>.
- 26 Borrell LN, Elhawary JR, Fuentes-Afflick E, et al. Race and genetic ancestry in medicine — a time for reckoning with racism. *N Engl J Med*. 2021;384:474.
- 27 Yee K, Tan HK. The role of academic medical centres in advancing global health equity in Southeast Asia. *Lancet Reg Health West Pac*. 2023;39:100933. <https://doi.org/10.1016/j.lanwpc.2023.100933>.
- 28 Dee EC, Ang CDU, Ting FIL, Tangco ED, Eala MAB. Improving cancer care in the Philippines: the need for deliberate and careful implementation of the National Integrated Cancer Control Act. *Lancet Reg Health West Pac*. 2022;28:100615. <https://doi.org/10.1016/j.lanwpc.2022.100615>.
- 29 Frech S, Morton Doherty R, Lesmes Duque MC, et al. C/Can city Engagement process: an implementation framework for strengthening cancer care in cities in low- and middle-income countries. *JCO Glob Oncol*. 2021;7:901–916. <https://doi.org/10.1200/GO.20.00606>.
- 30 Insamran W, Sangrajrang S. National cancer control program of Thailand. *Asian Pac J Cancer Prev*. 2020;21(3):577–582. <https://doi.org/10.31557/APJCP.2020.21.3.577>.