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# **Enhancing patient-centred approaches to optimise early-breast cancer care**

**A review of current practice and opportunities  
for improvement in Singapore**



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# About this Report

*“Enhancing patient-centred approaches to optimise early-breast cancer care: a review of current practice and opportunities for improvement in Singapore”* is a research report by Economist Impact examining the existing breast cancer care pathway in Singapore and the factors that help or hinder the goal of achieving optimal patient-centred care.

The research aims to understand the unmet needs within the health system and opportunities for improvement. We analyse how Singapore can improve patient-centred care and build awareness, promote screening, early detection, diagnosis and prognosis, and ensure access to high-quality treatment, including supportive and palliative care.

Our goal is to help develop patient-centred care pathways and improve long-term outcomes for women with breast cancer in Singapore. We hope to do this by identifying unmet needs for early breast cancer care and analysing factors that act as barriers or facilitators to delivering patient-centred early breast cancer care. Our report uses a research method called ‘force field analysis’, which maps out forces that promote or hinder patient-centred care and highlights opportunities and gaps that drive change.

Economist Impact conducted a primary research programme to raise awareness and stimulate

discussion among key stakeholders in Singapore. We performed an initial evidence review and convened an expert panel to help design the ‘force field’, which encompasses practices favouring and hindering optimised patient-centred early breast cancer care. Alongside this, Economist Impact co-facilitated a workshop with various key stakeholders to understand national-level challenges in Singapore. This country report is the result of this research and workshop insights.

Our thanks go to the Singapore stakeholders who attended the local country workshop and shared their insights and experience (in alphabetical order):

- Ms **Lu-Ching Lau**, Director, External Affairs, Policy and Communications, MSD Pharma (Singapore) Pte Ltd.
- Ms **Susan Leen**, General Manager, Breast Cancer Foundation, Singapore
- Ms **Susan Lim**, Manager, Welfare Services, Singapore Cancer Society
- Mr **Mark Lin**, PSS HOD, Singapore Cancer Society
- Dr **Samuel Low**, Chief Health Officer, Income Insurance Limited

- Ms **Fiona Pearce**, Senior Advisor, HTA and Consumer Engagement and Education, Agency for Care Effectiveness
- Associate Prof. **Benita Tan**, Chairman and Senior Consultant, Division of Surgery, Sengkang General Hospital, Senior Consultant, Breast Surgery, Singapore General Hospital, Senior Consultant, Division of Surgery and Surgical Oncology, National Cancer Centre, Singapore
- Dr **Cindy Yeo**, Chief Medical Officer, Jaga-Me

In addition, we are grateful to the following people who served as our Asia-Pacific regional expert panellists (in alphabetical order):

- **Libby Burgess**, Chair, Breast Cancer Aotearoa Coalition, New Zealand
- Dr **Polly SY Cheung**, Founder, Hong Kong Breast Cancer Foundation, Hong Kong
- Dr **Julia Gandhi**, Executive, Committee member, Breast Cancer Foundation (BCF), Singapore; Chair, Women in Pharma, ISPE, Singapore.
- Prof. **Chisato Hamashima**, Professor, Division of Health Policy, Department of Nursing,

Faculty of Medical Technology, Teikyo University, Japan

- Prof. **Mikael Hartman**, Senior Consultant and Head of Breast Services, National University of Singapore, Singapore
- Prof. **Chiun-Sheng Huang**, Professor and Chairman, Director of Breast Care Centre National Taiwan University Hospital, Taiwan
- Prof. **Ava Kwong**, Chief of Breast Surgery Division, The University of Hong Kong, Hong Kong
- Prof. **Bruce Mann**, Director of Breast Tumour Stream, Victorian Comprehensive Cancer Centre, Australia

The research programme was sponsored by MSD. The findings and views expressed do not necessarily reflect the views of the sponsor and Economist Impact bears sole responsibility for the content of this report.

This research programme was conducted by the Economist Impact team. This research team consisted of Gerard Dunleavy, Neeladri Verma, Emily Tiemann, and Yogita Srivastava.

# Executive summary

Breast cancer is the most common cancer and leading cause of cancer death among women in Singapore.<sup>1</sup> Incidence is also rapidly increasing, and the age-standardised incidence rate had risen from 20.1 per 100,000 population in 1968-1972 to 73.8 per 100,000 population in 2016-2020; this accounts for a 3.5 times increase.<sup>2</sup>

Breast cancer diagnosed at an early stage, when it is not too large and has not spread, is more likely to be treated successfully than breast cancer diagnosed at an advanced stage. In Singapore, a high proportion of women are diagnosed at later stages, with 10.9% being diagnosed at Stage IV between 2018-2020.<sup>2</sup> Advanced breast cancer not only creates an urgent health challenge but also impedes quality of life, and brings significant economic costs for patients, their families and public health systems.

There are significant opportunities to improve breast cancer care in Singapore by understanding the patient-centred care pathway for early breast cancer diagnosis and treatment and investigating the unmet needs in managing breast cancer.

Using an evidence-based approach that incorporates a review of existing data and an expert panel meeting, we designed a force field analysis to assess existing policies and system performance across four domains of the patient journey: population awareness, screening and

diagnosis, treatment, and survivorship.

Indicators within each domain were selected based on evidence of their impact on promoting or deterring optimisation of patient-centred care for early breast cancer. We then conducted a workshop to discuss our findings and gain the perspective of key experts in Singapore to flesh out key opportunities for improvement. We drafted scores for indicators within these four domains based on our research and insights from the workshop. This report combines in-depth research and force field analysis of early breast cancer care in Singapore.

## Key findings:

- **Population awareness:** Awareness of breast cancer and education are critical to promote increased participation in preventive care measures such as self-examination of breasts and screening, and Singapore advocacy groups play an important role. However, lack of knowledge about the disease and poor patient-provider communication have been highlighted as barriers towards achieving patient-centred care.
- **Screening and Diagnosis:** While Singapore has a robust breast cancer screening programme, low participation rates persist, particularly among women of Malay ethnicity,

and cancers are often diagnosed at late stages. Targeted health campaigns to increase screening rates could help bridge this gap. International guidelines are used to guide local practice which helps ensure that global best standards are adopted, though a need for increased focus on genetic testing and counselling has been identified.

- **Treatment:** Efficient navigation of services and generous financial assistance schemes contribute to driving better patient-centred early breast cancer care in Singapore. However, the lack of a meaningful patient voice in reimbursement decisions as well as poor integration of multidisciplinary teams in cancer care were identified as barriers.
- **Survivorship:** The number of survivors among patients with breast cancer in Singapore has been increasing steadily, and support groups for early breast cancer survivors in Singapore play an important role in helping patients to cope by providing interaction and comfort. However, the lack of professional survivorship care programmes can be a barrier towards achieving patient-centred care.

We conclude with the following opportunities to optimise early breast cancer care and improve outcomes for people with early breast cancer in Singapore:

**1. Drive self-responsibility for**

**health:** There are barriers preventing Singaporeans from taking greater personal responsibility for their health and in order to increase screening rates, the first step is for women to prioritise themselves and their health.

**2. Shift focus from curative to**

**preventative:** Singapore's rapidly ageing society means that the burden of cancer will continue to increase. Focusing efforts and resources on prevention and increasing knowledge of risk factors would encourage earlier detection, reduce costs for both health systems and individuals, and help save lives.

**3. Come together with a consistent**

**message:** Promoting more collaboration and partnership among stakeholders and encouraging a unified voice to share the same message could help uncover political influence, and effect change for patients with early breast cancer in Singapore.

# Introduction

In Singapore, every year approximately 24,000 people are diagnosed with cancer, and breast cancer accounts for approximately 15% of all cancers.<sup>3</sup> Among women, it is the most common cancer accounting for around 32% of cases. It is also a common cause of mortality in women and in 2020 there were 921 deaths.<sup>3</sup>

Detection of breast cancer at an early stage requires less aggressive treatment options, reduces the risk of disease spread, and results in better survival rates.<sup>4</sup> Early and intermediate-stage cancers are confined to the primary or source organ and adjacent areas, such as lymph nodes, while advanced-stage cancers usually spread elsewhere in the body. Early Stage Breast Cancer includes both precancerous stage (ductal carcinoma in situ) and invasive cancer of the breast (adenocarcinoma) – clinical stages I, II, and IIIA.<sup>5</sup> Women with early-stage disease have an excellent prognosis, and the overall five-year age-standardised relative survival rate for breast cancer in 2016-2020 was 82.4%.<sup>2</sup> According to the Singapore Cancer Registry report released in 2017, 5-year survival for Stage I at diagnosis was approximately 90%, while for Stage II it was approximately 80%.<sup>6</sup>

To provide holistic and well-coordinated patient care, the patient-centred care (PCC) model is adopted in many healthcare settings in Singapore, including for managing breast cancer.<sup>7</sup> Patient-centred care delivers timely optimum care, addresses patient values and preferences, and has been shown to improve patient and health system outcomes.<sup>8</sup> However, factors like age, cultural beliefs, attitudes, and perception of symptoms have been shown to influence delays in patients seeking health care and treatment for breast cancer.<sup>9</sup>

This report aims to understand key factors that affect the early breast cancer care pathways in Singapore and gain insight into how patient-centred approaches to early breast cancer care can be enhanced.



# The Burden of Breast Cancer in Singapore

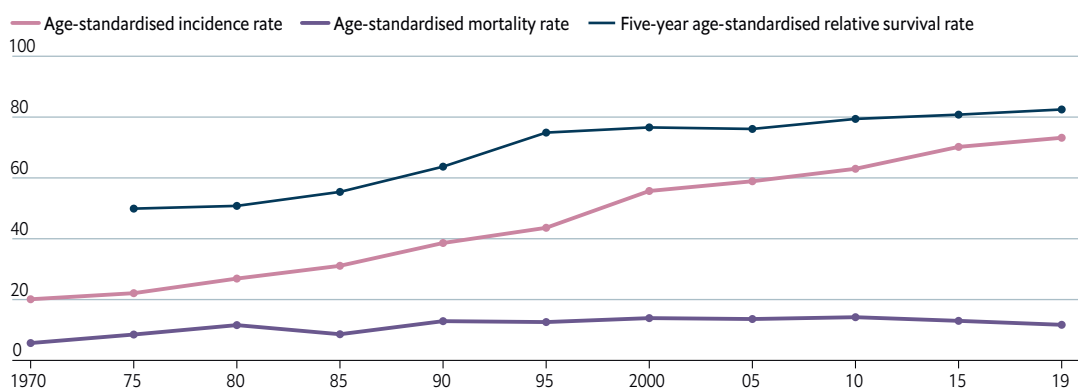
Breast cancer is the most common cancer diagnosed in women in Singapore and there were 3,662 new cases in 2020.<sup>3</sup> This is estimated to increase to up to 5,012 new cases per year by 2040.<sup>10</sup> In 2020, the five-year prevalence rate was 548.98 per 100,000 population (all ages),<sup>3</sup> and between 2014-2018 the age-standardised incidence rate was 70.7 per 100,000 women; it was the leading cause of cancer death among females during this period, accounting for 17.3% of cancer deaths.<sup>11</sup>

The five-year age-standardised survival rate for breast cancer in Singapore has increased

over the past 50 years (1968 -2020), however, the age-standardised incidence rate has also risen, as has the mortality rate (see figure 1).<sup>2</sup> Possible explanations for this include the ageing population, urbanisation, changes in socio-economic status, and adoption of a more western lifestyle.<sup>12</sup>

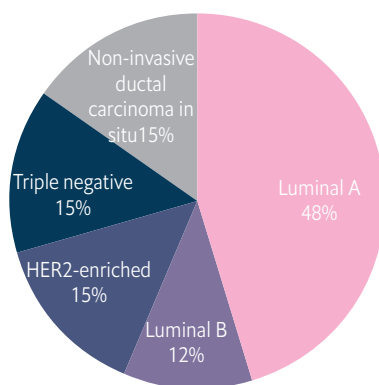
Breast cancer management and outcomes depend on the presence or absence of biomarkers. Invasive breast cancers make up over 80% of cancers, and among these special types of invasive breast cancers develop in different ways that influence their treatment. In Singapore,

**Figure 1: Age-standardised incidence rate (per 100,000 population), age-standardised mortality rate (per 100,000 population), and five year age standardised relative survival rate (%) of breast cancer**



Source: The Singapore Cancer Registry (SCR), Annual Report 2020.

**Figure 2: Prevalence of breast cancer by type**



Source: *World J Clin Oncol.* 2021 Sep 24; 12(9): 808–822.

Luminal A is the most frequently seen subtype occurring in 48% of women.<sup>13</sup> This subtype tends to grow more slowly than other cancers, be lower grade, and have a good prognosis.

The other subtypes are seen in 12-15% of women<sup>13</sup> including luminal B breast cancer which tends to grow faster than luminal A cancer and have a slightly worse prognosis, HER2-enriched breast cancer which grows faster than both luminal cancers and can have a worse prognosis but can usually be successfully treated with targeted therapy medicines, and triple negative breast cancer (TNBC) which is the most aggressive. The 5-year recurrence rate is significantly higher in TNBC than in non-TNBC subtypes (38.4% vs. 29.5%), and TNBC has also been shown to have the poorest survival.<sup>14</sup>

# The Cost of Breast Cancer in Singapore

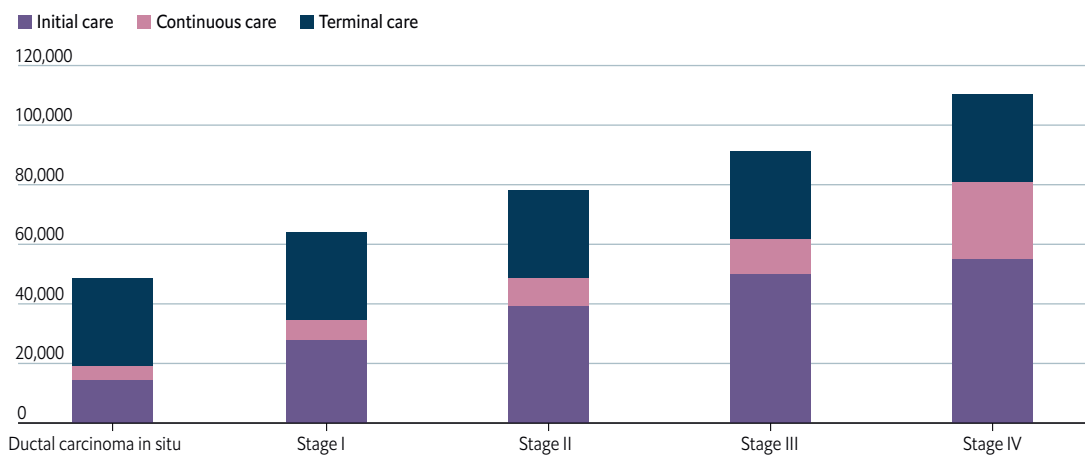
The higher proportion of breast cancer diagnoses at a late stage possess a high-cost burden on the healthcare systems due to the overall increase in the cost of treatment.<sup>15</sup> Singapore's public healthcare philosophy is anchored on individual responsibility and affordable healthcare for all.<sup>16</sup> The public healthcare financing framework comprises four key pillars of compulsory personal medical savings (MediSave), compulsory basic healthcare insurance (MediShield), government administered means-tested subsidies at public healthcare institutions and a government provided safety net (MediFund) to assist needy Singaporeans.<sup>17</sup> Patient out-of-pocket or co-payments remain a part of the Singapore public healthcare financing framework to encourage personal responsibility, and out-of-pocket payments can be reduced through additional individually purchased insurance plans and associated riders. An update to the Cancer Drug List (CDL) was published in September 2022 which includes the MediShield Life and Medisave claim limits for all cancer drugs in Singapore, and approximately 90% of all cancer drugs were included on the list.<sup>18</sup>

The overall costs of screening, diagnosis, and the treatment of breast cancer varies for different stages of the disease. Generally, the later the stage of cancer at diagnosis, the higher the

costs for treatment. At more advanced stages, treatment is likely to be more intensive, and a more aggressive approach is generally needed.<sup>19</sup> A global systematic review found that the mean treatment costs of Stages II, III and IV breast cancer were 32%, 95%, and 109% higher than those of Stage I disease, as patients diagnosed at later stages often receive more treatments than early-stage patients such as chemotherapy and targeted therapy, and more expensive drugs may be needed.<sup>19</sup>

In Singapore the average cost of screening mammography is approximately 110 SGD while the cost of a diagnostic work-up including clinical detection is approximately 1018-1818 SGD<sup>20</sup> with the cost of an ultrasound ranging from around 161-300 SGD for all stages.<sup>21</sup> Treating advanced stage breast cancer is associated with significant increases in costs compared to early-stage cancers, particularly during the initial care phase (the first 12 months after breast cancer diagnosis) and the continuous care phase (the period between initial care and terminal care).<sup>20</sup> This further promotes the importance of early detection which not only provides benefits in terms of life years, mortality reduction, quality of life, increased chance of breast conservation and increased productivity, but is also more cost-effective.

**Figure 3: Treatment cost (SGD) by breast cancer stage at diagnosis and phase of care**




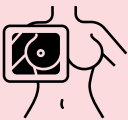


Source: Chootipongchaivat S et al. Cost-effectiveness Analysis of Breast Cancer Screening Using Mammography in Singapore: A Modeling Study.

# The current state of patient-centred care for early breast cancer in Singapore

The breast cancer care continuum spans from population awareness through to referral, screening, diagnosis, treatment, follow-up, rehabilitation and, if applicable, palliative care. The patient’s journey outlines steps within

defined timescales, and there are clear, bright spots (enablers) and some areas of further improvement (resistors) noted in Singapore for optimising patient-centred care for early breast cancer patients.

**Table 1: Overview of enablers and resistors for optimising patient-centred early breast cancer care in Singapore**

Domains	Enablers	Resistors
<b>Population awareness</b> 	<b>Patient Advocacy:</b> Strong patient advocacy ensures that women have information on screening and early detection, diagnosis, and treatment	<b>Lack of knowledge:</b> Limited knowledge on the disease, coupled with misinformation drives fear and discourages patients from seeking help.
	<b>Education:</b> Efforts have been made through community outreach programmes, campaigns and educational talks.	<b>Health Communication:</b> Patient-provider communication needs to be improved, awareness campaigns need to be tailored to targeted populations.
<b>Screening &amp; Diagnosis</b> 	<b>Screening:</b> BreastScreen Singapore was set up in 2002, and the Mammobus was introduced in 2018. Both provide mammography screening services at a subsidised rate.	<b>Inequity:</b> Those of lower education levels and household incomes and those of Malaysian ethnicity are less likely to have knowledge of and attend breast cancer screening.
	<b>International standards of screening guidelines:</b> Guidelines are made using reviews of local and international evidence	<b>Limited access to genetic testing:</b> Though guidelines for genetic assessment referral exist, lack of funding and resources remain a barrier to population-wide genetic testing.
<b>Treatment</b> 	<b>Navigation of services:</b> Access to information on next steps help patients understand their treatment plan and where to seek help.	<b>Patient voice in reimbursement decision-making:</b> Patient engagement in reimbursement decision-making processes is lacking.
	<b>Financial assistance schemes:</b> Including that of medical savings schemes, insurance plans and endowment funds help with out-of-pocket costs.	<b>Lack of integrated care:</b> Current landscape is oncologist-driven and there is a need to involve specialists across multiple disciplines to provide holistic care.
<b>Survivorship</b> 	<b>Support networks:</b> Provides survivors with emotional support from peers diagnosed with the same disease.	<b>Lack of survivorship care programmes:</b> There is a lack of professional care programmes for women to seek postoperative support.

Combining the evidence review findings and Asia-Pacific regional expert panel, the most influential forces affecting optimised patient-centric breast cancer care have been mapped for Singapore (methodology explained in the appendix). Table 1 summarises the various forces that have been identified as either driving (enablers) or hindering (resistors) the optimisation of patient-centric breast cancer care in Singapore, and the following section presents the scores allocated to each factor based on the research and workshop insights and explores each factor in detail.

### Population Awareness

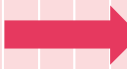

Within the domain of population awareness, four key forces were identified which have an impact on the provision of patient-centred early breast cancer care. Of these, active patient advocacy and inadequate health communication were determined to be the strongest enabling and resisting forces respectively. Effective education efforts and lack of patient knowledge were identified by workshop attendees to be

more moderate enabling and resisting forces respectively.

Population awareness is an important step towards achieving patient-centred care for early breast cancer patients, as it helps increase awareness of the possible benefits of breast cancer screening, early detection and early treatment of the disease. Patient advocacy groups in Singapore such as the Breast Cancer Foundation and the Singapore Cancer Society play a big role toward promoting breast cancer awareness among Singaporeans, actively raising awareness through talks, events, research, and publications that advocate for early detection through regular screening.<sup>22,23</sup>

Patient advocacy groups also regularly hold campaigns to educate the public about breast cancer, and public healthcare institutions such as the National Cancer Centre Singapore (NCCS)'s Cancer Education & Information Services (CEIS) programme provide helplines and education materials, run public programmes such as health talks at the workplace, schools,

**Table 2: Mapping enabling and resisting forces for population awareness in Singapore**

		Strong ← Weak				Weak ← Strong					
		4	3	2	1	1	2	3	4		
		Enabling Forces						Resistors Forces			
Population awareness	<p><b>Patient Advocacy:</b> Strong patient advocacy ensures that women have information on screening and early detection, diagnosis, and treatment.</p> 										<p><b>Lack of knowledge:</b> Limited knowledge on the disease, coupled with misinformation drives fear and discourages patients from seeking help.</p>
	<p><b>Education:</b> Efforts have been made through community outreach programmes, campaigns and educational talks.</p> 										<p><b>Health Communication:</b> Patient-provider communication needs to be improved, awareness campaigns need to be tailored to targeted populations.</p>
						<b>Optimisation of patient-centred early breast cancer care</b>					

community clubs and welfare organisations, and organise community outreach programmes to raise awareness in the heartlands through exhibits and interactive activities.<sup>24</sup> Additionally, patient groups such as the Singapore Cancer Society work closely with both corporations and community partners to further improve the lives of people diagnosed with cancer, often through educational talks and campaigns.<sup>25</sup>

October is Breast Cancer Awareness month in Singapore, and public forums are organised around the country during this time to raise awareness and educate the public on incidence, screening methods and treatment options.<sup>26</sup> Patient advocacy and education have been identified as strong driving forces in promoting patient-centred breast cancer care.

There is an opportunity, however, for advocacy groups to play more of a role in advocating for change, to be more vocal, and to work more closely with the government. “Patient advocacy is multifactorial” says Ms Fiona Pearce, Senior Advisor, HTA and Consumer Engagement and Education at the Agency for Care Effectiveness. “Cancer groups tend to focus on patient support networking, bringing people together to share experiences, education, outreach programmes and talks. But there is room for them to have more influence when it comes to policy decision making - this is not yet within their remit”. Resource and funding can also be a barrier, as support is needed to allow the groups to do more, as well as training for their members to ensure meaningful contribution.

Though efforts to educate the public have been made, there is still a lack of knowledge about breast cancer amongst Singaporeans, which, along with inaccurate understanding of breast cancer risk factors, misinformation and preference to alternate treatments, can act as a barrier to screening.<sup>9,27</sup> Singaporeans often acquire information either through friends or from online sources and although mass media

can act as an enabler to information access, it can also be a barrier if this information is not accurate. Misconceptions arising from unreliable sources can further propel fear of screening, diagnosis and treatment, driving patients’ reluctance to attend screening and to seek treatment.<sup>26</sup> Additionally, confusion can arise when education and messaging is provided in different formats by many different stakeholders across the healthcare ecosystem, as is the case in Singapore. Consolidating these efforts and promoting collaboration and partnership among stakeholders would help provide a more consistent message and drive improved awareness.

Patient-provider communication has also been highlighted as a barrier towards achieving patient-centred care. Short consultation times, overuse of scientific jargon and suboptimal delivery of information can be barriers to information provision by healthcare professionals.<sup>7</sup> “Communication skills should be emphasised in education programmes” says Associate Prof. Benita Tan, Chairman and Senior Consultant in the Division of Surgery at Sengkang General Hospital, Senior Consultant in Breast Surgery at Singapore General Hospital and Senior Consultant in the Division of Surgery and Surgical Oncology at the National Cancer Centre Singapore. “But shortage of manpower and high patient load can be a difficulty, making it hard for oncologists to balance and manage their time to allow for longer consultation times”. A lack of shared decision making is also apparent in Singapore, partly because of the culture, where doctors are sometimes turned to as the sole decision-makers. “We are currently trying to shift the dynamic so that patients are more empowered to ask certain questions about treatment, or find out where they can get more information,” says Ms Pearce. “However this can sometimes be met with resistance from doctors, as it takes more time”. A way forward could be to try to bring these ideas into the medical school

**“We are currently trying to shift the dynamic so that patients are more empowered to ask certain questions about treatment, or find out where they can get more information. However this can sometimes be met with resistance from doctors, as it takes more time.”**

Ms Fiona Pearce  
Senior Advisor, HTA and Consumer Engagement and Education, Agency for Care Effectiveness

curriculum, and co-develop education material with oncologists and patient groups.

### Screening and Diagnosis

Within the domain of screening and diagnosis, four key forces were identified which have an impact on the provision of patient-centred early breast cancer care. Of these, the use of international screening guidelines and the lack of equal access were determined to be

the strongest enabling and resisting forces respectively. The robustness of the screening process and limited access to genetic testing were identified by workshop attendees to be more moderate enabling and resisting forces respectively.

BreastScreen Singapore (BSS) was set up in 2002 under the Health Promotion Board's National Screen for Life programme. It offers mammography screening services at a subsidised rate for eligible patients and encourages women aged 40 and above, with emphasis on the 50-64 age group, to go for mammography every two years.<sup>28</sup> Several patient advocacy groups also provide funding assistance programmes to eligible patients to help with out-of-pocket costs for screening.<sup>29</sup> In 2018, the Mammobus was introduced through the collaborative efforts of the Breast Cancer Foundation (BCF), Singapore Cancer Society (SCS) and National Healthcare Group Diagnostics (NHGD) as a mobile mammography unit aiming to provide a faster, more convenient option for women to get screened.<sup>30</sup> However, despite these screening

**Table 3: Mapping enabling and resisting forces for screening and diagnosis in Singapore**

		Strong ← Weak				Weak → Strong				
		4	3	2	1	1	2	3	4	
		Enabling Forces				Resistors Forces				
Screening and Diagnosis	<p><b>Screening:</b> BreastScreen Singapore was set up in 2002, and the Mammobus was introduced in 2018. Both provide mammography screening services at a subsidised rate.</p>			→		←				<p><b>Inequity:</b> Those of lower education levels and household incomes and those of Malaysian ethnicity are less likely to have knowledge of and attend breast cancer screening.</p>
	<p><b>International standards of screening guidelines:</b> Guidelines are made using reviews of local and international evidence</p>		→			←				<p><b>Limited access to genetic testing:</b> Though guidelines for genetic assessment referral exist, lack of funding and resources remain a barrier to population-wide genetic testing.</p>
		<b>Optimisation of patient-centred early breast cancer care</b>								



**“Despite good access, screening rates are poor in Singapore and there is a lot to do to improve this. Although we have seen improvement in earlier stages of disease, the percentage of those who present at stage four of breast cancer is still higher than other developed countries and that hasn’t changed in 10 years”**

Associate Prof. Benita Tan  
Chairman and Senior Consultant, Division of Surgery, Sengkang General Hospital, Senior Consultant, Breast Surgery, Singapore General Hospital, Senior Consultant, Division of Surgery and Surgical Oncology, National Cancer Centre, Singapore

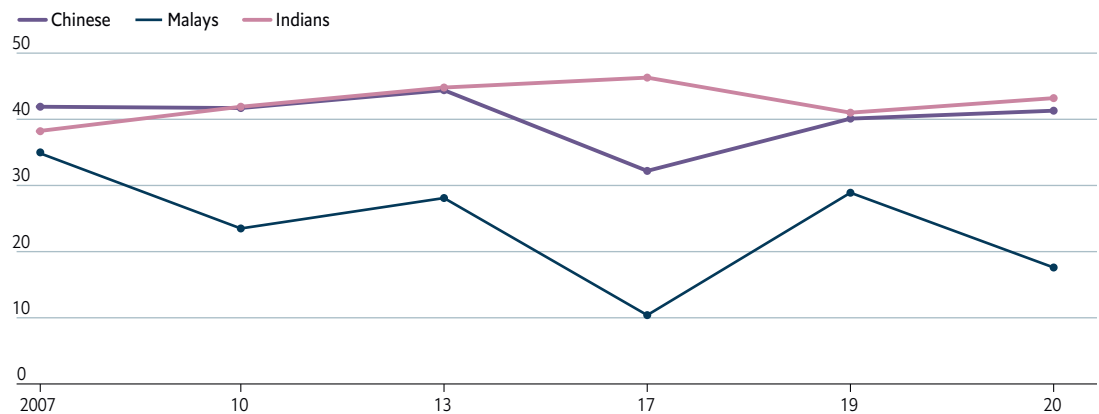
options and their affordability, the screening rates in Singapore remain low. The National Population Health Survey (NPHS) report 2019 found that despite 94% of Singapore female residents aged 50-69 having knowledge of mammography, only 38.7% of women in this age group had gone for mammography in the last two years.<sup>31</sup> In 2020, this number was 37.9%.<sup>11</sup> “Despite good access, screening rates are poor in Singapore and there is a lot to do to improve this. Although we have seen improvement in earlier stages of disease, the percentage of those who present at Stage IV of breast cancer is still higher than other developed countries and that hasn’t changed in 10 years” says Associate Prof. Tan. The system has also been described by some as complicated and inconvenient, due to personal or professional responsibilities. “There is a lot of reliance on the patients themselves,” says Dr Cindy Yeo, Chief Medical Officer at Jaga-Me. “They need to keep in mind that screening is annual or every two years, self-register and self-arrange their screening, make an appointment; most of the time via emails, rather than phone calls or something more automated. This can be a lot for a busy middle aged woman managing family and work commitments.” Despite this,

the screening system in Singapore has been identified as being a strong enabler towards achieving patient-centred care for early breast cancer patients, thanks to its robustness, easy access and low cost.

The Cancer Screening Clinical Practice Guidelines published by the Ministry of Health provide rationale for each screening guideline decision using reviews of local and international evidence.<sup>32</sup> Although the guidelines were published in 2010, the Screening Test Review Committee, under the Academy of Medicine Singapore (AMS) reviews and makes recommendations for these screening guidelines based on scientific evidence and endorsement of relevant professional bodies. Revised guidelines were recently announced in 2019, though there were no changes to breast cancer screening guidelines.<sup>33</sup> By relying on international guidelines to guide local clinical practice, which have been compiled through a rigorous evidence review, Singapore can ensure that global best standards are adopted.

Singapore is a multiracial, multireligious and multicultural society and racial, cultural and religious practices have often influenced cancer care.<sup>34</sup> Those of higher education levels and household incomes tend to be significantly more likely to have knowledge of breast cancer and attend screening. Additionally, screening rates were found to be lower within the Malay ethnic group as compared to the Chinese and Indian groups.<sup>35</sup> Stigma and fears of ostracism can often be barriers to screening amongst the Malay community in Singapore. “Malay patients tend to present themselves for treatment late, perhaps due to religious or cultural reasons” says Associate Prof. Tan. Targeted health campaigns to increase screening rates among Malay patients through focused engagements with community and religious groups could help address the low uptake of breast cancer screening. The Breast Cancer Foundation has ongoing engagements

**Figure 4: Coverage of breast cancer screening (%) of Singapore female residents aged 50 to 69 years by ethnic group**



Source: National Population Health Survey 2020.

with these stakeholders to this end. Ms Susan Leen, General Manager of the Breast Cancer Foundation, Singapore says “To help reach these women we have regular engagements with religious leaders.” Despite these interventions, more is needed to raise the screening rates among Malay women, and a major barrier towards achieving patient-centred care for early breast cancer in Singapore is that efforts to ensure equal access to breast cancer screening have not translated to equal uptake across its multi-ethnic population and sections with lower education and household income levels.<sup>36</sup>

Although genetic screening is not included in the Cancer Screening Clinical Practice Guidelines published by the Ministry of Health,<sup>32</sup> there are guidelines for referral for genetic testing published by the Singapore Cancer Action Network (SCAN).<sup>37</sup> The guidelines specify groups of patients with high risk of hereditary breast cancer to be referred to genetic assessment, but make no recommendations for universal screening due to high test costs and limited medical resources.<sup>37</sup> Despite genetic services being widely available in Singapore, high out-of-pocket costs and lack of funding from insurance companies and government agencies can discourage patients from seeking genetic testing

and counselling.<sup>38</sup> The demand for genetic testing is increasing, and there is a need for more dedicated healthcare professionals, better interpretation of test results, and increased predictive testing for at-risk family members in order to optimise patient-centred early breast cancer care.

## Treatment

Within the domain of treatment, four key forces were identified which have an impact on the provision of patient-centred early breast cancer care. Of these, the financial assistance schemes were determined to be the strongest enabling force. The navigation of services, the involvement of the patient voice, and the lack of integrated care were identified by workshop attendees as being more moderate forces.

In Singapore, the system for referral from primary to secondary care is convenient and effective, and the movement of patients through different services is well coordinated, which is an enabling factor for breast cancer patients.<sup>9</sup> Additionally HealthHub, the national population enablement platform for digital health serves, is a convenient resource for Singaporeans to access information and health records and perform transactions such as appointments, payments

**Table 4: Mapping enabling and resisting forces for treatment in Singapore**

		Strong ← Weak				Weak → Strong				
	Enabling Forces	4	3	2	1	1	2	3	4	Resistors Forces
Treatment	<p><b>Navigation of services:</b> Access to information on next steps help patients understand their treatment plan and where to seek help.</p>									<p><b>Patient voice in reimbursement decision-making:</b> Patient engagement in reimbursement decision-making processes is lacking.</p>
	<p><b>Financial assistance schemes:</b> Including that of medical savings schemes, insurance plans and endowment funds help with out-of-pocket costs.</p>									<p><b>Lack of integrated care:</b> Current landscape is oncologist-driven and there is a need to involve specialists across multiple disciplines to provide holistic care.</p>

and medication requests.<sup>39</sup> Due to its small population, Singaporeans tend to have good access to treatment and short waiting times. However if moving between different clusters of hospitals and different institutions, for instance to access services for mental health, difficulties can arise. Many services cannot be supported at the tertiary level, so patients are required to go into the community, where navigation of services is not as straightforward. “Navigation of services can be complicated. It helps if the services that are needed are all found within the same institution, otherwise it can be a bit of a maze” says Mr Mark Lin, PSS HOD at the Singapore Cancer Society.

Healthcare financing schemes for breast cancer such as MediSave, MediShield Life and MediFund help Singaporeans cover costs for treatment. The updated CDL which includes pre-determined claim limits for all cancer drugs in Singapore was published in September 2022, and approximately 90% of all currently marketed cancer drugs or drug indications are included.<sup>18</sup> In Singapore everyone can access medical care if they need it. However, the system has been designed in a way that caters for what works for the majority, and

more innovative ‘new generation’ treatments are less likely to be funded, including some designed to treat more aggressive forms of early breast cancer. “If you do not fall within the mainstream and your cancer does not respond very well to recommended treatment, this can be difficult because there may be no funding” says Mr Lin. “Due to this, a minority group of individuals may be impacted, but in the long run this is better for everybody. So what we need to do is figure out how to better support these minorities while still providing the hope that their cancer can be dealt with effectively”.

Many Singaporeans have private integrated shield plans (IPs) to protect themselves against high-cost treatments and hospitalisation bills.<sup>40</sup> However, there could be cancer treatment not on the CDL. Chief Health Officer for Income Insurance Limited, Dr Samuel Low says “For cancer treatment beyond the CDL, there are optional riders to provide additional coverage on top of the IPs, though coverage may vary depending on insurers’ plans”.

Singapore’s Ministry of Health (MoH) has recently raised the MediShield Life claim limit

**“We need clear concrete actions, and a roadmap. We need volunteers, and these volunteers need to be trained to understand the system and know how their inputs can make a difference, to make sure this is a value-add.”**

Mr Mark Lin  
PSS HOD, Singapore Cancer Society

for cancer drugs services for both CDL listed and non-listed indications, to encourage private insurers to increase coverage for basic plans and clinically proven, cost-effective treatments that are listed on the CDL and discourage “as-charged” insurance policies.<sup>41, 42</sup> This may result in an increased proportion of patients seeking care in the public sector, which in turn may lead to changing waiting times, chemotherapy chair availability and increased workload in the public sector, which may have a direct impact on patient-centered breast cancer care as well as outcomes, though the full impact is not yet clear.

Despite this, the healthcare financing system in Singapore has been identified as being a strong enabler towards achieving patient-centred care for early breast cancer patients, thanks in part, to the broad inclusion of 90% of registered cancer drugs and indicators on the cancer drug list.

Involving patients in health technology assessment (HTA) and reimbursement decision-making has been shown to lead to more informed, transparent, accountable and legitimate decisions about health technologies.<sup>43</sup> However, patients are rarely involved in decisions related to drug approval or reimbursement in Asia, partly due to a lack of clear, transparent methodologies on how to engage patients in a meaningful way.<sup>44</sup> The Agency of Care

Effectiveness (ACE) is Singapore’s HTA agency, established in 2015 by the Ministry of Health. Until recently, no processes were in place to involve the patient voice in decisions regarding drug reimbursement. “Efforts are being made to improve this,” says Ms Pearce. “The patient voice has been included in ACE’s drug evaluations since the start of 2022 and they have been working with patient organisations in Singapore as part of this process”. However, training and education will need to take place before patients and patient advocacy groups can meaningfully contribute to the process. “We need clear concrete actions, and a roadmap” says Mr Lin. “We need volunteers, and these volunteers need to be trained to understand the system and know how their inputs can make a difference, to make sure this is a value-add”. Despite the positive steps being taken, a gap remains until patients are systematically, meaningfully involved in decisions and this is a barrier towards achieving patient-centred care.

Cancer care in Singapore is provided by both private cancer centres and public tertiary institutes. The current landscape is an oncologist-centric one, leaving little room for primary and secondary health care providers to develop skill sets in cancer care.<sup>45</sup> Cancer patients in Singapore have expressed a desire for professional counselling to deal with emotional challenges of the disease, dietary advice and information on complementary therapies and financial assistance,<sup>7</sup> and there is a need for better integration of multidisciplinary teams of therapists, nurses and nutritionists into the pathway of cancer care and treatment. “In the public sector there are many partners working to provide holistic care and special support, but there are variations in care delivery,” says Associate Prof. Tan. “We can improve on coordination and communication with the public”.

**Table 5: Mapping enabling and resisting forces for survivorship in Singapore**

		Strong ← Weak				Weak ← Strong					
		4	3	2	1	1	2	3	4		
		Enabling Forces				Resisting Forces					
Survivorship	<p><b>Support networks:</b> Provides survivors with emotional support from peers diagnosed with the same disease.</p>										
						<p><b>Optimisation of patient-centred early breast cancer care</b></p>					
										<p><b>Lack of survivorship care programmes:</b> There is a lack of professional care programmes for women to seek postoperative support.</p>	

### Survivorship

Within the domain of survivorship, two key forces were identified which have an impact on the provision of patient-centred early breast cancer care. Of these, the existence of support networks was determined to be a strong enabling force, and the lack of survivorship care programmes was identified by workshop attendees as being a moderate resisting force.

The number of survivors among patients with breast cancer in Singapore has been increasing steadily, and the 5-year age-standardised observed survival rates increased from 70.4% during 2010-2014 to 82.4% during 2016-2020.<sup>46,2</sup> However, many survivors continue to experience health issues, whether related directly to their cancer or due to pre-existing comorbidities, and this can impact their health-related quality of life.<sup>47</sup> For breast cancer survivors, interaction and sharing of experiences can help provide support and comfort, and support groups are a positive step in optimising early-stage breast cancer in Singapore. Many support groups exist, organised by the BCF and others, exclusively for survivors and caregivers to help them better cope with the disease.<sup>48</sup> There can, however, be a lack of information, publicity, and awareness, and many of the attendees hear about them through word of mouth. To reach the subset of the population for whom support groups would be particularly useful, there is a need to improve

targeted awareness campaigns, perhaps through partnerships with hospitals and cancer centres. “We need to let patients know what is available in the community,” says Ms Leen. “If there was a better way for hospitals to signpost, this would let patients know that community organisations are able to facilitate help”.

The lack of survivorship care programmes in Singapore has been identified as a barrier towards achieving patient-centred care for early breast cancer. The majority of current cancer survivorship care programmes are provided by publicly funded national cancer centres, and tend to be small in scale, targeting specific health issues and populations. This is accompanied by a lack of awareness and integration of survivorship care into routine oncologic care, as well as a shortage of healthcare professionals with supportive and survivorship care expertise.<sup>40</sup> Working with primary healthcare providers and empowering them to be able to provide follow-up care for cancer survivors would help lessen the load felt by oncologists, and help provide patients with better continuity of care for the long term. Launched in 2018, the ‘Follow Up Cancer Care in the Community Programme’ helps cancer survivors receive follow-up care in their community provided by selected general practitioners (GPs).<sup>49</sup> This is a positive step towards meeting the survivorship care needs of the increasing numbers of survivors of breast cancer in Singapore.

**Table 6: Summarised force-field analysis**

		Strong ← Weak				Weak → Strong				
	Enablers	4	3	2	1	1	2	3	4	Resistors
Population awareness	<b>Patient Advocacy:</b> Strong patient advocacy ensures that women have information on screening and early detection, diagnosis, and treatment.									<b>Lack of knowledge:</b> Limited knowledge on the disease, coupled with misinformation drives fear and discourages patients from seeking help.
	<b>Education:</b> Efforts have been made through community outreach programmes, campaigns and educational talks.									<b>Health Communication:</b> Patient-provider communication needs to be improved, awareness campaigns need to be tailored to targeted populations.
Screening & Diagnosis	<b>Screening:</b> BreastScreen Singapore was set up in 2002, and the Mammobus was introduced in 2018. Both provide mammography screening services at a subsidised rate.									<b>Inequity:</b> Those of lower education levels and household incomes and those of Malaysian ethnicity are less likely to have knowledge of and attend breast cancer screening.
	<b>International standards of screening guidelines:</b> Guidelines are made using reviews of local and international evidence									<b>Limited access to genetic testing:</b> Though guidelines for genetic assessment referral exist, lack of funding and resources remain a barrier to population-wide genetic testing.
Treatment	<b>Navigation of services:</b> Access to information on next steps help patients understand their treatment plan and where to seek help.									<b>Patient voice in reimbursement decision-making:</b> Patient engagement in reimbursement decision-making processes is lacking.
	<b>Financial assistance schemes:</b> Including that of medical savings schemes, insurance plans and endowment funds help with out-of-pocket costs.									<b>Lack of integrated care:</b> Current landscape is oncologist-driven and there is a need to involve specialists across multiple disciplines to provide holistic care.
Survivorship	<b>Support networks:</b> Provides survivors with emotional support from peers diagnosed with the same disease.									<b>Lack of survivorship care programmes:</b> There is a lack of professional care programmes for women to seek postoperative support.

# Opportunities to improve and optimise early breast cancer care in Singapore

As we look to improve and optimise early breast cancer care in Singapore, there are some actions, suggested by the experts in our workshop, that could be implemented to begin moving towards better patient centred early breast cancer care.

## 1. Drive self-responsibility for health

The infrastructure for breast cancer screening exists in Singapore, yet rates remain low at approximately 40%. To encourage more women to get screened, they must first be encouraged to care for their health and for themselves. “Women in Singapore prioritise their families above all else, and do not prioritise themselves. They put everyone else first” says Ms Leen. “We need to change the mindset of people, to say that taking care of myself and my own health means I can take care of my family” agrees Associate Prof. Tan. Different angles could be explored, an example being BCF’s photo exhibition which

showcased the perspectives of cancer survivors’ children, to encourage mothers and family members to go for screening. Healthier SG is an initiative through the Ministry of Health which is helping Singaporeans take steps towards better health. It is recognised that there are barriers preventing Singaporeans from taking greater personal responsibility for their health, and recommendations are being explored to address these and empower people to take charge.<sup>50</sup> By expanding this initiative to address issues specifically faced by women, and what is preventing them from taking self-responsibility for their health, solutions and opportunities could be found.

## 2. Shift focus from curative to preventative

Singapore is one of the world’s fastest ageing countries, and the proportion of Singapore’s citizen population aged 65 years and above is rising rapidly. This has been driving the rising prevalence of chronic conditions such as breast cancer, and it is expected that this burden will continue to increase. Shifting the focus from curative care to preventive care would be a positive step towards resilience, and an integral part of prevention for breast cancer is screening and self-examination. “In Singapore, there is a lot more emphasis on treatment, and not.

**“In Singapore, there is a lot more emphasis on treatment, and not enough time and effort is being invested into preventive efforts. More upstream work is needed.”**

Mr Mark Lin  
PSS HOD, Singapore Cancer Society

**“Healthcare professionals who come together to make breast cancer care the top of the agenda can encourage women to come forward, and give them confidence that they are being heard.”**

Associate Prof. Benita Tan  
Chairman and Senior Consultant, Division of Surgery, Sengkang General Hospital, Senior Consultant, Breast Surgery, Singapore General Hospital, Senior Consultant, Division of Surgery and Surgical Oncology, National Cancer Centre, Singapore

enough time and effort is being invested into preventive efforts,” says Mr Lin. “More upstream work is needed”. In Singapore, low screening rates mean that a high proportion of women are being diagnosed at later stages, 10.9% at Stage IV.<sup>2</sup> Advanced breast cancer not only creates an urgent health challenge but also impedes quality of life, and brings significant economic costs for patients, their families and public health systems. By focusing efforts and resources on early detection and sharing knowledge about risk factors and prevention, this would reduce costs for both health systems and individuals, and in the long term could help save lives.

### **3. Come together with a consistent message**

There is action being taken across the country to drive awareness and engagement, with many initiatives and ideas being implemented

among different groups. Moving away from the current sporadic model and instead promoting more structured collaboration and partnership among stakeholders could lead to a more holistic programme being designed, and a consistent message being shared. “Healthcare professionals who come together to make breast cancer care the top of the agenda can encourage women to come forward, and give them confidence that they are being heard,” says Associate Prof. Tan. By having one unified voice sharing the same message rather than many smaller ones, this could help uncover some political influence, and effect change. Having a neutral party facilitate this collaboration could be a possible solution, and the People’s Association (PA) was suggested by the workshop participants as a possible conduit to integrate different stakeholder activities within each constituency, to collectively drive the message of self-responsibility as well as to educate the public on the value of preventative actions, early detection and treatment.

There are several drivers of patient-centred early breast cancer care in Singapore with bright spots being patient advocacy, the screening process, and financial assistance schemes. Yet poor health communication, unequal access and lack of integrated care remain the most significant barriers. Policymakers should focus on these areas of improvement to further enhance patient-centred care.



# References:

- <sup>1</sup> Ho PJ, Yeoh YS, Miao H, Lim SH, Tan EY, Tan BKT, et al. (2021) Cohort profile: The Singapore Breast Cancer Cohort (SGBCC), a multicenter breast cancer cohort for evaluation of phenotypic risk factors and genetic markers. *PLoS ONE* 16(4): e0250102. <https://doi.org/10.1371/journal.pone.0250102>
- <sup>2</sup> Health Promotion Board. Singapore Cancer Registry Annual Report 2020. Available from: [https://nrdo.gov.sg/docs/librariesprovider3/default-document-library/scr-2020-annual-report\\_web-release.pdf?sfvrsn=e0a73b99\\_0](https://nrdo.gov.sg/docs/librariesprovider3/default-document-library/scr-2020-annual-report_web-release.pdf?sfvrsn=e0a73b99_0)
- <sup>3</sup> International Agency for Research on Cancer, World Health Organisation. The Global Cancer Observatory - Singapore Cancer Profile 2020 Available from: <https://gco.iarc.fr/today/data/factsheets/populations/702-singapore-fact-sheets.pdf>
- <sup>4</sup> Ho, PJ, Wong, FY, Chay, WY, et al. Breast cancer risk stratification for mammographic screening: A nation-wide screening cohort of 24,431 women in Singapore. *Cancer Med.* 2021; 10: 8182– 8191. doi:10.1002/cam4.4297
- <sup>5</sup> National Cancer Institute. The definition of early-stage breast cancer. Available from: <https://www.cancer.gov/publications/dictionaries/cancer-terms/def/early-stage-breast-cancer>
- <sup>6</sup> National Cancer Centre Singapore. Available from: <https://www.nccs.com.sg/giving/pages/breast-cancer-research.aspx>
- <sup>7</sup> Chua GP, Tan HK. A qualitative approach in determining the patient-centered information and supportive care needs of cancer patients in Singapore. *BMJ Open.* 2020 Feb 28;10(2):e034178. doi: 10.1136/bmjopen-2019-034178.
- <sup>8</sup> Gagliardi AR, Wright FC, Look Hong NJ, Groot G, Helyer L, Meiers P, Quan ML, Urquhart R, Warburton R. National consensus recommendations on patient-centered care for ductal carcinoma in situ. *Breast Cancer Res Treat.* 2019 Apr;174(3):561-570. doi: 10.1007/s10549-019-05132-z
- <sup>9</sup> Ng, C.W.Q., Lim, J.N.W., Liu, J. et al. Presentation of breast cancer, help seeking behaviour and experience of patients in their cancer journey in Singapore: a qualitative study. *BMC Cancer* 20, 1080 (2020). <https://doi.org/10.1186/s12885-020-07585-8>
- <sup>10</sup> International Agency for Research on Cancer, World Health Organisation. Cancer Tomorrow 2022. Available from: [https://gco.iarc.fr/tomorrow/en/dataviz/trends?types=0&sexes=2&mode=cancer&group\\_populations=0&multiple\\_populations=0&multiple\\_cancers=1&cancers=20&populations=702&age\\_start=0&age\\_end=17](https://gco.iarc.fr/tomorrow/en/dataviz/trends?types=0&sexes=2&mode=cancer&group_populations=0&multiple_populations=0&multiple_cancers=1&cancers=20&populations=702&age_start=0&age_end=17)
- <sup>11</sup> National Population Health Survey 2020. Epidemiology & Disease Control Division and Policy, Research & Surveillance Group Ministry of Health and Health Promotion Board, Singapore. Available from: <https://www.moh.gov.sg/docs/librariesprovider5/default-document-library/nphs-2020-survey-report.pdf>
- <sup>12</sup> Ian TWM, Tan EY, Chotai N. Role of mammogram and ultrasound imaging in predicting breast cancer subtypes in screening and symptomatic patients. *World J Clin Oncol.* 2021 Sep 24;12(9):808-822. doi: 10.5306/wjco.v12.i9.808.
- <sup>13</sup> Jara-Lazaro AR, Thilagaratnam S, Tan PH. Breast cancer in Singapore: some perspectives. *Breast Cancer.* 2010;17(1):23-8. doi: 10.1007/s12282-009-0155-3. Epub 2009 Aug 22. PMID: 19701678.
- <sup>14</sup> Saw S, Lim J, Lim SH, Wong M, Lim C, Yap YS. Patterns of relapse after neoadjuvant chemotherapy in breast cancer: implications for surveillance in clinical practice. *Breast Cancer Res Treat.* 2019 Aug;177(1):197-206. doi: 10.1007/s10549-019-05290-0.
- <sup>15</sup> Lim, Y.X.; Lim, Z.L.; Ho, P.J.; Li, J. Breast Cancer in Asia: Incidence, Mortality, Early Detection, Mammography Programs, and Risk-Based Screening Initiatives. *Cancers* 2022, 14, 4218. <https://doi.org/10.3390/cancers14174218>
- <sup>16</sup> Ministry of Health Singapore. Singapore's Healthcare System. Available from: <https://www.moh.gov.sg/home/our-health-care-system>
- <sup>17</sup> Ministry of Health Singapore. Healthcare Schemes and Subsidies. Available from: <https://www.moh.gov.sg/cost-financing/healthcare-schemes-subsidies>
- <sup>18</sup> Cancer drug list. Available from: <https://www.moh.gov.sg/home/our-healthcare-system/medishield-life/what-is-medishield-life/what-medishield-life-benefits/cancer-drug-list>

- <sup>19</sup> Sun L, Legood R, Dos-Santos-Silva I, Gaiha SM, Sadique Z. Global treatment costs of breast cancer by stage: A systematic review. *PLoS One*. 2018 Nov 26;13(11):e0207993. doi: 10.1371/journal.pone.0207993. PMID: 30475890; PMCID: PMC6258130.
- <sup>20</sup> Chootipongchaivat S, Wong XY, Ten Haaf K, Hartman M, Tan KB, van Ravesteyn NT, Wee HL. Cost-effectiveness Analysis of Breast Cancer Screening Using Mammography in Singapore: A Modeling Study. *Cancer Epidemiol Biomarkers Prev*. 2021 Apr;30(4):653-660. doi: 10.1158/1055-9965.EPI-20-1230.
- <sup>21</sup> Wong, J.Z.Y., Chai, J.H., Yeoh, Y.S. et al. Cost effectiveness analysis of a polygenic risk tailored breast cancer screening programme in Singapore. *BMC Health Serv Res* 21, 379 (2021). <https://doi.org/10.1186/s12913-021-06396-2>.
- <sup>22</sup> Breast Cancer Foundation. About BCF. Available from: <https://www.bcf.org.sg/about/about-bcf/>
- <sup>23</sup> Singapore Cancer Society. To Minimise Cancer and Maximise Lives. Available from: <https://www.singaporecancersociety.org.sg/about/about-scs/to-minimise-cancer-and-maximise-lives.html>
- <sup>24</sup> National Cancer Centre, SingHealth. Cancer Education and Information. Available from: <https://www.nccs.com.sg/patient-care/specialties-services/cancer-education-and-information>
- <sup>25</sup> Singapore Cancer Society. Corporate and Community Partnerships. available from: <https://www.singaporecancersociety.org.sg/get-involved/corporate-partnerships.html#sponsorship>
- <sup>26</sup> Ng DY, Tudor Car L, Ng MJM, et al. Identifying barriers to early presentation in patients with locally advanced breast cancer (LABC) in Northern Singapore: Qualitative study. *PLOS ONE*. 2021; 16(5): e0252008. <https://doi.org/10.1371/journal.pone.0252008>
- <sup>27</sup> Ministry of Health Singapore. National Population Health Survey 2020 (Household Interview and Health Examination). 2020. Available from: <https://www.moh.gov.sg/docs/librariesprovider5/default-document-library/nphs-2020-survey-report.pdf>
- <sup>28</sup> Lee HP, Chew CT, Consigliere DT, Heng D, Huang DT, Khoo J, Khoo KS, Low J, Lui S, Ooi LL, Puvanendran R, Siow A, Tan A, Yeoh KG. Ministry of health clinical practice guidelines: cancer screening. *Singapore Med J*. 2010 Feb;51(2):170-3; quiz 174-5. PMID: 20358158.
- <sup>29</sup> HealthHub. Screen for Life - Breast Cancer Screening Programme. Available from: <https://www.healthhub.sg/programmes/174/breast-cancer-screening>
- <sup>30</sup> National Healthcare Group Diagnostics. Mammobus. Available from: <https://www.nhgd.com.sg/corporate-community-partners/Pages/Mammobus.aspx>
- <sup>31</sup> National Population Health Survey 2020. Epidemiology & Disease Control Division and Policy, Research & Surveillance Group Ministry of Health and Health Promotion Board, Singapore. Available [www.moh.gov.sg/docs/librariesprovider5/default-document-library/nphs-2020-survey-report.pdf](http://www.moh.gov.sg/docs/librariesprovider5/default-document-library/nphs-2020-survey-report.pdf)
- <sup>32</sup> Lee HP, Chew CT, Consigliere DT, Heng D, Huang DT, Khoo J, Khoo KS, Low J, Lui S, Ooi LL, Puvanendran R, Siow A, Tan A, Yeoh KG. Ministry of health clinical practice guidelines: cancer screening. *Singapore Med J*. 2010 Feb;51(2):170-3; quiz 174-5. PMID: 20358158.
- <sup>33</sup> Ministry of Health. Release of new screening test review committee (STRC) guidelines, including changes to diabetes mellitus, lipid disorders and cervical cancer screening. Available from: [https://www.moh.gov.sg/licensing-and-regulation/regulations-guidelines-and-circulars/details/release-of-new-screening-test-review-committee-\(strc\)-guidelines-including-changes-to-diabetes-mellitus-lipid-disorders-and-cervical-cancer-screening](https://www.moh.gov.sg/licensing-and-regulation/regulations-guidelines-and-circulars/details/release-of-new-screening-test-review-committee-(strc)-guidelines-including-changes-to-diabetes-mellitus-lipid-disorders-and-cervical-cancer-screening)
- <sup>34</sup> Low Cheng Hock, An Overview of the Cancer Control Programme in Singapore, *Japanese Journal of Clinical Oncology*, Volume 32, Issue suppl\_1, February 2002, Pages S62–S65, <https://doi.org/10.1093/jjco/hye133>
- <sup>35</sup> Chan TKC, Tan LWL, van Dam RM et al. Cancer Screening Knowledge and Behavior in a Multi-Ethnic Asian Population: The Singapore Community Health Study. *Frontiers in Oncology*. 2021; 11:684917. doi: 10.3389/fonc.2021.684917
- <sup>36</sup> Goh, SA., Lee, J.K., Seh, W.Y. et al. Multi-level determinants of breast cancer screening among Malay-Muslim women in Singapore: a sequential mixed-methods study. *BMC Women's Health* 22, 383 (2022). <https://doi.org/10.1186/s12905-022-01972-y>
- <sup>37</sup> Lee S, Ang P, Koh, P et al. Singapore Cancer Network (SCAN) Guidelines for Referral for Genetic Evaluation of Common Hereditary Cancer Syndromes. *Annals of the Academy of Medicine, Singapore*. 2015; 44:492-510.

- <sup>38</sup>. Chiang J, Ngeow J. The management of BRCA1 and BRCA2 carriers in Singapore. *Chin Clin Oncol* 2020; 9(5):62. doi: 10.21037/cco-20-104
- <sup>39</sup>. HealthHub. About HealthHub. Available from: <https://www.healthhub.sg/about-us>
- <sup>40</sup>. IP riders providing consumers choice for treatment beyond CDL. Available from: <https://www.lia.org.sg/media/3569/lia-press-release-ip-support-for-policyholders.pdf>
- <sup>41</sup>. Ministry of Health Singapore. MOH will act to manage cancer drug costs when necessary. Available from: <https://www.moh.gov.sg/news-highlights/details/moh-will-act-to-manage-cancer-drug-costs-where-necessary>
- <sup>42</sup>. Ministry of Health Singapore. No one will be denied appropriate cancer care due to an inability to pay. available from: <https://www.moh.gov.sg/news-highlights/details/no-one-will-be-denied-appropriate-cancer-care-due-to-an-inability-to-pay>
- <sup>43</sup>. Abelson J, Wagner F, DeJean D, Boesveld S, Gauvin FP, Bean S, Axler R, Petersen S, Baidoobonso S, Pron G, Giacomini M, Lavis J. Public and patient involvement in health technology assessment: A framework for action. *Int J Technol Assess Health Care*. 2016 Jan;32(4):256-264. doi: 10.1017/S0266462316000362.
- <sup>44</sup>. Oortwijn W, Determann D, Schiffrs K, Tan SS, van der Tuin J. Towards Integrated Health Technology Assessment for Improving Decision Making in Selected Countries. *Value Health*. 2017 Sep;20(8):1121-1130. doi: 10.1016/j.jval.2017.03.011.
- <sup>45</sup>. Loh KW, Ng T, Choo SP, Saw HM, Mahendran R, Tan C, Chang GCY, Ong YJ, Yee ACP, Chan A, Soo KC. Cancer Supportive and Survivorship Care in Singapore: Current Challenges and Future Outlook. *J Glob Oncol*. 2018 Sep;4:1-8. doi: 10.1200/JGO.17.00117.
- <sup>46</sup>. Singapore Cancer Registry: Interim Annual Registry Report: Trends in Cancer Incidence in Singapore, 2010-2014. Available from: [https://www.nrdo.gov.sg/docs/librariesprovider3/default-document-library/cancer-trends-2010-2014\\_interim-annual-report\\_final-\(public\).pdf?sfvrsn=0](https://www.nrdo.gov.sg/docs/librariesprovider3/default-document-library/cancer-trends-2010-2014_interim-annual-report_final-(public).pdf?sfvrsn=0)
- <sup>47</sup>. Rowland JH, Bellizzi KM. Cancer survivorship issues: life after treatment and implications for an aging population. *J Clin Oncol*. 2014 Aug 20;32(24):2662-8. doi: 10.1200/JCO.2014.55.8361.
- <sup>48</sup>. Breast Cancer Foundation. Our Services. Available from: <https://www.bcf.org.sg/our-services/#section-support-group>
- <sup>49</sup>. National University Cancer Institute Singapore. Follow Up Cancer Care in the Community. Available from: <https://www.ncis.com.sg/Our-Services/Home-and-Community-Programmes/Pages/Follow%20Up%20Cancer%20Care%20in%20the%20Community.aspx>
- <sup>50</sup>. HealthySG taskforce charts path to create a healthier Singapore for all. Available from: <https://www.moh.gov.sg/news-highlights/details/healthysg-taskforce-charts-path-to-create-a-healthier-singapore-for-all>

# Appendix

## Overall Methodology

The primary aim of this research programme was to understand the patient-centred approaches to early breast cancer in Singapore and the ways in which care can be enhanced.

Economist Impacts’s approach to achieve this aim is comprised of the following components:

1. Literature review: to understand the various data available on patient-centred early breast cancer care in Singapore and identify the factors that either strengthen or hinder patient care.
2. Meeting of experts across the Asia-Pacific region: to incorporate the expertise of those working directly on patient-centred care for early breast cancer patients in the region, to refine the focus of the research programme, and capture key aspects and best sources of information to help develop the Singapore-specific force-field.
3. In-country Singapore workshop: to incorporate insights from experts working in Singapore including surgeons, policy advisors, and patient advocates. The experts were asked to rate the various forces based on the level of impact that they have in either enabling or hindering patient-centred care.

The review started with a broad view of the issues related to breast cancer care in the Asia Pacific Region including the epidemiology of breast cancer subtypes, current prevalence rates, outcomes, early identification and diagnostic models, clinical pathways and delivery modes within early-stage breast cancer with a focus on patient-centred care.

## Scoring criteria for force-field analysis

To ensure a more nuanced view of early breast cancer care and treatment, we identified four domains of patient-centred care – Population Awareness, Screening and Diagnosis, Treatment, and Survivorship. For each of these areas, we triangulated primary (expert engagement) and secondary (desk research) data to identify enablers and resisters for optimising patient-centred cancer care specific to Singapore. We then developed a scale to assess the impact of each force, supported by judgements found in the research phase of this study.

### Scoring criteria for force-field analysis

Scoring		Enablers	Resistors
1	<b>Weak Impact</b>	Force has little impact on optimal patient-centred care	Force exists but has little impact on optimal patient-centred care or can be easily addressed
2	<b>Some Impact</b>	Force has some impact, but is still developing, is not widely utilised or implemented, or only certain groups may take it into consideration	Force poses some resistance to optimal patient-centred care but can be addressed with planning and resources
3	<b>Considerable Impact</b>	Evidence of the presence of the force, but not being followed or utilised sufficiently to deliver optimal patient-centred care	Force poses considerable resistance to optimal patient-centred care, but the impact can be minimised with extensive planning and resources.
4	<b>Strong Impact</b>	Force is a high-quality, generally accepted standard of practice and/or provides optimal patient-centred care	Force poses strong resistance to optimising patient-centred early breast cancer care

To tailor the force field to Singapore, it was felt that the perspective of the key experts should be used to elicit the scores. This was carried out in a workshop setting, with two follow-up interviews. In the workshop, an impartial facilitator worked iteratively with stakeholders to help them think more clearly about the relevant issues. Care was taken to ensure that as broad a range of potential stakeholders was included in the process as possible. Eight participants took part in the workshop and follow-up interviews, representing a range of expertise from healthcare to patient advisory groups.

During the workshop, the facilitator discussed each indicator in detail. After the workshop, each participant was given an option of providing their scores by sharing copies of the paper-based questionnaire. Each indicator was scored by the participants from 1 – 4 depending on the level of perceived impact that it has in enabling or hindering patient-centred care as shown in the table above. We analysed the results from the workshop and triangulated the data from desk research, and expert engagement and followed a consensus-based process to arrive at final scores for the forcefield analysis. This analysis helped in the identification of priority areas and issues at the country level and opportunities for improvement to tackle the greatest unmet needs in early breast cancer care.

While every effort has been taken to verify the accuracy of this information, Economist Impact cannot accept any responsibility or liability for reliance by any person on this report or any of the information, opinions or conclusions set out in this report. The findings and views expressed in the report do not necessarily reflect the views of the sponsor.

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