REVIEW ARTICLE

https://doi.org/10.47102/annals-acadmedsg.2026352

A snapshot of the cancer survivorship landscape in Singapore

Wei Lun Ng[1] *PhD*, Ravi Shankar[1] *PhD*, Ying Hua Grace Tan[2] *MSc*, Yan Lin Tan[2] *MPH*, Chin Jung Wong[3,5] *MBBS*, Ern Yu Tan[4,5,6] *MBBS*

ABSTRACT

Cancer survivorship has emerged as a critical healthcare priority as global survival rates continue to improve. With the increase in cancer incidence and declining mortality in Singapore, healthcare systems face increasing demands to provide comprehensive care across the cancer continuum, from diagnosis and active treatment to end of life, while also addressing the long-term survivor-ship challenges, including psychosocial distress, fear of recurrence, and the absence of personalised survivorship plans. Current survivorship care remains oncologist-centric with limited stratification between hospital-based oncology services and community health providers. This underscores the urgent need for a national cancer survivorship framework and guidelines to meet the growing demands of cancer survivors while ensuring quality healthcare delivery. This review examines the current state and ongoing work of cancer survivorship care in Singapore, identifies existing challenges, and explores future directions towards developing a comprehensive framework within the local healthcare ecosystem.

Keywords: cancer rehabilitation, cancer survivorship, care plan, shared care model, Singapore healthcare system

CLINICAL IMPACT

What is New

- This review serves to update the latest status, policy, and needs for cancer survivorship in Singapore.
- Findings underscore the potential identification of facilitators of and barriers to cancer survivorship programmes, paving the way for subsequent survivorship work including artificial intelligence and cancer survivorship, cancer rehabilitation, and economic impact to sustain the programme.

Clinical Implications

- The review supports the need to increase the awareness of and knowledge of cancer survivorship frameworks and cancer rehabilitation, which is emerging in Asia.
- This work serves as a starting point to meet the growing cancer survivor population needs prior to conducting implementation science.

INTRODUCTION

Cancer remains the leading cause of morbidity in Singapore, and new cases have increased from 61,522 (2010–2014) to 91,574 (2019–2023), while the cancer death rate has fallen by 21% since 2012.[1,2] The most common cancers affecting Singaporean men are prostate (18.0%), colorectal (15.8%), and lung (13.2%), while those affecting women are breast (29.9%), colorectal (12.6%), and lung (8.1%), with survival rates having greatly improved because of advances in screening and timely treatment.[3] Although cancer affects 1 in 4 Singaporeans over their lifetime, 5-year survival rates have tripled in the past 5 decades. In the US alone, the cancer survivor population is estimated to grow from 18 to 26 million by 2040, with similar trends observed in middle- and high-income countries worldwide.[4]

Despite advancements in anti-cancer treatment and therapy, improvements in care and disease control do not guarantee a restoration of health. Therefore, cancer survivorship care plans and national guidelines play an integral role in the healthcare system. In recognition of the urgency of cancer survivorship care, the Ministry of Health (MOH), Singapore, released a seminal report "Singapore's Approach to Cancer" in January 2026, outlining survivorship quality as 1 of the 5 main thrusts, and emphasises the importance of community support and access to quality care services as key

The Annals is an open access journal, allowing non-commercial use under CC BY-NC-SA 4.0.

[1] Clinical Research and Innovation Office, Tan Tock Seng Hospital, NHG Health, Singapore
[2] Office of Clinical Governance, NHG Population Health, NHG Health, Singapore
[3] Department of Rehabilitation Medicine, Tan Tock Seng Hospital, NHG Health, Singapore
[4] Department of General Surgery, Tan Tock Seng Hospital, NHG Health, Singapore
[5] Lee Kong Chian School of Medicine, Nanyang Technological University, Singapore
[6] Institute of Molecular and Cell Biology, Agency for Science, Technology and Research (A*STAR), Singapore
Correspondence: Dr Wei Lun Ng, Clinical Research and Innovation Office, Tan Tock Seng Hospital, NHG Health, Singapore. Email: ng.wei.lun1@nhg-health.com.sg; Mrs Yan Lin Tan, Office of Clinical Governance, NHG Population Health, NHG Health, Singapore. Email: yan.lin.tan@nhghealth.com.sg; Assoc Prof Ern Yu Tan, Lee Kong Chian School of Medicine, Nanyang Technological University, Singapore. Email: ern.yu.tan@nhghealth.com.sg
Accepted: 30 October 2026
Published Online First: 10 November 2026

domains to support long-term recovery and return to normalcy.[5]

In 2005, the Institute of Medicine (IoM) released a report detailing how cancer patients were "lost in transition" as they transitioned to cancer survivorship following primary treatment.[6] The IoM recommended a survivorship care plan for every survivor, yet the complex nature of the survivorship care team, healthcare resource allocation, and programme sustainability remain challenging issues to be addressed. According to the US National Cancer Institute, a person with a cancer diagnosis is considered a survivor from diagnosis through the end of life. After primary treatment, a survivor transitions into an extended phase consisting of close surveillance for recurrence or secondary cancers, commonly referred to as the survivorship phase.[7] Four distinct phases of survivorship have been proposed: acute, chronic, long-term, and cured, reflecting the illness trajectory and the differing care needs at each stage.[8] Re-establishing normalcy poses a significant challenge for survivors, as long-term adverse effects including cognitive decline and fatigue continue to plague quality of life. Additionally, psychosocial anxiety and a constant fear of recurrence persist throughout the survivorship continuum.[9] It is increasingly important to improve not only cancer mortality, outcomes, and quality of life but also the psychological well-being of cancer patients after treatment. In this regard, community-based cancer rehabilitation services play a pivotal role in supporting the transition from hospital-based care to community living or primary care settings, facilitating return to pre-illness functional levels.[10,11]

Although tremendous progress has been made, the implementation of survivorship care remains fragmented and insufficiently personalised to the needs of individual survivors.[12] A major limitation in survivorship care is the paucity of evidence for cancer survivorship programmes and appropriate methods to evaluate the programme's effectiveness.[13-15] Research on cancer survivorship is an emerging field in Asia, and it has been shown that cancer survivors in Southeast Asia (SEA) are often unprepared for cancer complications and the sequelae of treatment, culminating in physical disability, distress, and reduced quality of life (QOL).[16] Socioeconomic status, including employment and housing type, has also been shown to impact QOL.[17] While cancer rehabilitation is beneficial, practical barriers exist and impede the implementation of cancer survivorship efforts in Singapore.[11,18-20] In this review, the authors discuss the current landscape and challenges of Singapore's cancer survivorship programme and future directions for advancing survivorship care from a healthcare system perspective.

An overview of SEA cancer survivorship efforts

Although several reports have investigated the unmet needs of cancer survivors in Asia, 2 landmark studies have provided insight into the variations in symptom burden and supportive care needs across multiple countries, namely, the Association of Southeast Asian Nations Costs in Oncology[21] and Survivorship Transitions and Care in the Asia Pacific[22] studies, which examined 5249 and 1748 survivors across 8 and 9 countries, respectively, as summarised by Koczwara et al.[23] Despite these findings, efforts to implement a formal cancer survivorship plan across the region have been gaining ground with the effort of the Asia-Pacific Primary Care Cancer Research Group with representatives from Singapore, Malaysia, Hong Kong, and Australia.[24] Additionally, the passage of the National Cancer Control Act in the Philippines and Alola Foundation in Timor-Leste alongside certain patient organisations have contributed to cancer policy development in Malaysia and Singapore. High-income countries, such as the US and the UK, tend to have greater engagement with policymakers and in research, as evidenced by the establishment of dedicated cancer survivorship departments, accreditation bodies, and the publication of national white papers.[23]

Landscape of cancer survivorship in Singapore

Cancer rehabilitation programme

Apart from cancer survivorship, which encompasses the entire cancer journey from the time of diagnosis through the end of life, cancer rehabilitation is a goal-specific process aimed at helping cancer survivors achieve optimal physical, social, and psychological health within the limits of disease and treatment for functional improvement. Cancer rehabilitation is divided into 3 main paradigms—(1) preventive, (2) restorative, and (3) supportive rehabilitation—and may commence before (prehabilitation) or after cancer treatment.[10]

The primary focus of prehabilitation is to optimise physiological procedures prior to treatment, to allow for faster recovery and to mitigate the severity of post-treatment sequelae using targeted physical, nutritional, and psychological interventions. It has been shown to improve gait, QOL, and cardiopulmonary function. An early initiative in 2007 at Khoo Teck Puat Hospital in Singapore involved frail patients requiring colorectal surgery with a multidisciplinary team comprising nurse clinicians, physiotherapists, and clinicians delivering personalised care, including patient assessment, nursing care, and prehabilitation programme outline.[25] Although the programme led to shorter hospital stays and faster recovery with

apparent benefits, it has yet to be extended to other cancer types in Singapore. However, such prehabilitation efforts provide a valuable basis for the integration of a similar workplan into a personalised cancer survivorship care plan.

Building on this pilot programme, the National University Cancer Institute, Singapore (NCIS) merged 2 programmes in 2019 for surgical prehabilitation before cancer surgery and geriatric oncology support for older adults to form the Geriatric Oncology LongituDinal End to eNd programme to support patients from cancer diagnosis to cancer survivorship. Many of the participants reported improved outcomes in global health status from the programme, though further evaluation for sustainability is still required.[26]

While numerous efforts have been invested in hospital-based outpatient cancer rehabilitation in western countries, comparatively little focus has been directed towards community-based cancer rehabilitation programmes. In Singapore, community rehabilitation centres provide general rehabilitation services, including joint mobility, balance retraining, and fatigue management that cancer patients can benefit from. For cancer-specific rehabilitation services, the Singapore Cancer Society (SCS) is the primary provider, offering holistic survivorship care alongside specialised functions such as lymphoedema management delivered by trained therapists.[27] To assess the impact of community-based cancer rehabilitation programmes, an earlier study involving a multiethnic cohort of 304 cancer patients found impaired health-related QOL (HRQOL) and high distress levels in a community rehabilitation setting.[28] However, a subsequent retrospective study conducted 2 years later involving 197 cancer patients in Singapore demonstrated significant reductions in mean distress thermometer scores and improved HRQOL at 3- and 6-month assessments.[29]

First cancer survivorship care forum

Singapore's first cancer supportive and survivorship care forum was held on 3 December 2016, involving 74 oncology practitioners, including oncologists, nurses, pharmacists, and allied health professionals, with the aim of raising awareness of survivorship and provide a platform to address the challenges associated with delivering cancer supportive care in Singapore.[11] The forum highlighted the current challenges in Singapore's survivorship care landscape, including the current oncologist-centric model and the challenges of meeting increasing demand for cancer care services in a sustainable manner. This approach is in contrast with survivorship care models developed in the US and Europe, where survivorship care is delivered through a shared care model, which has been demonstrated to improve QOL, reduce costs, increase care continuity, and reduce oncologists' burden. The forum proposed that survivorship care should encompass the following principles: survivor-centred care, integrated and coordinated care, promotion of wellness, research-driven and evidence-based practices, and accessible and equitable care.

Community-based survivorship trial and implementation

Several culturally adapted community-based survivorship intervention programmes have been trialled in Singapore. For example, a psychoeducation group programme tested in 72 Asian early-stage breast cancer survivors showed reduced physical distress and fatigue, yielding overall positive feedback.[30] This highlights the value of identifying survivors with unmet supportive care needs. The growing cohorts of cancer survivors prompt the need to navigate follow-up care models. A decision aid (DA) was developed and evaluated for acceptability and usability with 73% of participants finding it useful for decision-making.[31] Remarkably, the Breast Cancer Survivorship Inter-Professional Community, a pilot trial on breast cancer survivorship, found that a shared care model with family physician visits and community pharmacists through survivorship care plan was feasible in Singapore.[32]

Community-based shared care survivorship model and cancer rehabilitation paradigms

The core values of shared care in primary care focus on 4 key areas as defined by Starfield's "4C" framework: maintaining close contact with survivors (Contact), providing holistic care (Comprehensiveness), fostering patient–physician relationships (Continuity), and coordinating specialties (Coordination).[33,34] The implementation of the shared care survivorship model is a relatively nascent concept in Asian settings. Current recommendations for shared care implementation, including care processes, healthcare professional training, patient education, and policies, have been predominantly developed and discussed within western healthcare systems. For a multicultural country like Singapore, the shared care model has been focused on chronic disease management and mental health issues while the cross-system application of these recommendations in cancer survivorship remains unclear and challenging to adopt because of several systemic factors. These include the division of the 3 healthcare clusters as regional managers covering central-north, west, and east Singapore, financial structural differences between public and private healthcare entities, and the fact that primary care providers (PCPs) in Singapore have historically rated primary care delivery less favourably than their counterparts in western countries, such as Australia and the UK.[20,35] Despite these challenges, a Singapore

study suggests that a well-designed multicultural model succeeded. For example, a randomised controlled trial of the Accessible Cancer Care to Enable Support for Cancer Survivors (ACCESS) programme, built on routine distress screening, found improved physical functioning, increased activity levels, and lowered psychosocial distress relative to usual care.[36] Another focus group study on community practitioners stressed that the success of community survivorship relied on the participation of survivors and should incorporate non-cancer-related medical histories, with multicultural differences taken into consideration.[20]

Before discussing the ongoing work of the shared care model in Singapore, the authors seek to gain an understanding of health concerns and familiarity with cancer survivorship. An early qualitative study among multiethnic breast cancer survivors in Singapore revealed an unfamiliarity with the term "survivorship" and identified cognitive impairment and peripheral neuropathy as key symptoms. Participants frequently highlighted limited consultation time and unplanned hospitalisation as significant barriers, often perceiving these as indicators of suboptimal care.[37] Two independent qualitative reviews have assessed the perspectives of PCPs in breast cancer survivorship within a community-based shared care model in Singapore.[38,39] Although the majority of PCPs' current role involves managing non-cancer issues and preventive care, many aspire to expand their involvement in cancer surveillance and psychosocial support. However, they emphasised that specialised training in care protocols and timely access to oncologists are necessary prerequisites. A qualitative study by Ke et al. involving 70 PCPs in Singapore indicated that low-risk breast cancer survivors exhibited acceptability of PCPs' involvement in follow-up treatment throughout the survivorship course.[39] PCPs perceived the shared care model positively for its ability to provide holistic care while adapting global recommendations to an Asian context. While the willingness of PCPs to share care with oncologists is encouraging, optimising such programmes requires distinct role definitions, clinical standard operating procedures, data sharing, financial processes, effectiveness evaluation, and improved resource allocation.

Cancer survivorship progress, guideline, and roadblocks in Singapore

Numerous guidelines and programmes have been published by Singapore national agencies, professional societies, and hospitals to address the survivorship issues in Singapore (Table 1). Notably, MOH has specifically stressed the importance of quality survivorship care as 1 of the 5 strategic thrusts in the latest report. Another important milestone is the MOH Community Collaborative Care that brought all 3 healthcare clusters together with private general practitioners (GPs) to promote cancer survivorship, with a handbook outlining the needs of breast and colorectal cancer survivors and recommended surveillance modalities and toxicities to monitor. Further plans include harmonising cancer survivorship care plans within an electronic medical record (EMR) along with survivorship registry. A major change is that cancer survivors are eligible for subsidies for cancer surveillance under the Breast Screen Singapore programme. In 2019, 2 steering groups were established in parallel to drive primary cancer care, research, and education. The first steering group comprised Singapore Primary Care Cancer Network (SPRiNT) members from NCIS and NCCS, SCS, 3 polyclinic clusters, and primary care network GPs. The second steering group comprised members from SPRiNT and cancer research institutions from Malaysia, Hong Kong, and Australia.

However, a nationally endorsed and unified guideline is still lacking for several reasons. First, effective provision requires a multidisciplinary approach comprising oncology nursing, rehabilitation, and allied health professionals. Currently, this involvement is largely provisional and not systematically integrated into routine oncologic care, particularly for patients with complex survivorship needs, such as greater treatment toxicity, comorbidities, financial, or psychosocial issues. Second, while prior work has described the roles of the professionals involved in the shared care model,[32] these descriptions have yet to be implemented as a standard of care, such as specifying responsibilities between community and specialist clinics, referral pathways, training and competency requirements, data sharing, and oncologist's role. Third, the financial subsidy framework for cancer survivors, whether via the review of MediSave, MediShield Life, and MediFund (3M) along with third-party insurance, will need to be finalised at a national level.

Globally, there is little information available on the cost-effectiveness of cancer survivorship programmes because of their complex nature, making the programme effectiveness measurement challenging. In Singapore, comparing outcomes across survivorship care models is difficult, as reported by Ke et al., who showed that the evaluation of guideline adherence was constrained by the EMR within each healthcare cluster that is inaccessible to private providers, which likely underestimates new diagnoses in the community.[31] This study also highlights the need to reverse the overutilisation of oncologist services by leveraging primary care strengths. At the system level, artificial intelligence (AI) could improve guideline adherence by integrating data across healthcare clusters, stratifying risks, and triaging. AI-driven decision tools can prompt PCPs with guideline actions and aid survivors to self-manage symptoms post-diagnosis.[40-42] An assessment study from the same

Table 1. List of latest cancer survivorship work and key focus areas in Singapore.

Singapore agency/member	Year	Report/guideline/programme/conference	Scope
MOH	2026	Singapore's Approach to Cancer	National strategy focusing on survivorship as one of the key thrusts by integrating its community care
NCIS/NUHS	2026	Follow-Up Cancer Care In the Community	A protocol and resources for polyclinics to manage breast and colorectal cancer survivors using a shared care model
NCIS/NUHS	2025	NCIS Personalised Wellness Programme	Provide holistic support to cancer survivors in terms of physical, psychological, and social needs through rehabilitation services and wellness activities
NCCS	2005	DOTS	Match breast cancer survivors to compatible GPs for affordable long-term survivorship care under the DOTS programme launched back in 2005
MASCC-ASCO	2024	Survivorship Care for People Affected by Advanced or Metastatic Cancer	Standards and practice recommendations, increasingly adopted by Southeast Asian countries.
			Survivorship study group and expert panel is established within MASCC for supportive care in cancer from diagnosis through treatment to post-treatment
ANCCA/NCCS	2023	Uniting Asia Against Cancer	Promote collaboration among national cancer centres for clinical care, research, and education
APPCCRG	2021	APPCCRG Virtual Symposium	Formally launched, with 3 streams of focus to develop collaborative research across prevention, early detection, survivorship, and end-of-life care
NCIS/NUHS	2019	NCIS Annual Research Meeting	Invite international leaders in primary care cancer research who could form an initial core collaborative group. Two steering groups: SPRiNT and APPCCRG were formed.

ANCCA: Asian National Cancer Centers Alliance; APPCCRG: Asia-Pacific Primary Care Cancer Research Group; ASCO: American Society of Clinical Oncology; DOTS: Delivering on Target Programme; MASCC: Multinational Association of Supportive Care in Cancer; MOH: Ministry of Health; NCCS: National Cancer Centre Singapore; NCIS: National University Cancer Institute, Singapore; NUHS: National University Health System; SPRiNT: Singapore Primary Care Cancer Network

author on a 5-year post-treatment cancer survivorship care on the compliance with international guidelines showed adherence rates to surveillance and osteoporosis care were high, yet extensive utilisation of oncologist services could be reversed by coordinating survivorship care with PCPs.[19]

An important goal of cancer survivorship is cancer rehabilitation. It varies according to patients' needs, but it aims to restore and optimise physical, social, psychological, and vocational functioning within the limits imposed by the cancer and its treatment. Consequently, healthcare clusters may struggle to justify the value of these initiatives. Restoring physical and social function, establishing a holistic return-to-work framework, and defining the employer's role in facilitating workforce reintegration are essential metrics for measuring the true effectiveness of any cancer survivorship plan.

Evaluation of cancer survivorship effectiveness in Singapore: A proposed method

Singapore is experiencing a rapid demographic transition, with projections indicating that 23.8% of residents will be aged 65 years and above by 2030.[43] Simultaneously, there has been a sharp rise in cancer incidence among those under 50 years of age over the last decade, specifically, a 15.5% increase in men in their 30s and 25.3% increase in women in their 40s.[5] Although scientific rigour is a primary metric for measuring survivorship programme success, a survivor-centred approach should be employed to capture the specific health outcomes of both younger (<40 years old) and older (>65 years old) survivors across Singapore's multicultural landscape. To achieve this evaluation objective, national data exchange platforms, such as the Trusted Research and Real world-data Utilisation and Sharing Tech dataset, comprising health-related research and anonymised data, could be a useful resource for clinical, population, and costing data. As a preliminary step towards a formal evaluation framework, Halpern's 14 measurements categorised by Kissick's iron triangle, Porter's outcome measure, and Donabedian's framework can be adapted.[13] To leverage Singapore's unique strength in regional healthcare clusters, comprehensive national EMR data, multicultural population, and the national

3M financing model, a hybrid model can be used to comprehensively assess the quality and value of a survivorship programme as outlined in Fig. 1.

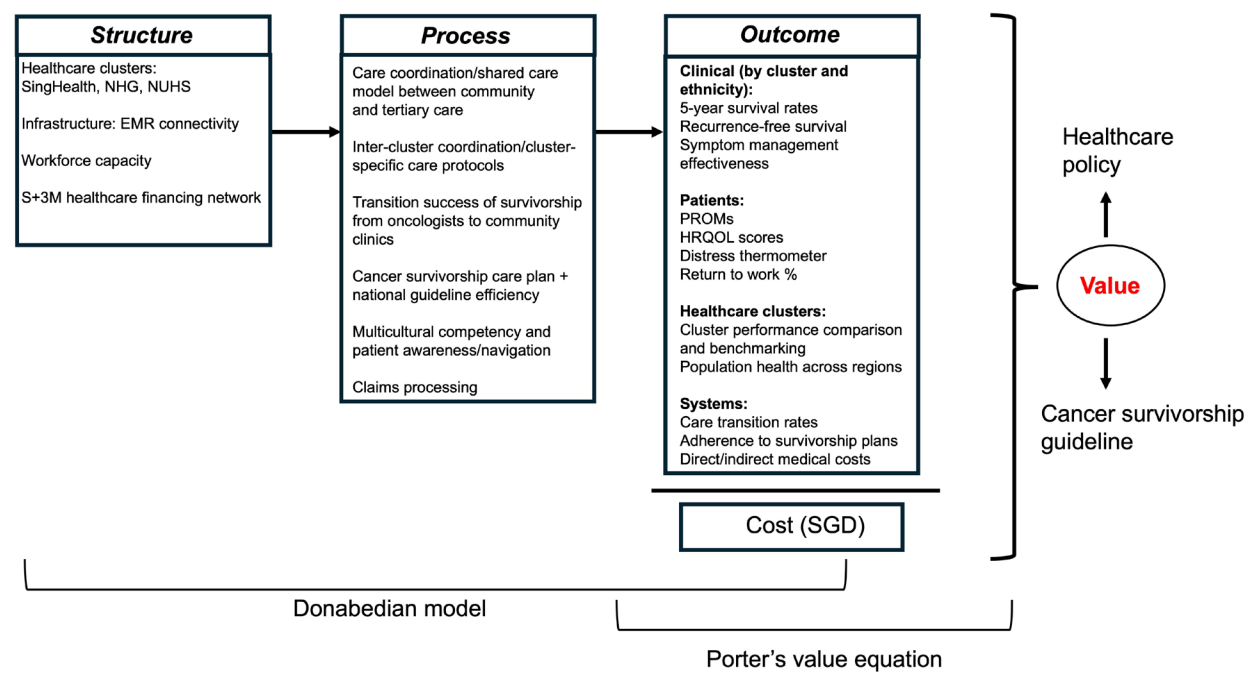
Potential of AI in cancer survivorship planning in Singapore

A scoping review of AI-powered digital health technologies in cancer survivorship care concluded that the majority of studies are currently designed for breast cancer survivors. These studies primarily focused on cancer recurrence, prediction, clinical decision support, symptom monitoring, and survivability modelling, all of which have been demonstrated to improve QOL and physical function.[44] For instance, AI serves as a decision support tool that makes delineation and implementation feasible.[45] It has potential in risk stratification, as demonstrated by machine learning-based prediction of adverse survivorship outcomes so that higher-risk survivors may benefit from more intensive care.[46,47] Model integration with large data on 25,592 cancer survivors predicted unplanned healthcare use and symptom burden, providing a framework for risk stratification and prediction to facilitate proactive survivorship care.[48]

The DA study by Ke et al. concluded that future work should focus on adapting AI to optimise information delivery to attributes such as age and familiarity with primary care.[31] Similar AI-based clinical decision tools can facilitate shared decision-making in survivorship by flagging patients at risk, stratifying the risk, and mapping guideline-based options during the decision process between patients and clinicians.[49] The shared decision model has its trade-off—although survivors vigilantly self-monitor for symptoms, which increases the chance of early detection, it could also increase anxiety and decrease QOL.[50] Consequently, recent consensus calls for AI-enabled supportive care across the survivorship journey.[51] Importantly, these tools should support clinicians as real-world use remains limited by data quality, model accuracy, and trial validation.

Harnessing a robust digital infrastructure and deep AI talent pool, Singapore has pursued a comprehensive approach to implementing AI across the healthcare system, as exemplified by the government-supported development and adoption of AI-enabled tools (Table S1). Singapore's healthcare landscape offers a "test-bed" for AI owing to the centralised data architecture, databases, and well-documented patient journeys. These features support the development of robust AI training models applicable to specific cancer survivorship care functions, including symptom moni-

Fig. 1. Hybrid framework integrating the Donabedian model and Porter's equation for assessing value-based cancer survivorship care in Singapore.



3M: MediSave, MediShield Life, and MediFund; EMR: electronic medical record; HRQOL: health-related quality of life; NHG: National Healthcare Group; NUHS: National University Health System; PROMs: patient-reported outcome measures; SGD: Singapore dollar

The Donabedian model organises care quality across structure (Singapore healthcare clusters, EMR infrastructure, and financing mode), process (care coordination, survivorship plan, and patient navigation) to outcome (clinical, patient, cluster, and system outcomes). Value is derived from outcome relative to cost ratio, which informs decision-making for healthcare policy and cancer survivorship guideline.

toring, clinical decision-making, and follow-up care. For example, AI tools, such as the Community Acquired Pneumonia and COVID-19 AI Predictive Engine, can be repurposed to help GPs determine whether a survivor's new symptom is manageable or requires escalation back to a national cancer centre. Moreover, a key strength of Singapore lies in the structured AI-innovation ecosystem, which enables real-world testing via a sandbox approach. Platforms such as the AI-enabled medical imaging platform for Singapore public healthcare accelerate AI adoption in radiology and support the deployment of imaging algorithms, while Health Empowerment thru Advanced Learning & Intelligent eXchange consolidates de-identified data for testing AI models for predictive care.

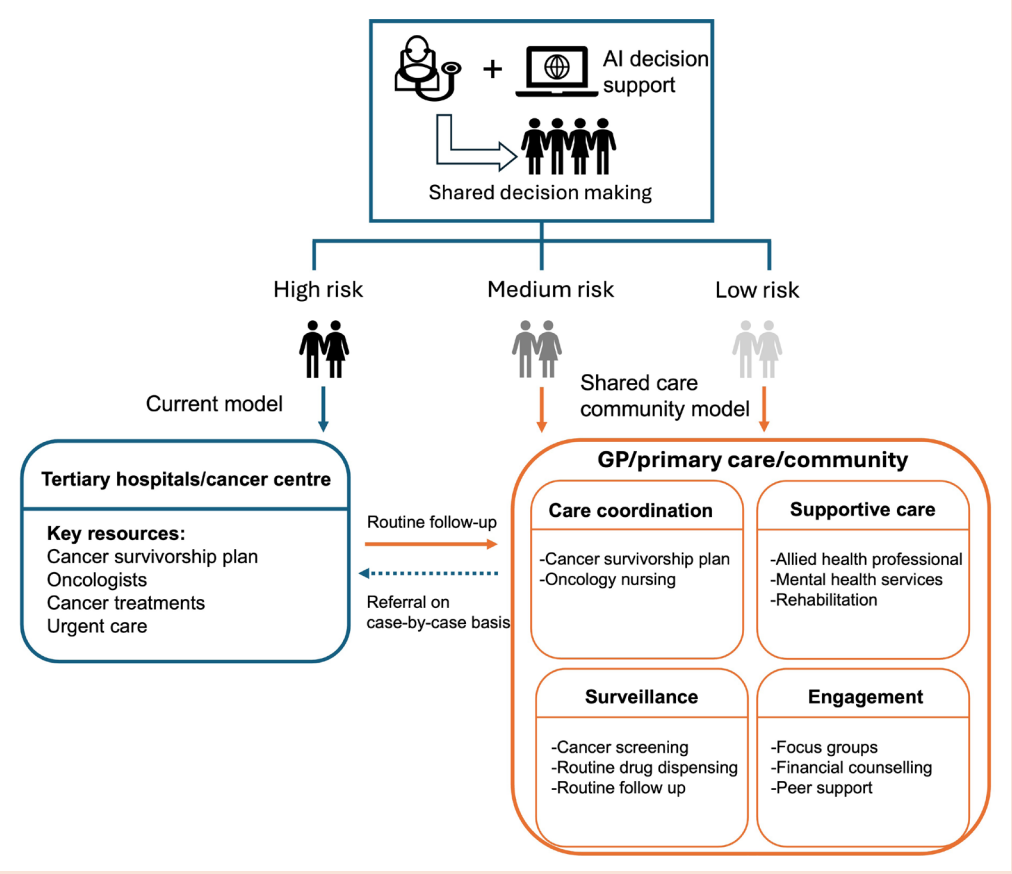
CONCLUSION

Singapore possesses all the required components to launch a successful national cancer survivorship programme supported by highly skilled healthcare professionals and world-class hospital systems. The proposed shared care model aims to alleviate oncologists' burden by redirecting routine follow-up care from tertiary centres to primary and community healthcare settings (Fig. 2). In this transition, oncology nurses and allied health professionals are integral, not only to navigate the transition from hospital to community but also to educate patients on cancer survivorship plans, disease awareness, and the long-term benefits of this care-stratified model. With increasing cancer survival rates, an ageing population, and significant unmet needs in survivorship support, an efficient cancer support system and a survivorship plan have never been more urgent. This service should be designed to complement the needs of Singapore's diverse cultural background and align with existing healthcare infrastructure. By involving working groups across hospitals, primary and community health providers, as well as social and community partners (e.g. volunteer welfare organisations), Singapore can create a framework that benefits not only cancer survivors but also their primary caregivers.

Supplementary material

Table S1. Compilation of AI-centred healthcare innovation in Singapore applicable to cancer survivorship care.

Fig. 2. AI-supported shared decision making and risk stratification transition stable survivors from hospital oncology to GP and polyclinic, with case-by-case referral for complex needs.



AI: artificial intelligence; GP: general practitioner

Note: This decentralises survivorship care, improves access, and patient support while optimising resources.

Ethics statement

Not applicable. This study is a comprehensive review, and no participants were involved.

Declaration

The authors declare that they have no affiliations with or involvement in any organisation or entity with any financial interest in the subject matter or materials discussed in this manuscript. Claude AI was used for grammar checking.

REFERENCES

1. National Registry of Diseases Office. Singapore Cancer Registry Annual Report 2023. Singapore: National Registry of Diseases Office; 2025.
2. National Registry of Diseases Office. Trends in Cancer Incidence in Singapore 2010-2014: Singapore Cancer Registry Interim Annual Report. Singapore: National Registry of Diseases Office; 2015.
3. National Cancer Centre Singapore. Cancer Statistics 2024. https://www.nccs.com.sg/your-care/about-cancer/cancer-statistics. Accessed 2 May 2026.
4. Tonorezos E, Devasia T, Mariotto AB, et al. Prevalence of cancer survivors in the United States. J Natl Cancer Inst 2024;116:1784-90.
5. Ministry of Health, Singapore. Singapore's Approach to Cancer. https://www.moh.gov.sg/others/resources-and-statistics/singapore-approach-to-cancer/. Accessed 2 May 2026.
6. Stovall E, Greenfield S, Hewitt M. From Cancer Patient to Cancer Survivor: Lost in Transition. National Academies Press; 2005.
7. Mullan F. Seasons of survival: reflections of a physician with cancer. N Engl J Med 1985;313:270-3.
8. Surbone A, Tralongo P. Categorization of Cancer Survivors: Why We Need It. J Clin Oncol 2016;34:3372-4.
9. Weaver KE, Forsythe LP, Reeve BB, et al. Mental and physical health-related quality of life among U.S. cancer survivors: population estimates from the 2010 National Health Interview Survey. Cancer Epidemiol Biomarkers Prev 2012;21:2108-17.
10. Tay MRJ, Wong CJ. Cancer Rehabilitation-Improving Cancer Survivorship in Singapore. Asia Pac J Oncol Nurs 2021;8:346-8.
11. Loh KWJ, Ng T, Choo SP, et al. Cancer Supportive and Survivorship Care in Singapore: Current Challenges and Future Outlook. J Glob Oncol 2018;4:1-8.
12. Ang WHD, Lau Y, Ngo LPE, et al. Path analysis of survivorship care needs, symptom experience, and quality of life among multiethnic cancer survivors. Support Care Cancer 2021;29:1433-41.
13. Halpern MT, Argenbright KE. Evaluation of effectiveness of survivorship programmes: how to measure success? Lancet Oncol 2017;18:e51-9.
14. Jefford M, Crawford-Williams F, Taylor C, et al. Global need, regional action: opportunities to improve cancer survivorship care in the Western Pacific. Lancet Reg Health West Pac 2025;65:101748.
15. Truant TLO, Lambert LK, Thorne S. Barriers to Equity in Cancer Survivorship Care: Perspectives of Cancer Survivors and System Stakeholders. Glob Qual Nurs Res 2021;8:23333936211006703.
16. Ostovar S, Modarresi Chahardehi A, Mohd Hashim IH, et al. Prevalence of psychological distress among cancer patients in Southeast Asian countries: A systematic review. Eur J Cancer Care (Engl) 2022;31:e13669.
17. Seow-En I, Chok AY, Matchar DB, et al. Long-term quality of life, sexual health and gastrointestinal function following colorectal cancer resection in an Asian cohort. Colorectal Dis 2021;23:2348-60.
18. Chan A, Ports K, Neo P, et al. Barriers and facilitators to exercise among adult cancer survivors in Singapore. Support Care Cancer 2022;30:4867-78.
19. Ke Y, Tan CJ, Yeo HLA, et al. Adherence to Cancer Survivorship Care Guidelines and Health Care Utilization Patterns Among Nonmetastatic Breast Cancer Survivors in Singapore. JCO Glob Oncol 2022;8:e2100246.
20. Chan A, Ngai GH, Chung WL, et al. Practitioners' perspectives on community-based breast cancer survivorship care in Singapore: A focus group study. Health Soc Care Community 2018;26:404-11.
21. ACTION Study Group. Health-related quality of life and psychological distress among cancer survivors in Southeast Asia: results from a longitudinal study in eight low- and middle-income countries. BMC Med 2017;15:10.
22. Molassiotis A, Yates P, Li Q, et al. Mapping unmet supportive care needs, quality-of-life perceptions and current symptoms in cancer survivors across the Asia-Pacific region: results from the International STEP Study. Ann Oncol 2017;28:2552-8.
23. Koczwara B, Chan A, Jefford M, et al. Cancer Survivorship in the Indo-Pacific: Priorities for Progress. JCO Glob Oncol 2023;9:e2200305.
24. Emery J, Wong MCS, Young D, et al. The development of the Asia-Pacific Primary Care Cancer Research Group. Eur J Cancer Care (Engl) 2022;31:e13579.
25. Chia CLK, Mantoo SK, Tan KY. 'Start to finish trans-institutional transdisciplinary care': a novel approach improves colorectal surgical results in frail elderly patients. Colorectal Dis 2016;18:O43-50.
26. Ho F, Kow A, Lim WC, et al. Feasibility of a Geriatric Oncology Longitudinal End to End (GOLDEN) Program in a Tertiary Cancer Center in Singapore. Oncologist 2023;28:e198-204.
27. Agency for Integrated Care. Community Rehabilitation, 2026. https://www.aic.sg/Care-Services/Community-Rehabilitation. Accessed 2 May 2026.
28. Tay MRJ, Wong CJ, Aw HZ. Assessment of Health-Related Quality of Life and Distress in an Asian Community-Based Cancer Rehabilitation Program. Curr Oncol 2022;29:7012-20.
29. Tay MRJ, Wong CJ, Chadachan V. Impact of an Asian Community-Based Cancer Rehabilitation Program on Health-Related Quality of Life. Healthcare (Basel) 2024;12:2251.
30. Chan A, Gan YX, Oh SK, et al. A culturally adapted survivorship programme for Asian early stage breast cancer patients in Singapore: A randomized, controlled trial. Psychooncology 2017;26:1654-9.
31. Ke Y, Cheng I, Tan GSH, et al. Development and pilot testing of a decision aid for navigating breast cancer survivorship care. BMC Med Inform Decis Mak 2022;22:330.
32. Ke Y, Fok RWY, Tan NC, et al. A Breast cAncer Survivorship Inter-Professional Community (BASIC) Shared Care Model to Promote Healthy Behaviors in Singapore: A Pilot Randomized Controlled Trial. Int J Behav Med 2025. Epub ahead of print.
33. Starfield B. Measuring the attainment of primary care. J Med Educ 1979;54:361-9.
34. Foo C, Surendran S, Jimenez G, et al. Primary Care Networks and Starfield's 4Cs: A Case for Enhanced Chronic Disease Management. Int J Environ Res Public Health 2021;18:2926.
35. Khoo HS, Lim YW, Vrijhoef HJ. Primary healthcare system and practice characteristics in Singapore. Asia Pac Fam Med 2014;13:8.

36. Ke Y, Neo PSH, Yang GM, et al. Impact of a Multidisciplinary Supportive Care Model Using Distress Screening at an Asian Ambulatory Cancer Center: A Cluster Randomized Controlled Trial. JCO Oncol Pract 2024;20:1207-18.
37. Chan A, Lum ZK, Ng T, et al. Perceptions and Barriers of Survivorship Care in Asia: Perceptions From Asian Breast Cancer Survivors. J Glob Oncol 2016;3:98-104.
38. Fok RWY, Low LL, Quah HMJ, et al. Roles and recommendations from primary care physicians towards managing low-risk breast cancer survivors in a shared-care model with specialists in Singapore-a qualitative study. Fam Pract 2020;37:547-53.
39. Ke Y, Fok RWY, Soong YL, et al. Implementing a community-based shared care breast cancer survivorship model in Singapore: a qualitative study among primary care practitioners. BMC Prim Care 2022;23:73.
40. Tabataba Vakili S, Haywood D, Kirk D, et al. Application of Artificial Intelligence in Symptom Monitoring in Adult Cancer Survivorship: A Systematic Review. JCO Clin Cancer Inform 2024;8:e2400119.
41. Tan NC, Lim RHL, Ng DCC. Supporting quadruple aim in primary care using artificial intelligence. Ann Acad Med Singap 2025; 54:305-9.
42. Zhang LN, Wang YT, Lan XW, et al. Multimodal Artificial Intelligence System for Risk-Adapted Cancer Survivorship Surveillance: A Multicenter Target Trial Emulation. Int J Radiat Oncol Biol Phys 2026;S0360-3016(26)04197-0.
43. National Population and Talent Division. Longevity. Updated 30 September 2026. https://www.population.gov.sg/our-population/population-trends/longevity/. Accessed 2 May 2026.
44. Pan LC, Wu XR, Lu Y, et al. Artificial intelligence empowered digital health technologies in cancer survivorship care: A scoping review. Asia Pac J Oncol Nurs 2022;9:100127.
45. Kim SH, Park SY, Lim SM, et al. Feasibility and preliminary efficacy of an artificial intelligence-based cancer survivorship care plan service using digital platforms: a single-arm prospective pilot study. J Cancer Surviv 2025. Epub ahead of print.
46. Wheeler SB, Rotter J, Spees LP, et al. Machine Learning Risk Stratification for Older Breast Cancer Survivors: Clinical Care Implications. Health Serv Res 2026;61:e70005.
47. Ghanem AS, Bata R, Móré M, et al. Explainable Machine Learning for Head and Neck Cancer Risk Stratification. Cancers (Basel) 2026;18:2228.
48. Natori A, Bonnell JR, Stathias V, et al. Machine Learning Risk Stratification Approach Using Patient-Reported Outcomes for Forecasting Unplanned Health Care Use and Symptom Burden in Cancer Survivors. JCO Clin Cancer Inform 2026;10:e2500389.
49. Brown SA, Chung BY, Doshi K, et al. Patient similarity and other artificial intelligence machine learning algorithms in clinical decision aid for shared decision-making in the Prevention of Cardiovascular Toxicity (PACT): a feasibility trial design. Cardiooncology 2023;9:7.
50. Heathcote LC, Goldberg DS, Eccleston C, et al. Advancing shared decision making for symptom monitoring in people living beyond cancer. Lancet Oncol 2018;19:e556-63.
51. Pfob A, Pinker K, Vaz-Luis I, et al. The Lucerne Toolbox 3: digital health and artificial intelligence to optimise the patient journey in early breast cancer-a multidisciplinary consensus. Lancet Oncol 2025;26:e694-706.