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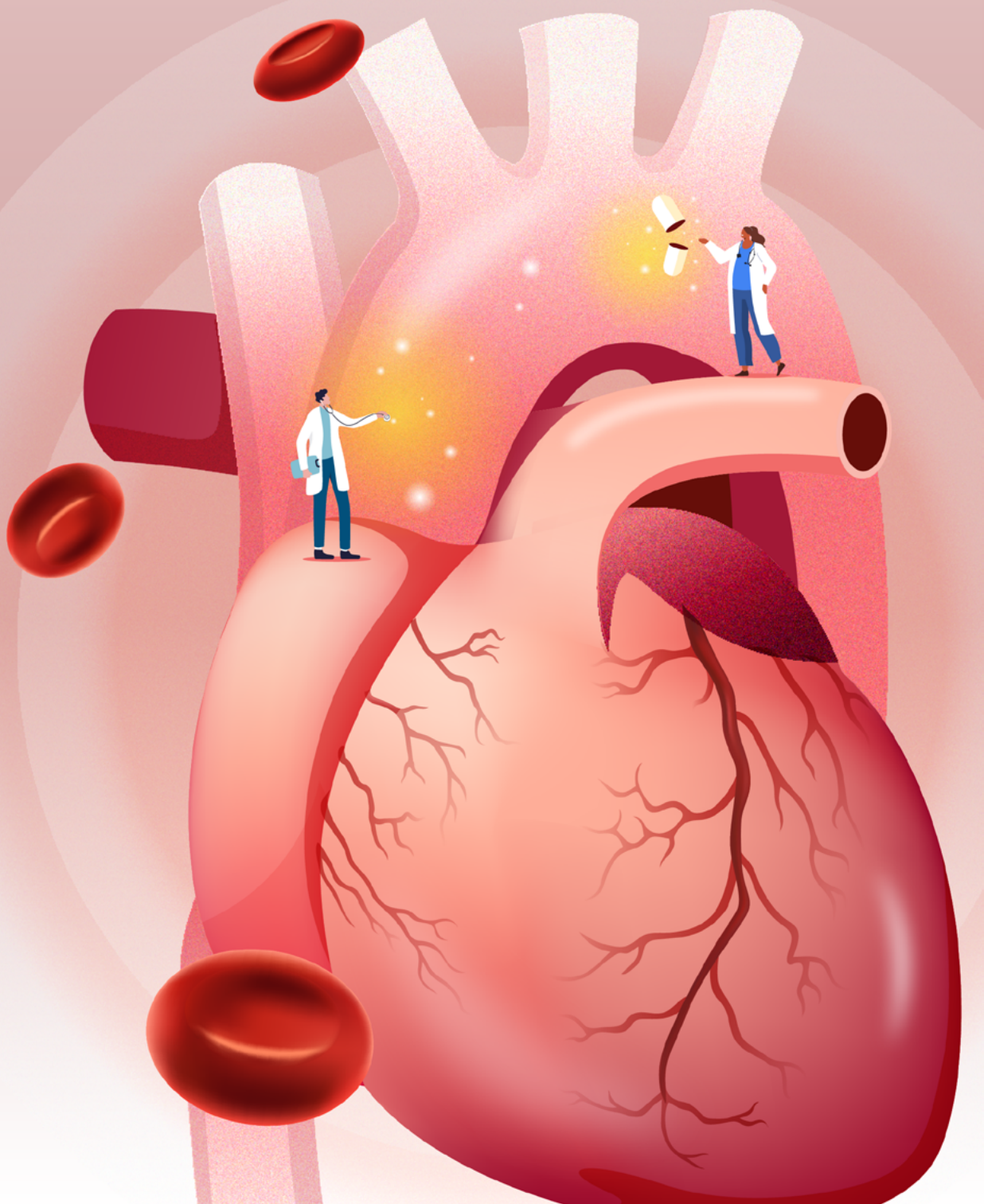
ASIA-PACIFIC CARDIOVASCULAR DISEASE ALLIANCE

Improving heart failure policy and management in Asia Pacific: Opportunities for impact

October 2025



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1.Foreword

Dr. N Krishna Reddy
APAC CVD Alliance

Cardiovascular diseases (CVD) remain the leading cause of death in Asia Pacific, claiming 19 lives every minute. Alongside a rapidly ageing population, the region faces a surge in hypertension (HT), diabetes, dyslipidemia and obesity-key drivers of the cardio-reno-metabolic disease spectrum-all of which are fueling the growing burden of heart failure (HF). An estimated 32 million people are currently living with HF in Asia Pacific (APAC), a number set to rise unless urgent action is taken.

While the Sustainable Development Goals (SDGs) have spurred greater policy awareness, attention to CVDs-and HF in particular-remains uneven across the region. Care models are often hospital-centric and highly fragmented, ill-equipped to manage what has become a silent and escalating epidemic. territories pursuing universal health coverage (UHC) face dual pressures of expanding service delivery and ensuring financial protection, even as their populations age and the prevalence of chronic conditions continues to climb. Without timely intervention, already overstretched health financing systems will face unsustainable strain.

In response, the Asia Pacific Cardiovascular Disease Alliance (APAC CVD Alliance), a coalition of committed multisectoral stakeholders, in collaboration with Deloitte, has developed this white paper:

Improving heart failure policy and management in Asia Pacific: Opportunities for impact.
HF care in APAC stands at a critical inflection point. This report offers a clear and actionable blueprint to reframe HF as a public health priority, improve access to quality care, and empower patients and communities. It calls for coordinated system-wide reform-from investing in primary and tertiary care, to scaling digital diagnostics and strengthening community-based models of care. With inclusive policymaking, sustained investment, and multi-stakeholder collaboration across borders, APAC has the potential to lead the world in developing equitable, data-driven, and resilient approaches to heart failure management.

HF and CVD remain a formidable challenge for the APAC region. The APAC CVD Alliance is committed to working with governments, policymakers, patient organisations, healthcare providers, and industry partners to help turn this vision into reality. Together, we can move toward our shared goal of a heart-healthy future for all.

Dr. N Krishna Reddy
On behalf of APAC CVD Alliance

2.About the White Paper

"Improving heart failure policy and management in Asia Pacific: Opportunities for impact" is a collaborative work by the APAC CVD Alliance and Deloitte. This White Paper evaluates the current HF policy and management landscape across eight key APAC markets: Australia, China, Hong Kong, Japan, South Korea, Taiwan, Thailand, and Vietnam. It aims to identify critical gaps, uncover areas for intervention, and provide actionable recommendations to drive meaningful improvement in HF policy and care.

Anchored in the APAC CVD Alliance's broader mandate to drive evidence-based cardiovascular policy reform, the report positions HF as a critical yet under-prioritised component of national health strategies. By mapping the entire continuum of HF care-from prevention and early detection to diagnosis, treatment, and long-term management-the White Paper identifies key policy gaps and system-level inefficiencies, while offering actionable, context-specific recommendations for governments and healthcare stakeholders.

To guide this effort, the Alliance and Deloitte conducted a comprehensive evidence review and convened an advisory panel comprising regional and local experts. Their insights informed a structured benchmarking framework that enabled consistent, comparative evaluation across territories. This scorecard approach highlights both strengths and areas requiring urgent attention and helps prioritise targeted actions for systemic improvement.

We would like to express our sincere thanks to the experts who contributed their time and knowledge to this initiative. Their input has been invaluable in shaping the findings and refining the recommendations.

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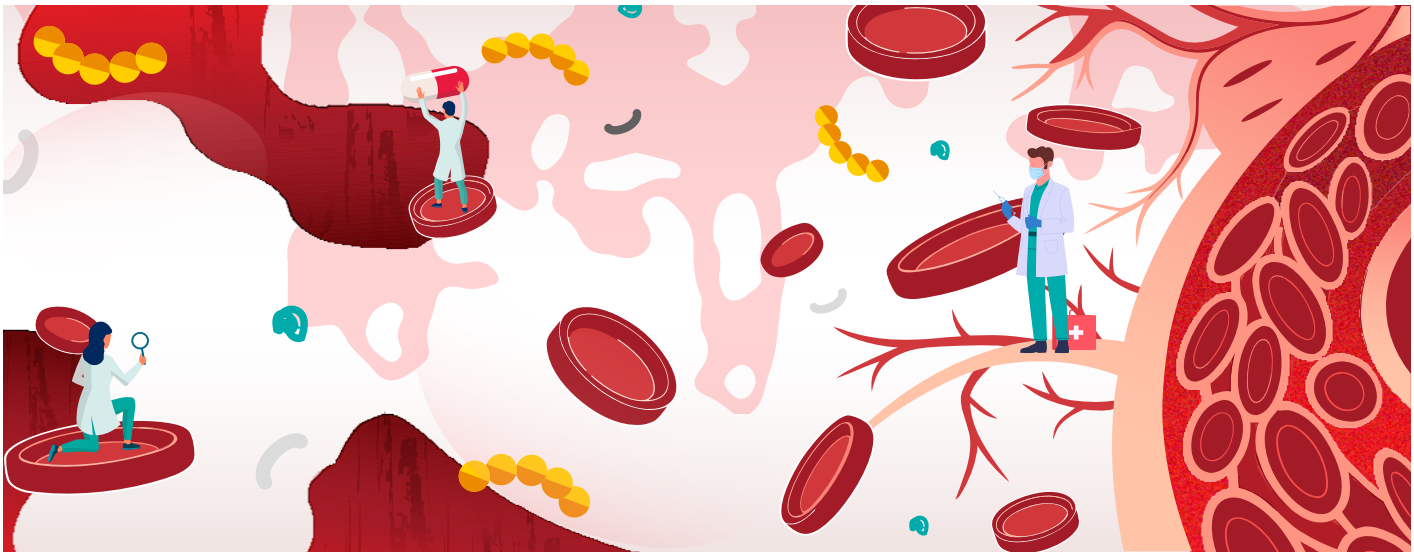
This White Paper reflects the independent work of the APAC CVD Alliance and Deloitte. The research was led by **Yongho Yi**, conducted by **Chi Tran** and **Josephine Irene Soeharto**. **Kavita Rekhraj** oversaw the research project. The views and conclusions expressed herein do not necessarily represent those of the sponsor or the Advisory Panel's affiliated organisations.

3.

Executive summary



Overview

HF has become a significant public health concern in the APAC region, driven by rapid demographic shifts, increased life expectancy, and a growing burden of chronic conditions such as HT, diabetes, and coronary artery disease. With nearly 32 million people currently affected, and projections indicating a steady rise in the coming decades, HF represents an urgent and growing priority for health systems across the region[1]. Epidemiological data reveal significant intra-regional variation, with prevalence rates ranging from 0.34% in South Korea to 1.40% in Taiwan[2]. These disparities reflect differences in healthcare access, disease awareness, and levels of socioeconomic development. Moreover, such disparities are closely linked to poorer patient outcomes, particularly delayed diagnosis and higher mortality. For instance, China reported a median 7.5-day delay from symptom onset to care-seeking among HF patients-driven by low symptom awareness, limited caregiver knowledge, and inadequate support within the primary care system. In Vietnam and Thailand, similar systemic weaknesses in diagnostics and continuity of care are implicated in elevated 1-year crude mortality rates, 25.8% and 20.6% respectively, compared to 11.1% in Japan and 10.9% in South Korea, both of which have stronger healthcare infrastructure and earlier intervention pathways[3]. These findings clearly illustrate how gaps in healthcare infrastructure directly contribute to late-stage presentation and adverse outcomes across the APAC region. The clinical challenges are real, and without timely, context-specific policy interventions, the burden on both patients and health systems will only intensify.

Beyond its clinical toll, HF places a substantial economic burden across the APAC region. In middle-income economies such as China and Thailand, HF accounts for over 10% of current health expenditure, while in high-income economies like South Korea, estimates reach up to 8%[4]. Productivity losses further compound this impact, with regional estimates indicating a 30-40% decline among working-age populations. Limited public coverage leads to high out-of-pocket expenses[5], while low awareness, inadequate screening, and fragmented care continue to hinder effective management[6].

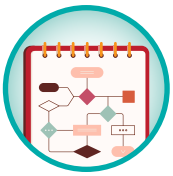
In addition, the scarcity of data on disease prevalence and incidence hinders healthcare policymakers and providers from fully evaluating the disease's effects on patients and regions. As APAC continues to urbanise and populations age, there is an urgent need for tailored strategies to enhance prevention, diagnosis, and long-term management of HF.

This White Paper reviews HF policy and care across eight APAC territories, highlighting key gaps and outlining an action plan focused on early diagnosis across primary and tertiary care, expanded point-of-care testing (POCT), greater public and provider awareness, and improved follow-up care. By leveraging financing mechanisms and task-shifting to primary settings, the plan aims to reduce HF-related hospitalisations by 20% and improve patient survival rates by 15% within five years.

Key Findings

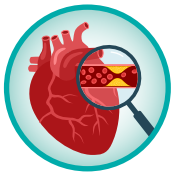
Heart failure lacks policy visibility and dedicated resources

Despite its growing burden, HF remains under-recognised as a distinct health priority in most APAC territories. national policies often subsume HF under broader cardiovascular or non-communicable diseases (NCD) frameworks, leading to fragmented implementation, limited funding, and weak accountability mechanisms. Only a few territories, such as Japan and South Korea, explicitly reference HF in national plans. Most territories lack measurable targets, dedicated budgets, or integration of HF into primary care reform, insurance schemes, or universal health coverage (UHC). Policy and financing disparities are stark: high-income economies demonstrate stronger policy alignment and financing, whereas middle-income ones often struggle with limited funding and weaker policy implementation capacity.



Guidelines exist but are poorly implemented at the frontline

Most APAC territories adopt international HF guidelines (e.g., European Society of Cardiology (ESC), American Heart Association/American College of Cardiology (AHA/ACC)) or develop localised versions, but implementation remains inconsistent. Barriers include limited integration of guidelines into primary care, delayed incorporation of new therapies into reimbursement systems, and a lack of continuous professional education. Health worker shortages, overreliance on tertiary care, and limited follow-up and palliative care services further hinder early detection, continuity of care, and effective long-term management.



Access to diagnostics and therapies are uneven

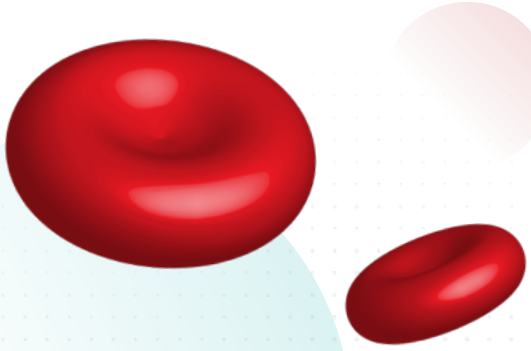
Diagnostic and treatment capabilities are concentrated in tertiary centers, with limited access in primary care. Cardiac biomarkers, including N-terminal pro–B-type natriuretic peptide (NT-proBNP) testing-a critical diagnostic tool-is underused due to financial, regulatory, and operational barriers. While high-income markets like Japan offer wide reimbursement, most middle-income territories provide limited or no coverage. Similarly, access to innovative therapies such as Angiotensin Receptor–Neprilysin Inhibitor (ARNI) and sodium-glucose cotransporter 2 inhibitors (SGLT2 inhibitors) is constrained by cost, slow health technology assessments, and misalignment between clinical guidelines and reimbursement policies. In many territories, out-of-pocket costs for patients remain prohibitively high.

Data and infrastructure gaps undermine policy and care quality

HF-related data collection across APAC is fragmented, with inconsistent coverage, limited interoperability, and few territory-specific registries focused solely on HF. Existing clinical study- or hospital-based registries often lack real-world outcomes data and standardised performance metrics. This limits territories' ability to track HF burden, evaluate care quality, and design evidence-based interventions. Regional collaboration on registry standardisation and data governance remains minimal.

Public and provider awareness remain critically low

HF symptoms are poorly recognised among the public, particularly in elderly and rural populations, contributing to delays in diagnosis and care-seeking. Advocacy efforts are limited, with few HF-specific campaigns or integrated patient voices in policy processes. Community health education and peer support programmes are rare, especially outside high-income settings. Frontline providers also face gaps in HF-specific training, particularly in applying diagnostics and initiating Guideline-Directed Medical Therapy (GDMT) in community settings.



Key recommendations

To address the growing burden of HF across APAC, this White Paper outlines a set of regionally relevant policy recommendations informed by multi-territory assessments, stakeholder consultations, and best practice reviews. These actions are designed to support governments, healthcare providers, and partner organisations in making measurable improvements in HF prevention, diagnosis, treatment, and system-level management.

Focus areas

01. Early diagnosis: Strengthening primary-tertiary collaboration using NT-proBNP

Early detection is pivotal for effective HF management. This plan emphasises **a balanced approach, integrating heart failure screening in primary care with diagnostic confirmation in tertiary care, leveraging NT-proBNP testing across both settings.** NT-proBNP's versatility-used for screening in primary care and diagnosis of acute HF in tertiary care-ensures its utility across different clinical contexts.

In primary care, validated tools such as the Framingham criteria and symptom checklists help identify high-risk individuals, including patients with HT, diabetes, chronic kidney disease, or prior cardiovascular events. Point-of-care NT-proBNP testing enables timely and more accessible diagnosis in community settings.

In tertiary care, NT-proBNP testing alongside echocardiography and specialist evaluation improves diagnostic accuracy. Evidence from randomised trials demonstrates increased diagnostic confidence, while UK audits show that NT-proBNP-guided pathways reduce unnecessary echocardiograms by 18-25%, with a negative predictive value of 96-97% for ruling out significant cardiac dysfunction[7].

Complementing clinical strategies, public awareness efforts, such as Australia's "Know Your Heart" campaign, can play a critical role in improving symptom recognition and driving earlier healthcare-seeking behaviour, particularly among risk communities.

Suggested KPIs/Illustrative Outcome Targets

50%

NT-proBNP coverage among high-risk patients by 2027

15%

reduction in delayed diagnoses by 2028

≥50%

of facilities equipped with NT-proBNP POCT by 2028

20%

misdiagnosis reduction by 2030

Notes: Suggested KPIs are aspirational and reflect varying health system readiness across the region. Targets should be adapted based on local context: mature systems may scale faster, while emerging systems may require phased implementation and support.

02. Follow-up care: Strengthening long-term HF management

Improving chronic HF management is essential to reduce hospital readmissions and mortality.

This action plan recommends the **establishment of multidisciplinary HF clinics that integrate specialist care with primary-level support.** Teleconsultations can extend specialist reach and support local care teams, including nurse practitioners and community health workers (CHWs), to manage routine follow-up and therapy initiation GDMT.

Digital health tools, such as mobile apps and remote monitoring platforms, will support medication adherence and help detect symptom deterioration early. Evidence from rural settings shows these tools can reduce hospitalisations and improve continuity of care.

By embedding digital platforms and structured team-based care into follow-up protocols, territories can enhance long-term patient outcomes and build resilient chronic care systems.

Suggested KPIs/Illustrative Outcome Targets

30%

GDMT adherence increase by 2029

15%

HF mortality reduction by 2029

≥60%

of hospitals provide tele-GDMT by 2030

25%

rural HF hospitalisation reduction by 2030

Notes: Suggested KPIs are aspirational and reflect varying health system readiness across the region. Targets should be adapted based on local context: mature systems may scale faster, while emerging systems may require phased implementation and support.

03. Financing and task-shifting to primary care

Sustainable funding and workforce innovation are critical for scale-up.

This plan recommends **establishing HF-specific strategy, allocating dedicated budgets to HF and integrating services into UHC.** Germany's model shows how this can work: since 2022, its statutory health insurance has reimbursed remote patient monitoring for HF, reaching up to 200,000 patients annually. Implementation required not just funding but also digital infrastructure, care protocols, and trained staff-underscoring the need for comprehensive investment beyond reimbursement alone[8].

To address specialist shortages, this plan promotes task-shifting to primary care providers and CHWs, supported by certified HF training modules and simplified digital protocols. Evidence from India's DISHA study, the largest cluster-randomised trial on CVD prevention in low and middle income territories, demonstrated that frontline health workers can effectively deliver lifestyle interventions and improve cardiovascular outcomes at scale, without compromising care quality. While the study does not quantify cost savings, it supports task-shifting as a feasible, scalable, and likely cost-effective strategy. Building long-term capacity will also involve expanding specialist training programmes through national HF fellowships and regional education hubs.

Suggested KPIs/Illustrative Outcome Targets

These disparities reflect differences in healthcare access, disease awareness, and levels of socioeconomic development, underscoring the need for context-specific policy responses.

Allocate ≥10%

of national CVD budgets to HF by 2028

Train ≥500

HF specialists by 2029 through fellowships and hubs by 2029

Notes: Suggested KPIs are aspirational and reflect varying health system readiness across the region. Targets should be adapted based on local context: mature systems may scale faster, while emerging systems may require phased implementation and support.

Implementation direction

This action plan can be implemented in phases, beginning with pilot programmes in mature systems-where infrastructure and financing mechanisms are already in place-and subsequently expanding to emerging systems, which may require stepwise implementation, capacity building, and international support.

Key stakeholders:
Health ministries, cardiology societies, diagnostic companies, technology and telecommunication providers, medical and academic institutions, donors, global and regional multilateral partners (e.g., World Health Organisation (WHO), Asian Development Bank (ADB))

Strategic enablers:

- National HF registries and interoperable electronic health records (EHRs)
- Public-private partnerships for diagnostics, digital tools, and workforce training
- Regional collaboration and knowledge-sharing platforms

Monitoring and evaluation:
A multi-level monitoring system should be established to track progress and ensure accountability. Ministries of Health should govern national oversight, integrating KPIs into health information systems and mandating annual reviews on outcomes such as NT-proBNP coverage, GDMT adherence, and specialist training. Provincial health departments and hospitals should report regularly, address local gaps, and monitor service delivery. At the regional level, cardiology societies, donors, and multilateral partners should coordinate benchmarking and support capacity-building. Transparent dashboards and joint accountability mechanisms will ensure stakeholders remain aligned and responsive throughout the phased implementation.

By anchoring reform in early detection, community-based care, and sustainable financing, this plan provides a clear, actionable roadmap for improving HF outcomes across diverse health system contexts.

Phased Implementation:
The action plan can be rolled out in phases:

Short term (1-3 years):
Launch pilots in mature systems (e.g., Australia, Japan, South Korea) with existing infrastructure (NT-proBNP screening, HF clinics)

Mid-term (3-5 years):
Standardise diagnostic and treatment protocols (POCT, GDMT, telehealth)

Long term (5-10 years):
Expand public awareness, digital care, and data systems (HF registries, interoperable EHRs)

Call to action

HF care in Asia Pacific stands at a pivotal crossroads. Without urgent intervention, the rising burden will strain already stretched health systems and deepen existing inequities. Yet this moment also presents an opportunity.

This report offers a clear blueprint for action-one that elevates HF as a public health priority, expands access to quality care, and empowers patients and communities. To realise this vision, **governments, healthcare providers, and industry partners** must come together to drive coordinated, system-wide change. By investing in both **primary and tertiary care, scaling digital diagnostics, and building community-based care models**, the region can transform HF management and build more resilient, responsive health systems.

With **inclusive policymaking, sustained investment, and cross-territory, multi-stakeholder collaboration,** APAC can lead the way in establishing a model for HF care that is equitable, data-driven, and sustainable.

4. Introduction

4.1 Why heart failure requires urgent policy attention

HF has emerged as a critical and escalating public health challenge across the APAC, demanding immediate attention and coordinated action from Ministries of Health and other policy-making bodies. Affecting an estimated **31.89 million people** in the region, HF is a leading driver of preventable hospital admissions, long-term disability, and healthcare system strain[10]. With up to **6.7% prevalence** in some territories and **over 6 million HF-related hospitalisations** annually-many of which result from lack of screening, delayed diagnosis and fragmented treatment pathway-the scale of the issue is already beyond what reactive care models can handle[11]. HF also intersects with broader health system concerns, including aging populations and rising multimorbidity. Approximately two-thirds of HF patients live with two or more additional chronic conditions, such as diabetes and HT, making them more vulnerable to costly complications and poorer outcomes[12]. In Malaysia, for example, HF patients with diabetes incurred ~50% higher annual healthcare costs than those without, while comorbid chronic kidney disease (CKD) further increased costs by up to 33%[13]. These comorbidities significantly drive up hospitalisation rates, extend length of stay, and contribute to up to fourfold increases in annual HF care costs for patients with recurrent admissions[14]. As multimorbidity becomes the norm rather than the exception, its impact on already constrained health systems across APAC is both clinically and economically unsustainable without integrated, preventive care models. These trends present not only clinical challenges but a fiscal and system level emergency. In 2021, HF carried a global economic burden of $284.17 billion-split between $136.86 billion in direct costs (48%) and $147.31 billion in indirect costs (52%)[15]. In APAC, lower- and middle-income territories often face a disproportionately high economic strain when HF costs are measured against national health budgets or GDP. Vietnam and China, for instance, spend 10.6% and 9.5% of their current health expenditure on HF respectively-despite low per-patient costs of $964 in Vietnam and $4,457 in China-indicating an outsized burden relative to available resources[16]. Both territories also report a heavy reliance on informal care and suffer high productivity losses, with indirect costs accounting for 71.3% of Vietnam's HF burden and 67.9% of China's, underscoring the fragility of under-resourced systems in managing chronic disease at scale[17].

High-income economies in APAC also face substantial financial pressures from HF, driven by higher per-patient costs and complex care delivery. In Hong Kong, for example, annual HF spending per patient reaches $19,969-the highest in the region[18]. Similarly, Australia, Japan, and South Korea report direct costs making up over 50% of their HF burden, reflecting advanced but resource-intensive systems reliant on hospitalisation, pharmacotherapy, and specialist care[19].

Without strategic intervention, heart failure will continue to overburden care delivery systems and outpace the fiscal capacity of public healthcare financing.

Why this matters for APAC government

Without strategic intervention, HF will continue to overwhelm public systems, exacerbate inequities, and impose rising fiscal burdens. By strengthening early detection, integrating HF care into primary systems, and aligning funding mechanisms, governments can deliver measurable improvements in HF patients outcomes and economic efficiency. Health systems across APAC is both clinically and economically unsustainable without integrated, preventive care models.

Cost Type	Impacted area	Estimated burdens
Direct costs	• Consultation charges • Primary healthcare costs • Expenditure of hospitalisation & hospital services • Medication • Post-discharge follow-ups • Rehabilitation & monitoring	**Global:** $136.9 billion (48% total cost)
Indirect costs	• Loss of tax revenue due to early retirement and premature mortality • Caregiving costs • Presenteeism • Absenteeism • Additional welfare payments • Loss in tax • Additional subsidies required to keep healthcare accessible	**Global:** $147.3 billion (52% total cost)

4.2 Purpose and value of this White Paper

Despite its growing impact, HF remains under-recognised and under-prioritised in national health agendas across the Asia Pacific region. Many governments **lack robust data, comprehensive policies, and dedicated strategies** to address the unique challenges HF presents. Effective management is further hampered by **limited awareness among both patients and healthcare providers,** often leading to delayed diagnosis and treatment[20]. **Screening and diagnostic capabilities remain inadequate**, while care delivery is frequently fragmented across different levels of the health system[21]. Economic barriers also play a critical role-HF treatment is costly, and funding support is insufficient. Among the surveyed patients by the Asian Pacific Society of Cardiology (APSC), only 17% reported receiving full public coverage for HF medications and devices, while 53% depended on reimbursement models requiring out-of-pocket co-payments[22].

This White Paper aims to:

- Guide **national HF strategies** through data-driven insights
- Pinpoint system-level gaps and enhance **HF care delivery**, especially at the primary care level
- Inform **health financing decisions and resource allocation**
- Facilitate **regional and cross-sector collaboration** among public agencies, providers, and industry to improve HF management outcomes

In response, this White Paper serves as a strategic guide for APAC governments to drive cost-effective approaches to HF management, enhance patient outcomes, and alleviate health system pressures. Developed by Deloitte in partnership with the Asia Pacific Cardiovascular Disease Alliance (APAC CVD Alliance), it provides:

By doing so, this White Paper seeks to catalyse more targeted and sustainable HF policies, ultimately enabling APAC governments to improve quality of life for millions of people across the region and strengthen health system resilience in the face of rising chronic disease trends.

A consolidated evidence base presenting epidemiological trends, economic burden, and care delivery gaps across eight APAC territories including both high-income (Australia, Hong Kong, Japan, Korea, Taiwan) and middle-income economies (China, Thailand, Vietnam).

Clear policy linkages connecting data insights to health system levers such as financing mechanisms, workforce capacity, integrated care models, multi-stakeholder collaboration.

Actionable recommendations outlining proven policy and programmatic reforms to reduce HF-related burden and improve outcomes based on existing gaps and opportunities in the current HF management approaches.

4.3 White Paper design and methodological approach

a. Literature review

This study involved a benchmarking exercise aimed at assessing current landscape, policies, progammes, clinical guidelines, and approaches to HF care within the APAC region, focusing specifically on eight target territories.

To gather relevant information across various territories, we conducted a comprehensive literature review of both international and national sources utilised indexed databases, including MEDLINE, Embase, and the Cochrane Library, as well as grey literature sources like policy documents. The review encompassed over 120 studies over the past 25 years (2000-2025), which were filtered based on relevance and systematically organised into three thematic areas: (1) Epidemiological trends, (2) Social and economic impacts, (3) Policy and programme effectiveness.

b. Scorecard for policy assessment

Through the targeted literature review, we derived a set of 5 domains, 34 sub-domains and 84 indicators, reflecting multiple aspects of HF management. This is served as the framework for assessing HF management practices and identifying areas for improvement across the region.

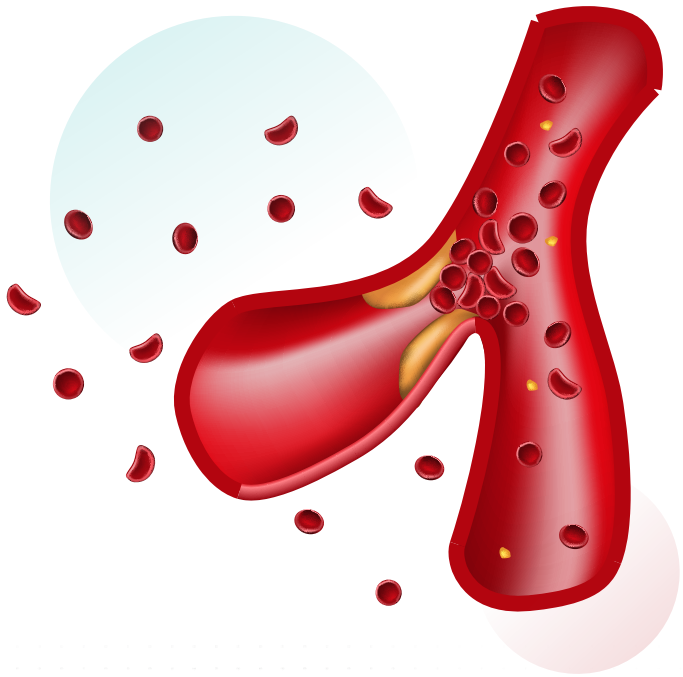
These five domains include:

- National Disease Policy and Planning Landscape: Evaluation of the national policies and management plans for overall cardiovascular diseases (CVD) and HF:
  - Overall CVD: policy existence and currency, scope, inclusion of implementation and budget plans, status of a population-based registry (PBCR) for CVD, and promotion of care equity
  - HF: priority in national policy and specificity, scope, inclusion of implementation and budget plans, status of a population-based registry (PBCR) for HF, clinical guidelines, and promotion of care equity
- HF prevention and screening: Assessment of screening guidelines, progammes, access, and funding for HF screening
- HF diagnosis and healthcare system capacity: Assessment of diagnosis guidelines, infrastructure, workforce capacity, access, and funding for HF diagnosis
- HF treatment monitoring and access: Assessment of treatment monitoring guidelines, service availability, drug access, funding for HF
- HF advocacy, awareness, and education: Assessment of patient engagement and advocacy, civil society engagement and advocacy, educational initiatives, continuous policy improvement progammes for HF

Each indicator within the scorecard is scored individually based on publicly available data, with specific scoring ranges (e.g., 0-2, 0-4). The scoring categories are designed to indicate levels of performance, ranging from low to high (low, moderately low, moderately high, high). The assessment process draws on a variety of international and national sources, employing both primary and secondary research to populate the scorecard. Scoring judgments were made based on the best publicly available information. Due to the complexity of the scoring process, where nuanced matters are simplified into scores, we acknowledge that not all readers may agree with every score. Additionally, in some instances, publicly available supporting information could not be located. Throughout the entire process, Deloitte and the APAC CVD Alliance maintained editorial independence.

c. Expert advisory panel

To ensure the integrity and quality of the research, an Expert Advisory Panel was established comprising leading experts in CVD and HF in APAC. This panel played a vital role in enhancing the research process by providing invaluable insights and expertise. They contributed to the development and refinement of the landscape overview, assessment framework, scorecard population via email correspondence, virtual meetings, and roundtables. This collaborative effort grounded our findings in the most current scientific knowledge and best practices in the field, reinforcing the reliability and applicability of our recommendations.



5.

Disease landscape and burdens of heart failure in Asia Pacific

5.1 Disease overview: Understanding heart failure

a. Heart failure as the end-stage of a growing cardiovascular crisis

The APAC region is experiencing a profound epidemiological transition driven by population aging, urbanisation, and shifts in behavioural risk factors such as sedentary lifestyles and poor dietary habits. Consequently, the region faces a sharp increase in the burden of NCDs, with CVDs emerging as the leading cause of mortality. In 2019, CVD accounted for over 10 million deaths in the Asia Pacific-representing approximately 35% of all deaths in the region[23].

CVD encompasses a broad spectrum of disorders affecting the heart and vasculature, primarily arising from atherosclerosis (plaque buildup in arteries), thrombosis, and various forms of cardiac dysfunction. Among the four major types of CVDs, **ischemic heart disease (IHD)** and **stroke** are the most prevalent, while **atrial fibrillation** is increasingly common due to aging populations[24]. The fourth major category is **HF**, which often represents the advanced or "end-stage manifestation" of various underlying CVD condition[25]. In many cases, if cardiovascular conditions are not properly managed, they can gradually weaken or damage the heart, ultimately impairing its ability to pump blood effectively-this is the hallmark of heart failure.

This White Paper specifically focuses on HF while also touching other aspects of CVD where relevant.

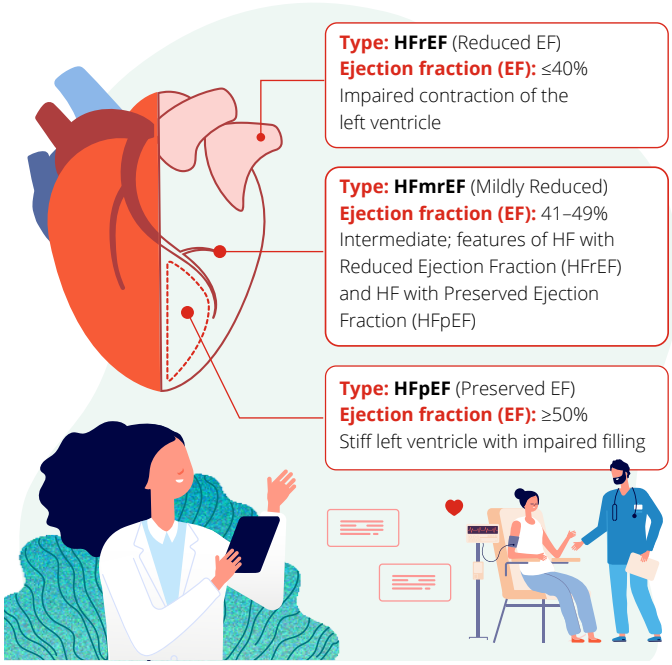
CVD Types	Description	Association with HF
Ischemic Heart Disease (IHD)	Also known as coronary heart disease, IHD refers to heart problems resulting from narrowed coronary arteries that supply blood to the heart muscle. This narrowing can occur due to blood clots, vessel constriction, or most commonly, plaque buildup (atherosclerosis). A complete blockage of blood flow to the heart muscle can lead to a myocardial infarction (MI), commonly known as a heart attack.	IHD is a common cause of HF via myocardial damage and loss of contractility, accounting for 56% of cases in Southeast Asia and 45% of cases in China specifically[26].
Stroke	Strokes occur when the blood supply to certain areas of the brain is interrupted, depriving brain cells of oxygen and causing them to die. This interruption can happen due to ischemia (lack of blood flow) or bleeding (hemorrhagic stroke).	Shared vascular risk factors: age, HT, diabetes mellitus (DM), coronary artery disease (CAD), and atrial fibrillation[27]. HF is an important comorbidity for patients with ischemic stroke[28].
Atrial Fibrillation	Atrial fibrillation is the most prevalent form of arrhythmia, characterised by an irregular heartbeat. It hampers the heart's ability to pump blood effectively, potentially allowing blood to backflow and form clots in the heart's atria. Consequently, this condition heightens the risk of stroke. Atrial fibrillation can often be asymptomatic, leading to many cases going undiagnosed.	Strongly associated with HF due to poor cardiac output and thromboembolic risk. Atrial fibrillation had a prevalence of 31.5% among HF patients in Northeast Asia, 4.6% in South Asia, and 19.8% in Southeast Asia[29].
Heart failure	HF arises when the heart cannot pump enough blood to sustainably meet the body's requirements. It can present suddenly or as a chronic condition. This condition frequently develops as a result of various issues that damage or weaken the heart, including HT, IHD, atrial fibrillation, or poor lifestyle choices.	

b. Types of heart failure

There are different types of HF, subject to which part of the heart not working well.

Left-sided HF[30]

Left-sided HF occurs when the left ventricle, responsible for pumping oxygenated blood from the lungs to the rest of the body, becomes inefficient. Since the left ventricle plays a central role in cardiac function, its impairment significantly affects circulation. The ejection fraction (EF), a measure of how much blood the heart pumps with each contraction, typically ranges from 55% to 60% in a healthy heart. Left-sided HF is further classified into:



Right-sided HF[31]

Right-sided HF typically arises as a consequence of left-sided HF. When the left ventricle fails to pump blood efficiently, pressure increases in the pulmonary circulation, placing additional strain on the right ventricle. Over time, this leads to right ventricular dysfunction, resulting in systemic venous congestion. As a result, fluid accumulates in peripheral tissues, often causing swelling (edema) in the lower extremities.

Congestive HF[32]

Congestive HF (CHF) refers to a state of fluid overload due to impaired cardiac output. As blood flow from the heart slows, venous return becomes congested, leading to fluid accumulation in tissues. Peripheral edema, particularly in the legs and ankles, is a common manifestation. In more severe cases, pulmonary edema can develop, causing respiratory distress, especially when lying down. Additionally, CHF affects renal function by reducing sodium and water excretion, further exacerbating fluid retention. If left untreated, CHF can lead to significant morbidity and requires prompt medical intervention.

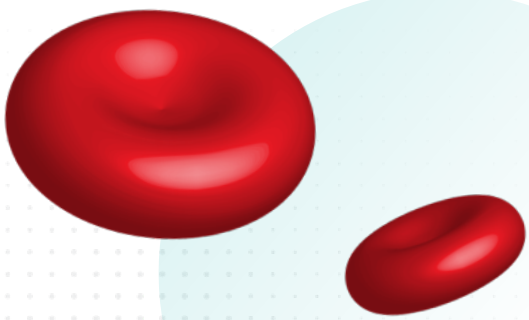
c. Risk factors

HF is a complex condition influenced by a combination of clinical, lifestyle, genetic, and environmental factors. Understanding these risk factors is crucial for prevention and management strategies.

Clinical factors

Several clinical conditions significantly contribute to the risk of HF.

- DM is a recognised contributor to an increased risk of cardiovascular complications, encompassing both macrovascular and microvascular conditions. Specifically, in the context of HF, individuals with diabetes face more than twice the likelihood of developing HF, including both HFrEF and HFpEF[33]. In particular, type 2 diabetes mellitus (T2DM) significantly predisposes individuals to HF through both direct mechanisms, such as impaired cardiac function, and indirect pathways involving comorbid conditions like HT, CAD, renal dysfunction, obesity, and other metabolic disorders[34]. The APAC region bears the world's highest diabetes burden, significantly increasing the risk of HF. For instance, in 2019, China had the largest number of people living with diabetes globally, with an estimated 116 million cases[35]. Accordingly, APAC territories such as Japan, Korea, Hong Kong are expanding screening and scaling up primary care management of these conditions to reduce future HF burden.
- IHD is among the leading causes of HF and accounts for 56% of HF cases in Southeast Asia and 45% cases in China specifically[36]. Many APAC territories have adopted national targets for reducing cardiovascular risk (for instance, China's "Healthy China 2030" plan and Vietnam's "National Noncommunicable Disease (NCD) Prevention and Management Strategy 2021–2025") to address the IHD epidemic and its HF consequences.
- Elevated blood pressure is a dominant HF risk factor in Asia, given its high prevalence. Untreated HT, characterised by persistently elevated blood pressure, can lead to myocardial hypertrophy, which increases cardiac workload and ultimately increases the risk of HF[37]. In terms of comorbidities, the prevalence of HT was highest in HF patients in Southeast (67%) and Northeast (55%) Asia, whereas it was lower in South Asia (38%)[38]. In response, several APAC territories have implemented targeted measure, for example, Korea's national General Health Screening Programme (GHSP) has included HT screening since 2009, supporting early detection and population-level management[39].
- Other chronic conditions such as sleep apnea, thyroid disorders, and valvular heart disease have also been linked to HF due to their impact on cardiovascular homeostasis[40,41].



Lifestyle factors

TLifestyle choices play a significant role in HF risk. Unhealthy behaviours, including physical inactivity, obesity, excessive alcohol consumption, smoking, and poor diet, substantially increase the likelihood of developing HF[42]. The detrimental effects of multiple unhealthy lifestyle factors on HF risk have been primarily documented in Western populations[43]. However, the China Kadoorie Biobank (CKB) cohort study provided novel insights into Asian populations[44,45]. This study formulated a healthy lifestyle score (HLS) incorporating variables such as smoking, alcohol consumption, physical activity, diet, body mass index (BMI), and waist circumference. Additionally, it compared the HLS with a more comprehensive assessment that included CVD risk markers-namely blood pressure, blood glucose, and blood lipids-alongside the HLS, collectively termed "ideal cardiovascular health metrics" (ICVHMs). The study analysed data from 487,197 participants over a median follow-up period of 10 years, during which 4,208 new HF cases were identified. The results demonstrated significant associations between both the HLS and ICVHMs with HF risk, with ICVHMs displaying a stronger predictive ability than lifestyle factors alone. These findings highlight that integrating lifestyle factors with cardiometabolic status significantly improves the prediction of HF risk[46,47].

Given the rising prevalence of lifestyle-related diseases in Asian territories, it is essential to manage these factors through a combination of lifestyle modifications and medical interventions[48]. Progammes incorporating dietary improvements, regular physical activity, and salt intake reduction, alongside pharmacological treatments, are critical for better managing HF in individuals with HT and diabetes[49].

Genetic factors

Genetic predisposition is another critical component in HF risk assessment. Individuals with a family history of HF have a higher likelihood of developing the condition[50]. Genetic mutations can contribute to HF by weakening or reducing the flexibility of heart tissue, making the heart more susceptible to dysfunction[51]. Notably, findings from the CKB cohort indicate that both genetic predisposition and adherence to ICVHMs independently influence HF risk, highlighting the importance of maintaining optimal cardiovascular health even among individuals with a genetic susceptibility[52]. His underscores that good health habits can attenuate genetic risk – an empowering message for public health.

Environmental factors

Environmental factors significantly influence CVD risk, including HF, yet they remain underrecognised in APAC[53]. According to the World Health Organisation, air pollution contributes to approximately 7 million global deaths annually, with 2.5 million linked to heart disease and 1.4 million to stroke[54]. A study conducted at OSI Bilbao-Basurto Hospital in Spain analysed 8,338 HF-related admissions from January 2012 to August 2017, with an average of 4.02 admissions per day, and concluded that environmental factors play a significant role in HF decompensation and patients' quality of life[55]. Two types of regression were performed: univariate to predict future hospitalisations and multivariate to assess the impact of environmental factors on admission rates. Findings showed a seasonal pattern, with fewer admissions in warmer months. Key environmental factors such as air temperature, sulfur dioxide (SO2), and nitrogen oxides (NOX) were significantly associated with HF hospitalisations, while humidity and particulate matter (PM_{10}) were not. A meta-analysis of 100 studies from 20 territories, covering China and South Korea, including both short-term (81 studies) and long-term (19 studies) exposure to air pollutants like PM2.5, PM10, NO2, SO2, CO, and Ozone (O3), examined the link between air pollution and HF outcomes such as hospitalisation, incidence, and mortality[56]. The findings revealed a significant association between these pollutants, particularly PM2.5, PM10, and NO2, and an increased risk of HF, regardless of exposure duration. The effects were more pronounced in low- and middle-income territories compared to high-income territories. Environmental pollution and air pollution continue to be major public health concerns worldwide, emphasising the need for comprehensive policies to reduce pollution and, in turn, alleviate the global burden of HF.

d. Prevention

Similar to other CVD, HF also requires a comprehensive approach that involves primary, secondary, and tertiary prevention strategies to manage its burden effectively[57]. Aligning each level with targeted health system policies and public health initiatives is essential to reduce the growing burden of HF in APAC.

Primary prevention of HF primarily targets individuals at high risk of developing the condition but who have not yet been diagnosed. Early detection and intervention are vital, as outlined by the AHA/ACC, which emphasise identifying those at high risk of developing symptomatic HF[58]. People without symptoms but with structural and/or functional heart abnormalities are classified as Stage B HF, a category that strongly predicts future HF development[59]. Managing Stage B patients is critical in reducing the risk of HF. Effective strategies include managing hT, diabetes, obesity, and smoking, alongside promoting physical activity, healthy diets, and salt reduction. Regular health check-ups and screenings are also essential for early detection and timely intervention, particularly in individuals with risk factors such as HT, diabetes, and CAD. Biomarkers such as NT-proBNP serve as valuable indicators of cardiac dysfunction, enabling clinicians to identify at-risk individuals and implement preventive strategies before significant HF develops[60]. At the policy level in APAC region, primary prevention requires the integration of cardiovascular risk screening into national NCD progammes and routine primary care. Governments can strengthen policies by subsidising population-based screenings, supporting public health campaigns on lifestyle modification, and including NT-proBNP testing in reimbursement packages. Expanding digital health infrastructure and incentivising community health workers can also increase reach in underserved areas.

Secondary prevention is aimed at individuals who have already been diagnosed with HF or other cardiovascular conditions. The objective is to prevent further progression and complications of the disease. This can be achieved through early diagnosis, medication management (e.g., ACE inhibitors, beta-blockers), and lifestyle modifications (e.g., low-sodium diet, weight management). By intervening early, healthcare providers can reduce the risk of worsening HF, hospitalisations, and additional cardiovascular events. From a policy perspective, secondary prevention calls for robust chronic disease management progammes supported by financing mechanisms that ensure equitable access to GDMT. Policymakers in the region should focus on scaling up disease registries, incentivising adherence through digital tools or provider payment reform, and ensuring availability of essential medications across all healthcare tiers. Integration of HF management into primary care through standardised protocols is also key.

Tertiary prevention focuses on individuals who are already experiencing the long-term effects of HF. It aims to improve life expectancy and quality of life by preventing further deterioration of the condition. Interventions may involve more invasive treatments such as heart transplants, left ventricular assist devices (LVADs), or pacemakers to manage symptoms and prevent further complications.

To support tertiary prevention, APAC health systems must invest in specialised cardiac care centers, rehabilitation services, and palliative care. Policymakers can improve outcomes by incorporating advanced HF therapies into insurance benefit packages, expanding reimbursement for cardiac rehabilitation, and investing in training for specialised HF providers. Strengthening referral systems between primary, secondary, and tertiary care can ensure continuity of care and reduce hospital readmissions.

By implementing primary, secondary, and tertiary prevention measures, the burden of HF in APAC can be reduced, improving patient outcomes, and enhancing overall public health.

e. Diagnosis

Similar to other CVD, HF also diagnosing HF requires the presence of characteristic symptoms and/or clinical signs of HF, supported by objective evidence of cardiac dysfunction. Common symptoms include breathlessness, fatigue, and ankle swelling. However, symptoms and signs alone are not sufficiently reliable for confirming a diagnosis. To assess patients with suspected chronic HF, some common diagnostic tests and procedures are recommended (table 1)[61].

In the APAC region, a consistent pattern emerges: HF diagnostic tools are mostly available in tertiary or urban hospitals but remain scarce in peripheral and rural settings. In high-resource environments, early and accurate diagnosis is supported by widespread use of electrocardiography (ECG), natriuretic peptide (NP) testing, chest X-ray, and echocardiography. In contrast, patients in low-resource or rural areas often face delayed diagnosis due to limited access to these tools-an inequity that contributes to poorer health outcomes.

Efforts are underway to bridge this gap such as mobile imaging units and telemedicine. Still, diagnostic tools like echocardiography represents a significant infrastructure and human resource investment: it requires skilled technicians, reliable electricity, and costly equipment maintenance, making widespread rural deployment challenging. In this case, more scalable and cost-effective alternatives such as NT-pro BNP can be utilised, especially for initial triage and diagnosis in primary care settings. For example, a 2023 study found that using age-adjusted NT-proBNP thresholds in emergency settings was more cost-effective than routine clinical assessment alone, reducing unnecessary echocardiograms and hospitalisations[62].

Reducing cost barriers through expanded insurance coverage or subsidised care is essential to ensure that NP testing and other core diagnostics are accessible, not luxuries, for patients. Ultimately, improving HF diagnosis in underserved areas requires not only investment in infrastructure and trained health workers but also smarter diagnostic strategies that match local resource levels. Early detection and intervention can save lives and reduce the long-term burden of HF on health systems.

Table 1: Heart failure diagnosis

Diagnostic	Function/Purpose	Usage in urban/ High-resource settings	Usage in rural/ Low-resource setting
Electrocardiogram (ECG)	A normal ECG reduces the likelihood of HF. However, abnormalities such as atrial fibrillation, Q waves, left ventricular hypertrophy (LVH), or a widened QRS complex may indicate HF and assist in guiding treatment	Widely available; used routinely in clinics	Limited availability in small clinics; lack of interpreters and devices in remote areas (e.g., Vietnam[63], rural China[65])
Natriuretic Peptide (NP) Testing	If available, NP measurement is advised. HF is unlikely when plasma B-type natriuretic peptide (BNP) levels are below 35 pg/mL, N-terminal pro-B-type natriuretic peptide (NT-proBNP) levels are under 125 pg/mL, or mid-regional pro-atrial natriuretic peptide (MR-proANP) levels are lower than 40 pmol/L	Common and reimbursed; supports diagnosis and treatment decisions	Often unavailable or doctors are reluctant to prescribe due to cost and lab capacity; Unfunded or only partially reimbursed by public insurance putting it out of reach for low-income patients (e.g., Vietnam[65])
Routine laboratory tests	Basic investigations, including serum urea and electrolytes, creatinine, full blood count, and liver and thyroid function tests, help differentiate HF from other conditions, assess prognosis, and guide therapeutic decisions	Comprehensive panels are standard; rapid and reliable results	Basic labs accessible at district level, but more specialised tests delayed or lacking. Smaller clinics might need to send samples to central labs, causing delays (e.g., Thailand[66])

Diagnostic	Function/Purpose	Usage in urban/ High-resource Settings	Usage in rural/ Low-resource setting
Echocardiography (Cardiac Ultrasound)	This imaging technique is essential for evaluating cardiac function. In addition to measuring left ventricular ejection fraction (LVEF), echocardiography provides insights into chamber dimensions, left ventricular hypertrophy (eccentric or concentric), regional wall motion abnormalities (potentially indicating CAD, Takotsubo syndrome, or myocarditis), right ventricular function, pulmonary HT, valvular function, and diastolic function markers	Gold-standard test; widely available with skilled technicians	Scarce access due to equipment cost and shortage of trained personnel[67](e.g., rural Australia[68], rural China[69])
Chest X-ray	Recommended to rule out alternative causes of breathlessness, such as pulmonary disease. It can also provide supportive evidence of HF, such as signs of pulmonary congestion or an enlarged heart.	Standard practice; quick access with digital interpretation	More accessible than advanced imaging, but still constrained by resource limits and inconsistent in smaller facilities; power and maintenance issues

f. Treatment

The management of HF aims to manage symptoms, enhance quality of life, and slow disease progression, with approaches tailored based on the type of HF (HFrEF, HFpEF) and the underlying causes. The primary aim of HF treatment is to enhance quality of life and extend lifespan. Treatment strategies generally involve lifestyle modifications, medications, devices, and surgical interventions. However, in the APAC region, significant disparities persist in the availability and affordability of advanced therapies.

Lifestyle modifications

Lifestyle changes like a low-sodium diet to reduce fluid retention, regular physical activity tailored by a healthcare provider, maintaining a healthy weight and managing stress, avoiding smoking and excessive alcohol consumption are fundamental in managing HF[70].

These lifestyle interventions are effective in both preventing disease progression and reducing hospitalisations. Yet in rural or low-income settings across Asia, awareness and sustained adherence remain challenges due to health literacy gaps, limited access to multidisciplinary care teams, and weak community-based follow-up.

Pharmacological therapy

Medications can reduce symptoms like fatigue, shortness of breath, and fluid retention, while improving energy levels for physical activity[71]. Patients with HF typically require multiple medications, each targeting a specific symptom or underlying factor. These medications work in unison to improve heart function, minimise complications, and enhance overall well-being. Medications commonly prescribed for HF include[72]:

Drug class	Key functions
ACE Inhibitors and ARBs	Lower blood pressure by widening blood vessels, easing the heart's workload, and preventing disease progression. ACE inhibitors and Angiotensin II Receptor Blockers (ARBs) are not used together.
Beta-blockers	Help regulate heart rate and force
Aldosterone Antagonists	Manage fluid retention and support heart function, even in normal blood pressure cases.
SGLT2 Inhibitors (Sodium-Glucose Cotransporter-2 Inhibitors)	Originally designed for diabetes, aid in HF by improving heart function and symptoms.
Hydralazine and Isosorbide Dinitrate	Vasodilators that improve blood flow by widening blood vessels, benefiting patients with reduced heart function, particularly those of African descent.
Diuretics (Water Pills)	Remove excess fluid from the body, ease heart strain and improve breathing.
Ivabradine	Slow heart rate without affecting blood pressure.
Digoxin	Strengthen the heart's pumping action and regulate abnormal heart rhythms.
Vericiguat	Enhance blood vessel dilation to reduce heart workload.
Additional medications	Potassium or magnesium supplements, anticoagulants for clot prevention, cholesterol-lowering drugs, oxygen therapy for improved breath and activity levels.

In APAC, diuretics are the most frequently prescribed medications, followed by Renin-Angiotensin System Inhibitors (RAS inhibitors) and β-blockers[73]. The use of angiotensin-converting enzyme inhibitors (ACEIs) and ARBs is nearly equal in prevalence[74]. However, usage rates for newer agents such as SGLT2 inhibitors and ARNIs vary widely due to affordability, insurance coverage, and regulatory approval delays.

Notably, a meta-analysis of three large randomised controlled trial (RCTs) (13,857 patients) found that SGLT2 inhibitors yielded the greatest reduction in HF hospitalisation and cardiovascular death in Asian patients (HR: 0.62)-a stronger effect than in White patients (HR: 0.82)[75]. This suggests a high potential for outcome improvement, provided better medication access and funding is expanded.

Device-based therapies

For patients with moderate to severe HFrEF and electrical conduction delays, device-based therapies offer survival and quality-of-life benefits:

- Implantable cardioverter-defibrillators (ICDs): Prevent sudden cardiac death
- Cardiac resynchronisation therapy (CRT): Improves left ventricular function and reduces hospitalisation
- Left ventricular assist devices (LVADs): Mechanical pumps used as bridge-to-transplant or destination therapy (DT) in advanced HF

Despite strong evidence of benefit, these therapies are underutilised in many APAC territories due to accessibility and affordability challenges[76]. In many territories, device therapy is largely confined to urban tertiary centers, and out-of-pocket costs are prohibitive for most patients due to limited reimbursement under national health schemes.

Surgical interventions

Surgical treatments are considered for patients with HF due to underlying structural or ischemic disease include[77]:

- Coronary artery bypass grafting (CABG) and percutaneous coronary intervention (PCI): used in ischemic HF to restore myocardial perfusion
- Valve repair or replacement: essential in cases of severe aortic or mitral disease contributing to HF
- Heart transplantation: the gold standard for end-stage HF, offering a median survival of over 10 years post-transplant

However, access to surgical interventions, particularly heart transplantation, remains severely limited in many lower-income APAC territories due to constrained infrastructure, limited organ availability, and a shortage of specialised surgical teams. Despite representing over 60% of the global population, Asia accounts for only about 5.7% of heart transplants performed worldwide[78]. These disparities highlight a critical policy imperative: to strengthen upstream measures such as population-wide screening, early diagnosis, and preventive care at the primary level. Investing in these early-stage interventions can significantly reduce the burden on advanced treatment systems and improve long-term outcomes for heart failure patients.

5.2 heart failure epidemiology in Asia Pacific

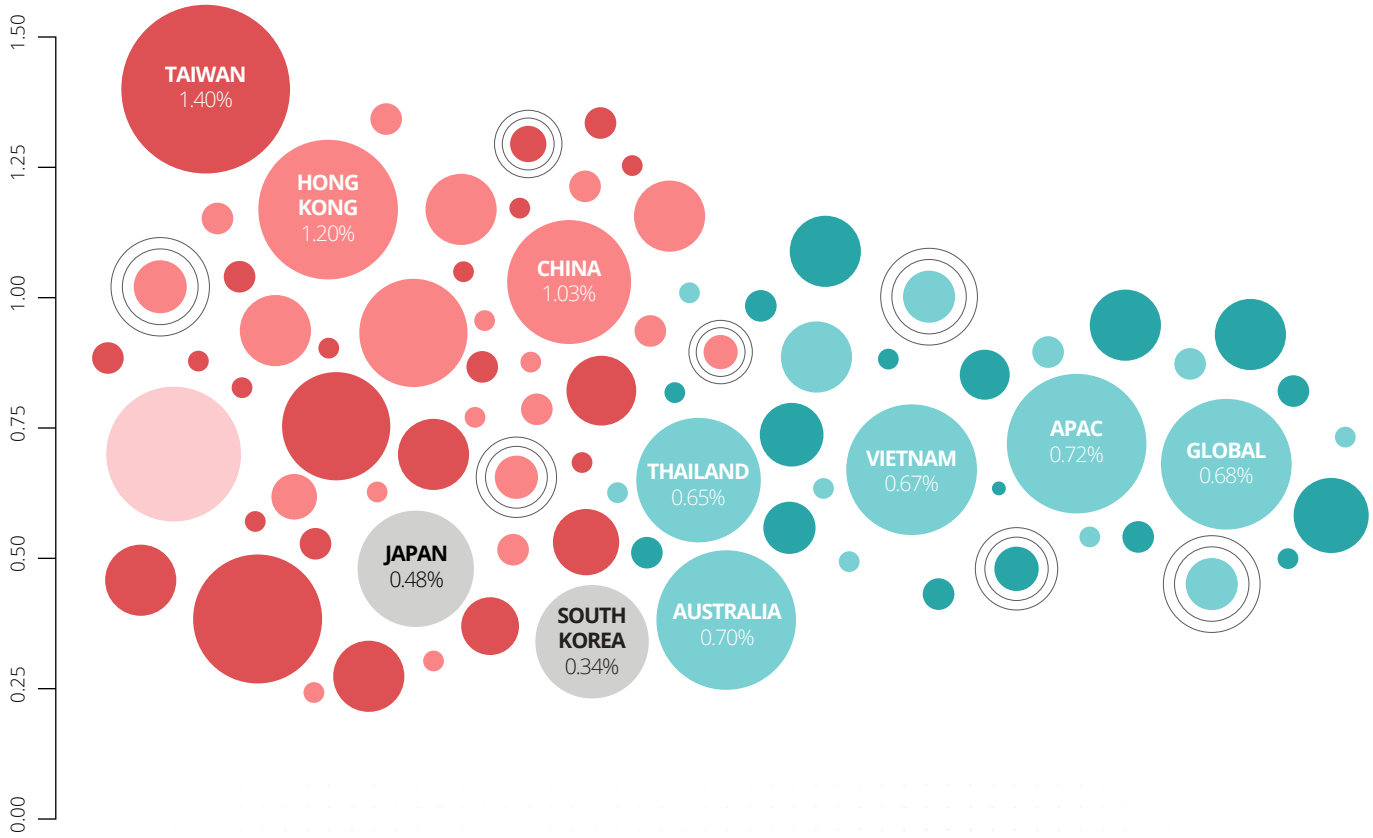
HF is a growing public health concern in the APAC region, with significant variations in prevalence, incidence, and comorbidities across territories.

a. Prevalence

According to the Global Burden of Disease (GBD) 2019 study, Asia and Oceania collectively accounted for approximately 31.89 million (95% UI: 25.94-39.25 million) prevalent cases of HF, with an age- standardised rate (ASR) of 0.72% (722.45 per 100,000 population)[79]. The number of prevalent cases was lower than in the Americas (810.42 per 100,000) but higher than in Europe (606.61 per 100,000), highlighting a substantial regional burden[80].

Taiwan reports the highest HF prevalence at 1.40%, more than doubling from 0.63% in 2001[81]. This substantial increase reflects not only an aging population but also improved survival rates for acute cardiovascular events, leading to more people living with chronic HF. Similarly, Hong Kong (1.20%)[82] and China (1.03%)[83] also exhibit elevated HF prevalence. In these regions, rapid urbanisation, high rates of HT, diabetes, and IHD, and lifestyle shifts (e.g., sedentary behaviour, high sodium diets) contribute to the growing HF burden. Additionally, improved diagnostic capacity and health data systems may be capturing more cases. Middle-range territories such as Australia (0.70%), Thailand (0.65%), and Vietnam (0.67%) reflect a mix of demographic transition and evolving healthcare capacity[84].

Notably, Japan (0.48%) and South Korea (0.34%) are among the territories with lower HF prevalence[85]. The reasons are multifactorial, including robust primary care systems, early detection and management of risk factors, and effective prevention efforts in these territories. For example, Japanese and Korean patients have significantly lower odds of CAD as a comorbidity compared to other Asian populations, suggesting better control of atherosclerotic risk factors[86]. Additionally, longstanding public health measures (e.g., HT and salt-intake control in Japan, aggressive dyslipidemia management in South Korea) may have delayed the onset of HF. The aging of Japan's population (with >28% over age 65) has not yet translated into extremely high HF prevalence, likely thanks to these preventive measures, though the absolute number of HF cases is still rising[87].



b. Incidence

Incidence data are sparse due to limited surveillance, complicating efforts to gauge the true extent of the disease. At territory-level, China's age-standardised HF incidence is about 275 per 100,000 person-years (0.275% per year as of 2017), reflecting the large at-risk population[88]. In Australia, incidence has been reported at ~0.35% per year, indicating similar burdens in high-income Pacific nations[89]. Overall, incidence rates tend to be higher in older age groups and in communities with prevalent cardiovascular risk factors.

Encouragingly, some high-income parts of APAC have seen age-adjusted HF incidence stabilise or even decline in the last decade. For example, in Korea, the age-standardised incidence rate of HF declined significantly from 824 per 100,000 in 2002 to 572 per 100,000 in 2020, reflecting improved prevention and treatment of precursor conditions, particularly among women[90]. However, the total number of new HF cases is increasing because more people are living longer (the population aged ≥65 in Asia is projected to rise from 7.4% in 2015 to 10.9% by 2030[91]. This means even if incidence rates per age-group fall, the absolute caseload grows-a phenomenon often described as the coming "HF epidemic" in Asia's aging societies.

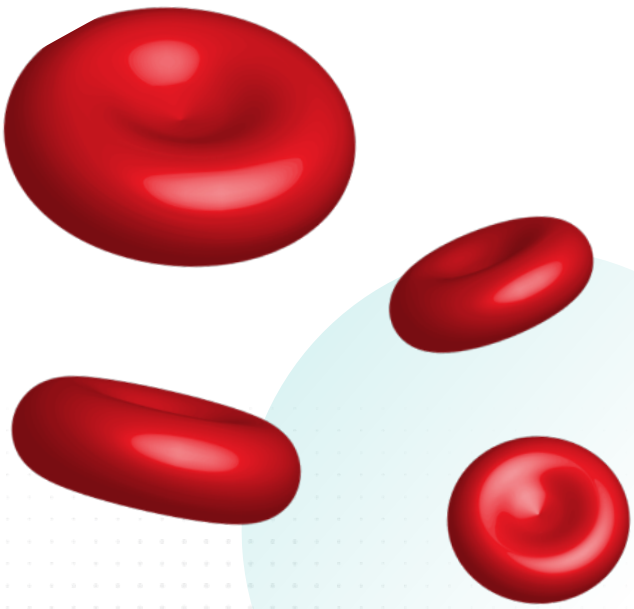
Impacts of COVID-19: The COVID-19 pandemic (2020–2022) had a notable short-term impact on HF incidence and care. During the initial pandemic years, many territories observed a temporary drop in recorded HF hospitalisations and diagnoses[92]. This was largely attributed to restricted access to routine care, overwhelmed healthcare systems, and patient hesitancy to seek medical attention during lockdowns[93]. As a result, fewer routine check-ups and diagnostic procedures were performed. However, this dip was likely artificial, a result of under-detection, and was followed by a rebound. In 2021-2022, as healthcare access normalised, HF admissions surged with many patients presenting with more advanced disease due to delays in care. For example, one APAC hospital analysis found HF admission rates halved during early lockdowns in 2020, then rose above pre-pandemic levels once restrictions eased[94]. Surveys of cardiology providers in APAC corroborate a broad rebound. By 2022, over half of APAC cardiovascular practices reported increased patient volumes relative to the pandemic's first year[95]. In 2021, about 27% already saw volumes rising, and in 2022 this jumped to ~52%[96]. This aligns with the expectation that as clinics and hospitals normalised services, many HF patients who had deferred visits rushed back for care.

Beyond healthcare disruptions, COVID-19 may have directly influenced HF incidence. COVID infection can damage the heart; studies have shown survivors (especially of severe COVID) face higher risk of developing new-onset heart failure in the year after infection[97,98]. This suggests we may see an uptick in HF cases in the coming years attributable to post-COVID cardiac complications. In summary, COVID-19's net impact is a likely increase in HF burden: initially masked by underdiagnosis, and subsequently driven by both untreated chronic conditions and direct viral cardiac effects. Health systems will need to monitor these trends and possibly adapt HF care capacity for a post-pandemic surge.

c. Comorbidities

In the region, approximately two-thirds of HF patients have at least two other comorbidities, with distinct multimorbidity patterns identified[99]. One such group includes younger patients with multiple comorbidities, commonly found in China, Japan, South Korea, and Thailand. Another pattern features individuals with metabolic diseases, such as obesity, HT, and diabetes, primarily in Vietnam, and Australia. Additionally, there are elderly patients with atrial fibrillation, most prevalent in Australia, Japan, South Korea, and Vietnam. Some HF patients also suffer from IHD, a pattern observed in Australia and Vietnam.

These multimorbidity patterns highlight the need for integrated chronic disease management models that address HF alongside common comorbidities such as diabetes, HT, and atrial fibrillation. Policymakers should prioritise the development of multidisciplinary care pathways and expand access to primary care teams capable of managing complex, multimorbid patients. Additionally, territory-specific interventions are essential, for example, targeting younger multimorbid patients in East Asia and focusing on metabolic risk reduction in Southeast Asia and Australia to better manage the growing disease burden in the region.



5.3 Social and economic burdens of heart failure in Asia-Pacific

HF imposes a substantial societal and economic burden in the APAC region, stemming from the disease's chronic nature and the region's unique socioeconomic dynamics. The impacts are multifaceted-spanning physical, emotional, and financial dimensions-and affect not only patients but also caregivers, communities, and health systems. To provide a clearer picture of these challenges and inform effective policy responses, this section examines the burden of HF in APAC through three interconnected thematic lenses: (1) HF patients' quality of life (QoL), (2) caregiving dynamics, and (3) direct versus indirect economic costs.

a. Heart failure patients' quality of life (Psychosocial impact)

Across the region, the psychosocial burden of HF is deeply felt. The disease has a profound impact on QoL, as patients often experience physical limitations, psychological distress, and dependency on others for daily activities. The inability to participate in normal social and work-related activities leads to feelings of isolation and depression, further exacerbating the disease's impact. HF significantly impacts the QOL for patients across the region, with varying degrees of severity depending on healthcare infrastructure and societal support. Japan, despite having reduced age-adjusted HF mortality rates through proactive policies, struggles with the social isolation of its aging population, compounding the QOL challenges for HF patients[100]. In Chinese HF patients, psychological distress, especially depression, was the strongest predictor of poor health-related quality of life (HRQOL), with over half showing psychiatric symptoms[101]. Social support paradoxically negatively impacted QoL in Thai HF patients, as greater reliance on others increased feelings of being a burden and trapped by illness[102,103]. Anxiety and depression were particularly detrimental, with depression being more prevalent[104]. In Vietnam, older patients face progressive declines in QOL, primarily due to dependence on caregivers, frequent hospitalisations, and comorbidities; Cancer patients have access to palliative care, whereas HF patients do not[105].

To improve the quality of life for HF patients across the region, several policy actions are essential. Expanding access to palliative care in low-resource settings can help address unmet needs in symptom relief and psychosocial support.

Palliative care remains a critical but unevenly integrated component of HF care across the APAC region. While some health systems, such as in Australia, Hong Kong, Japan, Taiwan, Thailand, and Vietnam, have already established formal linkages between HF treatment guidelines and palliative or supportive care, others like South Korea and China still lack this integration.

Heart failure treatment monitoring guidelines have linkage to supportive/palliative care							
AU	HK	JP	KR	TW	CN	TH	VN
√	√	√	X	√	X	√	√

Regional scaling of palliative care can be achieved through knowledge exchange and workforce development. territories with established models should take the lead in sharing clinical protocols, referral pathways, and financing mechanisms via APAC-wide professional networks or World Health Organisation (WHO) Collaborating Centers. Regional training initiatives, such as mobile palliative care units, integrated home-based care, and e-learning platforms for rural providers, can help build capacity in lower-resource settings.

Importantly, integrating palliative care should not be viewed as an end-of-life measure only, but as a parallel support system to alleviate physical and psychosocial distress from early stages of HF. Policymakers should embed palliative care into national cardiovascular strategies, secure funding for palliative-trained staff, and ensure that guidelines recommend timely referral based on symptom burden-not just prognosis.

Integrating mental health screening and services into routine HF care is also critical, as depression and anxiety are common and significantly impact patient outcomes. Strengthening community-based support systems can reduce the risk of social isolation, especially among elderly patients living alone. In addition, providing caregiver training and counseling can help alleviate feelings of burden and improve the well-being of both patients and their families. A multidisciplinary approach that includes mental health and palliative care specialists is vital to ensuring more comprehensive and person-centered care for HF patients.

[102]Mahoney, J.S. (2001). An ethnographic approach to understanding the illness experience of patients with congestive HF and their family members. Heart & Lung, 30(6), 429–436. [Accessed 14 May]

[103]Hobbs, F.D.R., Kenkre, J.E., Roalfe, A.K., Davis, R.C., Hare, R., & Davies, M.K. (2002). Impact of HF and left ventricular systolic dysfunction on quality of life: A cross-sectional study comparing common chronic cardiac and medical disorders and a representative adult population. European Heart Journal, 23, 1867–76. [Accessed 14 May]

b. Heart failure patients' gender-specific burdens

Women with HF across APAC often face a dual burden: managing their illness while continuing to fulfill caregiving and domestic roles[106]. This intersection of personal health decline and social expectation results in disproportionately high rates of depression and anxiety among female HF patients. In many parts of the region, especially in Southeast Asia, cultural norms around gender roles mean that women are less likely to seek or receive support for mental health challenges, despite experiencing greater psychosocial strain. These gender-specific burdens have direct consequences on adherence to treatment, care-seeking behaviour, and long-term outcomes, yet remain under-addressed in most national HF strategies.

c. Caregiving dynamics

Caregiving is an indispensable but often unsupported pillar of HF care in the APAC region. The emotional, financial, and physical toll on informal caregivers-most of who are family members-can be severe, affecting their well-being, economic productivity, and family relationships. Without formal mechanisms for support, caregiver burnout can undermine the continuity and quality of care for HF patients. Strengthening caregiver support is therefore not only a matter of compassion but a crucial strategy to sustain long-term HF management across diverse socioeconomic contexts.

In China, over 63% caregivers sacrifice their social activities, time for themselves, time for family members due to caregiving responsibilities[107]. Caregiving responsibilities in Japan are increasingly shifting toward professional nursing services due to declining family support structures, leading to greater societal costs and increased isolation for elderly HF patients[108]. Conversely, Taiwan has shown promise in mitigating caregiving burdens by integrating telehealth services and discharge planning, which not only improve patient outcomes but also strengthen family dynamics[109]. The shared and unique social burdens of HF across the region emphasise the critical role of public health policies, caregiver support mechanisms, and technological innovations in mitigating these challenges.

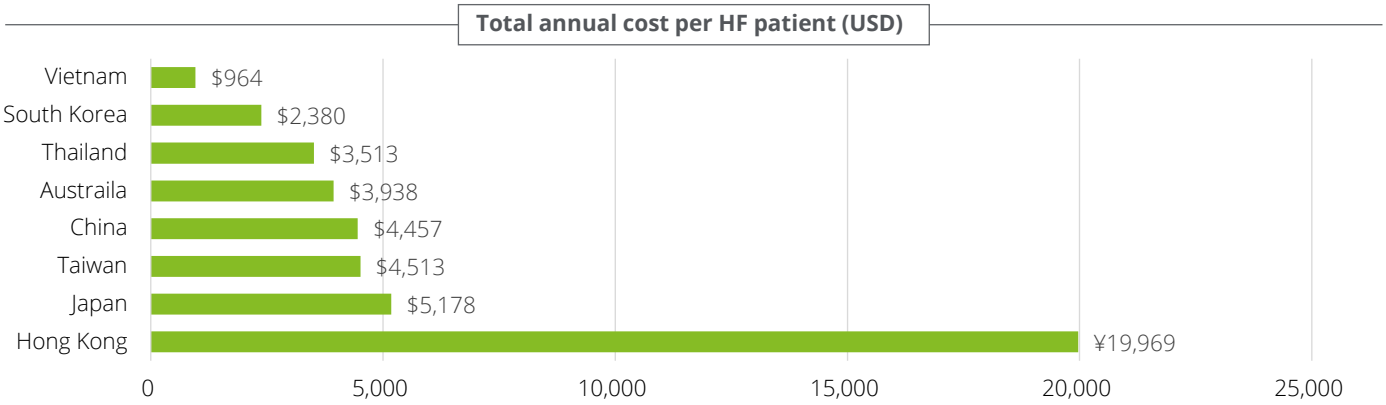
In detail, governments should prioritise the establishment of comprehensive caregiver support progammes that offer training, psychosocial services, and respite care. Integrating caregiver needs into formal HF care pathways, such as discharge planning and patient education, can improve outcomes for both patients and families. Leveraging digital health tools, including telehealth and remote monitoring, can further alleviate caregiver burdens by enabling real-time clinical guidance and reducing unnecessary hospital visits. Importantly, regional collaboration can play a catalytic role in scaling effective innovations. territories can learn from Taiwan's successful integration of telehealth in HF care by organising regional policy dialogues, pilot exchanges, and knowledge-sharing platforms. Through initiatives led by APAC health forums, middle-income territories with similar healthcare constraints can adapt and contextualise such models. By investing in cross-border learning and scalable solutions, the region can build more resilient and caregiver-inclusive HF care systems.

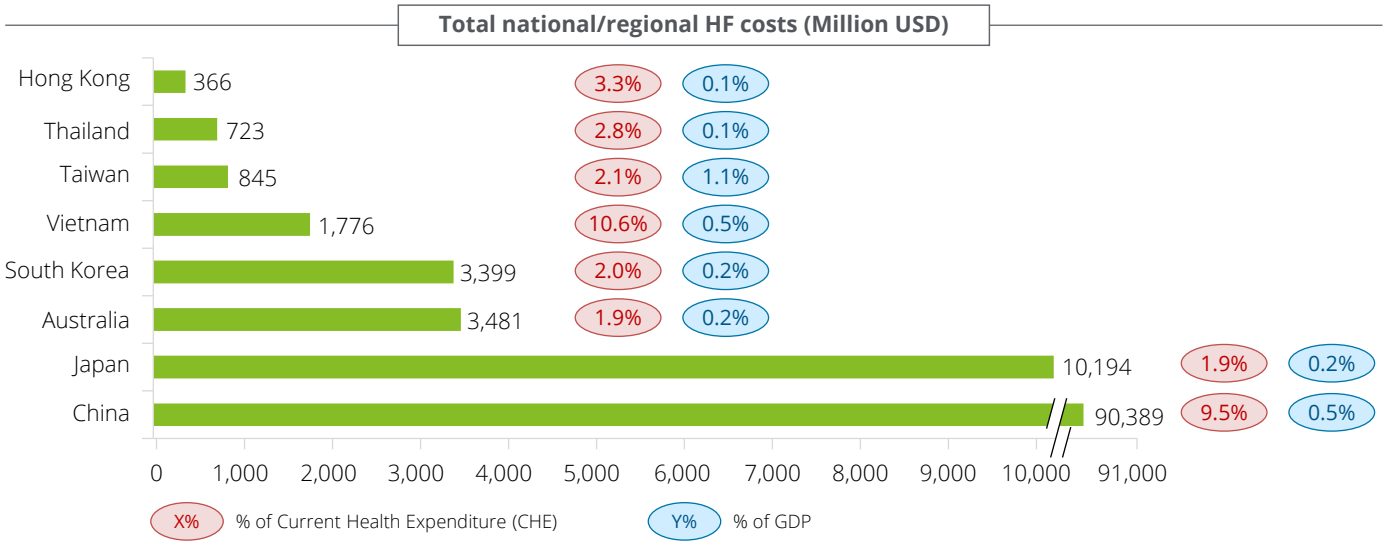
d. Economic burdens

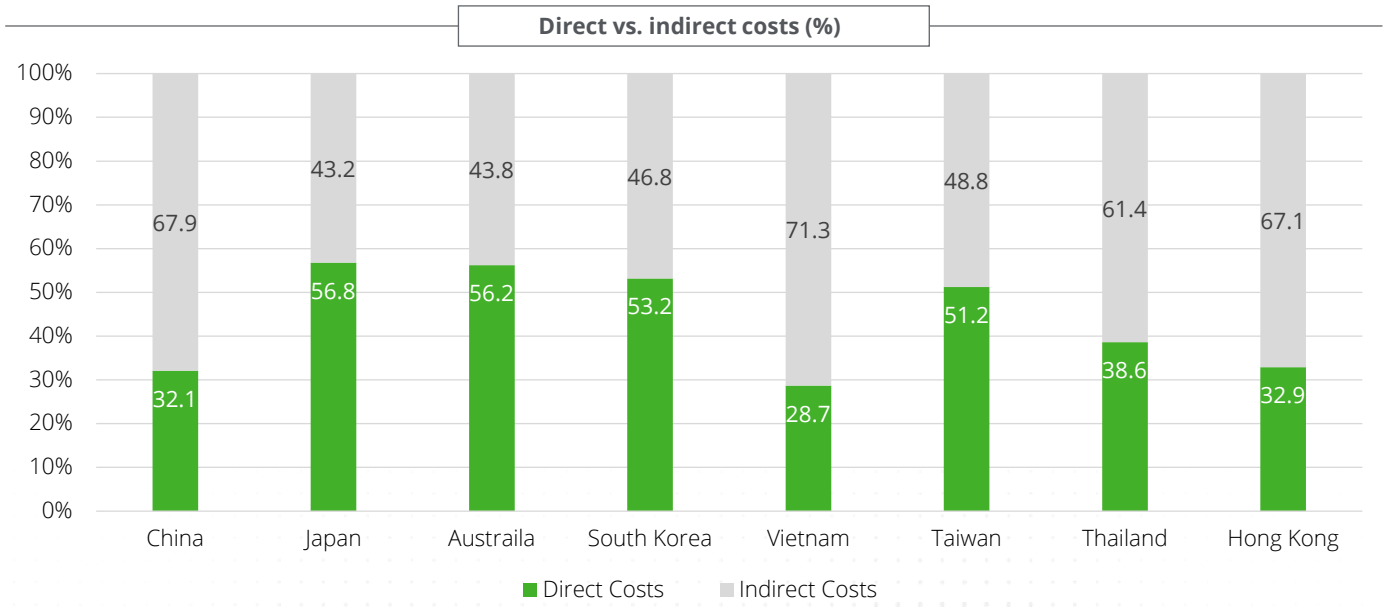
HF is a major and rising economic challenge for health systems worldwide. In 2021, the global economic burden of HF was estimated at $284.17 billion, comprising $136.86 billion in direct costs (48%) and $147.31 billion in indirect costs (52%)[110]. This reflects the growing prevalence of HF, currently affecting over 64.3 million people globally, and the long-term demands of managing a progressive and chronic condition.

High-income economies, such as the United States, account for the largest share of global HF expenditure. The U.S. alone contributes 32% of global direct costs, driven by high labor and administrative expenses (up to 8% of total healthcare spending) and widespread use of advanced therapies such as ARNI and SGLT2 inhibitors[111,112]. In contrast, emerging health systems, while accounting for a lower share of the global HF spending, face a substantial burden when HF costs are measured as a percentage of national healthcare expenditure or GDP.

figure 1: Heart failure cost statistics in PAC







National burden relative to health spending

- Vietnam and China spend 10.6% and 9.5% of their CHE on HF despite significantly lower cost per patient compared to high-income peers.
- This indicates a disproportionately high national burden relative to available health system resources, highlighting the fragility of under-resourced healthcare systems in managing chronic disease at scale.

Potential intervention: Strengthen outpatient and community-based HF care to reduce avoidable hospitalisations. Establishing multidisciplinary HF clinics and expanding primary care-based follow-up can reduce high direct costs and emergency use.

Direct vs. indirect cost balance

- In high-income economies like Australia, Japan, and South Korea, direct costs account for over 50% of the total burden, showing well-established systems for hospitalisation, outpatient care, and pharmacotherapy.
- Conversely, indirect costs dominate in Vietnam (71.3%) and China (67.9%), driven by high informal caregiving needs, productivity loss, and limited formal healthcare access.

Potential intervention: Improve GDMT adherence by investing in clinician training, counseling, and medication access. For instance, only 48% of Chinese HF patients receive ACEI/ARB + β-blocker therapy, highlighting a major opportunity to reduce exacerbations and related productivity losses[121].

Patient-level spending and efficiency

- Despite having one of the lowest per-patient costs ($964), Vietnam bears the highest relative burden across both CHE and GDP. This underscores that low per capita spending does not equal sustainability if system-level costs are rising due to undiagnosed, unmanaged, or late-stage disease.
- Hong Kong presents the opposite profile, very high per-patient cost ($19,969) but a low GDP burden (0.1%), reflecting expensive but well-contained care within a high-income, service-driven economy.

Potential intervention: Expanding the use of digital health tools offers a cost-effective way to monitor symptoms and intervene early in HF management, particularly in rural and underserved areas. Remote monitoring progammes, such as the one implemented in Hong Kong, have proven effective in improving outcomes and reducing costs[122]. Wider adoption of mobile health apps, wearable devices, and telehealth consultations can extend care into the home, reduce unnecessary clinic visits, and prevent emergency admissions. When combined with patient education on self-management, these tools can significantly lower hospitalisation rates and overall healthcare expenditure.

Cost efficiency and sustainability

- South Korea, with one of the lowest patient-level costs ($2,380) among high-income territories and a balanced cost profile (53% DC), may serve as a model of cost-effective chronic disease management.

Potential intervention: Preventing avoidable HF readmissions offers a high-impact opportunity for cost containment and long-term sustainability. In Australia unplanned 30-day readmissions for HF cost about $604 million over 5 years (2013-2017). In Australia, unplanned 30-day HF readmissions cost $604 million over five years (2013–2017). Targeted interventions, such as comprehensive discharge planning, tailored patient education, and structured post-discharge follow-up, can significantly reduce relapse and rehospitalisation rates. These measures are relatively low-cost compared to inpatient admissions and have been proven to reduce healthcare utilisation. Progammes such as home visits, rapid-access HF clinics, and early medication optimisation help maintain patient stability and prevent deterioration. By reducing acute care demand, these strategies not only generate direct cost savings but also ease pressure on hospital systems, making HF care more financially and operationally sustainable in the long term.

Future outlook and sustainability risks

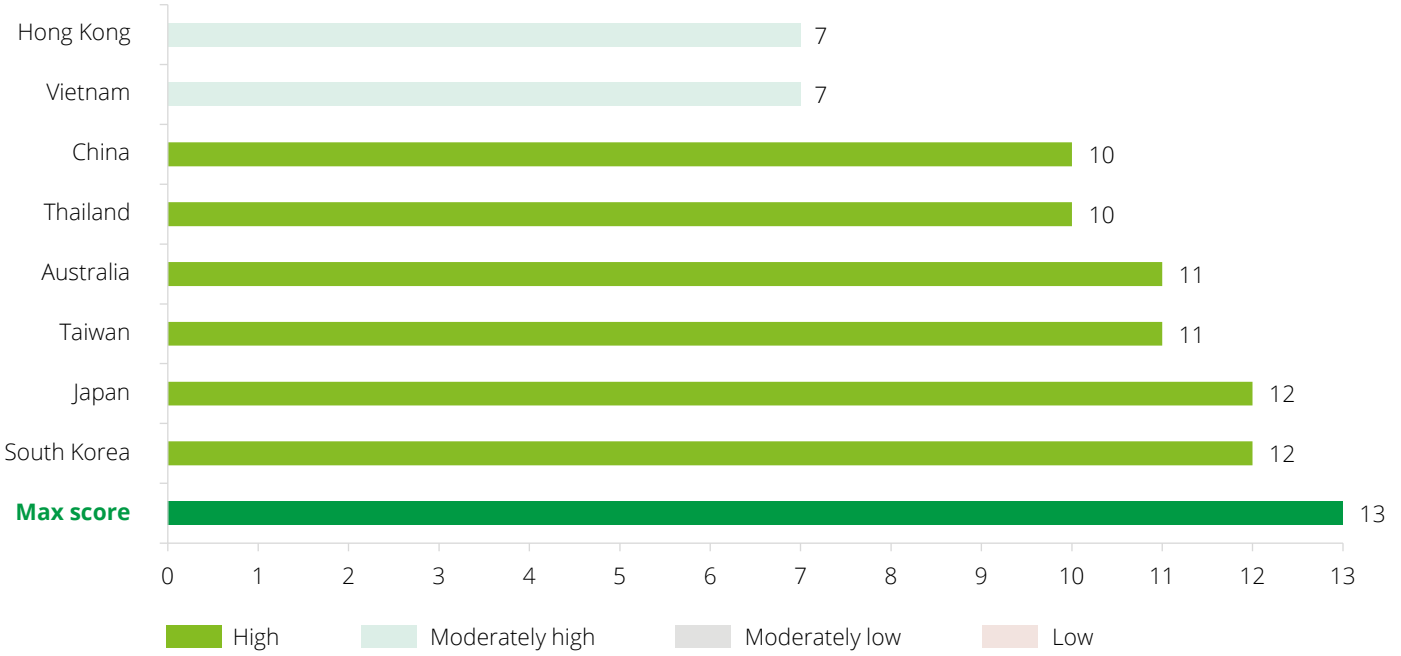
Without reforms, the economic burden of HF in these territories is projected to rise sharply in coming years, posing sustainability risks. Aging populations and increasing HF prevalence will escalate costs dramatically, e.g., Australia expects 750,000 HF patients by 2030 with total annual costs of ~$3.8 billion, up from $2.7 b in 2014[123]. Similarly, South Korea's HF prevalence is set to double by 2040[124], and China's growing elderly demographic will swell the absolute number of HF cases. If current care patterns continue (with heavy reliance on inpatient care), healthcare systems could face unsustainable financial strain, crowding out resources for other needs. In summary, the status quo of frequent HF hospitalisations is economically untenable long-term-without proactive investments in preventive care and early diagnosis, chronic disease management, and system innovations, HF will consume a rising share of health budgets and potentially overwhelm hospital capacity. Implementing timely and relevant interventions is therefore critical not only for patient outcomes but also for the economic sustainability of healthcare systems in the APAC region.

6.

Assessment of heart failure management in Asia Pacific

6.1 Domain 1: National/regional disease policy and planning landscape

(Domain 1a) Overall national/regional cardiovascular disease policy and planning landscape



Comparative summary

- **Standalone policies:** 5 out of 8 territories have dedicated national CVD strategies, enabling more targeted policies and better-coordinated implementation.
- **Common gaps:** Key gaps include the absence of national CVD targets (e.g., Australia, South Korea, Vietnam), fragmented or underdeveloped registry systems (e.g., Vietnam, Hong Kong), and limited financing mechanisms (e.g., Vietnam and Thailand).
- **Policy disparities:** High-income territories demonstrate stronger financing, policy alignment, and robust data infrastructure, whereas middle-income territories often struggle with limited funding and weaker implementation capacity.
- **Best practices:** Japan's legislative framework, Taiwan's integration of financing and national registries, and Australia's large-scale funding model serve as practical examples for other territories in the region.

Territory	Standalone CVD Policy	CVD targets	CVD registries	Financing mechanism	Equity measures
Australia	Yes	No	Yes	Strong	Yes
Hong Kong	No (NCD)	Yes	No	Moderate	No
Japan	Yes	Yes	Yes	Strong	Yes
South Korea	Yes	No	Yes	Strong	Yes
Taiwan	Yes	Yes	Yes	Moderate	Yes
China	Yes	Yes	Yes	Moderate	Yes
Thailand	No (NCD)	Yes	Yes	Moderate	Yes
Vietnam	No (NCD)	No	No	Weak	Yes

Observation and evaluation

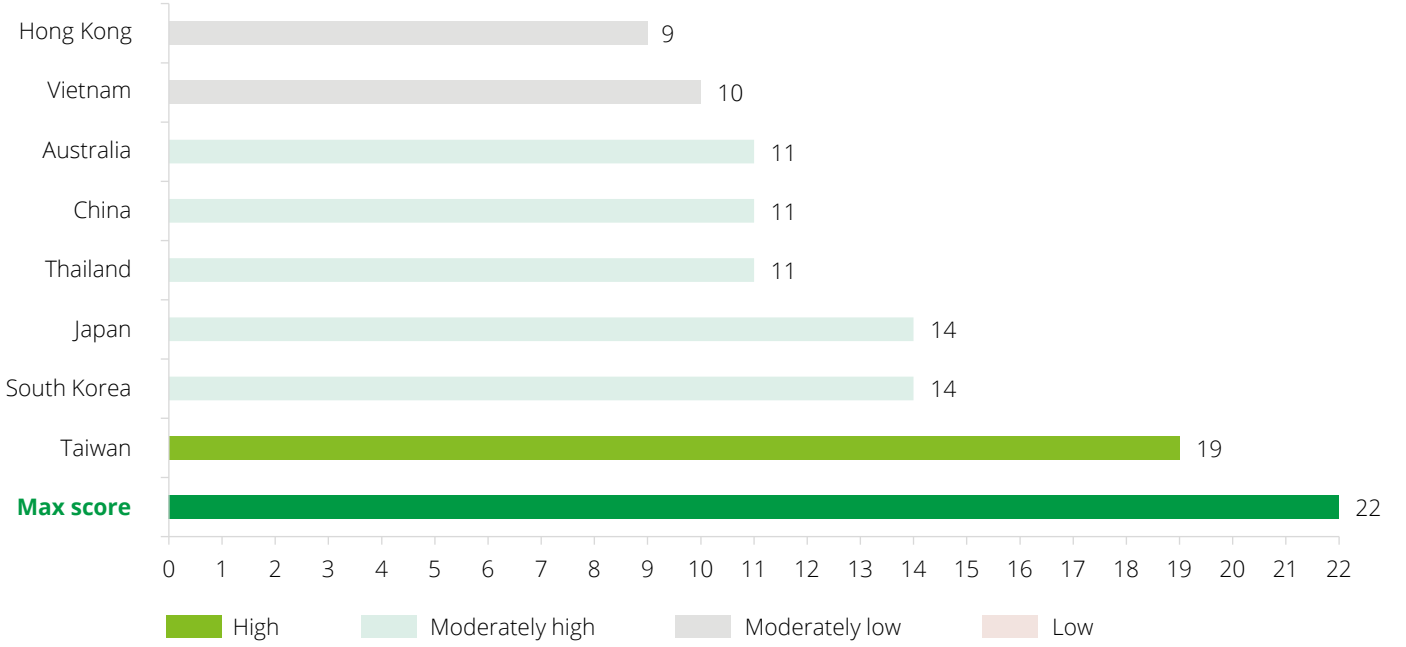
- **Standalone vs. integrated policies**
  - **Standalone CVD policies:** Australia, Japan, South Korea, Taiwan, and China have adopted standalone national CVD strategies for. This policy structure enables focused attention, clear governance structures, and typically facilitates earmarked funding and implementation roadmaps.
  - **Integrated NCD policies:** In contrast, Hong Kong, Thailand, and Vietnam address CVD within broader NCD frameworks. While integration can promote coordination across related conditions, it often leads to diluted CVD focus, vague targets, and insufficient programmatic detail. These territories risk underprioritising CVD-specific interventions in favour of broader NCD efforts.
- **Specific targets and timelines**
  - **Territories with specific, quantifiable CVD targets:** Hong Kong, Japan, Taiwan, China, and Thailand have articulated measurable objectives within their strategies, which is essential for accountability and progress tracking. Examples: Hong Kong aims to reduce premature mortality from NCDs (including CVD) by 25% by 2025; China's HC2030 plan targets a reduction of CVD mortality to 209.7 per 100,000 people by 2030; Taiwan has adopted the World Health Organisation (WHO)'s "25 by 25" target for premature NCD mortality.
  - **Territories lacking specific targets:** Australia, South Korea, and Vietnam do not specify time-bound or measurable CVD goals. This limits strategic clarity and may hinder performance monitoring and resource prioritisation. More precise targets are needed to drive policy implementation and secure budgetary commitment.
- **Population-based registries**
  - **Established registries:** territories like Australia, Japan, South Korea, Taiwan, China, and Thailand have developed national or large-scale registries that inform clinical practice and guide policymaking. Examples: Japan's JROAD registry collects hospital-based cardiovascular data nationwide; Australia's national Clinical Quality Registry and Virtual Registry Strategy (2020–2030) supports longitudinal data use in care quality improvement; South Korea manages both the Korea Acute Myocardial Infarction Registry (KAMIR) and Korean Registry of Actute Korea Acute Myocardial Infarction Registry (KRAMI) registries for MI and heart failure, respectively.
  - **Fragmented registries:** Hong Kong lacks a centralised CVD registry, which constrains data-driven decision-making. Vietnam's registry infrastructure is fragmented and largely dependent on pilot progammes, academic institutions, or external funding, highlighting a significant gap in surveillance and quality improvement.
- **Financing mechanisms**
  - **High-investment territories:** Australia, Japan, and South Korea have allocated substantial funding to CVD initiatives. Examples: The $220 million Cardiovascular Health Mission funds research to improve heart health and reduce stroke in Australia; Japan committed 4.9 billion yen in its FY2021 budget for CVD prevention, screening, and treatment infrastructure; South Korea invested USD 56M in regional cerebrovascular centers and runs national screening progammes for adults over 20.
  - **Limited investment:** Thailand and Vietnam lack dedicated national CVD budgets. Their reliance on fragmented or donor-driven financing creates sustainability risks and limits the scale of intervention. This underinvestment may undermine efforts to reduce CVD morbidity and mortality.
- **Inclusivity and equity**
  - **Strong equity initiatives:** Australia's national registry strategy includes efforts to capture underrepresented populations. Japan and South Korea have implemented financial protection and regional equity progammes to reduce disparities. Taiwan and China have made strides in improving rural access to CVD care, contributing to more inclusive service delivery. Examples: China's Internet + Health Care initiative extends telemedicine and coverage to rural patients; South Korea allocates specialists and emergency care services to underserved regions under its 2017 Act; Taiwan supports rural access through nationwide insurance and outreach via the Post-Acute Integrated Care Plan.
  - **Weaker efforts:** Hong Kong does not have equity-focused policies for CVD, despite its capacity. Vietnam continues to face challenges in rural service delivery due to health workforce shortages and inadequate infrastructure. Addressing these equity gaps is essential to reduce geographic and socioeconomic disparities in cardiovascular outcomes.

Table 2: High-level summary of CVD policies in APAC

Territory	Policy	Strengths	Weaknesses	Financing
Australia	National Strategic Action Plan for Heart Disease and Stroke (2020); national Strategic Framework for Chronic Conditions (2017–2025)	Standalone CVD policy with regular updates; strong preventive focus; integration with national Medicare services	Lacks specific, quantifiable CVD targets	The $220 million Cardiovascular Health Mission funds research to improve heart health and reduce stroke in Australia; extended Heart Health Check under Medicare
Hong Kong	Towards 2025: Strategy and Action Plan for NCDs (2018); Elderly Health Care Voucher Scheme; Chronic Disease Co-Care Pilot scheme (2023)	Strong elderly-focused progammes; pilot co-care model for long-term follow-up	No standalone CVD policy; lacks national registries; equity gaps	Subsidies through voucher schemes; publicly supported pilot progammes
Japan	Health Japan 21 (latest 2013); Stroke and Cardiovascular Disease Control Act (2019); national Plan for Measures Against Cerebrovascular and Cardiovascular Disease (2020)	Legislative foundation for CVD; strong registry and data systems; integrated with regional health policy	Targets may be broad; some regional inequalities remain	CVD budget of 4.9 billion yen; strong government commitment to stroke and CVD research
South Korea	Act on the Prevention and Management of Cardio-cerebrovascular Disease (2017); 2nd Comprehensive Plan for CVD Management (2023–2027); General Health Screening Programme; Patient-Centered Integrated Model of Home Health Care Services (PICS-K) (2021); Chronic Disease Management Programme (2023–2027)	Legal framework for CVD; regular screening; investments in emergency care and health networks	Limited standalone targets for CVD; implementation across regions varies	Significant public investment, e.g., USD 56 million for regional centers; ongoing screening programme funding

Territory	Policy	Strengths	Weaknesses	Financing
Taiwan	National Chronic Disease Strategy (2023); First national CVD Prevention Programme (2018–2022); Adult Preventive Care Health Plus Plan; Post-Acute Integrated Care Plan (HF-PAC)	Comprehensive chronic care integration; robust early detection and follow-up care	Dependence on multiple plans may complicate execution; some rural disparities	Public insurance and structured incentives for preventive care
China	Implementation Plan for CVD and CeVD (2023–2030); Pan-Vascular Management Center in 14th FYP; CDQI (2023); DPCC (2021); Diabetes Plan (2024–2030)	National scale early screening; integration of AI and traditional medicine	Execution consistency across regions; rural care disparities	Government-supported progammes through Five-Year Plans and digital health initiatives
Thailand	20-Year national Strategic Plan for Public Health (2017–2036); 5-Year NCDs Prevention & Control Plan (2023–2027); ThaiHealth Promotion Foundation Act (2001)	Community-level prevention; workforce capacity building; health promotion agency	Lack of dedicated CVD targets; limited national budget for CVD	Health promotion funded by autonomous agency; no dedicated CVD line-item
Vietnam	Strategy for Prevention of Cancer, CVD, Diabetes, Chronic Obstructive Pulmonary Disease (COPD), Asthma, and other NCDs (2015–2025); national Strategy to Protect, Care for, and Improve People's Health by 2030; national Strategy for NCDs and Mental Disorders (2022–2025)	Broad NCD inclusion; expanding universal health coverage	No dedicated CVD policy or targets; fragmented registry and limited capacity	Limited dedicated funding; donor and programme-based support common

(Domain 1b) Overall national/regional HF policy and planning landscape



Comparative summary

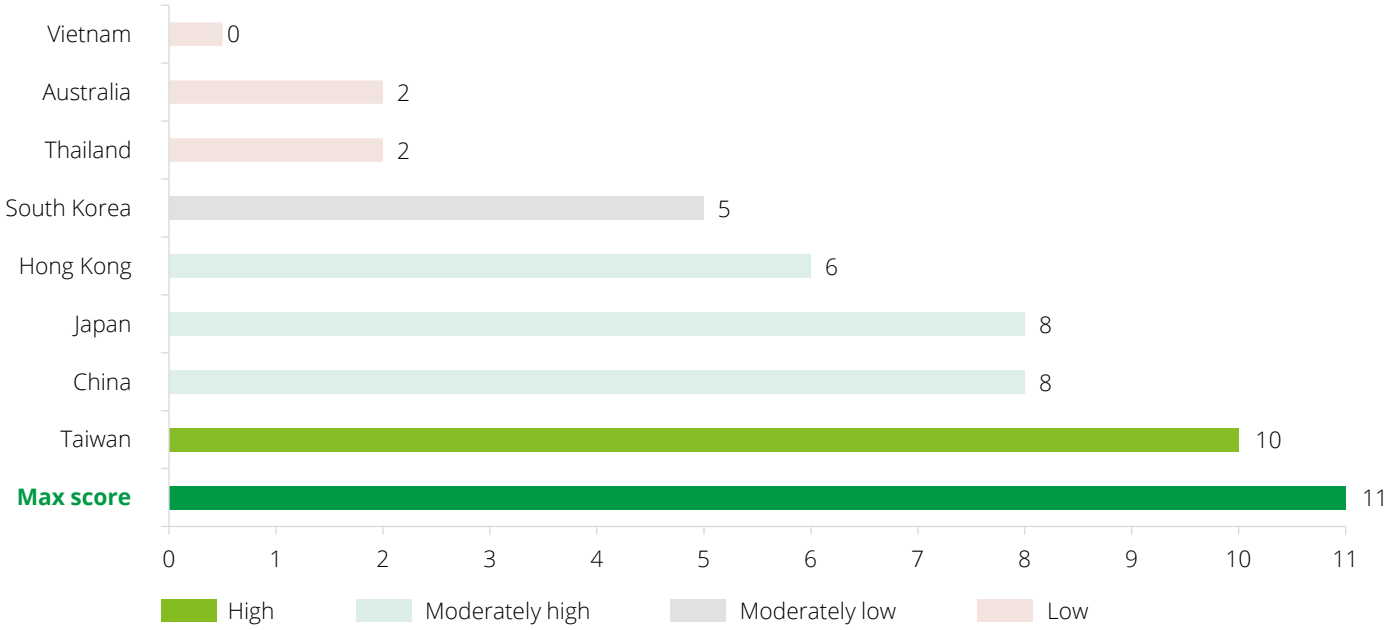
- **Standalone HF policies:** Only Taiwan has a national-level heart HF policy embedded within its national Health Insurance framework via the HF Post-Acute Care (HF-PAC) programme. Australia has state-level HF strategies, but no cohesive national policy. The remaining territories (Japan, South Korea, China, Thailand, Vietnam, Hong Kong) integrate HF into broader CVD or NCD strategies, often resulting in fragmented implementation.
- **Common gaps:** 6/8 territories lack standalone HF policies or strategies. Even where HF is mentioned (e.g., in Australia, China, Thailand), it is rarely prioritised with actionable targets. Implementation of national HF care guidelines remains limited, with fewer than 50% of healthcare regions in most territories applying them. Secondary prevention strategies are inconsistently deployed, and integration of biomarker-based screening and multidisciplinary post-discharge care is rare.
- **Policy disparities:** Taiwan stands out with a high rating due to national programmatic implementation and coordinated post-acute care. High-income territories (Australia, Japan, South Korea, Taiwan) tend to have moderately high HF policy readiness due to stronger infrastructure and financing. China and Thailand show growing momentum but still face execution challenges. In contrast, Hong Kong and Vietnam rank moderately low due to fragmented progammes, lack of standalone policies, and limited registry or equity initiatives.
- **Best practices:** Taiwan's HF-PAC and national registry exemplify proactive, system-wide HF management. Japan's Japanese Registry of All Cardiac and Vascular Diseases-Diagnostic Procedure Combination (JROAD-DPC) and multiple registries offer comprehensive national-level data collection. Thailand's mandate to establish HF clinics in all hospitals shows strong policy intent. Australia's telehealth and equity-focused progammes, while fragmented nationally, offer models for community-based care.

Observation and evaluation

- **Standalone vs. integrated policies**
  - **Standalone HF policies:** Only Taiwan has a national HF programme (HF-PAC). Australia has several state-level HF strategies but no national policy.
  - **Integrated approaches:** HF is addressed under broader CVD/NCD plans in most territories. Examples: Thailand integrates HF care under its 20-Year national Strategic Plan, and China addresses HF via its Cardiovascular Disease Quality Initiative (CDQI) and Healthy China 2030 initiatives.
- **Specific targets and timelines**
  - **Territories with HF-related targets:** Thailand mandates multidisciplinary HF clinics and appropriate treatment for > 50% of HFrEF patients. China sets KPIs such as BNP/NT-proBNP testing and emergency metrics.
  - **Territories lacking HF targets:** Australia, Japan, South Korea, Vietnam, and Hong Kong reference HF but without measurable goals.

- **Population-based registries**
  - **Established HF registries:** Japan (JCARE-CARD, ATTEND, JROAD-DPC), South Korea (KorHF, KorAHF), China (China-HF), Taiwan (TSC-HF Registry), Thailand (Thai HF Registry).
  - **Limited or no HF registries:** Australia and Vietnam lack dedicated HF registries; Hong Kong has no centralised system.
- **Financing mechanisms**
  - **High-investment territories:** Japan provides full HF coverage through multiple public schemes. Australia, South Korea, Taiwan offer strong reimbursement systems for HF care. South Korea has 77% private insurance uptake, Japan 70%, Australia 55%. HF-decided funding for research and innovation is observed in South Korea, Taiwan, China.
  - **Lower investment or fragmented models:** Vietnam and Thailand rely heavily on public schemes with little HF-specific budget allocation. Hong Kong offers general NCD support but lacks HF-targeted subsidies.
- **Inclusivity and equity**
  - **Strong efforts:** Australia (telehealth & navigation), Taiwan (community-based risk screening), Vietnam (Heartbeat Vietnam for congenital HF).
  - **Limited equity progammes:** Japan, South Korea, Hong Kong, Thailand lack structured HF equity strategies. Programmes often focus on CVD or general care without tailored HF approaches.

6.2 Domain 2: Heart failure prevention and screening



Comparative summary

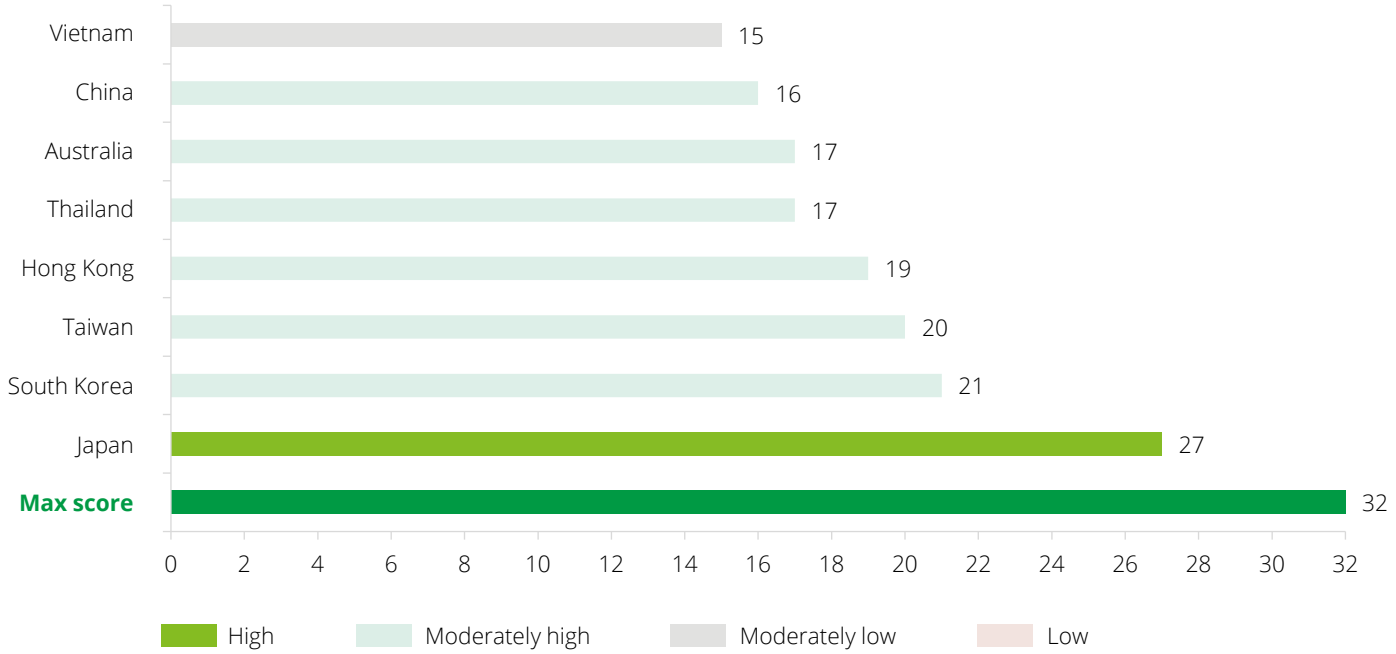
- **Overall upside:** Widespread inclusion of HF screening in national clinical guidelines (6/8 APAC territories); Availability of advanced practices such as biomarker-based screening (Japan, China, and South Korea); Integration of upstream risk management, like HT and diabetes, in national clinical guidelines.
- **Common gaps:** No fully funded screening progammes; Lack of biomarker guidance, protocols, and reimbursement (Australia, Thailand, Vietnam); Limited NT-proBNP coverage for T2DM patients, except Taiwan.
- **Disparities in comprehensiveness of HF prevention and screening:**
  - **High:** Taiwan-Moderate to Strong performance across both guideline and funding domains: comprehensive clinical guideline coverage (screening, comorbidities, risk groups) and partial public reimbursement, including for T2DM patients.
  - **Moderately high:** Hong Kong, Japan, China-Solid guideline coverage and biomarker inclusion. Partial reimbursement exists (Japan, China), though gaps remain in T2DM coverage and high-risk group screening. Hong Kong lacks funding but has broad biomarker inclusion.

  - **Moderately low:** South Korea-Good guideline quality and biomarker mention, but no reimbursement and weak targeting of high-risk groups or T2DM funding.
  - **Low:** Australia, Thailand, Vietnam-Minimal or no inclusion of screening or biomarkers in guidelines. No public funding or reimbursement mechanisms in place.
- **Best practices:** Japan and South Korea endorse BNP and NT-proBNP testing within clinical guidelines. China and Hong Kong offer comprehensive biomarker panels. Taiwan uniquely reimburses NT-proBNP testing for T2DM patients. Thailand includes HF diagnostic testing in its UHC scheme. Japan's structured guideline framework and partial insurance support offer a replicable model.

Observation and evaluation

- **HF Screening coverage in national clinical guideline**
  - **Comprehensive coverage:** Japan and South Korea offer national HF guidelines that strongly support screening for high-risk populations and endorse the use of BNP and NT-proBNP for early detection. Japan's guidelines further incorporate American College of Cardiology Foundation (ACCF)/ AHA HF staging, while China expands its screening to include biomarkers such as soluble ST2, galectin-3, and GDF-15 for enhanced risk stratification.
  - **Moderate coverage:** Taiwan's guidelines recommend general cardiovascular screening and mention HF in the context of broader CVD risk, but provide limited guidance on biomarker-based screening. Thailand integrates HF into broader national CVD guidelines with some attention to clinical diagnosis, but lacks detailed screening recommendations.
  - **Minimal coverage:** Australia's national guidelines lack specific HF screening strategies and provide no recommendations for routine biomarker testing. Vietnam's HF guidelines remain limited in scope, with no structured approach for early detection or biomarker use.
- **HF screening funding**
  - **Reimbursement for HF screening:**
    - Japan, Taiwan, China, and Thailand offer partial reimbursement for HF screening (e.g., BNP, NT-proBNP, echocardiography). Thailand includes diagnostic testing in its UHC.
    - Australia, Hong Kong, South Korea, and Vietnam do not reimburse HF screening publicly.
  - **Reimbursement for biomarkers in HF screening:** Most territories (except Japan, Taiwan, China) rely heavily on patients to cover biomarker screening costs, impeding broad adoption of early detection strategies.
  - **Screening for T2DM patients:** Only Taiwan reimburses NT-proBNP testing for T2DM patients, supporting HF risk stratification in high-risk individuals.

6.3 Domain 3: Heart failure diagnosis and resource capacity



Comparative summary

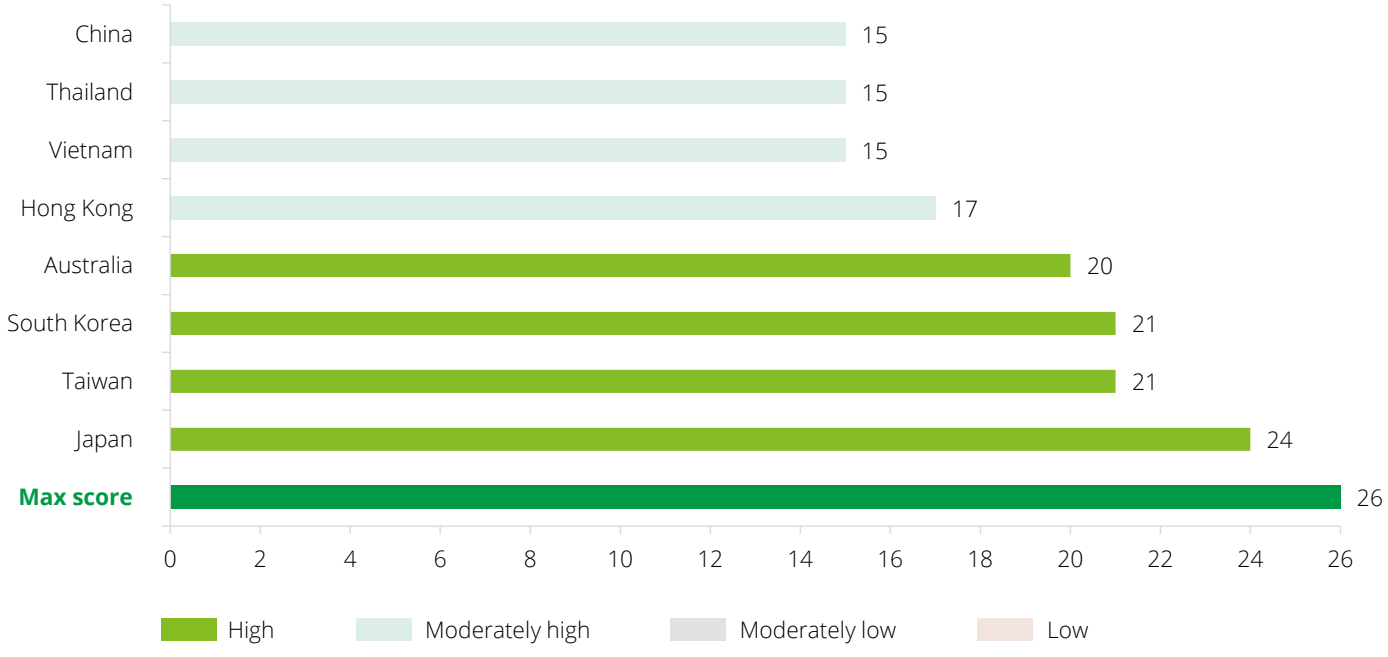
- **Overall upside:** Most APAC territories have national HF diagnostic guidelines with core tools like ECG, echocardiography, and BNP/NT-proBNP (Japan, Australia, South Korea, Taiwan, China, Vietnam); Diagnostic testing is reimbursed to varying degrees (Japan, South Korea, Taiwan, China); Multidisciplinary HF care models are emerging (Australia, Hong Kong, South Korea).
- **Common gaps:** Limited biomarker use in primary care (<20%) in most territories except Japan (~50%); Reimbursement restrictions limit access in some systems (Australia, Vietnam); Narrow biomarker panels dominate outside South Korea and Taiwan.
- **Disparities in comprehensiveness of HF prevention and screening:**
  - **High:** Japan-Strong performance across all criteria including comprehensive guideline coverage, full inclusion of biomarkers, highest imaging capacity (Magnetic Resonance Imaging (MRI) and CT), widespread biomarker testing across all settings, and full public reimbursement for diagnostics.
  - **Moderately high:** Australia, Hong Kong, Japan, South Korea, Taiwan, China, Thailand-Strong guideline coverage and basic biomarker inclusion. However, they show moderate-to-low imaging capacity, CVD workforce constraints (especially in Australia, Hong Kong, South Korea, Thailand), or lower biomarker testing rates in primary care. Diagnostics are partially or fully reimbursed, but not uniformly comprehensive as in Japan.
  - **Moderately low:** Vietnam-Basic guideline coverage and biomarker inclusion, but limited diagnostic access, imaging availability, biomarker testing rates, workforce capacity, and funding. Despite some reimbursement, systemic limitations hinder effective implementation.
- **Best practices:** Comprehensive reimbursement and strong adoption across care levels (Japan); broad biomarker guidance and structured reimbursement (South Korea, Taiwan); High emergency/private sector testing and clinic-based teams (Hong Kong); Established multidisciplinary progammes and national funding (Australia).

Observation and evaluation

- **HF diagnosis coverage in national clinical guideline**
  - **Comprehensive coverage:** Australia and Japan have the most comprehensive HF diagnostic guidelines, incorporating ECG, chest X-ray, echocardiography, and BNP/NT-proBNP testing as standard; South Korea, Taiwan, China, and Vietnam follow with strong inclusion of biomarkers and imaging, with Taiwan uniquely recommending 3D echocardiography and multi-marker panels.
  - **Moderate coverage:** Hong Kong and Thailand adopt international standards and recommend biomarker testing, but lack depth and consistency in implementation or early diagnostic prioritisation.

- **HF diagnosis fundingCom**
  - **Reimbursement for HF diagnostics:**
    - Japan offers full reimbursement for HF diagnostics, including monthly NT-proBNP testing; South Korea, Taiwan, China, Thailand, and Vietnam provide partial coverage through national schemes or selective access in public facilities.
    - Australia and Hong Kong offer subsidised or selective reimbursement with usage caps or institutional limitations.
  - **Reimbursement for biomarkers in diagnostics:**
    - Broad public reimbursement exists in Japan, South Korea, Taiwan, and China; in other territories, access remains fragmented or capped (e.g., Australia's Medicare limits tests/year).
    - Vietnam and Thailand offer limited public coverage, often restricted to certain progammes or public institutions.
- **HF Biomarker testing rate**
  - **Emergency/Private settings:** >80% testing in Hong Kong, South Korea, Taiwan, and China-indicating strong integration of biomarkers into acute care protocols; ~50% in Japan, Thailand, and Vietnam; <20% in Australia.
  - **Primary care settings:** Most territories fall below 20% in public and private primary care use; Japan is a notable exception, achieving ~50% testing in primary care, reflecting stronger integration of diagnostic tools beyond tertiary centers.
- **Multidisciplinary HF care team**
  - **Established models:** Australia, Hong Kong, South Korea, and Taiwan operate structured multidisciplinary teams with cardiologists, dietitians, and rehabilitation professionals integrated across care settings.
  - **Early implementation:** Japan and China are in the early stages of multidisciplinary model development, with limited published outcomes.
  - **Limited availability:** Vietnam faces major barriers, including lack of structured care teams, limited care continuity, and low adherence to GDMT.

6.4 Domain 4: Heart failure treatment and access



Comparative summary

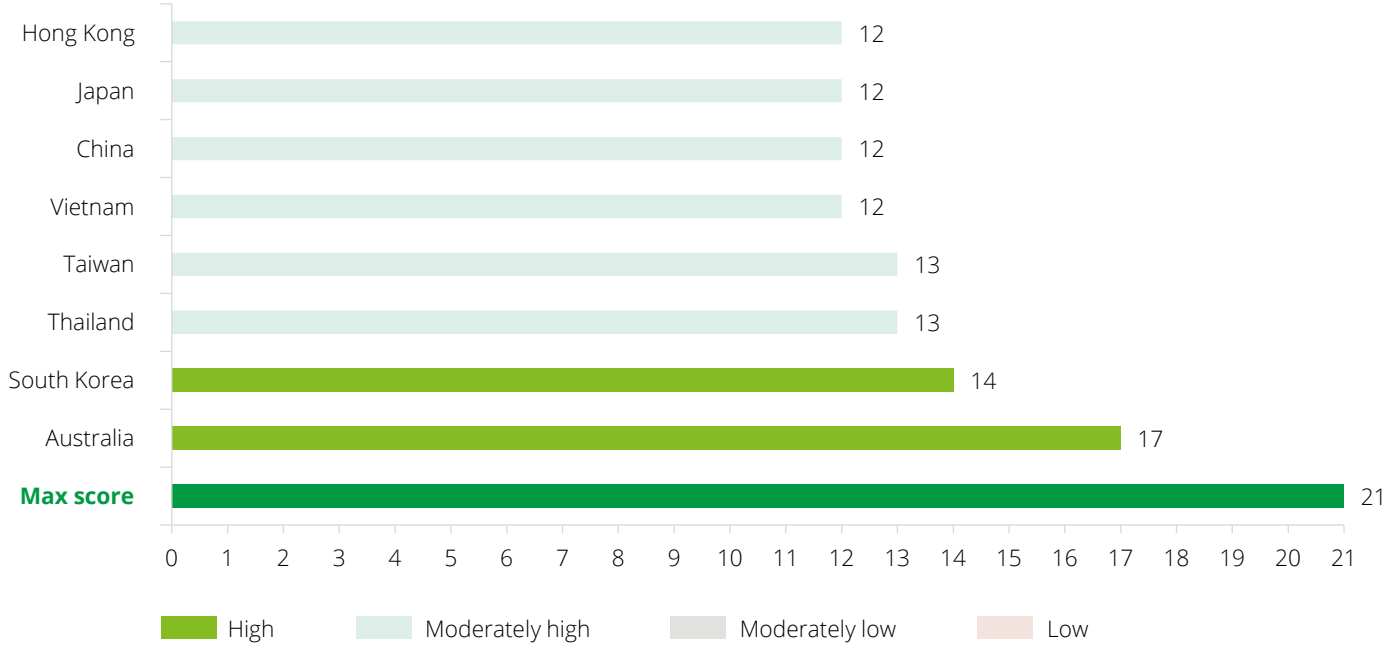
- **Overall upside:** Broad GDMT access with ≥50% prescription rates; Implantable devices increasingly adopted; Remote monitoring commonly piloted or implemented; Palliative and multidisciplinary care integrated into guidelines in most territories.
- **Common gaps:** NT-proBNP in monitoring underfunded or not reimbursed (AU, HK, CN, TH, VN); Emergency care protocols missing in most guidelines; Incomplete WHO essential HF drug coverage (except Taiwan and Hong Kong).

- **Disparities in comprehensiveness of HF prevention and screening:**
  - **High:** Australia, Japan, South Korea, Taiwan-These territories have comprehensive HF guidelines covering treatment monitoring, biomarker use (≥3 in Japan), and multidisciplinary care. All show high GDMT prescription rates, full access to devices, and adoption of newer therapies. NT-proBNP reimbursement for monitoring is available in Japan, South Korea, and Taiwan. Australia compensates for limited biomarker funding with strong telemonitoring and palliative care integration.
  - **Moderately high:** Hong Kong, China, Thailand, Vietnam-These territories meet minimum treatment and monitoring requirements but lack consistency. Hong Kong and China miss multidisciplinary care and biomarker monitoring coverage. Thailand and Vietnam do not include multidisciplinary teams in guidelines and lack full reimbursement for biomarkers and essential drugs. While some progress is noted (e.g., drug funding in Thailand, remote care in Vietnam), overall policy coverage remains uneven.
- **Best practices:** Comprehensive biomarker use and monitoring (Japan, South Korea, Taiwan); Broad GDMT access and adherence (Australia, Japan, South Korea, Taiwan); Inclusion of emergency care protocols in HF guidelines (Japan, Australia, China, Hong Kong).

Observation and evaluation

- **HF treatment and monitoring coverage in national clinical guideline**
  - **Comprehensive coverage:** Japan, South Korea, and Taiwan have robust national guidelines that recommend NT-proBNP for treatment monitoring, define thresholds for prognosis (e.g., >10,000 pg/mL in Japan), and include ≥3 biomarkers (e.g., BNP, troponin, ANP, aldosterone). These territories also advocate for post-discharge monitoring, remote health tracking, and multidisciplinary care models for long-term management.
  - **Moderate coverage:** Australia, China, and Vietnam mention NT-proBNP in guidelines, but primarily for risk stratification or pre-discharge assessment; none provide clear protocols for periodic treatment monitoring. Vietnam prioritises routine labs over biomarker follow-up; Thailand references follow-up echocardiography but lacks biomarker-based monitoring guidance.
  - **Emergency care protocols**: included in Australia (diuretics for congestion), Japan (vasodilators for hypertensive emergencies), Hong Kong, and China (door-to-wire KPIs, troponin timing); however, timeliness standards are only explicitly covered in Hong Kong's national guidelines.
  - **Palliative care protocols:** included in six territories (Australia, Japan, Hong Kong, Taiwan, Thailand, Vietnam), with South Korea and China yet to adopt formal guidance.
  - **Multi-disciplinary care:** Australia, Japan, South Korea, Taiwan, and Hong Kong include multidisciplinary HF teams in national guidelines, integrating roles such as nurses, pharmacists, dietitians, and rehab specialists; Australia and Japan also emphasise nurse-led titration and telemonitoring. Thailand and Vietnam lack clear recommendations for team-based HF care in guidelines.
- **HF treatment & monitoring funding**
  - **Reimbursement for drug therapy**
    - **Full coverage:** Japan, South Korea, and Thailand provide full public reimbursement for WHO-listed HF medications, ensuring equitable access to core GDMT including ACEi/ARBs/ARNI, beta-blockers, mineralocorticoid receptor antagonists (MRA), and SGLT2 inhibitors.
    - **Partial coverage:** Australia, Taiwan, Hong Kong, China, and Vietnam offer only partial coverage, hence financial barriers to comprehensive HF pharmacotherapy, particularly in lower-income and rural populations.
  - **Reimbursement for biomarkers in monitoring:**
    - **Available reimbursement:** Japan, South Korea, Taiwan, and Vietnam reimburse NT-proBNP testing for treatment monitoring, with Japan allowing monthly testing, Taiwan at 1-3 month intervals, and Vietnam within public facilities.
    - **Prognosis-only coverage:** China, Thailand, and Hong Kong cover NT-proBNP testing only for prognostic purposes, limiting its utility for ongoing therapy adjustment.
    - **No monitoring coverage:** Australia offers reimbursement for NT-proBNP in diagnosis of other conditions (e.g., pulmonary HT), but not for HF treatment monitoring, despite guideline references.
  - **Reimbursement for HF Management with rapid optimisation and NT-proBNP testing:**
    - **Public support exists:** Japan, South Korea, Taiwan, China, Thailand, Vietnam, and Hong Kong provide some form of funding or insurance coverage for progammes aligned with STRONG-HF, e.g., rapid medication titration guided by NT-proBNP levels during hospitalisation or early post-discharge phases.
    - **Lack of funding:** Australia does not currently fund NT-proBNP-supported optimisation progammes, creating a major gap in aligning with global best practices for early therapy intensification.
- **HF home health medication monitoring**
  - **Available:** Japan, Taiwan, Australia, South Korea, Hong Kong, and China have implemented or piloted remote monitoring progammes using telehealth, wearable devices, or structured home visits to support medication adherence and symptom tracking. In general, uneven adoption across primary care; financial, regulatory, and infrastructure barriers limit scale-up in lower-resource settings.
  - **Limited or early stage:** Vietnam offers basic monitoring through public facilities; Thailand lacks structured home monitoring progammes.

6.5 Domain 5: Heart failure advocacy, awareness and education



Comparative summary

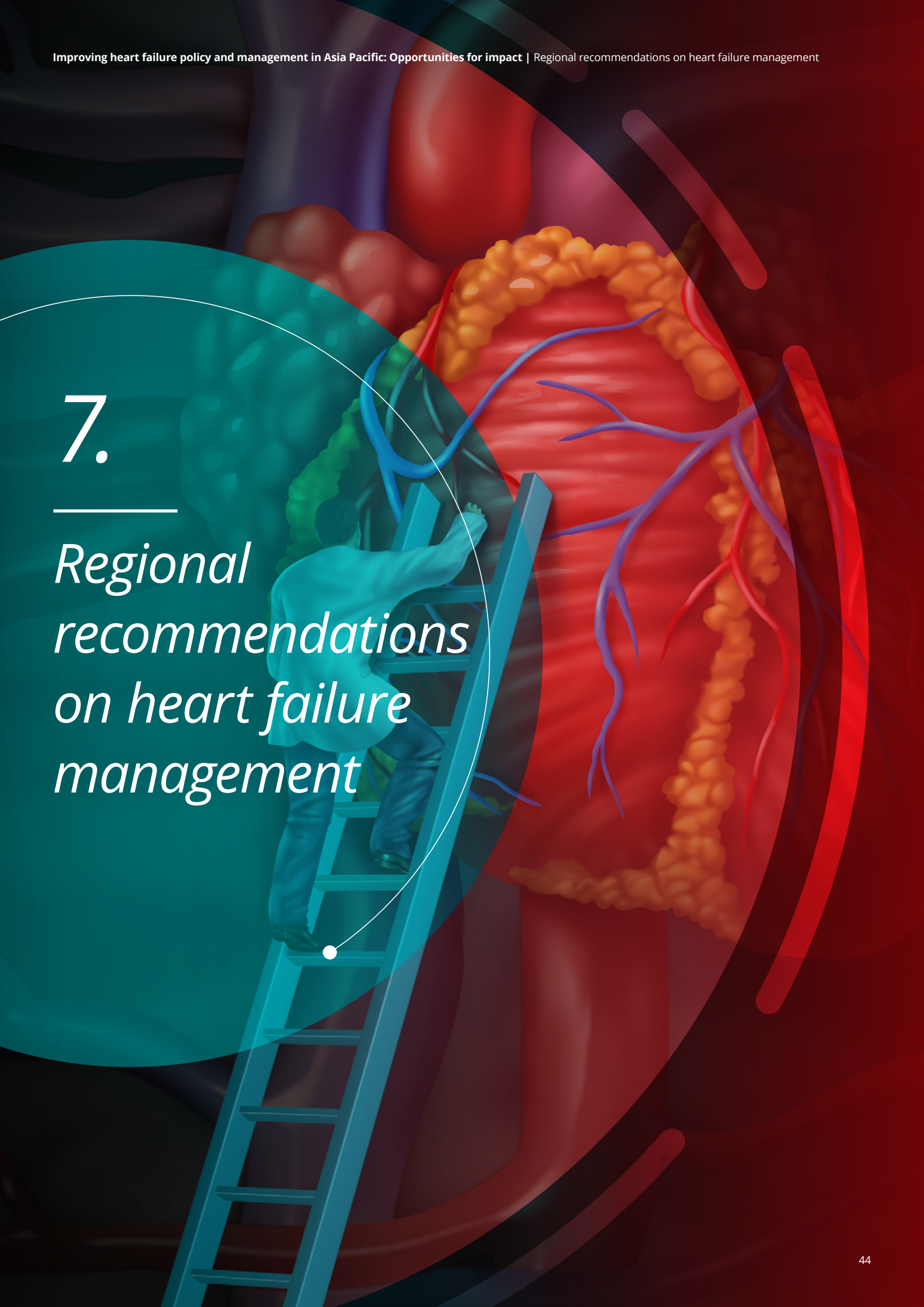
- **Overall upside:** HF-specific patient education materials available through non-governmental organisations (NGOs) or societies (Australia, Japan, Hong Kong, Taiwan, Vietnam); HF-specific provider education progammes established (Australia, South Korea, Taiwan, Vietnam); multi-sector collaboration with private sector and government implemented.
- **Common gaps:** No HF-specific patient orgs (South Korea, Japan, Taiwan, China, Vietnam); Limited patient role in HF policy (all except Australia); Lack of HF-specific government-led HF education (all except Japan); No HF-specific provider training (Hong Kong, Japan, China, Thailand).
- **Disparities in comprehensiveness of HF prevention and screening:**
  - **High:** Australia, South Korea-Strong patient and civil society engagement; HF-specific provider education available; Consistent policy improvement efforts; Established community outreach and multistakeholder partnerships.
  - **Moderately high:** Hong Kong, Japan, Taiwan, China, Thailand, Vietnam-Partial strengths across domains-most demonstrate strong education or civil society activity but lack consistent patient advocacy, policy participation, and HF-specific outreach.
- **Best practices:** HF awareness month, provider training (South Korea); HF Health Association-led patient education, webinars (Vietnam); Active HF societies and public campaigns (Hong Kong).

Observation and evaluation

- **HF patient organisations**
  - **Established organisations:** Australia, Hong Kong, and Thailand have dedicated HF or heart disease-related patient organisations providing patient support, advocacy, and awareness. Australia leads with multiple groups (e.g., Heart Support Australia; Hearts4Heart; Cardiomyopathy Australia; HerHeart) actively engaged in national policy development and collaboration with government stakeholders.
  - **Limited presence:** Japan, South Korea, Taiwan, China, and Vietnam lack HF-specific patient organisations; where groups exist, they focus on broader cardiovascular conditions with minimal policy participation or advocacy visibility.
- **HF civil society**
  - **Strong engagement:** South Korea, Japan, Taiwan, China, Thailand, and Vietnam host HF-focused or CVD-related civil society organisations, including professional associations that contribute to education, clinical guidelines, or policy development. Examples: Australia (NHFA, ACvA); Hong Kong (Hong Kong heart failure Society ((HKHFS), CHF Society); Japan (JHFS, Japan Heart Foundation); South Korea (KSHF, KSC); Taiwan (TSOC, Taiwan Heart Foundation); China (CVH Alliance); Thailand (Heart Foundation of Thailand); Vietnam (VHFS, VNHA).

  - **Policy and government collaboration:** Civil society contributions to HF/CVD policy are evident in Australia, South Korea, Taiwan, China, and Vietnam, with active participation in national strategies and programme delivery. Hong Kong and Japan show limited evidence of formal policy engagement despite having active professional societies.
  - **Private sector collaboration:** Partnerships with private entities for research, public campaigns, or awareness exist across most territories, supporting HF initiatives, though the degree of impact varies by territory.

- **HF educational initiatives**
  - **Government-led patient education:** Japan is the only territory with HF-specific government education progammes. Other territories operate general CVD education progammes with limited HF-specific focus.
  - **Civil Society-led education:** Australia, Japan, Hong Kong, Taiwan, and Vietnam provide HF-specific education through patient groups or professional societies; South Korea and others offer only general CVD education.
  - **Community-based outreach:** South Korea stands out with a dedicated HF awareness campaign (March HF Month); most others conduct broader CVD outreach. Taiwan and Vietnam currently lack structured HF-specific community progammes.
  - **Provider education progammes:** HF-specific clinical training is available in Australia, South Korea, Taiwan, and Vietnam; other territories provide general cardiology education without structured HF-focused tracks.



7.

Regional recommendations on heart failure management

Regional recommendations on heart failure management

HF is a pressing public health challenge in the APAC region, driven by aging populations, increasing prevalence of risk factors (e.g., HT, diabetes), and varying healthcare capacities. Building on the gaps identified in this white paper-limited policy prioritisation, inconsistent guideline adoption, restricted diagnostic access, fragmented data systems, and low patient awareness-this section proposes a prioritised, evidence-based framework to transform HF management across the region. Recommendations span five core domains: (1) Policy and Planning, (2) Prevention and Screening, (3) Diagnosis and Resource Capacity, (4) Treatment and Access, (5) Education and Awareness.

These strategies are tailored to two regional healthcare archetypes:

- Mature healthcare systems (e.g., Australia, Japan, South Korea, Taiwan, Hong Kong) with advanced clinical and policy infrastructure
- Emerging healthcare systems (e.g., Thailand, Vietnam, China) with evolving system capacity

Innovative tools such as NT-proBNP testing, SGLT2 inhibitors, and digital health platforms are emphasised for their potential to support scalable, equitable, and sustainable solutions.

Prioritisation by Impact and Feasibility

Recommendations are categorised along two dimensions-Impact and Feasibility-to support better decision-making and sequencing of actions.

- **Impact**
  - **High impact:** Actions that offer transformational improvements in HF care delivery, health outcomes, and economic burden reduction across systems
  - **Medium impact:** Actions that enhance effectiveness and efficiency of HF care through incremental improvements or support to high-impact strategies
- **Feasibility (Time horizon):** Feasibility is defined in terms of time horizon and the ease of implementation, based on current system readiness
  - **Short term (1-3 years):** Implementable using existing progammes or infrastructure; enables early gains and momentum-building
  - **Mid term (3-5 years):** Require more coordination, moderate investment, or policy adaptations for scale-up
  - **Long term (5-10 years):** Dependent on structural reforms, legislative change, sustained investment, or system transformation

Localised action and flexibility

While the recommendations aim to be actionable and specific, they are presented at a strategic, high level rather than as prescriptive territory-by-territory interventions. To ensure relevance and effectiveness, each territory should:

- Localise outcome targets (currently set as aspirational for reference) and milestones, aligned with national goals and capacities
- Designate specific stakeholders or agencies to lead and coordinate actions
- Tailor interventions to be inclusive, equitable, and responsive to underserved populations

This framework serves as a regional roadmap to elevate HF as a policy priority and reduce its growing burden through strategic investment, targeted innovation, and regionally coordinated action.

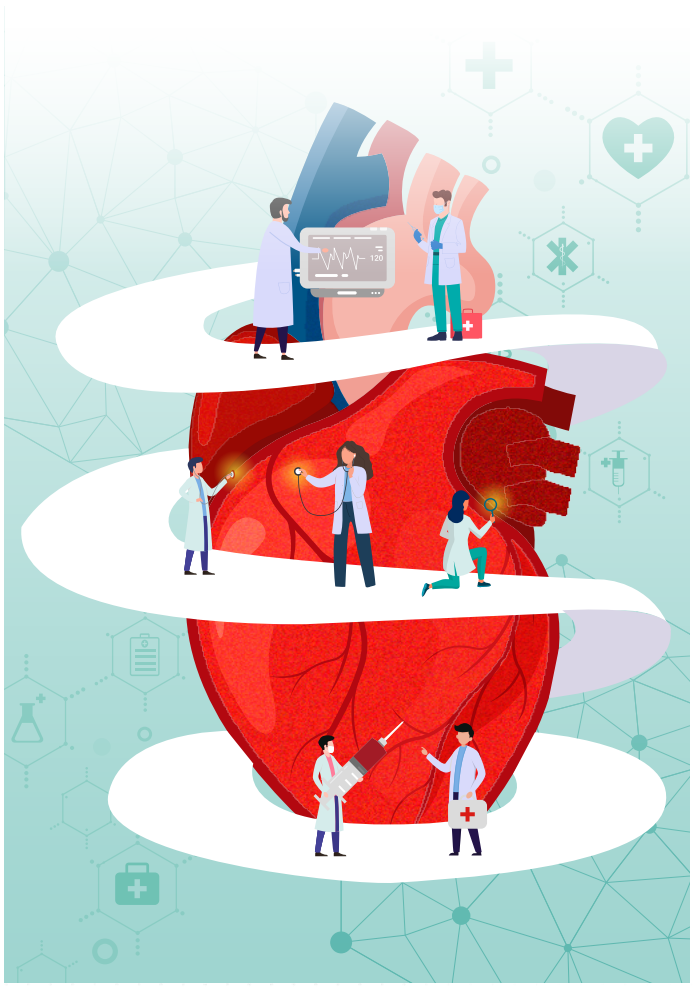


Table 3: Summary of regional recommendations improving heart failure management

#	Impact	Timeline	Recommendations	Domain	Target stakeholder	Illustrative outcome targets	Recommendations/ Action points
1	High	Short-term (1-3 years)	Elevate HF as a national Health 	Policy and Planning	Health Ministries, Cardiology Associations/ Societies	Integrate HF indicators into national reporting by 2027; ≥10% of CVD budgets to HF by 2028; HF clinics in all tertiary and ≥50% secondary hospitals by 2028	Mature: national HF roadmaps, task forces, funding; Emerging: Integrate into NCD plans, form committees, include in UHC
2	High	Short-term (1-3 years)	Expand Universal NT-proBNP Screening 	Prevention and Screening	Health Ministries, Diagnostic Companies, Public Hospitals	50% NT-proBNP coverage for high-risk by 2027; 15% reduction in delayed diagnoses by 2028	Mature: Routine screening, task-sharing, insurance coverage; Emerging: Guidelines, mobile access, PPP subsidies
3	High	Short-term (1-3 years)	Strengthen Community-Based Prevention 	Prevention and Screening	Health Ministries, Local Governments, NGOs	15% reduction in risk factors by 2028; ≥70% of CHWs trained by 2028	Mature: Public campaigns, mobile apps, social determinants; Emerging: CHW integration, primary-specialist collaboration
4	High	Mid-term (3-5 years)	Standardise Diagnostic Pathways 	Diagnosis and Resource Capacity	Health Ministries, Cardiology Societies, Tech Providers	80% diagnosed within 48 hours; 20% misdiagnosis reduction by 2030; ≥50% facilities with NT-proBNP POCT by 2028	Mature: Mandate diagnostics, coverage expansion; Emerging: Guidelines, district hospital protocols, staff training
5	High	Mid-term (3-5 years)	Improve CVD/HF Specialist Availability 	Diagnosis and Resource Capacity	Health Ministries, Medical Universities, Hospital Networks, Cardiology Societies	≥5 national HF fellowships by 2027; ≥5 training hubs by 2030; ≥500 specialists trained by 2029	Mature: Fellowship, CoE, Continuing Medical Education Progammes (CME) progammes; Emerging: Residency modules, virtual training, tele-education

#	Impact	Timeline	Recommendations	Domain	Target stakeholder	Illustrative outcome targets	Recommendations/ Action points
6	High	Mid-term (3-5 years)	Ensure Access to Guideline-Directed Therapies 	Treatment and Access	Health Ministries, Pharmaceutical Companies, Telemedicine Providers	30% GDMT adherence increase by 2029; 15% HF mortality reduction by 2029; ≥60% hospitals provide tele-GDMT by 2030	Mature: GDMT with NT-proBNP, insurance, subsidies; Emerging: Generics via procurement, telehealth support
7	High	Long-term (5-10 years)	Build a Regional Advocacy Ecosystem 	Patient Awareness and Education	Health Ministries, Patient Groups, Media Partners	30% increase in HF awareness by 2028; 20% rise in advocacy participation by 2030	Mature: Portals, campaigns, networks; Emerging: CHW training, SMS outreach, grassroots advocacy
8	High	Long-term (5-10 years)	Scale Digital Health for HF Care 	Treatment and Access	Health Ministries, Tech & Telecom Companies, Community Networks	25% rural HF hospitalisation reduction by 2030; 15% telehealth adoption by 2030; 80% data integration by 2032	Mature: Reimbursement for tech, dashboards; Emerging: Mobile apps, CHW support, device subsidies
9	Medium	Short-term (1-3 years)	Promote Cross-Territory Collaboration on HF Best Practices 	Policy and Planning	Health Ministries, Cardiology Societies, Donor Organisations, Academia	HF policy network by 2026; best practices repository by 2028; 3 pilot projects by 2028; policy alignment by 2030	Mature: Lead forums, share toolkits; Emerging: Participate in platforms, adapt tools
10	Medium	Mid-term (3-5 years)	Invest in national HF Registries 	Policy and Planning	Health Ministries, Academic Institutions, Donor Organisations	≥80% hospitals submit data by 2028; full data in 6 territories by 2030; 15% care quality improvement by 2030	Mature: Expand registry, EHR integration; Emerging: Pilot registries, open-source, donor support
11	Medium	Long-term (5-10 years)	Develop an HF Prediction Score Tailored to Asian Populations 	Prevention and Screening	Health Ministries, Primary Care Networks, Cardiology Societies, Donors, Academia	Model validated by 2030; pilot in ≥3 territories by 2032	Mature: Leverage cohort data, integrate with EHRs; Emerging: Simplified tools, embedded in CHW/ NCD platforms

7.1 High impact, Short-term recommendations (1-3 years)

01. Elevate HF as a national health priority (Domain 1: Policy and planning)

- **Challenges:** Lack of dedicated national heart failure policies and Roadmaps.
  - Although developed economies have sophisticated healthcare systems, HF is often not prioritised as a distinct national health issue, leading to fragmented policies and inconsistent implementation of evidence-based practices. Even when HF is mentioned in national strategies, there is a lack of clear, measurable targets and dedicated funding to drive meaningful improvements in patient outcomes.
  - In middle-income territories, HF competes with infectious diseases and other NCDs for limited healthcare resources. While some nations, such as Thailand, include HF in broader NCD strategies, there is an absence of dedicated action plans and funding mechanisms. In fact, all the territories under evaluation except Australia lack dedicated HF policies.
- **Objectives of recommendations:** Secure dedicated policy focus to drive funding, accountability and effective implementation.
- **Recommendations for mature systems:**


Develop national HF roadmaps with measurable targets (e.g., reduce HF hospitalisations by 20% by 2030), integrating EHRs for real-time monitoring.


Establish multidisciplinary HF task forces with representation from leading experts, patient advocacy groups, and policymakers for continuous policy improvements such as regular reviews of HF policies and guidelines based on the latest scientific evidence and technological advancements e.g., SGLT2 inhibitors.


Allocate dedicate.d funding for HF research, education, and implementation of evidence-based guidelines. Example: under Japan's Stroke and Cardiovascular Disease Control Act (2019), the FY2024 CVD budget remains at 4.5 billion yen-yet a defined portion should be earmarked for HF to address its growing burden[124].

- **Recommendations for emerging systems:**


Integrate HF into existing NCD plans with clear targets for reducing hospitalisations, improving patient outcomes, and increasing access to cost-effective evidence-based therapies and interventions such as NT proBNP-guided management. Example: Thailand's 20-year national Strategic Plan for Public Health (2017-2036) includes a specific target: establishing HF clinics with multidisciplinary teams in all hospitals, ensuring that over 50% of patients with reduced ejection fraction receive appropriate treatment. Similar, more detailed targets should be incorporated into the NCD plans of other territories[126].


Form regional HF committees to adapt policies to local needs.


Include HF in UHC schemes to ensure access to essentialservices like NT-proBNP testing and GDMT.

- **Target stakeholders for driving actions:** Health Ministries, Cardiology Associations/Societies both regional (e.g., Asian Pacific Society of Cardiology) and local.
- **Illustrative outcome targets:** Integrate HF indicators into national CVD/NCD reporting by 2027; Allocate ≥10% of national CVD budgets to HF by 2028; Reduce 30-day readmissions by 10% by 2028; Reduce HF hospitalisations by 10% by 2028; Establish HF clinics in all tertiary and ≥50% of secondary hospitals by 2028.

02. Expand Universal NT-proBNP Screening (Domain 2: Prevention and Screening)

- **Challenges:** Limited reimbursement and lack of consistency in the adoption and implementation of biomarker-based screening strategies for HF.
  - Early HF detection in APAC is hindered by low awareness among patients and providers, despite symptoms often emerging up to five years before diagnosis[127]. Around 75% of HF cases are only diagnosed during hospital admissions[128], with nearly half of patients having reported symptoms like dyspnea to primary care providers beforehand[129]. These symptoms are frequently misattributed to conditions like COPD, atrial fibrillation, or aging, particularly in women, who often present atypically, as seen in territories like China, Korea, Thailand, and Japan[130,131,132,133,134,135]. The lack of early detection hinders the timely initiation of effective GDMT, which is crucial for preventing or delaying the onset of HF.
  - Although tools like NT-proBNP can enable earlier diagnosis and risk stratification, their use remains fragmented. High-income territories often lack coordinated screening protocols, while middle-income territories face infrastructure gaps and weak institutional support, delaying diagnosis and limiting access to GDMT.
  - Additionally, reimbursement for HF screening, especially in high-risk groups like those with T2DM or HT, is inconsistent. Despite proven clinical utility and cost-effectiveness of NT-proBNP testing in T2DM patients[136,137,138,139], NT-proBNP is often not covered, excluding many who would benefit most. Without targeted reimbursement policies and broader adoption of screening protocols, opportunities for early intervention and improved outcomes are missed.
- **Objectives of recommendations**: Enable early HF detection to reduce disease progression.

- **Recommendations for mature systems:**

Implement routine NT-proBNP screening for adults over 50 or with risk factors (e.g., diabetes) during annual check-ups, integrated into EHRs with AI-driven risk stratification. Example: Align with the 2023 heart failure Guidelines by incorporating BNP/NT-proBNP testing for at-risk individuals and using multi-biomarker strategies for HF risk stratification; South Korea's national Health Screening Programme (NHSP) could integrate NT-proBNP testing by 2027.

Promote task-sharing models that empower trained non-physician professionals to support HF screening and education. Example: In Japan, certified HF educators, including nurses, clinical engineers, and nutritionists, conduct early detection using BNP/NT-proBNP testing in small clinics. These educators, required to pass certification exams, collaborate with hospitals and physicians to deliver coordinated care. This model offers a promising approach, though its effectiveness is still under evaluation.

Establish specialised clinical trial networks focused on HF secondary prevention research. Leverage existing research infrastructure and expertise to accelerate the development and evaluation of new therapies and technologies.

Expand coverage by including NT-proBNP testing for screening under national health insurance schemes.

Offer targeted subsidies or tiered co-payment schemes to support access to innovative diagnostics for vulnerable populations.

- **Recommendations emerging systems:**

Develop joint educational progammes and collaborate with regional and global experts to create locally adapted HF screening guidelines tailored to healthcare capacity and resources.

Prioritise NT-proBNP testing for symptomatic or high-risk patients at district hospitals, using portable devices in mobile clinics for rural access. Example: Vietnam can pilot mobile screening in primary care centers by 2027.

Strengthening partnerships between middle- and high-income territories through peer learning, clinical exchanges, and case discussions to accelerate NT-proBNP adoption by sharing practical insights from successful national HF screening strategies.

Leverage public-private partnerships (PPPs) to subsidize testing kits.

Advocate for the inclusion of NT-proBNP and other biomarkers in national reimbursement schemes for HF screening, ensuring wider accessibility and affordability for patients.

- **Target stakeholders for driving actions:** Health ministries, diagnostic companies (e.g., Roche), public hospitals.
- **Illustrative outcome targets:** 50% NT-proBNP testing coverage for high-risk groups by 2027; 15% reduction in delayed

Case #1: China

In January 2025, the Chinese Journal of Diabetes Mellitus published the "Guideline for the Prevention and Treatment of Diabetes Mellitus in China (2024 Edition)," updating the 2020 version. This marks the first domestic endocrinology guideline to recommend screening for N-terminal pro-B-type natriuretic peptide (NT-proBNP) and high-sensitivity cardiac troponin T (hs-cTnT) in patients with type 2 diabetes mellitus (T2DM). This recommendation reflects growing recognition among endocrinology experts of the value of these biomarkers in assessing cardiovascular risk in T2DM patients. As a critical reference for medical institutions and clinicians, the guideline provides the most authoritative scientific foundation for the diagnosis, treatment, and management of diabetes in China, shaping clinical practice and public health policies.

Key updates relevant to cardiovascular risk assessment include:

1. **Evaluation of newly diagnosed diabetes:** Serum B-type natriuretic peptide (BNP) measurement is recommended for patients suspected of having heart failure (HF).
2. **Routine assessments at initial diagnosis:** An electrocardiogram (ECG) is standard for all diabetic patients. Those with hypertension, abnormal ECG findings, or abnormal cardiac auscultation should undergo echocardiography. Additional tools, such as coronary artery calcium scoring and serum biomarkers like hs-cTnT and NT-proBNP, are advised to detect subclinical CVD.
3. **CVD risk screening:** Risk stratification is based on symptoms and cardiac structural abnormalities. For patients with relevant symptoms or structural changes, specific tests, including CAD screening and HF risk assessment, are recommended.

These updates underscore the integration of advanced diagnostic tools to enhance early detection and management of cardiovascular complications in T2DM patients.

Case #2: Hong Kong

Heart failure ranks among the top five most expensive and prevalent complications of T2DM, with annual incremental healthcare costs reaching US$12,800 in Hong Kong.
In a study of adults with T2DM managed within the Hong Kong public health system, NT-proBNP was utilised for early risk assessment of heart HF. Patients identified as 'high risk' were proactively managed with SGLT2 inhibitors alongside standard care. The intervention proved cost-effective across a willingness-to-pay (WTP) threshold range of 1 to 3 times GDP per capita (USD$ 50,889 to USD$ 152,667), and under specific conditions, it was also cost-saving. Specifically, at a 125 pg/mL threshold, NT-proBNP costs $28,023 versus $26,173 for standard care, an increase of $1,850, but adds 0.061 life years (20.360 vs. 20.299) and 0.064 QALYs (17.730 vs. 17.666), with an ICER of $30,237, indicating cost-effectiveness. At an NT-proBNP threshold of 400 pg/mL, the strategy is cost-saving with total costs of $32,987 compared to $33,832 for standard care, saving $846, while gaining 0.127 life years (20.257 vs. 20.130) and 0.129 QALYs (17.624 vs. 17.495), resulting in an ICER of -$6,651.

Overall, NT-proBNP-based risk assessment in T2DM patients facilitates earlier identification and intervention for HF risk, optimizing therapy through timely SGLT2 inhibitors use. This approach not only enhances patient outcomes by potentially preventing HF-related hospitalisations and complications but also reduces downstream healthcare costs. At the system level, it supports more efficient resource allocation, demonstrating both clinical and economic benefits.

03. Strengthen community-based prevention (Domain 2: Prevention and screening)

- **Challenges:** Inadequate implementation efforts for primary prevention of HF risk factors.
  - Despite efforts to strengthen primary prevention, gaps between policy and practice remain across both high-and middle-income economies.
  - For instance, Japan's health Japan 21 struggles with regulating unhealthy food marketing, while Australia faces fragmented obesity and diabetes strategies despite broad pharmaceutical access. Middle-income territories like China, Thailand, and Vietnam have national CVD prevention plans targeting tobacco use and salt reduction, but continue to face low HT awareness, limited physical activity, and a lack of comprehensive dietary guidelines.
- **Objectives of recommendations:** Reduce HF incidence through targeted risk factor management.
- **Recommendations for mature systems:**
  - Launch population-level campaigns promoting healthy diets and exercise, using tax incentives and NT-proBNP for risk stratification in high-risk groups.
  - Leverage mobile technology (e.g., SMS campaigns, mobile apps) to deliver prevention messages and personalised risk communication based on available data, such as reminders for medication adherence or lifestyle changes.
  - Implement comprehensive policy interventions that address the social determinants of health, such as access to healthy food, safe environments, and affordable housing. Example: Japan's Health Japan 21 initiative to include HF-specific targets.
- **Recommendations for emerging systems:**
  - Strengthen community-based prevention by deploying community health workers (CHWs) to educate underserved populations on HF risk factors. Integrate HF prevention into existing CHW-led progammes for diseases like reproductive health and tuberculosis to maximise reach and resource efficiency.
  - Implement integrated care models that combine primary care with specialist services and community-based progammes. Provide primary care physicians with advanced training and tools to support HF prevention and management.
- **Target stakeholders for driving actions:** Health ministries, local governments, NGOs.
- **Illustrative outcome targets:** 15% reduction in HF risk factors (e.g., uncontrolled HT) by 2028; ≥70% of CHWs are trained in HF risk education and prevention by 2028.

7.2 High impact, mid-term recommendations (3-5 years)

04. Standardise diagnostic pathways (Domain 3: Diagnosis and resource capacity)

- **Challenges:** Low HF testing rates and limited reimbursement
  - The diagnostic value of NT-proBNP for both clinical utility and cost-effectiveness is well established globally in primary care[140,141] and emergency settings[142,143,144]. In the APAC region, HF is generally diagnosed using clinical signs and symptoms, primarily due to restricted access to diverse imaging methods and cardiac biomarker tests[145]. However, because HF symptoms can be vague, a thorough evaluation is essential for patients suspected of having the condition to ensure proper treatment and interventions. Recent diagnostic advancements have equipped clinicians with reliable tools to diagnose heart failure with greater confidence and monitor disease progression, which is critical for reducing hospital readmissions. Biomarker testing, particularly for natriuretic peptides (NP), plays a vital role in diagnosing and managing heart failure, serving as the gold standard for diagnosis, prognosis, and treatment planning [146,147,148]. In addition to global clinical guidelines endorsing NT-proBNP as a diagnostic tool, research from the APAC region supports these recommendations with consistent evidence. NT-proBNP testing is a cost-effective-and in many cases cost-saving-tool for aiding HF diagnosis in both emergency and primary care settings. By enabling earlier diagnosis, it reduces reliance on costly procedures like echocardiography.
  - However, inconsistencies in reimbursement policies for HF diagnostics, particularly NT-proBNP testing, persist across the region. While Japan and South Korea fully reimburse HF diagnostics, other APAC territories offer only partial coverage, often leaving patients to rely on private insurance or out-of-pocket payments. The availability of NT-proBNP testing varies, with Japan, South Korea, Taiwan, and China offering reimbursement, albeit with limits on testing frequency. In contrast, Thailand and Vietnam primarily cover tests in public facilities, and Australia imposes stricter annual test caps. These discrepancies contribute to low testing rates, particularly in primary care settings, where testing rates are generally below 20% across most territories-except in Japan, where the rate reaches 50%.
- **Objectives of recommendations:** Ensure timely and accurate HF diagnosis across settings.
- **Recommendations for mature systems:**
  - Mandate NT-proBNP and echocardiography for suspected HF, with POCT in primary care. Use teleconsultation hubs for specialist support, integrating AI-enhanced imaging. Example: Taiwan's telecardiology network to process NT-proBNP results by 2028.
  - Expand coverage by including NT-proBNP testing for screening under national health insurance schemes.
  - Offer targeted subsidies or tiered co-payment schemes to support access to innovative diagnostics for vulnerable populations.
- **Recommendations for emerging systems:**
  - Develop national or regional guidelines that clearly outline the appropriate use of NT-proBNP testing in HF diagnosis and management. Integrate NT-proBNP testing into standardised diagnostic pathways for suspected HF cases. Ensure that the guidelines are up to date with the latest evidence on the use of NT-proBNP.
  - Disseminate simplified diagnostic algorithms prioritising NT-proBNP over imaging, equipping district hospitals with affordable testing kits and mobile decision support tools. Train local staff for decentralised diagnostics. Example: Thailand's district hospitals to adopt NT-proBNP-based protocols by 2028.
  - Implement targeted subsidy progammes to reduce out-of-pocket costs for NT-proBNP testing in high-risk individuals or those with limited financial resources.
  - Develop national or regional reimbursement policies that ensure comprehensive coverage for NT-proBNP testing for diagnosis and other essential HF diagnostics.
- **Target stakeholders for driving actions:** Health ministries, Local cardiology associations/societies, Tech providers.
- **Illustrative outcome targets:** 80% of suspected HF cases diagnosed within 48 hours; 20% reduction in misdiagnoses by 2030; Ensure ≥50% of primary care facilities are equipped with NT-proBNP POCT by 2028.

05. Improve CVD/HF specialist availability (Domain 3: Diagnosis and resource capacity)

- **Challenges:** Shortage of trained HF specialists and uneven access to expertise.
  - Many APAC territories face a shortage of cardiologists and HF-trained specialists, especially in rural and secondary care settings.
  - Limited access to structured training, regional disparities in specialist distribution, and inadequate exposure to emerging therapies and technologies hinder the quality and consistency of HF care.
- **Objectives of recommendations:** Expand the availability and capacity of HF specialists to ensure equitable access to expert-led care across APAC.
- **Recommendations for mature systems:**


Establish advanced HF fellowship progammes in academic medical centers, emphasising clinical management, device therapy, use of NT-proBNP and digital tools.


Create regional Centers of Excellence that serve as training hubs and research collaboratives, offering fellowships and clinical rotations for neighboring territories.


Implement national continuing medical education (CME) progammes with a focus on the latest GDMT, emerging technologies (e.g., SGLT2 inhibitors), and multidisciplinary HF management.

- **Recommendations for emerging systems:**


Develop foundational HF training modules integrated into general cardiology and internal medicine residencies, with emphasis on early diagnosis, GDMT, and referral pathways.


Partner with regional institutions or professional societies for virtual training, fellow exchanges, and shared learning models.


Support decentralised training through tele-education platforms to reach clinicians in rural and underserved areas.

- **Target stakeholders for driving actions:** Health Ministries, Medical universities; Hospital networks; Cardiology societies both regional (e.g., Asia Pacific Society of Cardiology) and local; Regional Cardiology Alliances (e.g., APAC CVD Alliance).
- **Illustrative outcome targets:** Launch national HF fellowship progammes in ≥5 APAC territories by 2027; Establish ≥5 regional HF training hubs by 2030 to serve local and cross-border trainees; Train ≥500 specialists or generalists in updated HF management practices by 2029 through CME progammes.

06. Ensure access to guideline-directed therapies (Domain 4: Treatment and access)

- **Challenges**: Limited access to essential HF medications and lack of funding for HF management with rapid optimisation and NT-proBNP testing.
  - Ensuring timely access to essential HF medications remains a challenge across APAC. Except for Hong Kong, most territories have not fully included all WHO-recommended HF drugs in their national essential drug lists, limiting treatment options, especially in low-resource settings. Key drugs like Losartan are often missing, restricting access to optimal care.
  - NT-proBNP-guided uptitration of GDMT after hospitalisation is clinically effective and cost-saving by reducing re-hospitalisations[150,151,152]. However, funding for protocols like Strong HF varies widely, with inconsistent reimbursement for diagnostics and monitoring, leading to unequal patient access across the region.
- **Objectives of recommendations:** Optimize HF treatment to improve outcomes.
- **Recommendations for mature systems:**


Enforce rapid initiation of four-pillar HFrEF therapies (ARNI, beta-blockers, MRA, SGLT2 inhibitors), with NT-proBNP monitoring for dose titration. Example: South Korea's KAMIR registry to track GDMT adherence by 2028.


Utilise clinical evidence to inform policy discussions, encourage physician adoption, and support reimbursement frameworks that promote early and aggressive HF treatment optimisation. Leverage Strong HF clinical evidence that demonstrates that rapid GDMT uptitration reduces HF rehospitalisation and mortality while maintaining patient safety under close monitoring.


Expand coverage and fast track reimbursement for essential HF treatments by including NT-proBNP testing, SGLT2 inhibitors, and remote monitoring devices (e.g., CardioMEMS) under national health insurance schemes.


Implement value-based pricing models that link reimbursement to patient outcomes, ensuring cost-effectiveness and long-term sustainability. Offer targeted subsidies or tiered co-payment schemes to support access to innovative diagnostics for vulnerable populations.

- **Recommendations for emerging systems:**

Ensure availability of generic HF drugs (e.g., ACE inhibitors) via national procurement. Introduce phased inclusion of advanced therapies like SGLT2 inhibitors through PPPs as prices decrease.

Leverage telehealth for therapy optimisation, start with generics and scale to advanced therapies, especially in rural areas to enable consistent clinical support without overburdening central hospitals. Example: Vietnam's telehealth programme to support rural HF treatment by 2028.

Advocate for the inclusion of NT-proBNP and other biomarkers in national reimbursement schemes for HF monitoring, ensuring wider accessibility and affordability for patients.

Encourage PPP (multi-sector collaboration among governments, healthcare providers, and private insurers) to co-develop bundled payment packages and shared-risk models that support biomarker-guided HF management as part of standard care.

Pilot micro-insurance progammes that cover the cost of NT-proBNP monitoring and other essential HF services for specific high-risk populations.

- **Target stakeholders for driving actions:** Health ministries, Pharmaceutical companies, Telemedicine solution providers.
- **Illustrative outcome targets:** 30% increase in GDMT adherence by 2029; 15% reduction in HF mortality by 2029; ≥60% of rural or district hospitals provide telehealth-supported GDMT optimisation by 2030; 100% availability of all WHO.-recommended HF medications in national essential drug lists by 2030.

Case #3: China

An economic evaluation conducted in China assessed the impact of NT-proBNP-supported guideline-directed medical therapy (GDMT) in patients discharged after an episode of acute heart failure. The study found that NT-proBNP-supported GDMT significantly improved health outcomes and yielded substantial economic benefits. Specifically, high-intensity GDMT reduced the combined rate of all-cause mortality or heart failure (HF) readmission by 8.1%-from 23.3% to 15.2%-and HF readmission alone by 7.6%, decreasing from 17.1% to 9.5% within 180 days post-discharge. Economically, the total medical cost per patient decreased by 9.7%, dropping from 6,187.6 CNY to 5,587.8 CNY. While there were increased costs associated with laboratory testing (1,445.3 CNY) and medication (152.7 CNY), these were more than offset by a reduction in readmission-related expenses (2,260.7 CNY), reinforcing the value of intensive post-discharge management in acute HF care.

7.3 High impact, long-term recommendations (5-10 years)

07. Build a regional advocacy ecosystem (Patient awareness and education)

- **Challenges:** HF advocacy efforts remain fragmented and lack a coordinated approach.
  - HF advocacy efforts remain fragmented; there is a need to strengthen the voice of patients and ensure their involvement in HF advocacy but no HF-specific patient organisation exists in Taiwan, South Korea and Vietnam.
  - Even when patient organisations exist in Hong Kong, Japan, China, and Thailand, there is no documented evidence of formal collaborations with governments for HF advocacy. The absence of formal collaboration suggests that HF support services may not be effectively integrated into national healthcare frameworks, limiting accessibility.
- **Objectives of recommendations:** Increase public and patient awareness to drive prevention and empowerment.
- **Recommendations for mature systems:**

Develop online platforms for patient organisations, healthcare professionals, and policymakers to connect, collaborate, and share information on HF policies and progammes while it can serve as a single source of truth.

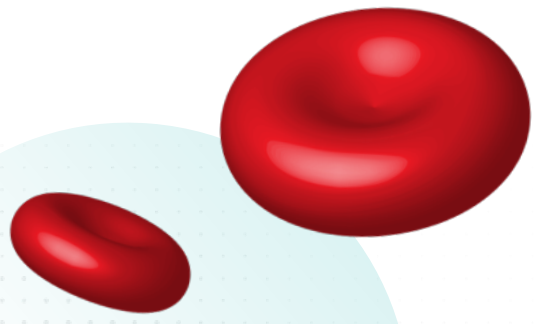
Establish patient portal to provide personalised education and support based on individual patient needs and preferences.

Ensure that portals are accessible to patients with limited digital literacy.

Launch multimedia campaigns via TV and social media, integrating NT-proBNP education into patient portals. Example: South Korea's K-drama-based HF campaign to reach 10 million viewers by 2030.

Fund HF support groups with digital tools for symptom tracking.

Establish regional networks (including both mature and emerging systems) of patient organisations, healthcare professionals, and researchers to share best practices and coordinate advocacy efforts. Organise regular forums and conferences to facilitate knowledge exchange and collaboration on HF management. Develop joint advocacy campaigns to raise awareness about HF and promote the adoption of evidence-based policies.



- **Recommendations for emerging systems:**


Integrate HF awareness campaigns into existing public health initiatives focused on CVD and NCD.


Train CHWs to deliver HF education in local languages via radio and visual aids.


Establish grassroots patient advocacy groups to demand better care Example: Thailand's village health volunteers to educate 500,000 households by 2030.


Distribute SMS and voice messages explaining HF management and the role of NT-proBNP, tailored to cultural contexts, leveraging mobile penetration for outreach.


Establish and support patient advocacy groups to raise awareness and demand better HF care, leveraging local success stories, fostering community engagement.
Ensure that HF patients and advocacy groups have a voice in national healthcare policy discussions, similar to Hearts4Heart in AU. Support the development of patient-led initiatives to raise awareness and improve access to HF services.

- **Target stakeholders for driving actions**: Health ministries, Patient groups, Media partners.
- **Illustrative outcome targets:** 30% increase in HF awareness by 2028; 20% rise in advocacy participation by 2030.

08. Scale digital health for HF care (Treatment)

- **Challenges**: Limited remote monitoring and telehealth Integration.
  - Adoption of remote HF monitoring varies widely across APAC, with rural and low-resource areas lagging behind. While some high-income economies such as Australia have piloted wearable devices, coverage remains limited and inconsistent.
  - The absence of standardised clinical protocols, digital infrastructure, and reimbursement mechanisms hinders broader implementation. Additionally, older adults, who make up a large proportion of HF patients, often lack digital literacy, reducing engagement with remote tools.
  - Integration with existing care pathways is weak, leading to data silos and underutilisation of insights from remote monitoring systems.
- **Objectives of recommendations:** Enhance equitable HF care access through technology, especially for rural populations.

- **Recommendations for mature systems:**


Mandate national reimbursement for remote monitoring technologies, including wearables (e.g., ECG patches, blood pressure monitors) and implantable like CardioMEMS, to ensure affordability and uptake; paired with AI-driven risk prediction models using NT-proBNP data. Example: Japan's wearable pilot in rural Tohoku by 2030.


Create national telemonitoring dashboards linked with EHRs and registries to track trends, outcomes, and therapy optimisation in real time.

- **Recommendations for emerging systems:**


Scale telehealth platforms (e.g., China's Internet + Health Care) for HF monitoring, utilise modular telehealth solutions for cost-effectiveness. Example: Vietnam's telehealth expansion to 1,000 rural clinics by 2030 to enable a scalable model for hybrid digital-physical care delivery.


Develop simplified mobile apps or SMS tools to help patients track symptoms, medication adherence, and vitals, with escalation triggers linked to clinical hotlines.


Train CHWs to support patient onboarding, digital literacy, and basic device troubleshooting, especially for elderly and low-tech users.


Partner with telecom providers and tech companies to subsidize devices and data plans in remote communities.

- **Target stakeholders for driving actions:** Health ministries, Technology and telecommunication companies, Community networks.
- **Illustrative outcome targets:** 25% reduction in rural HF hospitalisations through early detection and remote care by 2030; 15% telehealth adoption for HF management across APAC territories by 2030; 80% of wearable and implantable monitoring data is integrated into national EHR systems by 2032; remote monitoring protocols implemented in ≥100% of tertiary hospitals and ≥80% of district hospitals by 2035.

7.4 Medium impact, short-term recommendations (1-3 years)

09. Promote cross-territory collaboration on HF best practices (Domain 1: Policy and planning)

- **Challenges:** Limited regional collaboration hinders knowledge exchange and HF management improvement progress
  - Fragmented HF strategies across APAC territories limit the ability to share successful models and scale proven interventions.
  - Many emerging systems lack access to technical expertise, clinical data, and implementation tools that more mature systems have developed.
  - The absence of formal regional mechanisms for HF-specific collaboration hinders knowledge transfer, regional benchmarking, and collective policy advancement.
- **Objectives of recommendations:** Foster regional knowledge exchange to accelerate adoption of evidence-based HF policies, reduce duplication of efforts, and support harmonization of guidelines, training, and data use across territories.
- **Recommendations for mature systems:**
  - Lead regional forums or task forces focused on HF policy, clinical guidelines, and registry design, drawing from successful national models (e.g., Japan's JROAD, South Korea's KorHF).
  - Share technical toolkits, implementation frameworks, and digital health protocols (e.g., telemonitoring, NT-proBNP testing integration) with other territories.
  - Partner with academic and development organisations to support capacity-building in neighboring territories.
- **Recommendations for emerging systems:**
  - Participate in regional HF knowledge platforms and pilot joint initiatives in areas like NT-proBNP screening, CHW-led prevention progammes, or GDMT optimisation.
  - Adapt proven tools and guidelines (e.g., simplified HF diagnostic pathways, registry templates) to fit national health system contexts.
  - Seek technical support from high-income APAC economies and multilateral partners (e.g., WHO, ADB) to co-develop and Localise HF strategies.
- **Target stakeholders for driving actions:** Health ministries, Cardiology societies both regional (e.g., Asia Pacific society of cardiology) and local; Regional cardiology alliances (e.g., APAC CVD Alliance); International and regional donor organisations (e.g., WHO); Academic institutions.
- **Illustrative outcome targets:** Establish a regional HF policy network or task force by 2026; Develop a regional HF best practices repository by 2028; Launch 3 cross-territory pilot projects on HF management (e.g., registries, digital tools, GDMT optimisation) by 2028; Achieve regional HF policy alignment benchmarks across ≥4 domains (e.g., diagnostics, medication access, data, prevention) by 2030.

7.5 Medium Impact, mid-term recommendations (3-5 years)

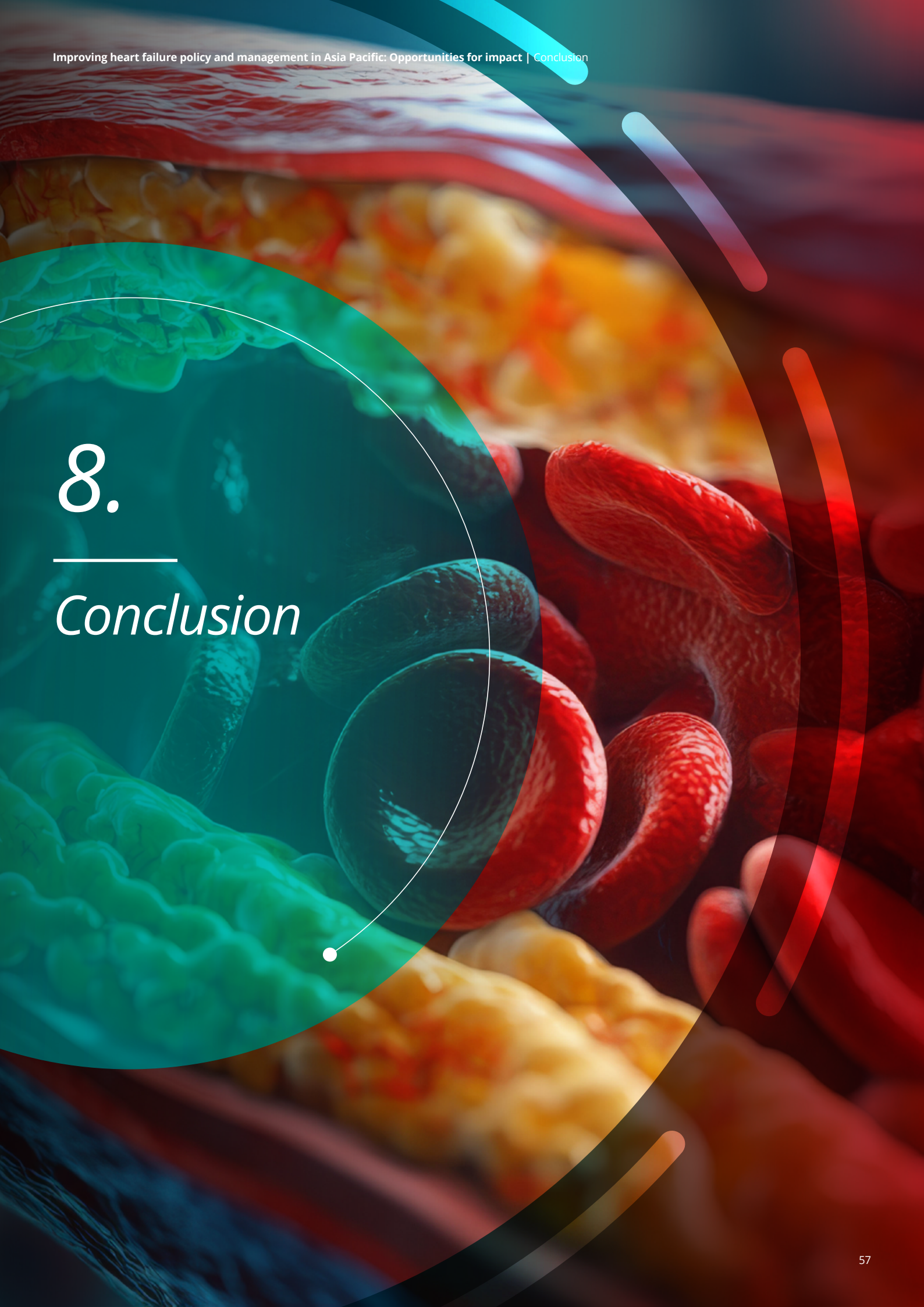
10. Invest in national HF registries (Domain 1: Policy and planning)

- **Challenges:** Fragmented data infrastructure and limited HF registry coverage.
  - Some APAC territories (e.g., Australia, Vietnam) lack national HF registries, limiting real-world data on HF burden, treatment patterns, and outcomes. This data gap weakens policy development, quality monitoring, and regional benchmarking.
  - Even where registries exist, challenges persist with data infrastructure, including limited interoperability with EHRs, inconsistent data standards, and fragmented reporting systems. These issues prevent seamless tracking of patient outcomes and integration of key indicators like NT-proBNP levels or medication adherence across care settings.
- **Objectives of recommendations:** Build data infrastructure to inform evidence-based policy.
- **Recommendations for mature systems:**
  - Expand existing registries (e.g., Japan's JROAD) to include NT-proBNP trends and SGLT2 inhibitor outcomes, ensuring interoperability with EHRs. Example: Taiwan to enhance its HF registry with real-world evidence by 2028.
  - Develop national data standards and mandate integration protocols to link HF registries with existing EHR systems, enabling automatic data capture, real-time monitoring, and longitudinal tracking of patient outcomes.
- **Recommendations for emerging systems:**
  - Launch pilot HF registries in major urban hospitals using open-source software and standardised data metrics, with scale-up plans.
  - Seek technical and financial support from WHO, ADB, or other regional partners to build registry infrastructure.
  - Integrate HF data collection into existing NCD reporting systems to streamline implementation.
  - Collaborate with academic institutions for registry design, data analysis, and training.
- **Target stakeholders for driving actions:** Health ministries, Academic institutions, Global and regional donor organisations.
- **Illustrative outcome targets:** Ensure ≥80% of registry-linked hospitals submit quarterly HF data by 2028; Comprehensive HF data in 6/8 APAC territories by 2030; 15% improvement in care quality by 2030.

7.6 Medium impact, long-term recommendations (5-10 years)

11. Develop a heart failure (HF) prediction score tailored to Asian populations (Domain: Prevention and screening)

- **Challenges:** Lack of region-specific risk prediction tools for early HF detection.
  - Most existing HF risk prediction models are developed based on Western populations, limiting their accuracy and applicability in Asian contexts.
  - Asian populations have distinct risk profiles, including higher prevalence of HT, diabetes, and stroke at younger ages, as well as unique genetic and lifestyle factors.
  - The absence of validated, population-specific tools hinders early risk identification and targeted prevention strategies across the region.
- **Objectives of recommendations:** Create an evidence-based HF risk prediction model tailored to Asian populations to enable earlier identification of at-risk individuals and guide targeted screening, lifestyle interventions, and clinical decision-making.
- **Recommendations for mature systems:**
  - Leverage existing national cohort and registry data (e.g., Japan's JROAD, Korea's NHIS) to develop and validate HF risk scores that reflect local demographic, clinical, and genetic variables.
  - Integrate the prediction tool into EHR systems and preventive health platforms, including mobile apps and health screening progammes.
  - Pilot the tool in diverse clinical settings and refine thresholds based on NT-proBNP levels and real-world outcomes.
- **Recommendations for emerging systems**
  - Collaborate with academic institutions and high-income territories to adapt and test simplified HF risk scores using locally available data (e.g., blood pressure, BMI, family history, NT-proBNP).
  - Embed risk prediction into existing NCD screening platforms and CHW progammes to guide early intervention.
  - Seek regional or multilateral funding to support multicenter validation studies across diverse population groups.
- **Target stakeholders for driving actions:** Health ministries, Primary care networks; Cardiology societies both regional (e.g., Asia Pacific society of cardiology) and local; Regional Cardiology Alliances (e.g., APAC CVD Alliance); International and regional donor organisations (e.g., WHO.); academic institutions.
- **Illustrative outcome targets:** Develop and validate at least one regionally tailored HF prediction model by 2030; Pilot the risk score in ≥3 APAC territories through public health screening progammes by 2032.



8.

Conclusion

HF represents a critical test of health system resilience and policy responsiveness across the Asia Pacific region. Our comprehensive analysis of HF care across multiple APAC territories highlights **significant disparities in national policy frameworks, persistent implementation challenges, and systemic gaps that undermine the delivery of timely, equitable, and effective care**. Japan and Taiwan emerge as regional leaders, showcasing strong alignment between clinical guidelines, reimbursement policies, and investments in digital infrastructure. In contrast, middle-income economies commonly face structural constraints, including inadequate financing, underdeveloped primary care networks, and limited workforce and data capacity. Although therapeutic innovations such as NT-proBNP testing, ARNI, and SGLT2 inhibitors have redefined global standards for HF management, their adoption across the region remains fragmented and inequitable, particularly in resource-constrained settings.

Figure 2: Matrix of Overall domain scores for all territories

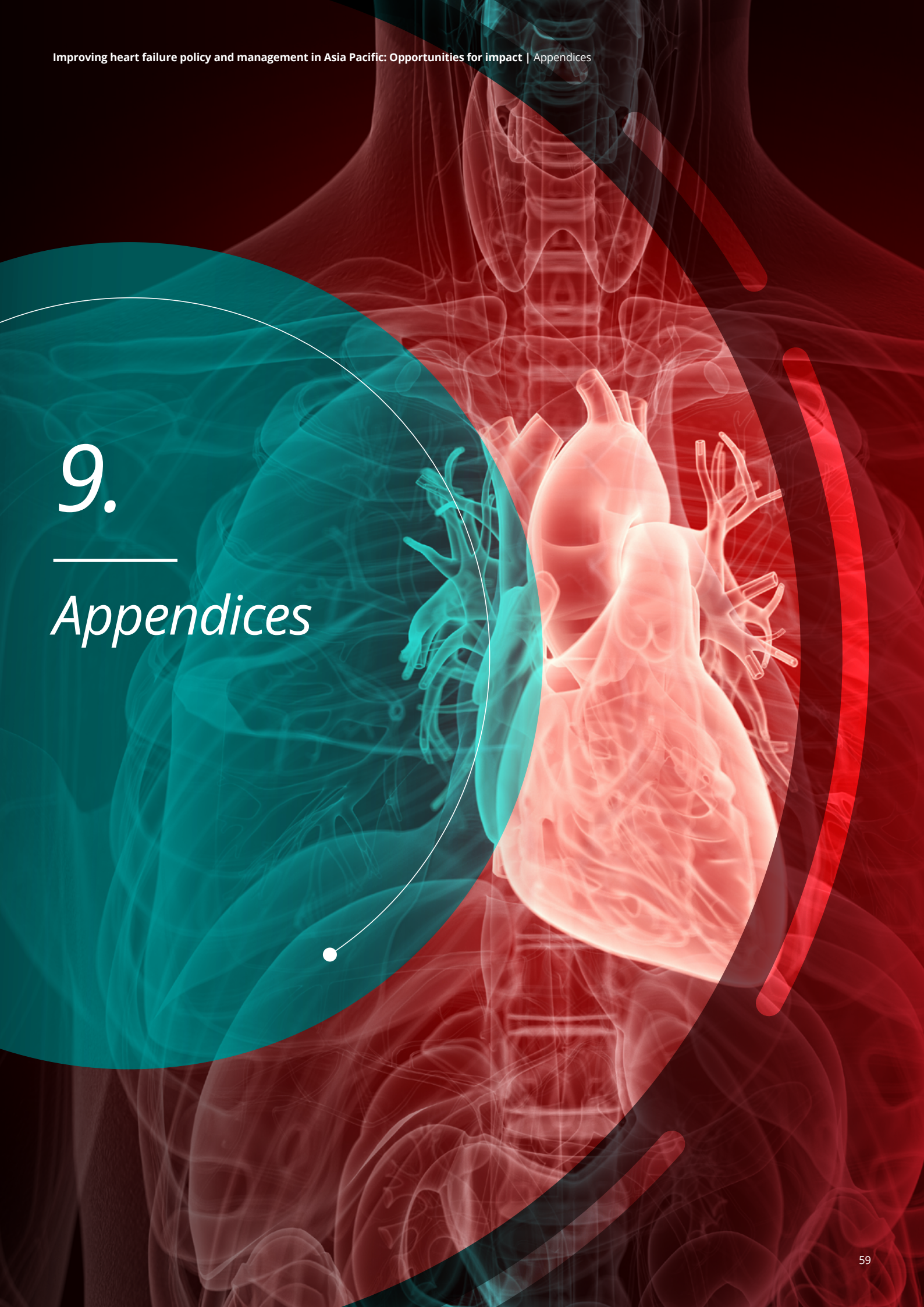
Domains	AU	HK	JP	KR	TW	CN	TH	VN
1a) Overall national CVD policy and planning landscape	High	Moderately high	High	High	High	High	High	Moderately high
1b) Heart failure policy and planning landscape	Moderately high	Moderately low	Moderately high	Moderately high	High	Moderately high	Moderately high	Moderately low
2) Heart failure prevention & screening	Low	Moderately high	Moderately high	Moderately low	High	Moderately high	Low	Low
3) Heart failure diagnosis & healthcare system capacity	Moderately high	Moderately high	High	Moderately high	Moderately high	Moderately high	Moderately high	Moderately low
4) Heart failure treatment monitoring and access	High	Moderately high	High	High	High	Moderately high	Moderately high	Moderately high
5) H eart failure advocacy, awareness and education	High	Moderately high	Moderately high	Moderately high	Moderately high	Moderately high	Moderately high	Moderately high

High Moderately high Moderately low Low

This White Paper identifies persistent gaps: HF often lacks standalone policy visibility; access to diagnostics and therapies is unequal; guideline uptake is limited at the primary care level; and data systems are fragmented or missing altogether. These challenges are compounded by health workforce shortages and limited community engagement in HF awareness and advocacy. To address these structural shortcomings, policymakers must **formally recognise HF as a distinct national health priority**, supported by targeted strategies, time-bound goals, and adequate budget allocations. National plans should **integrate HF into UHC schemes, reimbursement frameworks, and clinical protocols**, ensuring that innovative diagnostics and therapies are both available and affordable. Workforce policies should promote **task-shifting and continuous professional education**, particularly in underserved areas. In parallel, governments should invest in **national HF registries and interoperable health data systems**, enabling more effective monitoring, benchmarking, and quality improvement.

Multilateral donors, academic institutions, and industry should collaborate with governments to scale proven solutions and ensure that no territory is left behind. At the regional level, greater coordination is needed to **harmonise standards, share best practices, and promote joint investment in innovation and capacity building**.

The strategic actions laid out in this report-early diagnosis, access to innovative therapies, frontline empowerment, and digital-enabled follow-up-offer governments a practical blueprint for action. With political will, cross-sector alignment, and sustained investment, APAC can move from fragmented efforts to a regionally coordinated, policy-driven response to HF-one that ensures equitable, efficient, and high-quality care for all patients.



9. Appendices

Detailed methodology & scorecard

This research consisted of a benchmarking exercise that assessed the current landscape of HF care in the APAC region, with a specific focus on eight territories. A targeted literature review was conducted using indexed databases (including MEDLINE, Embase, and the Cochrane Library) and grey literature sources (such as policy documents and reports) to identify existing policy frameworks, clinical guidelines, and programmatic approaches related to CVD and HF. The review included over 150 studies published between 2000 and 2025, which were screened for relevance and thematically categorised into three areas: epidemiological trends, social and economic impacts, and policy and programme effectiveness. From this analysis, we developed a draft set of indicators and sub-domains, ultimately organised across five domains designed to benchmark HF care and identify opportunities for improvement. These domains included: national disease policy and planning landscape; HF prevention and screening; HF diagnosis and healthcare system capacity; HF treatment monitoring and access; and HF advocacy, awareness, and education. In total, the scorecard comprised 5 domains, 34 sub-domains, and 84 indicators.

A scoring structure was then developed for each indicator, with defined scoring ranges (e.g. 0–2, 0–4) used to classify performance levels from low to moderately low, moderately high, and high. territories were assessed based on the best available publicly accessible information, and the evaluation drew on a range of both primary and secondary research sources. The scoring process inevitably involves simplifying complex realities, and as such, we acknowledge that not all readers may agree with every individual score. In several instances, supporting data were unavailable or incomplete in the public domain. The purpose of the exercise was not to rank territories but to support evidence-informed policy dialogue and highlight areas where targeted interventions may improve HF care outcomes.

Deloitte and the APAC CVD Alliance retained full editorial independence throughout the research process. An Expert Advisory Panel composed of local and regional leaders in cardiovascular care provided critical guidance, reviewing the indicator framework and contributing insights via interviews, email correspondence, and virtual roundtables. Their input ensured scientific rigor and helped ground the findings in current clinical best practices and the regional context.

Domains	No.	Sub-domains	No.	Indicators & scoring criteria
1a) Overall national CVD policy and planning landscape	**1**	**Existence and operational status of a national CVD policies/ strategies/plans**	**1**	**Existence and operational status of a national CVD policies/strategies/plans** 2 = Operational national CVD policies/strategies/plans exist 1 = National CVD policies/strategies/plans exist but are embedded within a broader plan for non-communicable disease 0 = No national policy/strategy/plan exists
			2	**Currency of the national CVD policies/strategies/plans** 1 = Strategies/policies/plans were updated/in force within last 5 years (launch/last update in 2020) 0 = The launch/latest update is before 2020
	2	**Scope and specificity of the national CVD policies/strategies/ plans**	**3**	**Specific CVD reduction targets** 1 = Policies/strategies/plans have specific CVD reduction targets 0 = Policies/strategies/plans don't have specific CVD reduction targets
			4	**Objectives or strategies for management of acute and chronic CVD** 1 = Policies/strategies/plans cover management of acute and chronic CVD 1 = Policies/strategies/plans don't cover management of acute and chronic CVD
	3	**Coordinating mechanism for implementation**	**5**	**Dedicated national CVD progammes/initiatives** 1 = Policies/strategies/plans have national CVD progammes initiatives 1 = Policies/strategies/plans don't have national CVD progammes/initiatives
			6	**Joint national and regional CVD coordination mechanisms** 1 = There is a coordination between state and subnational governments specific to CVD 0 = There is no coordination between state and subnational governments specific to CVD
	4	**CVD financing**	**7**	**Dedicated budget to CVD progammes** 1 = There's a dedicated budget to CVD progammes 0 = There's no dedicated budget to CVD progammes
			8	**Universal coverage for screening for CVD** 1 = There's a universal coverage for screening for CVD 0 = There's no universal coverage for screening for CVD
			9	**Universal coverage for diagnostic tests and imaging for CVDs** 1 = There's a universal coverage for diagnostic tests and imaging for CVDs 0 = There's no universal coverage for diagnostic tests and imaging for CVDs
			10	**Universal coverage for CVD essential medicines** 1 = There's a universal coverage for CVD essential medicines 0 = There's no universal coverage for CVD essential medicines
	5	**Existence of a population-based registry**	**11**	**Existence of national registries established for CVD** 1 = National CVD registries exist 0 = National CVD registries don't exist

Domains	No.	Sub-domains	No.	Indicators & scoring criteria
1a) Overall national CVD policy and planning landscape	**5**	**Inclusivity and equitable policy formulation**	**12**	**Policies/strategies/plans/progammes addressing equitable access to care to CVD** 1 = Policies/progammes addressing equitable access to care to CVD exist 0 = Policies/progammes addressing equitable access to care to CVD don't exist
1b) heart failure policy and planning landscape	**6**	**Heart failure dedicated policies/ strategies/plans**	**13**	**Heart failure dedicated policies/strategies/plans** 1 = Heart failure-specific policies/strategies/plans exist 0 = heart failure-specific policies/strategies/plans don't exist
	7	**Priority & specificity of heart failure in the national CVD/NCD policies/strategies/ plans**	**14**	**Priority & specificity of heart failure in the national CVD/ NCD policies/strategies/plans** 2 = Hearth failure is identified as a priority area, and specific initiatives/actions are stated in the policies/strategies/plans 1 = Hearth failure is briefly mentioned as one of the focus areas in the policies/strategies/plans 0 = Hearth failure is not mentioned in the policies/strategies/ plans
			15	**Inclusion of desired outcomes/targets for heart failure control** 1 = Policies/strategies/plans outline specific, measurable outcomes/targets within a specific timeframe specifically for heart failure control 0 = Policies/strategies/plans don't have specific, measurable outcomes/targets within a specific timeframe specifically for heart failure control
	8	**National heart failure strategy implementation**	**16**	**Percentage of healthcare regions or facilities implementing national heart failure care guidelines, such as standardised treatment protocols and follow-up care** 2 = 50% or more healthcare regions or facilities implementing national heart failure care guidelines 1 ≤ 50% healthcare regions or facilities implementing national heart failure care guidelines
	9	**Policy support for preventive care**	**17**	**National policies focused on primary prevention of heart failure (e.g., salt reduction, improved diabetes care, HT management)** 1 = Territory has targets for upstream risk factors such as physical activity, obesity, HT, hyperlipidemia, alcohol consumption, smoking, salt intake and healthy diets 0 = Territory has no target for upstream risk factors
			18	**National policies focused on secondary prevention of heart failure (biomarkers etc.)** 1 = Policies/strategies/plans have strategy on screening for HF risk factors 0 = Policies/strategies/plans don't have strategy on screening for HF risk factors

Domains	No.	Sub-domains	No.	Indicators & scoring criteria
1b) heart failure policy and planning landscape	**10**	**HF research and innovation**	**19**	**Funding for heart failure research: Annual investment in heart failure-specific clinical trials, basic science research, and public health research** 1 = Annual investment is made in heart failure-specific clinical trials, basic science research, and public health research 0 = No annual investment is observed in heart failure-specific clinical trials, basic science research, and public health research
	10	**HF research and innovation**	**20**	**Clinical trial participation: Eligible heart failure patients enrolled in clinical trials e.g., for new therapies or medical devices** 1 = Eligible heart failure patients are enrolled in clinical trials for new therapies or medical devices 0 = No observation of eligible heart failure patients being enrolled in clinical trials for new therapies or medical devices
			21	**Translation of research into practice: Time-to-adoption for new guidelines, therapies, and technologies from clinical trials to everyday practice** 2 = Typical time-to-adoption for new guidelines, therapies, and technologies from clinical trials to everyday practice is from 1 to 3 years 1 = Typical time-to-adoption for new guidelines, therapies, and technologies from clinical trials to everyday practice is more than 3 years 0 = Unpredicted and no standardised adoption timeframe
	11	**HF financing**	**22**	**Insurance coverage for heart failure care (Public)** 2 = Hearth failure care is fully funded/reimbursed 1 = Hearth failure care is partially funded reimbursed 0 = Hearth failure care is not funded/reimbursed
			23	**Insurance coverage for heart failure care (Private & alternatives)** 2 = Hearth failure care is fully funded/reimbursed 1 = Hearth failure care is partially funded/reimbursed 0 = Hearth failure care is not funded/reimbursed
	12	**Presence of heart failure registries**	**24**	**Presence of heart failure registries** 1 = Hearth failure registries currently exist 0 = Hearth failure registries currently don't exist
	13	**Existence of heart failure clinical guidelines**	**25**	**Existence of clinical guidelines** 1 = National evidence-based heart failure guidelines exist
			26	**Currency of clinical guidelines** 2 = Guidelines were updated within last 2 years (last update in 2023) 1 = Guidelines were updated within last 5 years (last update in 2020) 0 = The latest update is before 2020

Domains	No.	Sub-domains	No.	Indicators & scoring criteria
1b) heart failure policy and planning landscape	**14**	**HF health equity**	**27**	**Patient navigation progammes: Heart failure patients from underserved backgrounds enrolled in patient navigation progammes to improve access to care and follow-up** 1 = Patient navigation progammes exist for underserved communities e.g., Heart failure patients from underserved backgrounds are enrolled in patient navigation progammes to improve access to care and follow-up 0 = Patient navigation progammes don't exist for underserved communities
			28	**Community-based care progammes: Community-based heart failure management progammes designed to support at-risk groups (e.g., community health workers, peer support groups)** 1 = Community-based care progammes exist for risk groups 0 = Community-based care progammes don't exist for risk groups

Domains	No.	Sub-domains	No.	Indicators & scoring criteria
Heart failure prevention & screening	**15**	**Heart failure screening guidelines**	**29**	**National heart failure clinical guidelines coverage** 1 = National heart failure clinical guidelines cover screening for heart failure 0 = National heart failure clinical guidelines don't cover screening for heart failure or or only cover it at a minimal level
			30	**# of biomarkers included in heart failure screening guidelines (e.g. BNP/NT-proBNP, Troponin, Soluble ST2, Galectin-3, MR-proANP)** 2 = Three or more 1 = One or Two 0 = None
			31	**Inclusion of biomarker testing in screening guidelines** 1 = Biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP) are mentioned or recommended as screening tools in the national heart failure screening guidelines 0 = Biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP) are not mentioned or recommended as screening tools in the national heart failure screening guidelines
			32	**Inclusion of HT management** 1 = National heart failure clinical guidelines cover HT management 0 = National heart failure clinical guidelines don't cover HT management
			33	**Inclusion of diabetes control in HF** 1 = National heart failure clinical guidelines cover diabetes control 0 = National heart failure clinical guidelines don't cover diabetes control
			34	**Inclusion of screening for high-risk populations (e.g., older adults, patients with CAD, diabetes, or HT) for early signs of HF or related risk factors** 1 = National heart failure clinical guidelines cover screening for high-risk populations 0 = National heart failure clinical guidelines don't cover screening for high-risk populations

Domains	No.	Sub-domains	No.	Indicators & scoring criteria
Heart failure prevention & screening	**16**	**Heart failure screening funding**	**35**	**Existence of publicly funded/reimbursed screening test for heart failure** 2 = Heart failure screening is fully funded/reimbursed 1 = Heart failure screening is partially funded/reimbursed 0 = Heart failure screening is not funded/reimbursed
			36	**Funding for HF screening for T2DM patients** 1 = Screening for T2DM patients is funded/reimbursed 0 = Screening for T2DM patients is not funded/reimbursed
			37	**Financing mechanism for biomarkers in HF screening** 1 = Tests using HF biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP) are reimbursed 0 = Tests using HF biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP) are out of pocket
Heart failure diagnosis & healthcare system capacity	**17**	**Heart failure diagnosis guidelines**	**38**	**National heart failure clinical guidelines coverage** 1 = National heart failure clinical guidelines cover diagnosis for heart failure 0 = National heart failure clinical guidelines don't cover diagnosis for heart failure
			39	**# of biomarkers included in heart failure diagnosis guidelines** (e.g. BNP/NT-proBNP, Troponin, Soluble ST2, Galectin-3, MR-proANP) 2 = Three or more 1 = One or Two 0 = None
			40	**Inclusion of biomarker testing in diagnostic guidelines** 1 = Biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP) are mentioned or recommended as diagnostic tools in the national heart failure screening guidelines 0 = Biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP) are not mentioned or recommended as diagnostic tools in the national heart failure screening guidelines
	18	**Capacity of/ availability of access to diagnostic services**	**41**	**MRI** 4 = High (>0.43 machines per ten thousand of population) 3 = Moderately high (>0.28-0.43 machines per ten thousand of population) 2 = Moderately low (>0.14-0.28 machines per ten thousand of population) 1 = Low (0-0.14 machines per ten thousand of population)
			42	**CT** 4 = High (>0.87 machines per ten thousand of population) 3 = Moderately high (>0.58-0.87 machines per ten thousand of population) 2 = Moderately low (>0.30-0.58 machines per ten thousand of population) 1 = Low (0-0.30 machines per ten thousand of population)

Domains	No.	Sub-domains	No.	Indicators & scoring criteria
Heart failure diagnosis & healthcare system capacity	**19**	**HF biomarker testing rate (percentage of patients with suspected heart failure undergoing biomarkers (e.g., BNP, NT-proBNP) to confirm diagnosis)**	**43**	**Use of HF biomarkers at emergency care in public institutions** 3 ≥ 80% of patients with suspected HF get a test using HF biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP) 2 = 50% of patients with suspected HF get a test using HF biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP) 1 ≤ 20% of patients with suspected HF get a test using HF biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP)
			44	**Use of HF biomarkers at emergency care in private institutions** 3 ≥ 80% of patients with suspected HF get a test using HF biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP) 2 = 50% of patients with suspected HF get a test using HF biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP) 1 ≤ 20% of patients with suspected HF get a test using HF biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP)
			45	**Use of HF biomarkers at primary care centers in public institutions** 3 ≥ 80% of patients with suspected HF get a test using HF biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP) 2 = 50% of patients with suspected HF get a test using HF biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP) 1 ≤ 20% of patients with suspected HF get a test using HF biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP)
			46	**Use of HF biomarkers at primary care centers in private institutions** 3 ≥ 80% of patients with suspected HF get a test using HF biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP) 2 = 50% of patients with suspected HF get a test using HF biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP) 1 ≤ 20% of patients with suspected HF get a test using HF biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP)
	20	**Capacity of workforce/ availability of HF specialists (adjusted for regional distribution)**	**47**	**Cardiologists** 4 = High (>0.90 staffs per ten thousand of population) 3 = Moderately high (>0.66-0.90 staffs per ten thousand of population) 2 = Moderately low (>0.42-0.66 staffs per ten thousands of population) 1 = Low (0-0.42 staffs per ten thousands of population)
	21	**Multidisciplinary heart failure care team availability**	**48**	**Hospitals and clinics offering care from a multidisciplinary team, including cardiologists, dietitians, psychologists, and rehabilitation specialists** 1 = Hospitals and clinics offering care from a multidisciplinary team, including cardiologists, dietitians, psychologists, and rehabilitation specialists 0 = A multidisciplinary team, including cardiologists, dietitians, psychologists, and rehabilitation specialists is not available for HF care

Domains	No.	Sub-domains	No.	Indicators & scoring criteria
Heart failure diagnosis & healthcare system capacity	**22**	**Heart failure diagnostics funding coverage**	**49**	**Existence of publicly funded/reimbursed diagnostics test for heart failure** 2 = Heart failure diagnostics is fully funded/reimbursed 1 = Heart failure diagnostics is partially funded/reimbursed 0 = Heart failure diagnostics is not funded/reimbursed
			50	**Financing mechanism for biomarkers in HF diagnostics** 1 = Diagnostic tests using HF biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP) are reimbursed 0 = Diagnostic tests using HF biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP) are out of pocket
Heart failure treatment monitoring and access	**23**	**Heart failure treatment monitoring guidelines**	**51**	**National heart failure clinical guidelines coverage** 1 = National heart failure clinical guidelines cover treatment monitoring for heart failure 0 Done= National heart failure clinical guidelines don't cover treatment monitoring for heart failure
			52	**Involvement of multi-disciplinary team** 1 = Guidelines cover shared decision making/treatment of a multidisciplinary HF team 0 = Guidelines don't cover shared decision making/treatment of a multidisciplinary HF team
			53	**Linkage to supportive/palliative care** 1 = Guidelines include referral pathway to supportive/palliative care services 0 = Guidelines don't include referral pathway to supportive/ palliative care services
			54	**# of biomarkers included in heart failure treatment/ monitoring guidelines (e.g. BNP/NT-proBNP, Troponin, Soluble ST2, Galectin-3, MR-proANP)** 2 = Three or more 1 = One or Two 0 = None
			55	**Inclusion of biomarker testing in treatment monitoring guidelines** 1 = Biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP) are mentioned or recommended as treatment monitoring tools in the national heart failure screening guidelines 0 = Biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP) are not mentioned or recommended as treatment monitoring tools in the national heart failure screening guidelines
			56	**Inclusion of Timeliness of heart failure Care in the national HF clinical guideline (e.g., Heart failure patients receiving care within 24 hours of hospital admission or referral for outpatient care (especially critical in emergency or exacerbation settings)** 1 = National heart failure clinical guidelines cover timeliness of heart failure Care 0 = National heart failure clinical guidelines don't cover timeliness of heart failure Care

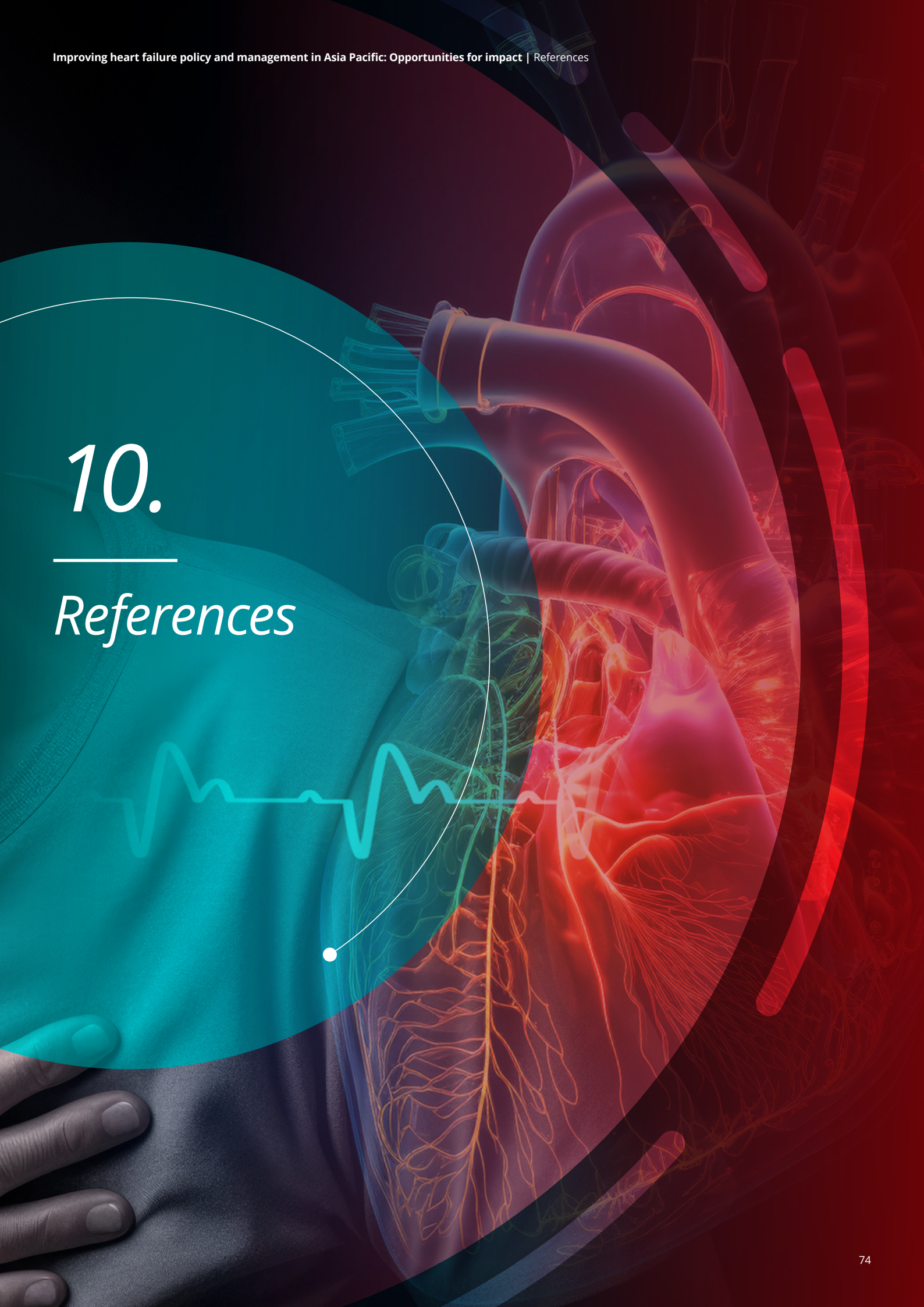
Domains	No.	Sub-domains	No.	Indicators & scoring criteria
Heart failure treatment monitoring and access	**23**	**Heart failure treatment monitoring guidelines**	**57**	**Inclusion of emergency care protocols (e.g., Availability and utilisation of standardised heart failure care protocols in emergency departments (e.g., Early use of diuretics, anticoagulation for arrhythmia)** 1 = National heart failure clinical guidelines cover emergency care protocols 0 = National heart failure clinical guidelines don't cover emergency care protocols
	24	**Availability of/access to different types of drug therapy**	**58**	**Availability/access to heart failure therapy** 1 = All (100%) of the heart failure drugs listed on the WHO Essential HF Drug List of 2023 are included in the most current national essential drugs list (NEDL) 0 = Not all (100%) of the heart failure drugs listed on the WHO Essential HF Drug List of 2023 are included in the most current national essential drugs list (NEDL)
	25	**Prescription of Guideline-Directed Medical Therapy (GDMT): Eligible heart failure patients (EF < 40%) prescribed key medications**	**59**	**ACE inhibitors/ARBs/ARNI** 2 = The rate of HF patients being treated with the medication is ≥ 50% 1 = The rate of HF patients being treated with the medication is < 50% 0 = No usage of the medication observed
			60	**Beta-blockers** 2 = The rate of HF patients being treated with the medication is ≥ 50% 1 = The rate of HF patients being treated with the medication is < 50% 0 = No usage of the medication observed
			61	**MRAs** 2 = The rate of HF patients being treated with the medication is ≥ 50% 1 = The rate of HF patients being treated with the medication is < 50% 0 = No usage of the medication observed
			62	**SGLT2 inhibitors** 2 = The rate of HF patients being treated with the medication is ≥ 50% 1 = The rate of HF patients being treated with the medication is < 50% 0 = No usage of the medication observed
	26	**Implementation of new therapies**	**63**	**Adoption of newer heart failure therapies (e.g., SGLT2 inhibitors, ARNI)** 1 = Adoption of adoption of newer heart failure therapies (e.g., SGLT2 inhibitors, ARNI) is observed in the territory 0 = No adoption of adoption of newer heart failure therapies (e.g., SGLT2 inhibitors, ARNI) is observed in the territory

Domains	No.	Sub-domains	No.	Indicators & scoring criteria
Heart failure treatment monitoring and access	**27**	**Use of implantable devices**	**64**	**ICDs** 1 = The implantation is available and performed in the territory 0 = The implantation is unavailable in the territory
			65	**CRT** 1 = The implantation is available and performed in the territory 0 = The implantation is unavailable in the territory
			66	**LVAD** 1 = The implantation is available and performed in the territory 0 = The implantation is unavailable in the territory
	28	**Home health medication monitoring: Heart failure patients in home health progammes receiving regular medication reviews and adjustments**	**67**	**Availability of home health medication monitoring/ remote patient monitoring for people with HF** 1 = Home health medication monitoring/remote patient monitoring is available for people with HF 0 = Home health medication monitoring/remote patient monitoring is unavailable for people with HF
	29	**Heart failure drugs funding coverage**	**68**	**Existence of publicly funded/reimbursed drug therapy for heart failure** 2 = All drugs included in the WHO essential meds list for heart failure are fully funded/reimbursed 1 = Some drugs included in the WHO essential meds list for heart failure are funded/reimbursed 0 = No drug included in the WHO essential meds list for heart failure is funded/reimbursed
			69	**Funding for HF management/treatment using rapid optimisation, supported by NT-proBNP testing for HF therapies (STRONG HF)** 1 = Funding for HF management/treatment using rapid optimisation, supported by NT-proBNP testing for HF therapies (STRONG HF) is funde/reimbursed 0 = Funding for HF management/treatment using rapid optimisation, supported by NT-proBNP testing for HF therapies (STRONG HF) is not funded/reimbursed
			70	**Financing mechanism for biomarkers in HF treatment monitoring** 1 = Tests using HF biomarkers in treatment monitoring (e.g., Natriuretic peptide-BNP or NT pro BNP) are reimbursed 0 = Tests using HF biomarkers in treatment monitoring (e.g., Natriuretic peptide-BNP or NT pro BNP) are out of pocket

Domains	No.	Sub-domains	No.	Indicators & scoring criteria
Heart failure advocacy, awareness and education	**30**	**Heart failure patient engagement and advocacy**	**71**	**Existence of patient organisations** 1 = One or more patient organisations/patient advocacy groups which cover heart failure exist 0 = No patient organisation/patient advocacy group which cover heart failure exist
			72	**Participation in national heart failure policy & plan development** 2 = One or more patient organisations which cover heart failure participate in developing the national heart failure policy and plan development 1 = One or more patient organisations which cover heart failure exist but don't participate in developing the national heart failure policy and plan development 0 = No patient organisation which covers heart failure participates in developing the national heart failure policy and plan development
			73	**Collaborations/participation in joint progammes with government** 1 = Collaborations and joint progammes/initiatives, including lobbying efforts, exist between patient groups and policy groups/ministries/government bodies 0 = Collaborations and joint progammes/initiatives, including lobbying efforts, don't exist between patient groups and policy groups/ministries/government bodies
	31	**Heart failure civil society engagement and advocacy**	**74**	**Existence of civil society organisations (NGOs/Advocacy associations etc.)** 2 = Existence of civil society organisations (NGOs/Advocacy associations etc.) dedicated to heart failure 1 = Existence of civil society organisations (NGOs/Advocacy associations etc.) related to heart failure 0 = No civil society organisation (NGOs/Advocacy associations etc.) related to heart failure exists
			75	**Participation in national CVD/HF policy & plan development** 1 = One or more civil societies which cover heart failure participate in developing the national CVD/HF policy & plan 0 = No civil society which covers heart failure participates in developing the national CVD/HF policy & plan
			76	**Collaborations/participation in joint HF progammes with government** 1 = Collaborations and joint progammes/initiatives, including lobbying efforts, exist between civil societies and policy groups/ministries/government bodies 0 = No collaboration and joint programme/initiative, including lobbying efforts, exist between civil societies and policy groups/ministries/government bodies exists

Domains	No.	Sub-domains	No.	Indicators & scoring criteria
Heart failure advocacy, awareness and education	**31**	**Heart failure civil society engagement and advocacy**	**77**	**Collaborations/participation in joint progammes with the private sector** 1 = Collaborations and joint progammes/initiatives, including lobbying efforts, exist between civil societies and the private sector 0 = No collaboration and joint programme/initiative, including lobbying efforts, exist between civil societies and the private sector
			78	**Contributions towards clinical guidelines development** 1 = One or more civil societies which cover heart failure are listed as contributors in clinical guidelines 0 = No civil society which covers heart failure are listed as contributors in clinical guidelines
	32	**Heart failure educational initiatives**	**79**	**Availability of patient education progammes and support resources by the government** 2 = Educative progammes/resources specific for heart failure run by the government exist 1 = Only general CVD educative programme/resource run by the government exist 0 = No CVD/HF educative programme/resource run by the government exist
			80	**Availability of patient education progammes and support resources by the civil society or patient organisations** 2 = Educative progammes/resources specific for heart failure run by the civil society or patient organisations exist 1 = Only general CVD educative programme/resource run by the civil society or patient organisations exist 0 = No CVD/HF educative programme/resource run by the civil society or patient organisations exist
			81	**Existence of community-based outreach progammes** 2 = Existence of at least one community-based outreach services programme/public awareness campaign specific for heart failure 1 = Existence of at least one community-based outreach services programme/public awareness campaign for general CVD 0 = No CVD/HF programme exists
			82	**Educational progammes for healthcare providers** 2 = Clinical heart failure-specific educational progammes targeted towards healthcare providers exist 1 = Only clinical general CVD educational progammes targeted towards healthcare providers exist 0 = No clinical CVD/HF educational programme targeted towards healthcare providers exists

Domains	No.	Sub-domains	No.	Indicators & scoring criteria
Heart failure advocacy, awareness and education	**33**	**Continuous HF policy improvement progammes**	**83**	**Existence of HF continuous policy improvement progammes (policy committee meeting, pre- and post-campaign surveys, etc.)** 1 = Continuous HF policy improvement progammes (policy committee meeting, pre- and post-campaign surveys, etc.) exist 0 = No continuous HF policy improvement progammes (policy committee meeting, pre- and post-campaign surveys, etc.) exist
			84	**Frequency of HF continuous policy improvement progammes** 2 = Progammes conducted with a well-defined schedule (e.g., quarterly or after each campaign) 1 = Progammes conducted on an ad-hoc basis 0 = No policy improvement progammes conducted



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11. Territory profiles

High-income territories

Heart failure territory snapshot

Domains	Overall national CVD policy and planning landscape	Heart failure policy and planning landscape	Heart failure prevention & screening	Heart failure diagnosis & healthcare system capacity	Heart failure treatment monitoring and access	Heart failure advocacy, awareness and education
Australia						

High | Moderately high | Moderately low | Low

Top opportunities for improvement

01. Develop HF-specific policy framework

- **Challenges:** HF accounts for a significant portion of the CVD burden alongside atrial fibrillation and atherosclerotic CVD, yet remains underrepresented in policy. It is currently addressed only as part of broader CVD strategies, which limits focused intervention and resource allocation.
- **Target stakeholders for driving actions:** Department of Health and aged care, Heart foundation, Cardiac Society of Australia and New Zealand (CSANZ), consumer advocacy groups.
- **Opportunities:**
  - Develop a national HF action plan: Embed HF as a distinct focus area within the broader CVD policy, with a detailed roadmap, measurable targets, and an implementation timeline.
  - Establish an HF taskforce: Form a national HF taskforce comprising policymakers, clinicians, researchers, and patient representatives to oversee the development and implementation of targeted HF policy. For example, the national hypertension workforce task force has been established, demonstrating a move toward structured collaboration among key leaders.
  - Leverage consumer advocacy: Promote real-world patient stories and case studies to engage policymakers. Consumer voices resonate strongly in Australia and can be powerful tools for accelerating policy reforms.
  - Secure dedicated funding and research grants: Allocate funding for HF-focused research and pilot initiatives to guide data-driven policy development.

02. Update HF clinical guidelines

- **Issues:** The national HF clinical guideline (last updated in 2018) is outdated and lacks recommendations on newer therapies. Many clinicians note that the HF care model has remained largely unchanged for decades. This highlights the need to update the clinical guideline and re-evaluate current approaches. In addition, its implementation varies significantly by state, leading to inequities and inconsistencies in care.
- **Target stakeholders for driving actions:** national Health and Medical Research Council (NHMRC), CSANZ, State health departments.
- **Opportunities:**
  - Revise clinical guidelines: Accelerate efforts to update the 2018 guideline to include innovative therapies and new evidence-based practices.
  - Mandate national adoption: Promote uniform implementation across states through federal leadership and incentivized compliance.
  - Support clinical change through White Papers: Use evidence-backed discussion papers and consensus statements to engage clinicians and policymakers in reforming outdated HF care models.

03. Promote early detection through evidence-based HF screening campaigns challenges

- **Issues:** HF screening for high-risk populations, particularly individuals with T2DM, HT, and high cholesterol, is underutilised and not reimbursed. Delays in screening rollout hinder early diagnosis and intervention.
- **Target stakeholders for driving actions:** Medicare, Private Health Insurers, Department of Health and aged care.
- **Opportunities:**
  - Reimburse HF screening for high-risk groups: Fund NT-proBNP or other validated biomarker tests for early detection in high-risk populations, aligned with existing CVD risk check progammes.
  - Engage private sector in screening campaigns: Collaborate with private insurers and health providers to expand access to screening tools and deliver targeted awareness initiatives.
  - Demonstrate cost-wffectiveness: Commission health economic evaluations showing long-term benefits of early HF diagnosis to inform reimbursement decisions and policy support.

04. Enhance public-private integration to strengthen HF care continuity

- **Issues:** The public and private sectors in Australia operate with limited coordination, resulting in fragmented care pathways and inefficiencies in managing chronic conditions like HF.
- **Target stakeholders for driving actions:** Department of Health and aged care, Private hospitals australia, Primary Health Networks (PHNs).
- **Opportunities:**
  - Expand create structured referral pathways: Establish standardised links between hospital discharge, secondary prevention, and rehabilitation services across public and private sectors.
  - Leverage private sector capacity: Utilise private hospitals to reduce elective surgery backlogs and provide ongoing HF management, easing the burden on public systems.
  - Expand partnerships beyond pharma: Include digital health, community-based rehab, and chronic disease management progammes in public-private collaborations.
  - Align incentives across sectors: Reform funding models to support integrated care and patient handover between systems.

05. Accelerate national telehealth integration for HF diagnosis and management

- **Issues:** Australia is making progress in integrating telemedicine and wearable monitoring for heart failure patients, but implementation is still in its early stages and mostly limited to research projects or small-scale applications. Ongoing efforts are focused on stratifying high-risk patients for CVD through electronic medical records (EMRs). A key challenge remains the fragmented nature of patient care due to the separation between federally funded primary care and state-run hospital systems. This creates difficulties in tracking the full patient journey, especially during transitions from hospital discharge to community-based care and secondary prevention progammes. Without a national framework or standardised linkages, scaling these initiatives will be difficult.
- **Target stakeholders for driving actions:** Australian Digital Health Agency (ADHA), Medicare, State health departments.
- **Opportunities:**
  - Develop a national telehealth framework for HF: Build a cohesive strategy for remote HF monitoring and follow-up care, particularly for rural and high-risk patients.
  - Improve EMR Interoperability: Enable patient data sharing between hospitals and primary care through a centralised or federated system to support continuous HF care.
  - Invest in digital tools: Fund wearable devices, remote monitoring tools, and virtual rehab progammes via public-private collaboration.
  - Support clinician training and reimbursement: Provide financial incentives and education for providers to adopt telehealth for HF care, ensuring scalability and uptake.

Prevalence, incidence, mortality rate

Metrics	Australia
Age-standardised prevalence rate (%, 2022)	0.70%[1]
Age-standardised incidence rate (per 100,000 population, 2017)	348[2]
Crude mortality rate at 1 year (%, 2018)	25%[3]

Economic burdens

Metrics	Australia
Total cost per patient per year (USD, 2017)	$3,938[4]
Inpatient cost per patient per year (USD, 2017)	$2,430[5]
Length of stay (days, 2012)	5.1-9.9[6]

Scorecard results

No.	Sub-domains	Range	Score	Indicators		Justifications
Domain 1a: Overall national CVD policy and planning landscape						
1	Existence and operational status of a national CVD policies /strategies/plans	**0-3**	**3**	Existence and operational status of a national CVD policies/strategies/plans	**+2**	**1. National Strategic Action Plan for Heart Disease and Stroke (2020)[7]** – Outlines a national roadmap to reduce heart disease and stroke through four priorities: (1) Prevention and early detection, (2) Diagnosis and treatment, (3) Support and care, and (4) Research. – Implementation is tailored to each state/territory to align with local initiatives and needs. **2. National strategic framework for chronic conditions (2017–2025)[8]** – Defines 'chronic conditions' as including CVD, cancer, diabetes, and chronic respiratory diseases – Focuses on three priorities: (1) Prevention to support a healthier Australia, (2) Quality care to improve life for those with chronic conditions, and (3) Support for priority populations.
				Currency of the national CVD policies/strategies/plans	**+1**	The latest relevant policy (National strategic action plan for heart disease and stroke) has been published in 2020.

No.	Sub-domains	Range	Score	Indicators		Justifications
Domain 1a: Overall national CVD policy and planning landscape						
2	Scope and specificity of the national CVD policies/ strategies/plans	**0-2**	**1**	Specific CVD reduction targets	**+0**	Australia's goal is to reduce CVD mortality but does not mention quantifiable targets.
				Objectives or strategies for management of acute and chronic CVD		Strategies like the chronic conditions framework (2017–2025) guide chronic disease prevention and management[9]. Acute CVD care is strong, but hospital capacity remains a challenge. Public and private hospital systems operate in parallel; private care requires insurance to cover unsubsidised costs.
3	Coordinating mechanism for implementation	**0-2**	**1**	Dedicated national CVD progammes/initiatives	**+1**	**Policies/strategies/plans have national CVD progammes/ initiatives. E.g.,** • National obesity strategy (2022–2032): Framework to tackle obesity as a CVD risk factor. • Pharmaceutical Benefits Scheme (PBS): Subsidizes CVD medicines. • Medical workforce strategy (2021–2031): Aims to address workforce gaps, including in cardiology.
				Joint national and regional CVD coordination mechanisms	**+0**	Coordinated implementation of CVD management progammes has been a challenge in Australia, with each state taking charge of how CVD treatment is managed within their state[10].

No.	Sub-domains	Range	Score	Indicators		Justifications
Domain 1a: Overall national CVD policy and planning landscape						
4	CVD financing	**0-4**	**4**	Dedicated budget to CVD progammes	**+1**	There's a dedicated budget to CVD progammes. E.g., The cardiovascular health mission will provide $220 million over 10 years under the medical research future fund to improve cardiovascular health and stroke for all Australians[11].
				Universal coverage for screening for CVD	**+1**	Australia lacks a national CVD screening programme; current screening relies on the Medicare Heart Health Check, which requires patient or general practioner (GP) initiation[12]. This self-initiated approach limits early detection. Unlike CVD, for some other diseases e.g., cancer, screening is systematically implemented at a national level (Cancer Australia). For example, all individuals in Australia are automatically sent a bowel cancer screening test when they turn 50-no equivalent national screening programme exists for CVD.
				Universal coverage for diagnostic tests and imaging for CVDs	**+1**	Tests/tools such as X-ray, Echocardiogram, ECG, etc. are partially or fully covered by Medicare. PHI offers coverage if the diagnostic services are not listed on MBS and done within the hospitals[13].
				Universal coverage for CVD essential medicines	**+1**	Essential medications are subsidised under the Pharmaceutical Benefits Scheme and are highly utilised by citizens to manage CVD. Under the PBS, 35% of total PBS prescriptions were for cardiovascular medicines[14].

No.	Sub-domains	Range	Score	Indicators		Justifications
Domain 1a: Overall national CVD policy and planning landscape						
5	Existence of a population based registry	**0-1**	**1**	Existence of national registries established for CVD	**+1**	Australia has multiple national registries in place and is working on embedding registries into the health records system for better continuity of care post-discharge[15]. The national Clinical Quality Registry and Virtual Registry Strategy (2020–2030) aims to embed key CVD data into EMRs, MHR, and national datasets, enabling automated data extraction by 2030[16].
6	Inclusivity and equitable policy formulation	**0-1**	**1**	Policies/strategies/plans/ progammes addressing equitable access to care to CVD	**+1**	Policies/progammes addressing equitable access to care to CVD exist. E.g., Key barriers to healthcare access for Indigenous people in remote areas include distance, transport, cost, and service availability; 61% report difficulty accessing care. The government is addressing these gaps through initiatives like Aboriginal community controlled health services, closing the gap, and various national Indigenous health plans and frameworks[17].

No.	Sub-domains	Range	Score	Indicators		Justifications
Domain 1b: Heart failure policy and planning landscape						
7	Heart failure dedicated policies/ strategies/plans	**0-1**	**1**	Heart failure dedicated policies/strategies/plans	**+1**	Heart failure policies, strategies, and plans vary by state. While some states, such as New South Wales, Victoria, and Queensland, have dedicated strategies, others do not[18,19,20].
8	Priority & specificity of heart failure in the national CVD/NCD policies/strategies/plans	**0-3**	**1**	Priority & specificity of heart failure in the national CVD/NCD policies/strategies/plans	**+1**	HF is mentioned among other CVD in "National strategic action Plan for heart disease and stroke 2020", no dedicated section for HF[21].
				Inclusion of desired outcomes/ targets for heart failure control	**+0**	Not specified.
9	National heart failure strategy Implementation	**0-2**	**1**	Percentage of healthcare regions or facilities implementing national heart failure care guidelines, such as standardised treatment protocols and follow-up care	**+1**	< 50% healthcare regions or facilities implementing national heart failure care guidelines. A national heart failure audit (2022) through the Australian commission on safety and quality healthcare found poor adherence to guideline recommended care and management in NSW, ACT and VIC. (Source: Expert interview)
10	Policy support for preventive care	**0-2**	**2**	National policies focused on primary prevention of heart failure (e.g., salt reduction, improved diabetes care, HT management)	**+1**	**Australia has set ambitious targets that will be hard to achieve unless concrete and immediate action is taken[22]:** • Smoking: Reduce to ≤5% by 2030. • Alcohol: 10% reduction in harmful consumption by 2028. • Salt intake: Reduce by 30% by 2030. • HT: Increase control rate from 32% to 70% by 2030. • Physical activity: Reduce insufficient activity by 15% by 2030. • Obesity: Halt rise and reduce childhood obesity by 5% by 2030.

No.	Sub-domains	Range	Score	Indicators		Justifications
Domain 1b: Heart failure policy and planning landscape						
10	Policy support for preventive care	**0-2**	**2**	National policies focused on secondary prevention of heart failure (biomarkers etc.)	**+1**	CVD patients in Australia have a wide array of medication options, with people using multiple cardiovascular medicines tending to remain in therapy and adhere to initiated therapy more than people using medicines from only one cardiovascular group despite the increased complexity of therapy[23].
11	HF research and innovation	**0-4**	**1**	Funding for heart failure research: Annual investment in heart failure-specific clinical trials, basic science research, and public health research	**+0**	No HF-dedicated funding available.
				Clinical trial participation: Eligible heart failure patients enrolled in clinical trials e.g., for new therapies or medical devices	**+1**	**Eligible heart failure patients are enrolled in clinical trials for new therapies or medical devices. E.g.,** • Heart failure & transplant service (Prof. Kaye): GARDEN-TIMI-74: Drug trial to reduce HF symptoms and improve quality of life; SGLT2 Mechanisms Study: Evaluates Dapagliflozin effects in HFrEF patients; RESPONDER-HF: Assesses IASD® (Corvia InterAtrial Shunt Device) device to reduce symptoms in HFpEF[24]. • CTC Cardiovascular Trials: Influential in AMI treatment and CVD prevention[25]. • BANDAID: Tests digital tools to improve guideline-based HF therapies post-discharge[26]. • SMART-risk: Uses health to guide care and reduce readmissions in acute HF[27].

No.	Sub-domains	Range	Score	Indicators		Justifications
Domain 1b: Heart failure policy and planning landscape						
11	HF research and innovation	**0-4**	**1**	Translation of research into practice: Time-to-adoption for new guidelines, therapies, and technologies from clinical trials to everyday practice	**+0**	No standardised timeframe for adoption. (Source: Expert interview)
12	HF financing	**0-4**	**2**	Insurance coverage for heart failure care (Public)	**+1**	• Medicare: Tax-funded; covers public hospital care and eligible outpatient services for citizens, permanent residents, and some international visitors. • Pharmaceutical Benefits Scheme (PBS): Subsidizes inpatient and outpatient medications. • Medicare Benefits Scheme (MBS): Covers 100% of GP visits, 85% of other outpatient services, and 75% of private in-hospital services. (Source: Expert interview)
				Insurance coverage for heart failure care (Private & alternatives)	**+1**	• Private insurance: ~55% have coverage for private hospital care, dental, and other services. • Patient Assistance Progammes (PAPs): Provide financial/ treatment support via partnerships, targeting low-income groups.
13	Presence of heart failure registries	**0-1**	**0**	Presence of heart failure registries	**+0**	HF registries do not exist.
14	Existence of heart failure clinical guidelines	**0-3**	**1**	Existence of clinical guidelines	**+1**	National heart foundation of Australia and cardiac society of Australia and New Zealand: Guidelines for the prevention, detection, and management of heart failure in Australia 2018[28].
				Currency of clinical guidelines	**+0**	The latest heart failure guideline update was in 2018, making it outdated by 5+ years as of 2025.

No.	Sub-domains	Range	Score	Indicators	Justifications
Domain 1b: Heart failure policy and planning landscape					
15	HF health equity	**0-2**	**2**	Patient navigation progammes: Heart failure patients from underserved backgrounds enrolled in patient navigation progammes to improve access to care and follow-up	**+1**	• Heart of Australia programme: Mobile cardiac clinic by St Andrew's War Memorial hospital provides diagnosis and treatment in rural Queensland; served 2,500+ patients and identified 76 urgent cases in year one[29]. • Royal Flying Doctor Service (RFDS): Delivers telehealth and primary care in remote areas, including CVD risk guidance; limited rehabilitation progammes[30]. • Queensland government nurse and Midwife navigators: Help rural and remote residents access and navigate the healthcare system[31,32].

No.	Sub-domains	Range	Score	Indicators	Justifications
Domain 1b: Heart failure policy and planning landscape					
15	HF health equity	**0-2**	**2**	Community-based care progammes: Community-based heart failure management progammes designed to support at-risk groups (e.g., community health workers, peer support groups)	**+1**	• Heart support Australia: Runs national peer support groups across the territory providing support to HF patients and their family members[33]. • Health Navigator (WA): Free virtual support for chronic disease risk reduction in Wheatbelt, South West, Great Southern, and Bunbury; coordinated with GPs[34]. • Healthy hearts – Illawarra Shoalhaven Local Health District (NSW): Family-centred outreach model to improve cardiac rehab access and identify at-risk relatives[35]. • NSW Health – Aboriginal healthy hearts project: Evaluating culturally inclusive, family-based cardiac rehab for Aboriginal communities[36]. • Healthy hearts Initiative (VIC, QLD, NSW): Pop-up clinics offering free cardiovascular risk checks, including blood pressure screening[37]. • Nowra community health Centre – Cardiac Services (NSW): Free heart failure service with nurse and exercise support from Gerringong to Milton, aiming to improve quality of life and reduce admissions[38].

No.	Sub-domains	Range	Score	Indicators		Justifications
Domain 2: Heart failure prevention & screening						
16	Heart failure screening guidelines	**0-7**	**2**	National heart failure clinical guidelines coverage.	**+0**	The national heart failure clinical guideline doesn't cover screening due to the lack of local evidence[39].
				# of biomarkers included in heart failure screening guidelines (e.g. BNP/ NT-proBNP, Troponin, Soluble ST2, Galectin-3, MR-proANP)	**+0**	The national heart failure clinical guideline doesn't cover screening due to the lack of local evidence[40].
				Inclusion of biomarker testing in screening guidelines	**+0**	The national heart failure clinical guideline doesn't cover screening due to the lack of local evidence[41].
				Inclusion of HT management	**+1**	The national heart failure clinical guideline covers HT management[42].
				Inclusion of diabetes control in HF	**+1**	The national heart failure clinical guideline covers diabetes control[43].
				Inclusion of screening for high-risk populations (e.g., older adults, patients with CAD, diabetes, or HT) for early signs of HF or related risk factors	**+0**	The national heart failure clinical guideline doesn't cover screening for high-risk population[44].

No.	Sub-domains	Range	Score	Indicators		Justifications
Domain 2: Heart failure prevention & screening						
17	Heart failure screening funding	**0-4**	**0**	Existence of publicly funded/ reimbursed screening test for heart failure	**+0**	There is no formal HF screening programme available in Australia. While the heart health check (funded under the MBS) utilises the Australian CVD risk calculator to estimate the 5-year risk of cardiovascular events and captures a number of risk factors associated with HF, it is not a HF screening tool. Medicare covers an NT-proBNP test once per year in primary care, but only for ruling out a diagnosis of HF (not screening)[45,46].
				Funding for HF screening for T2DM patients	**+0**	No funding/reimbursement available.
				Financing mechanism for biomarkers in HF screening	**+0**	NT-proBNP tests are reimbursed under MBS, with a restriction of one test per year. It is thus primarily used in the diagnosis stage of HF, resulting in additional tests for screening/ monitoring being paid OOP. (Source: Expert interview)
Domain 3: Heart failure diagnosis & healthcare system capacity						
18	Heart failure diagnosis guidelines	**0-4**	**3**	National heart failure clinical guidelines coverage	**+1**	National heart failure clinical guidelines cover diagnosis for heart failure. The 2018 guidelines by the national heart foundation of Australia and cardiac society of Australia and New Zealand recommend a 12-lead ECG, chest X-ray, and transthoracic echocardiogram for diagnosing suspected or newly diagnosed heart failure, with BNP or NT-proBNP levels advised when diagnosis is uncertain[47].
				# of biomarkers included in heart failure diagnosis guidelines (e.g. BNP/ NT-proBNP, Troponin, Soluble ST2, Galectin-3, MR-proANP)	**+1**	BNP/NT-pro BNP.[48]

No.	Sub-domains	Range	Score	Indicators		Justifications
Domain 3: Heart failure diagnosis & healthcare system capacity						
18	Heart failure diagnosis guidelines	**0-4**	**3**	Inclusion of biomarker testing in diagnostic guidelines	**+1**	NT-proBNP tests are highly recommended for the diagnosis of suspected HF by the guidelines in Australia[49].
19	Capacity of/availability of/access to diagnostic services	**0-8**	**5**	MRI	**+2**	Moderately low (>0.14-0.28 machines per ten thousand of population).
				CT	**+3**	Moderately high (>0.58-0.87 machines per ten thousand of population).
20	HF biomarker testing rate (Percentage of patients with suspected heart failure undergoing biomarkers (e.g., BNP, NT-proBNP) to confirm diagnosis)	**0-12**	**4**	Use of HF biomarkers at emergency care in public institutions	**+1**	<20% of patients with suspected HF get a test using HF biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP). (Source: Expert interview)
				Use of HF biomarkers at emergency care in private institutions	**+1**	<20% of patients with suspected HF get a test using HF biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP. (Source: Expert interview)
				Use of HF biomarkers at primary care centers in public institutions	**+1**	<20% of patients with suspected HF get a test using HF biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP). (Source: Expert interview)
				Use of HF biomarkers at primary care centers in private institutions	**+1**	<20% of patients with suspected HF get a test using HF biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP). (Source: Expert interview)
21	Capacity of workforce/availability of HF specialists (adjusted for regional distribution)	**0-4**	**2**	Cardiologists	**+2**	Moderately low (>0.42-0.66 staffs per ten thousand of population).

No.	Sub-domains	Range	Score	Indicators		Justifications
Domain 3: Heart failure diagnosis & healthcare system capacity						
22	Multidisciplinary heart failure care team availability	**0-1**	**1**	Hospitals and clinics offering care from a multidisciplinary team, including cardiologists, dietitians, psychologists, and rehabilitation specialists	**+1**	Australia has seen a rapid expansion of structured multidisciplinary chronic heart failure management progammes involving a range of professionals, including aboriginal health workers, cardiologists, dietitians, exercise physiologists, general physicians, GPs, nurses (including those with cardiology training, heart failure nurse practitioners, community and palliative care nurses), occupational therapists, palliative care physicians, pharmacists (hospital, community, and accredited), physiotherapists, psychologists, and social workers[50].
23	Heart failure diagnostics funding coverage	**0-3**	**2**	Existence of publicly funded/ reimbursed diagnostics test for heart failure	**+1**	Partial funding for HF diagnostics covered under the Medicare Benefits Scheme[51].
				Financing mechanism for biomarkers in HF diagnostics	**+1**	NT-proBNP tests are reimbursed under the MBS for diagnosing heart failure and can be used in non-hospital settings as a diagnostic aid. (Source: Expert interview)
Domain 4: Heart failure treatment monitoring and access						
24	Heart failure treatment monitoring guidelines	**0-8**	**6**	National heart failure clinical guidelines coverage	**+1**	National heart failure clinical guidelines cover treatment monitoring for heart failure. The national heart foundation of Australia and cardiac society of Australia and New Zealand's 2018 guidelines suggest considering BNP or NT-proBNP tests for prognostic stratification in established heart failure patients. Additionally, implantable pulmonary arterial pressure monitoring may be considered for patients previously hospitalized for heart failure, provided there are systems for daily data upload and weekly review of pressure data[52].

No.	Sub-domains	Range	Score	Indicators		Justifications
Domain 4: Heart failure treatment monitoring and access						
24	Heart failure treatment monitoring guidelines	**0-8**	**6**	Involvement of multi-disciplinary team	**+1**	Two main models of care in Australia include multidisciplinary heart failure disease management progammes with telemonitoring and nurse-led titration clinics, both involving advanced practice heart failure nurses or nurse practitioners[53]. Recommendations include referring patients with high-risk heart failure to multidisciplinary disease management progammes to reduce mortality and rehospitalisation. For areas with limited access to in-person progammes, telemonitoring or telephone support should be provided. Nurse-led medication titration is recommended for patients with HFrEF who haven't reached maximum doses of ACE inhibitors, ARBs, ARNIs, beta blockers, or MRAs to reduce hospitalisations.
				Linkage to supportive/ palliative care	**+1**	Recommendation: Referral to palliative care should be considered in patients with advanced heart failure to alleviate end-stage symptoms, improve quality of life, and decrease rehospitalisation. Involvement of palliative care should be considered early in the trajectory towards ESHF[54].
				# of biomarkers included in heart failure treatment/ monitoring guidelines (e.g., BNP/NT-proBNP, Troponin, Soluble ST2, Galectin-3, MR-proANP)	**+1**	BNP or NT-proBNP tests may be considered in patients with an established diagnosis of heart failure for prognostic stratification[55].
				Inclusion of biomarker testing in treatment monitoring guidelines	**+1**	The heart failure guidelines consider the use of NT-proBNP for prognostic stratification of HF patients. However, physicians are less likely to utilise the biomarker for monitoring due to the suboptimal evidence available for periodic use of NT-proBNP. (Source: Expert interview)

No.	Sub-domains	Range	Score	Indicators		Justifications
Domain 4: Heart failure treatment monitoring and access						
24	Heart failure treatment monitoring guidelines	**0-8**	**6**	Inclusion of timeliness of heart failure care in the national HF clinical guideline (e.g., Heart failure patients receiving care within 24 hours of hospital admission or referral for outpatient care (especially critical in emergency or exacerbation settings))	**+0**	Not specified.
				Inclusion of emergency care protocols (e.g., Availability and utilisation of standardised heart failure care protocols in emergency departments (e.g., early use of diuretics, anticoagulation for arrhythmia))	**+1**	A diuretic should be considered in patients with heart failure and clinical symptoms, or signs of congestion, to improve symptoms and manage congestion[56].
25	Availability of/access to different types of drug therapy	**0-1**	**0**	Availability/access to heart failure therapy	**+0**	Not all (100%) of the heart failure drugs listed on the WHO essential HF Drug List of 2023 are included in the most current national essential drugs list (NEDL)[57].
26	Prescription of Guideline-Directed Medical Therapy (GDMT): Eligible heart failure patients (EF < 40%) prescribed key medications	**0-8**	**8**	ACE inhibitors/ARBs/ARNI	**+2**	The rate of HF patients being treated with the medication is ≥ 50%. (Source: Expert interview)
				Beta-blockers	**+2**	The rate of HF patients being treated with the medication is ≥ 50%. (Source: Expert interview)
				MRAs	**+2**	The rate of HF patients being treated with the medication is ≥ 50%. (Source: Expert interview)
				SGLT2 inhibitors	**+2**	The rate of HF patients being treated with the medication is ≥ 50%. (Source: Expert interview)

No.	Sub-domains	Range	Score	Indicators		Justifications
Domain 4: Heart failure treatment monitoring and access						
27	Implementation of new therapies	**0-1**	**1**	Adoption of newer heart failure therapies (e.g., SGLT2 inhibitors, ARNI)	**+1**	In Australia, SGLT2 inhibitors like dapagliflozin (Forxiga) and empagliflozin (Jardiance) are now considered a treatment option for heart failure, regardless of whether a patient has diabetes, and are available on the Pharmaceutical Benefits Scheme (PBS) for patients with reduced left ventricular ejection fraction (HFrEF)[58].
28	Use of implantable devices	**0-3**	**3**	ICDs	**+1**	The implantation is available and performed in the territory[59].
				CRT	**+1**	The implantation is available and performed in the territory[60].
				LVAD	**+1**	The implantation is available and performed in the territory[61].
29	Home health medication monitoring: Heart failure patients in home health progammes receiving regular medication reviews and adjustments	**0-1**	**1**	Availability of home health medication monitoring/remote patient monitoring for people with HF	**+1**	Home health medication monitoring/remote patient monitoring is available for people with HF. E.g., Medibank Heart health at home is a phone-based cardiac rehabilitation programme that runs over 6 to 8 weeks and you can participate no matter where you live in Australia[62].
30	Heart failure drugs funding coverage	**0-4**	**1**	Existence of publicly funded/ reimbursed drug therapy for heart failure	**+1**	6/7 drugs on the WHO essential med list are covered by the pharmaceutical benefits scheme. Losartan has been delisted in 1998 but its therapeutic alternatives (C09CA Angiotensin II receptor blockers (ARBs), plain) are covered by the pharmaceutical benefits scheme; All drugs are general schemed, requiring co-payment from the consumer[63,64].
				Funding for HF management/ treatment using rapid optimisation, supported by NT-proBNP testing for HF therapies (STRONG HF)	**+0**	Funding for HF management/ treatment using rapid optimisation, supported by NT-proBNP testing for HF therapies (STRONG HF) is not funded/reimbursed. (Source: Expert interview)

No.	Sub-domains	Range	Score	Indicators		Justifications
Domain 4: Heart failure treatment monitoring and access						
30	Heart failure drugs funding coverage	**0-4**	**1**	Financing mechanism for biomarkers in HF treatment monitoring	**+0**	Tests using HF biomarkers in treatment monitoring (e.g., Natriuretic peptide-BNP or NT-pro BNP) are out of pocket.
Domain 5: Heart failure advocacy, awareness and education						
31	Heart failure patient engagement and advocacy	**0-4**	**4**	Existence of patient organisations	**+1**	Examples: 1. Heart Support Australia 2. Cardiomyopathy Australia 3. Hearts4Heart 4. HerHeart
				Participation in national heart failure policy & plan development	**+2**	One or more patient organisations which cover heart failure participate in developing the national heart failure policy and plan development. E.g., Heart support Australia and Hearts4heart actively participates in national policy planning by engaging in roundtable discussions in the House of Parliament and advocating for improved heart disease care[65,66].
				Collaborations/participation in joint progammes with government	**+1**	Collaborations and joint progammes/initiatives, including lobbying efforts, exist between patient groups and policy groups/ministries/ government bodies. E.g., Heart support Australia advocates for people living with heart disease, including heart failure, by engaging with government and stakeholders on key issues[67]. Additionally, a national cardiovascular implementation and policy roundtable has been convened to unite stakeholders in identifying solutions, setting priorities, and addressing barriers to improve CVD outcomes, forming the basis for a national action plan[68].

No.	Sub-domains	Range	Score	Indicators		Justifications
Domain 5: Heart failure advocacy, awareness and education						
32	Heart failure civil society engagement and advocacy	**0-6**	**4**	Existence of civil society organisations (NGOs/advocacy associations etc.)	**+1**	Examples: 1. Heart aupport Australia: national peak body offering peer support to Australians affected by heart disease. 2. Hearts4heart: Connects patients and healthcare professionals to raise awareness about heart conditions. 3. National Heart Foundation of Australia (NHFA): Provides resources and guidelines for prevention and management of heart failure and broader CVD. 4. Australian Cardiovascular Alliance (ACvA): Focuses on advancing cardiovascular research and collaboration. 5. Cardiac Society of Australia and New Zealand (CSANZ): Contributes to clinical guidelines, education, and advocacy in cardiology.
				Participation in national CVD/ HF policy & plan development	**+1**	One or more civil societies which cover heart failure participate in developing the national CVD/HF policy & plan. E.g., national Heart Foundation of Australia (NHFA) played a key role, both in providing input and in collaborating with other organisations to shape the "National Strategic Action Plan for Heart Disease and Stroke"[69].
				Collaborations/participation in joint HF progammes with government	**+0**	NPS MedicineWise heart failure Programme (developed in collaboration with the national Heart Foundation of Australia) used to focus on providing resources for heart failure management but it is no longer funded by the government and ceased operations in 2022[70].

No.	Sub-domains	Range	Score	Indicators		Justifications
Domain 5: Heart failure advocacy, awareness and education						
32	Heart failure civil society engagement and advocacy	**0-6**	**4**	Collaborations/participation in joint progammes with the private sector	**+1**	Collaborations and joint progammes/initiatives, including lobbying efforts, exist between civil societies and the private sector. E.g., Australian Cardiovascular Alliance (ACvA) partners with government and private sectors, including Bioplatforms Australia, to advance cardiovascular research through the cardiovascular framework initiative, which includes heart failure.[71]
				Contributions towards clinical guidelines development	**+1**	National Heart Foundation of Australia (NHAF) and Cardiac Society of Australia and New Zealand (CSANZ) developed guidelines for the prevention, Detection and management of heart failure in Australia 2018.[72]
33	Heart failure educational initiatives	**0-8**	**5**	Availability of patient education progammes and support resources by the government	**+1**	Only general CVD educative programme/resource run by the government exist.
				Availability of patient education progammes and support resources by the civil society or patient organisations	**+2**	Heart support Australia and the heart foundation have developed a wide range of resources to support individuals with CVD, with specific materials tailored for HF patients. Heart support Australia offers both online and printed resources, as well as support, education, and advocacy for people living with heart disease[73]. Hearts4heart focuses exclusively on three conditions: HF, atrial fibrillation (AF), and heart valve disease-providing targeted education and advocacy for individuals affected by these specific conditions[74].

No.	Sub-domains	Range	Score	Indicators		Justifications
Domain 5: Heart failure advocacy, awareness and education						
33	Heart failure educational initiatives	**0-8**	**5**	Existence of community-based outreach progammes	**+1**	Community based outreach services programme/public awareness campaign for general CVD exist.
				Educational progammes for healthcare providers	**+2**	Clinical heart failure-specific educational progammes targeted towards healthcare providers exist.
34	Continuous HF policy improvement progammes	**0-3**	**3**	Existence of HF continuous policy improvement progammes (policy committee meeting, pre- and post-campaign surveys, etc.)	**+1**	**Continuous HF policy improvement progammes (policy committee meeting, pre- and post-campaign surveys, etc.) exist. E.g.,** • The national strategic framework for chronic conditions is reviewed every three years.[75] • NHFA, ACvA, and CSANZ led a national Roundtable to develop a CVD implementation and policy agenda across prevention, acute care, and rehabilitation, guided by a preliminary survey of key priorities.[76]
				Frequency of HF continuous policy improvement progammes	**+2**	Progammes conducted with a well-defined schedule (e.g., quarterly or after each campaign). E.g., The timeframe for national strategic framework for chronic conditions is eight years (2017-2025), with a review proposed every three years[77].

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Hong Kong

Heart failure territory snapshot

Domains	Overall national CVD policy and planning landscape	Heart failure policy and planning landscape	Heart failure prevention & screening	Heart failure diagnosis & healthcare system capacity	Heart failure treatment monitoring and access	Heart failure advocacy, awareness and education
Hong Kong						

High | Moderately high | Moderately low | Low

Top opportunities for improvement

01. Develop HF-specific policies and guidelines

- **Challenges:** Absence of local HF clinical guidelines leads to fragmented care.
- **Target stakeholders for driving actions:** Hospital Authority (HA), Department of Health (DH), HKHFS.
- **Opportunities:**
  - Formulate local HF guidelines: HA and HKHFS should develop Hong Kong-specific HF guidelines by 2027, adapting AHA/ESC standards and emphasising NT-proBNP use for screening, diagnosis and monitoring.
  - Establish an HF action plan: DH should integrate HF into the chronic cisease co-care pilot scheme, targeting a specific reduction target in HF readmissions by 2030.
  - Create an HF policy committee: Health Bureau should support a committee to oversee guideline implementation and policy updates.

02. Expand access to biomarker screening

- **Issues:** Biomarkers like NT-proBNP are not widely available in public hospitals and are typically paid out-of-pocket. Additionally, heart failure screening, even among high-risk populations such as T2DM patients, is not available in the public sector which provides medical care for the majority of these patients-highlighting both a clinical and policy-level gap.
- **Target stakeholders for driving actions:** HA, Health Bureau.
- **Opportunities:**
  - Reimburse NT-proBNP screening: HA should support annually to cover NT-proBNP testing for high-risk groups (e.g., T2DM, HT patients) in public hospitals by 2027, increasing early diagnosis by 30%.
  - Integrate biomarkers into Patient Support Programme (PSP): Leverage the expansion of existing progammes, such as PSP, to incorporate NT-proBNP testing in the routine management of high-risk populations like T2DM patients. Position this integration as a pilot to demonstrate the cost-effectiveness and clinical benefit of biomarker-based screening, with potential to scale across chronic disease progammes. Collaborate with stakeholders managing PSPs, including public health authorities and private sponsors, to expand the programme's scope and ensure sustainability.
  - Train clinicians especially primary care: HKHFS should train 2,000 primary care providers by 2028 on biomarker-based diagnostics, addressing low testing rates. Educate clinicians on overcoming barriers to drug therapy initiation and the use of biomarkers in guiding treatment pathways. Upskilling clinicians will support earlier diagnosis, improved therapy uptake, and more consistent HF management. Foster collaboration between cardiology and endocrinology by encouraging joint case discussions, shared care protocols, and referral pathways-ensuring a more holistic approach to HF management, especially for patients with comorbidities like diabetes.

03. Enhance treatment optimisation and monitoring

- **Issues:** Low GDMT prescription rates (<50%) and limited biomarker use in monitoring.
- **Target stakeholders for driving actions:** HA, Health Bureau.
- **Opportunities:**
  - Scale telemonitoring progammes: HA should support by 2028 to expand CUHK ORKTS telemonitoring to 20% of HF patients, integrating wearable devices for GDMT adjustments.
  - Update monitoring guidelines: HKHFS should ensure the HF-specific guidelines to be developed includes NT-proBNP for treatment monitoring, addressing the current gap.
  - Pilot STRONG-HF rapid optimisation protocol: HA and FHB should support a pilot by 2027 in 8 public hospitals, implementing the STRONG-HF protocol for rapid GDMT up-titration (ACEi/ARBs, beta-blockers, MRAs, SGLT2 inhibitors) within 2 weeks post-discharge, guided by NT-proBNP monitoring every 1–3 months. Train 500 clinicians to ensure adherence, targeting a 20% reduction in 180-day readmissions.

04. Boost patient engagement and advocacy

- **Issues:** Limited patient advocacy and awareness hinder adherence.
- **Target stakeholders for driving actions:** DH, HKHFS, Care for your heart.
- **Opportunities:**
  - Expand HF awareness campaigns: DH and HKHFS should support annually in campaigns via Heart caring campaign and social media, targeting 70% awareness by 2030.
  - Enhance community outreach: Support 1,000 community health workers by 2028 to deliver HF education in district health centers.

05. Foster multi-stakeholder public-private partnerships to expand access to innovative therapies

- **Issues:** Limited multi-stakeholder collaboration on HF hampers resource mobilization and effective management strategies.
- **Target stakeholders for driving actions:** DH, HA, Health Bureau, Private sector.
- **Opportunities:**
  - Biomarkers access pilot initiative: Establish co-funded pilot progammes in collaboration with diagnostic manufacturers, insurers, and private hospitals to support NT-proBNP testing access in selected public hospitals or community clinics. These pilots can demonstrate feasibility and affordability while targeting high-risk populations like patients with T2DM.
  - Integrated HF diagnostic bundles: Implement bundled service offerings (e.g., Consultation + biomarker testing + follow-up care) through joint ventures or shared infrastructure models, reducing per-patient cost while optimizing the continuum of care and resource efficiency.
  - Evidence-to-Reimbursement Pathway: Generate real-world evidence and economic data through these partnerships to support health technology assessment submissions and advocate for public reimbursement, helping bridge the gap between innovation and policy adoption.

06. Other opportunities for improvement to address current gaps and improve overall HF care

- Establish an HF registry: HA should support by 2027 to enhance the Hong Kong heart failure Registry with real-time data integration.
- Increase cardiologist capacity: Health Bureau should support training for 200 cardiologists by 2030, addressing low density to improve the quality of care.

Prevalence, incidence, mortality rate

Metrics	Hong Kong
Age-standardised prevalence rate (%, 2021)	1.2%[1]
Age-standardised incidence rate (per 100,000 population, 1997)	70[2]
Crude mortality rate at 1 year (%, 2005-2012)	19.5%[3]

Economic Burdens

Metrics	Hong Kong
Total Cost per patient per Year (USD, 2006-2008)	$19,969[4]
Inpatient Cost per patient per Year (USD, 2006-2008)	$18,312[5]
Length of stay (days, 2016)	6-10[6]

Scorecard results

No.	Sub-domains	Range	Score	Indicators		Justifications
Domain 1a: Overall national CVD policy and planning landscape						
1	Existence and operational status of a national CVD policies/ strategies/plans	**0-3**	**2**	Existence and operational status of a national CVD policies/strategies/plans	**+1**	Local CVD policies/strategies/ plans exist but are embedded within a broader plan for non-communicable disease. Towards 2025: Strategy and action plan to prevent and control noncommunicable diseases in Hong Kong chronic disease co-care pilot scheme.
				Currency of the national CVD policies/strategies/plans	**+1**	The latest relevant policy (Chronic Disease Co-Care Pilot scheme) has been updated within the past 5 years (11/2023).
2	Scope and specificity of the national CVD policies/strategies /plans	**0-2**	**2**	Specific CVD reduction targets	**+1**	The "Towards 2025: Strategy and action plan to prevent and control noncommunicable diseases in Hong Kong" has 9 targets to be achieved by 2025, related to CVD prevention and control, including a 25% relative reduction in risk of premature mortality from CVD, cancers, diabetes, or chronic respiratory diseases[7].
				Objectives or strategies for management of acute and chronic CVD	**+1**	Strategies are in place for management of acute & chronic CVD. E.g., Elderly health care voucher scheme: Subsidizes private primary care for individuals aged 65+, with up to HKD 8,000 available annually, but most users apply vouchers for acute care rather than preventive services due to low confidence in private healthcare and limited coverage[8].

No.	Sub-domains	Range	Score	Indicators		Justifications
Domain 1a: Overall national CVD policy and planning landscape						
3	Coordinating mechanism for implementation	**0-2**	**1**	Dedicated national CVD progammes/initiatives	**+1**	Examples: • Elderly health care voucher scheme: Subsidizes private care for those 65+, with vouchers up to HKD 8,000. Primarily used for acute care, not preventive services. • Chronic Disease Co-Care Pilot scheme: Launched in 2023, provides screening and follow-up for adults 45+ without diabetes or HT.
				Joint national and regional CVD coordination mechanisms	**+0**	No coordination mechanism between state and subnational governments specific to CVD identified.
4	CVD financing	**0-4**	**2**	Dedicated budget to CVD progammes	**+1**	Budget available for using SGLT2 inhibitors and GLP1RA for specific groups of T2DM patients. (Source: Expert interview)
				Universal coverage for screening for CVD	**+0**	There's no universal coverage for screening for CVD. (Source: Expert interview)
				Universal coverage for diagnostic tests and imaging for CVDs	**+0**	There's no universal coverage for diagnostic tests and imaging for CVDs. (Source: Expert interview)
				Universal coverage for CVD essential medicines	**+1**	There's a universal coverage for CVD essential medicines. The "Towards 2025: Strategy and action plan to prevent and control non-communicable diseases in Hong Kong" outlines the government's commitment to improving the availability of affordable basic technologies and essential medicines for treating major NCDs, such as CVD[9].

No.	Sub-domains	Range	Score	Indicators		Justifications
Domain 1a: Overall national CVD policy and planning landscape						
5	Existence of a population based registry	**0-1**	**0**	Existence of national registries established for CVD	**+0**	Hong Kong does not have a single, centralised local CVD registry. Some related initiatives are in place e.g., Population health survey: This survey collects data on cardiovascular risk factors, such as blood pressure, cholesterol levels, and smoking habits, among the general population[10].
6	Inclusivity and equitable policy formulation	**0-1**	**0**	Policies/strategies/plans/ progammes addressing equitable access to care to CVD	**+0**	Policies/progammes addressing equitable access to care to CVD don't exist.
Domain 1b: Heart failure policy and planning landscape						
7	Heart failure dedicated policies/ strategies/plans	**0-1**	**0**	Heart failure dedicated policies/strategies/plans	**+0**	Heart failure-specific policies/ strategies/plans don't exist.
8	Priority & specificity of heart failure in the national CVD/NCD policies/strategies/plans	**0-3**	**0**	Priority & specificity of heart failure in the national CVD/NCD policies/strategies/plans	**+0**	Not specified.
				Inclusion of desired outcomes/ targets for heart failure control	**+0**	Not specified.
9	National heart failure Strategy Implementation	**0-2**	**1**	Percentage of healthcare regions or facilities implementing national heart failure care guidelines, such as standardised treatment protocols and follow-up care	**+1**	≤ 50% or more healthcare regions or facilities implementing the "Adaption of international guidelines by the Hong Kong heart failure Society". (Source: Expert interview)

No.	Sub-domains	Range	Score	Indicators		Justifications
Domain 1b: Heart failure policy and planning landscape						
10	Policy support for preventive care	**0-2**	**2**	National policies focused on primary prevention of heart failure (e.g., Salt reduction, improved diabetes care, HT management)	**+1**	**9 targets for CVD prevention and control by 2025, including[11]:** • 25% reduction in premature mortality from CVD, cancer, diabetes, and respiratory diseases. • 10% reduction in binge drinking and harmful alcohol use. • 10% reduction in insufficient physical activity. • 30% reduction in average daily salt intake. • 30% reduction in tobacco use. • Contain raised blood pressure. • Halt increases in diabetes and obesity. • Prevent heart attacks and strokes through drug therapy and counselling. • Improve access to essential medicines and technologies for NCDs.
				National policies focused on secondary prevention of heart failure (biomarkers etc.)	**+1**	Policies/strategies/plans have strategy on screening for HF risk factors.
11	HF research and innovation	**0-4**	**1**	Funding for heart failure Research: Annual investment in heart failure-specific clinical trials, basic science research, and public health research	**+0**	No annual investment is observed in heart failure-specific clinical trials, basic science research, and public health research.

No.	Sub-domains	Range	Score	Indicators		Justifications
Domain 1b: Heart failure policy and planning landscape						
11	HF research and innovation	**0-4**	**1**	Clinical trial participation: Eligible heart failure patients enrolled in clinical trials e.g., for new therapies or medical devices	**+1**	**Eligible heart failure patients are enrolled in clinical trials for new therapies or medical devices. Examples:** • Hong Kong diastolic heart failure Study: A randomised controlled trial assessing the impact of diuretics, irbesartan, and ramipril on quality of life, exercise capacity, and left ventricular function in heart failure with a normal ejection fraction[12]. • Home-based transitional palliative care trial: Examining the effects of home-based palliative care for patients with End-Stage heart failure (ESHF) after hospital discharge[13].
				Translation of research into practice: Time-to-adoption for new guidelines, therapies, and technologies from clinical trials to everyday practice	**+0**	No predicted timeframe but overall objective is to follow guideline-directed therapy. (Source: Expert interview)
12	HF financing	**0-4**	**2**	Insurance coverage for heart failure Care (Public)	**+1**	• Public health Scheme: Tax-financed programme providing free healthcare, including primary care, preventive care, hospitalisation, emergency care, and rehabilitation. • Voluntary Health Insurance Scheme (VHIS): Government-regulated, privately operated scheme offering standardised health insurance for voluntary purchase. • Elderly Health Care Voucher Scheme (HCVS): Cash vouchers for eligible elderly patients, supplementing the public health scheme for primary care services. (Source: Expert interview)

No.	Sub-domains	Range	Score	Indicators		Justifications
Domain 1b: Heart failure policy and planning landscape						
12	HF financing	**0-4**	**2**	Insurance coverage for heart failure care (Private & Alternatives)	**+1**	• Private Health Insurance (PHI): Voluntary insurance supplementing public healthcare, with coverage varying by provider and policy; around 34% of the population is covered (affording individuals). • Charity donation schemes: Led by foundations and hospitals (e.g., Li Ka Shing foundation, Children's heart foundation, etc.) providing support for low-income patients. • Patient Assistance Programme (PAP): Partnerships between manufacturers, government, private sector, or NGOs offering direct treatment or financial support for CVD care for low-income individuals. (Source: Expert interview)
13	Presence of heart failure registries	**0-1**	**1**	Presence of heart failure registries	**+1**	The Hong Kong heart failure registry is available[14].
14	Existence of heart failure clinical guidelines	**0-3**	**1**	Existence of clinical guidelines	**+0**	Currently, there is no local clinical guidelines for heart failure in Hong Kong. However, the territory closely follows and has its adaptation of international guidelines (e.g. AHA, ESC) as published on the website of the Hong Kong heart failure Society.
				Currency of clinical guidelines	**+1**	Adaption of international guidelines by the Hong Kong heart failure Society has been updated within the past 5 years (2021).

No.	Sub-domains	Range	Score	Indicators		Justifications
Domain 1b: Heart failure policy and planning landscape						
15	HF health equity	**0-2**	**1**	Patient navigation progammes: Heart failure patients from underserved backgrounds enrolled in patient navigation progammes to improve access to care and follow-up	**+0**	Patient navigation progammes don't exist for underserved communities.
				Community-based care progammes: community-based heart failure management progammes designed to support at-risk groups (e.g., Community health workers, peer support groups)	**+1**	Community-based care progammes exist for risk groups. E.g., Chronic Disease Co-Care pilot scheme (CDCC): Launched in November 2023 for residents aged 45+ to screen for DM and HT. Outcome: 40% diagnosed with prediabetes, DM, or HT, receiving follow-up care from family doctors and district health centre[15].
Domain 2: Heart failure prevention & screening						
16	Heart failure screening guidelines	**0-7**	**6**	National heart failure clinical guidelines coverage	**+1**	Heart failure clinical guidelines cover screening for heart failure with low comprehensiveness. A formal risk scoring system is recommended for assessing cardiovascular risk in adults aged ≥40 with at least one CVD risk factor. (Source: Adaption of international guidelines by the Hong Kong heart failure society (2021))
				# of biomarkers included in heart failure screening guidelines (e.g. BNP/ NT-proBNP, Troponin, Soluble ST2, Galectin-3, MR-proANP)	**+2**	Three or more biomarkers included in heart failure screening guidelines. (Source: Adaption of international guidelines by the Hong Kong heart failure society (2021))
				Inclusion of biomarker testing in screening guidelines	**+1**	Biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP) are mentioned. However, in practice, NT-proBNP screening remains a low priority and is currently at the awareness stage. (Source: Adaption of international guidelines by the Hong Kong heart failure Society (2021), Expert interview)

No.	Sub-domains	Range	Score	Indicators		Justifications
Domain 2: Heart failure prevention & screening						
16	Heart failure screening guidelines	**0-7**	**6**	Inclusion of HT management	**+1**	Heart failure clinical guidelines cover HT management. (Source: Adaption of international guidelines by the Hong Kong heart failure Society (2021))
				Inclusion of diabetes control in HF	**+1**	Heart failure clinical guidelines cover diabetes control (Source: Adaption of international guidelines by the Hong Kong heart failure Society (2021))
				Inclusion of screening for high-risk populations (e.g., older adults, patients with HT, diabetes, or HT) for early signs of HF or related risk factors	**+0**	Heart failure clinical guidelines don't cover screening for high-risk populations. (Source: Adaption of international guidelines by the Hong Kong heart failure Society (2021))
17	Heart failure screening funding	**0-4**	**0**	Existence of publicly funded/ reimbursed screening test for heart failure	**+0**	Heart failure screening is not funded/reimbursed. (Source: Expert interview)
				Funding for HF screening for T2DM patients	**+0**	Screening for T2DM patients is not funded/reimbursed. (Source: Expert interview)
				Financing mechanism for biomarkers in HF screening	**+0**	Tests using HF biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP) are out of pocket. (Source: Expert interview)
Domain 3: Heart failure diagnosis & healthcare system capacity						
18	Heart failure diagnosis guidelines	**0-4**	**3**	National heart failure clinical guidelines coverage	**+1**	Heart failure clinical guidelines cover diagnosis.
				# of biomarkers included in heart failure diagnosis guidelines (e.g. BNP/ NT-proBNP, Troponin, Soluble ST2, Galectin-3, MR-proANP)	**+1**	Three or more biomarkers included in heart failure diagnosis guidelines. NT-proBNP or BNP are more readily available than other biomarkers. (Source: Expert interview)
				Inclusion of biomarker testing in diagnostic guidelines	**+1**	NT-proBNP for use in diagnosis is moderate and endorsed by medical associations. However, studies have shown that adherence of CPG is suboptimal. (Source: Adaption of international guidelines by the Hong Kong heart failure Society (2021))

No.	Sub-domains	Range	Score	Indicators		Justifications
Domain 3: Heart failure diagnosis & healthcare system capacity						
19	Capacity of/availability of/access to diagnostic services	**0-8**	**4**	MRI	**+2**	Moderately low (>0.14-0.28 machines per ten thousand of population).
				CT	**+2**	Moderately low (>0.30-0.58 machines per ten thousand of population).
20	HF biomarker testing rate (Percentage of patients with suspected heart failure undergoing biomarkers (e.g., BNP, NT-proBNP) to confirm diagnosis)	**0-12**	**8**	Use of HF biomarkers at emergency care in public institutions	**+3**	≥ 80% of patients with suspected HF get a test using HF biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP). (Source: Expert interview)
				Use of HF biomarkers at emergency care in private institutions	**+3**	≥ 80% of patients with suspected HF get a test using HF biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP). (Source: Expert interview)
				Use of HF biomarkers at primary care centers in public institutions	**+1**	≤ 20% of patients with suspected HF get a test using HF biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP). (Source: Expert interview)
				Use of HF biomarkers at primary care centers in private institutions	**+1**	≤ 20% of patients with suspected HF get a test using HF biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP). (Source: Expert interview)
21	Capacity of workforce/availability of HF specialists (adjusted for regional distribution)	**0-4**	**1**	Cardiologists	**+1**	Low (0-0.42 staffs per ten thousand of population).
22	Multidisciplinary heart failure care team availability	**0-1**	**1**	Hospitals and clinics offering care from a multidisciplinary team, including cardiologists, dietitians, psychologists, and rehabilitation specialists	**+1**	Example: • Prince of Wales Hospital: Offers a multi-disciplinary heart failure Clinic (2 sessions/week) and a hybrid cardiovascular operating theatre for one-stop consultation and surgery on thoracic aortic pathologies[16]. • CUHK medical centre: Provides comprehensive, patient-centred cardiology services from screening to intervention, delivered by a multidisciplinary team[17].

No.	Sub-domains	Range	Score	Indicators		Justifications
Domain 3: Heart failure diagnosis & healthcare system capacity						
23	Heart failure diagnostics funding coverage	**0-3**	**2**	Existence of publicly funded/ reimbursed diagnostics test for heart failure	**+1**	Heart failure diagnostics is partially funded/reimbursed. (Source: Expert interview)
				Financing mechanism for biomarkers in HF diagnostics	**+1**	Diagnostic tests using HF biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP) are reimbursed. (Source: Expert interview)
Domain 4: Heart failure treatment monitoring and access						
24	Heart failure treatment monitoring guidelines	**0-8**	**5**	National heart failure clinical guidelines coverage	**+1**	National heart failure clinical guidelines cover treatment monitoring for heart failure (Guidelines in use: Chinese guidelines for the diagnosis and treatment of heart failure 2024)[18].
				Involvement of multi-disciplinary team	**+1**	Guidelines cover shared decision making/treatment of a multidisciplinary HF team (Guidelines in use: Chinese guidelines for the diagnosis and treatment of heart failure 2024)[19].
				Linkage to supportive/ palliative care	**+1**	Guidelines include referral pathway to supportive/palliative care services (Guidelines in use: Chinese guidelines for the diagnosis and treatment of heart failure 2024)[20].
				# of biomarkers included in heart failure treatment/ monitoring guidelines (e.g. BNP/NT-proBNP, Troponin, Soluble ST2, Galectin-3, MR-proANP)	**+0**	No biomarker included in heart failure treatment/monitoring guidelines (Guidelines in use: Chinese guidelines for the diagnosis and treatment of heart failure 2024)[21].
				Inclusion of biomarker testing in treatment monitoring guidelines	**+0**	Biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP) are not mentioned or recommended as treatment monitoring tools in the national heart failure screening guidelines (Guidelines in use: Chinese guidelines for the diagnosis and treatment of heart failure 2024)[22].

No.	Sub-domains	Range	Score	Indicators		Justifications
Domain 4: Heart failure treatment monitoring and access						
24	Heart failure treatment monitoring guidelines	**0-8**	**5**	Inclusion of timeliness of heart failure care in the national HF clinical guideline (e.g., Heart failure patients receiving care within 24 hours of hospital admission or referral for outpatient care (especially critical in emergency or exacerbation settings))	**+1**	National heart failure clinical guidelines cover timeliness of heart failure care (Guidelines in use: Chinese guidelines for the diagnosis and treatment of heart failure 2024)[23].
				Inclusion of emergency care protocols (e.g., Availability and utilisation of standardised heart failure care protocols in emergency departments (e.g., early use of diuretics, anticoagulation for arrhythmia))	**+1**	National heart failure clinical guidelines cover emergency care protocols (Guidelines in use: Chinese guidelines for the diagnosis and treatment of heart failure 2024)[24].
25	Availability of/access to different types of drug therapy	**0-1**	**1**	Availability/access to heart failure therapy	**+1**	All (100%) of the heart failure drugs listed on the WHO Essential HF drug List of 2023 are included in the most current national essential drugs list (NEDL)[25].
26	Prescription of Guideline-Directed Medical Therapy (GDMT): Eligible heart failure patients (EF < 40%) prescribed key medications	**0-8**	**4**	ACE inhibitors/ARBs/ARNI	**+1**	The rate of HF patients being treated with the medication is < 50%. (Source: Expert interview)
				beta-blockers	**+1**	The rate of HF patients being treated with the medication is < 50%. (Source: Expert interview)
				MRAs	**+1**	The rate of HF patients being treated with the medication is < 50%. (Source: Expert interview)
				SGLT2 inhibitors	**+1**	The rate of HF patients being treated with the medication is < 50%. (Source: Expert interview)
27	Implementation of new therapies	**0-1**	**1**	Adoption of newer heart failure therapies (e.g., SGLT2 inhibitors, ARNI)	**+1**	Adoption of newer heart failure therapies (e.g., SGLT2 inhibitors, ARNI) is observed in the territory[26].

No.	Sub-domains	Range	Score	Indicators		Justifications
Domain 4: Heart failure treatment monitoring and access						
28	Use of implantable devices	**0-3**	**3**	ICDs	**+1**	The procedure has been performed at major hospitals e.g., Hong Kong Asia heart center.[27]
				CRT	**+1**	The procedure has been performed in major hospitals in HK.[28]
				LVAD	**+1**	Since Hong Kong's first implantable LVAD surgery in 2010, 95 patients have received the device, increasingly DT; over 50% of heart transplant recipients now use LVAD as a bridge. Since Hong Kong's first implantable LVAD surgery in 2010, 95 patients have received the device, increasingly as DT; over 50% of heart transplant recipients now use LVAD as a bridge.[29]
29	Home health medication monitoring: Heart failure patients in home health progammes receiving regular medication reviews and adjustments	**0-1**	**1**	Availability of home health medication monitoring/remote patient monitoring for people with HF	**+1**	**Home health medication monitoring/remote patient monitoring is available for people with HF. Examples:** • CUHK ORKTS project: Provides heart failure patients with a heart rate monitoring watch and Bluetooth-enabled BP device upon discharge; a mobile and web-based platform supports remote monitoring, medication titration advice, and patient education.[30] • Telemedicine research: Multiple ongoing studies are exploring telemonitoring and telemedicine approaches for heart failure management in Hong Kong.[31,32]

No.	Sub-domains	Range	Score	Indicators		Justifications
Domain 4: Heart failure treatment monitoring and access						
30	Heart failure drugs funding coverage	**0-4**	**2**	Existence of publicly funded/ reimbursed drug therapy for heart failure	**+1**	Some drugs included in the WHO essential meds list for heart failure are funded/reimbursed. (Source: Expert interview)
				Funding for HF management/ treatment using rapid optimisation, supported by NT-proBNP testing for HF therapies (STRONG HF)	**+1**	Funding for HF management/ treatment using rapid optimisation, supported by NT-proBNP testing for HF therapies (STRONG HF) is funded reimbursed. (Source: Expert interview)
				Financing mechanism for biomarkers in HF treatment monitoring	**+0**	Tests using HF biomarkers in treatment monitoring (e.g., Natriuretic peptide-BNP or NT pro BNP) are out of pocket. (Source: Expert interview)
Domain 5: Heart failure advocacy, awareness and education						
31	Heart failure patient engagement and advocacy	**0-4**	**2**	Existence of patient organisations	**+1**	One or more patient organisations/patient advocacy groups which cover heart failure exist. E.g., Care For Your Heart is a patient organisation in Hong Kong that focuses on supporting patients with heart disease, including heart failure. It provides education, counselling, and rehabilitation services, aiming to enhance patients' quality of life and improve heart health awareness in the community[33].
				Participation in national heart failure policy & plan development	**+1**	One or more patient organisations which cover heart failure exist but don't participate in developing the national heart failure policy and plan development.
				Collaborations/participation in joint progammes with government	**+0**	Collaborations and joint progammes/initiatives, including lobbying efforts, don't exist between patient groups and policy groups/ministries/ government bodies.

No.	Sub-domains	Range	Score	Indicators		Justifications
Domain 5: Heart failure advocacy, awareness and education						
32	Heart failure civil society engagement and advocacy	**0-6**	**4**	Existence of civil society organisations (NGOs/ advocacy associations etc.)	**+2**	Hong Kong heart failure Society (HKHFS) is promoting the advancement of education of heart failure both to professional community and general public so as to protect and preserve health of the people of Hong Kong.
				Participation in national CVD/ HF policy & plan development	**+0**	No civil society which covers heart failure participates in developing the national CVD/HF policy & plan.
				Collaborations/participation in joint HF progammes with government	**+1**	In collaboration with the government, civil society will continue to organise health promotion campaigns to raise public awareness about the importance of healthy living in preventing cardiovascular diseases and to promote a heart-healthy environment.[34]
				Collaborations/participation in joint progammes with the private sector	**+1**	Collaborations and joint progammes/initiatives, including lobbying efforts, exist between civil societies and the private sector. E.g., HKHFS conducted "Heart failure Management Beyond Medications Multidisciplinary Approach" on Sep 2024, sponsored by several private companies (Abbott, AstraZeneca, Bayer, Pfizer, Medtronic, etc.)[35].
				Contributions towards clinical guidelines development	**+0**	No civil society which covers heart failure are listed as contributors in clinical guidelines.

No.	Sub-domains	Range	Score	Indicators		Justifications
Domain 5: Heart failure advocacy, awareness and education						
33	Heart failure educational initiatives	**0-8**	**6**	Availability of patient education progammes and support resources by the government	**+1**	Only general CVD educative programme/resource run by the government exist. E.g., The hospital authority of Hong Kong has developed a strategic service framework for coronary heart disease, which includes components related to patient education and support resources for heart disease, including heart failure. This framework emphasises the importance of educating patients about their conditions and available treatments.[36]
				Availability of patient education progammes and support resources by the civil society or patient organisations	**+2**	Educative progammes/resources specific for heart failure run by the civil society or patient organisations exist.
				Existence of community-based outreach progammes	**+1**	Community based outreach services programme/public awareness campaign for general CVD exist/E.g., Heart caring campaign: A joint initiative by the Labour department and occupational safety and health council to raise awareness of cerebro-and cardiovascular disease risks among frontline construction and property management workers through health assessments, lifestyle education, and early screening and prevention activities[37].
				Educational progammes for healthcare providers	**+2**	Clinical heart failure-specific educational progammes targeted towards healthcare providers exist, e.g., by HKHFS[38]
34	Continuous HF policy improvement progammes	**0-3**	**0**	Existence of HF continuous policy improvement progammes (policy committee meeting, pre- and post-campaign surveys, etc.)	**+0**	No continuous HF policy improvement progammes (policy committee meeting, pre-and post-campaign surveys, etc.) exist.
				Frequency of HF continuous policy improvement progammes	**+0**	No policy improvement progammes conducted.

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Japan

Heart failure territory snapshot

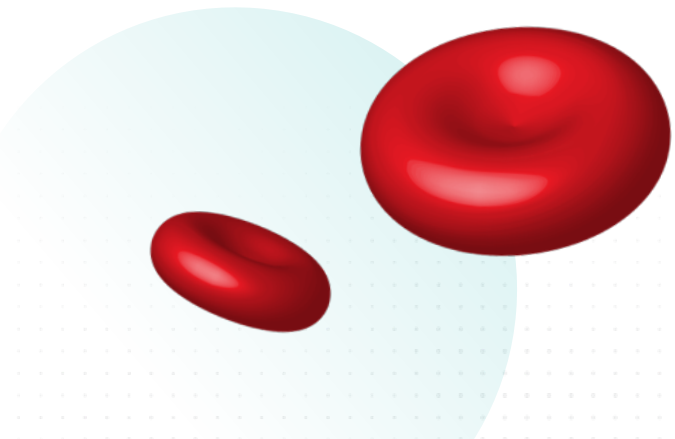
Domains	Overall national CVD policy and planning landscape	Heart failure policy and planning landscape	Heart failure prevention & screening	Heart failure diagnosis & healthcare system capacity	Heart failure treatment monitoring and access	Heart failure advocacy, awareness and education
Japan						

High | Moderately high | Moderately low | Low

Top opportunities for improvement

01. Develop HF-specific policies and guidelines

- **Challenges:** Lack of HF-specific policies and targets limits focused interventions.
- **Target stakeholders for driving actions:** Ministry of Health, Labor and Welfare of Japan (MHLW), Japan heart failure Society (JHFS).
- **Opportunities:**
  - Formulate a national HF strategy: MHLW should integrate an HF action plan into the Japanese national plan for CVD (2020), with specific target in the medium term, e.g., 20% reduction in HF mortality by 2030.
  - Enhance HF screening guidelines: JHFS should update the 2025 JCS/JHFS guidelines to include mandatory NT-proBNP screening for high-risk groups (e.g., elderly, diabetic patients).
  - Establish an HF policy committee: MHLW and JHFS should create a committee to monitor HF policy and strategy implementation.



02. Strengthen multidisciplinary care coordination

- **Issues:** Fragmented care due to poor hospital-GP communication and limited community-based systems-Hospital cardiologists and GPs in Japan have differing care priorities and goals when it comes to diagnosing and managing HF. There are significant gaps in the quality of care between cardiologists and non-cardiologists, with hospital cardiologists failing to provide information that meets the needs of GPs. Additionally, there is a lack of community-based systems to share patient information, and communication between hospitals and community healthcare staff during the transition from hospital to home care is insufficient. Collaboration between cardiologists and GPs is needed to provide comprehensive care for HF patients.
- **Target stakeholders for driving actions:** MHLW, national Health Insurance (NHI), JHFS.
- **Opportunities:**
  - Pilot nurse-led HF teams: MHLW should support nurse-led multidisciplinary teams in hospitals by 2027. Training 1,000 cardiovascular nurses to bridge hospital-GP care gaps.
  - Develop standardised care protocols: JHFS should develop educational progammes for hospital cardiologists and GPs to standardise HF care, including bi-directional training and harmonised priorities in medical information, rehabilitation, and nursing care by 2028.
  - Integrated Care Coordination Protocols: JHFS should develop guidelines to improve coordination between allied health professionals, primary care physicians, and cardiologists to ensure continuous patient referral and care.
  - Connected care access initiative: MHLW should support strengthen linkages between care nodes by incentivising low-cost technologies for patient monitoring and enabling tele-consultations or SMS in areas with poor digital infrastructure.

03. Strengthen treatment optimisation and monitoring

- **Issues:** High GDMT adoption but suboptimal post-discharge optimisation and monitoring.
- **Target stakeholders for driving actions:** MHLW, NHI.
- **Opportunities:**
  - Expand enhance JROAD registry: MHLW should support to automate JROAD data entry and integrate real-time GDMT adherence alerts.
  - Pilot STRONG-HF rapid optimisation protocol: MHLW and NHI should support pilot by 2027 in 15 tertiary hospitals, implementing the STRONG-HF protocol for rapid GDMT up-titration (ACEi/ARBs, beta-blockers, MRAs, SGLT2 inhibitors) within 2 weeks post-discharge, guided by NT-proBNP monitoring every 1–3 months. Train 800 clinicians to ensure adherence, targeting a 20% reduction in 180-day readmissions.

04. Enhance telehealth/home health monitoring adoption

- **Issues:** Japan faces barriers such as high technology adoption costs, lack of patient support, and low digital readiness. The absence of an integrated electronic medical record system and fragmented data hampers continuity of care. While there is interest in telemedicine and digital solutions, adoption remains slow due to concerns over initial investments, educational costs, and the need to support patients, especially the elderly, in using new tools. Additionally, digital literacy and cybersecurity measures are underdeveloped for both healthcare professionals and patients.
- **Target stakeholders for driving actions:** MHLW, NHI.
- **Opportunities:**
  - Develop a national EHR system: MHLW should support to create a standardised electronic health record (EHR) system, integrating HF patient data across providers.
  - Telehealth transition support scheme: Offer financial incentives (e.g., by the government or public-private partnership) to healthcare providers to hire change-management consultants, either externally or in-house, to help with the shift to telehealth/home health monitoring systems.
  - Digital health competency programme: Create training progammes for healthcare professionals to improve their digital skills, covering areas like patient navigation systems, troubleshooting, and helping patients use relevant tools e.g., wearables.

05. Enhance telehealth/home health monitoring adoption

- Patient navigation progammes: MHLW should pilot navigation progammes for HF patients in underserved areas to address health equity.
- Timeliness of care: Update 2025 guidelines to include 24-hour care protocols, reducing readmissions.

Prevalence, incidence, mortality rate

Metrics	Japan
Age-standardised prevalence rate (%, 2019)	0.48%[1]
Age-standardised incidence rate (per 100,000 population, 2015)	126.70[2]
Crude mortality rate at 1 year (%, 2020)	11.1%[3]

Economic burdens

Metrics	Japan
Total cost per patient per year (USD, 2013-2018)	$5,178[4]
Inpatient cost per patient per year (USD, 2013-2018)	$3,484[5]
Length of stay (days, 2012-2014)	18[6]

Scorecard results

No.	Sub-domains			Indicators		Justifications
Domain 1a: Overall national CVD policy and planning landscape						
1	Existence and operational status of a national CVD policies/ strategies/plans	**0-3**	**3**	Existence and operational status of a national CVD policies/strategies/plans	**+2**	• Health Japan 21 (HJ21): Aims to extend healthy life expectancy and reduce regional health gaps, though broad targets risk diluted focus. • Stroke and cardiovascular disease control act: Establishes legal framework for CVD control plans with multi-stakeholder input and periodic reviews. • Japanese national plan for promotion of measures against cerebrovascular and cardiovascular disease: Guides national and local efforts to prevent CVD and improve healthcare systems, though specificity is lacking.
				Currency of the national CVD policies/strategies/plans	**+1**	The latest relevant policy (Japanese national plan for promotion of measures against cerebrovascular and cardiovascular disease) has been updated within the past 5 years (03/2023).[7]

No.	Sub-domains			Indicators		Justifications
Domain 1a: Overall national CVD policy and planning landscape						
2	Scope and specificity of the national CVD policies/strategies /plans	**0-2**	**2**	Specific CVD reduction targets	**+1**	The Japanese national plan sets forth 2 primary objectives: to extend healthy life expectancy by 3 years by 2040 compared with 2016; and to decrease the age-adjusted mortality of CVD.[8]
				Objectives or strategies for management of acute and chronic CVD	**+1**	Japan has implemented strategies to manage both acute and chronic cardiovascular diseases (CVD), including the basic act on stroke and cardiovascular diseases-a five-year initiative aimed at enhancing care across all disease stages through multidisciplinary approaches, development of a national patient registry, public education, and research into underlying causes. Additionally, the JHFS 2017 guideline outlines diagnostic and treatment protocols for acute and chronic heart failure, with disease-specific guidance on tests and imaging.[9]
3	Coordinating mechanism for implementation	**0-2**	**1**	Dedicated national CVD progammes/initiatives	**+1**	Policies/strategies/plans have national CVD progammes /initiatives. (Source: Expert interview)
				Joint national and regional CVD coordination mechanisms	**+0**	Lack of coordination exists between national and subnational governments for CVD. Regional treatment disparities persist due to inconsistent guideline adherence, impacting rural patient outcomes. (Source: Expert interview)

No.	Sub-domains			Indicators		Justifications
Domain 1a: Overall national CVD policy and planning landscape						
4	CVD financing	**0-4**	**4**	Dedicated budget to CVD progammes	**+1**	The CVD budget for FY2024 is 4.5 billion yen, consistent with the amount allocated in recent years.[10]
				Universal coverage for screening for CVD	**+1**	Japan's national health insurance covers annual health checkups for individuals aged 40–74, but participation remains low—only 56.5% nationally in 2021, with non-participation reaching 62% among municipal national Health Insurance (NHI) members.[11]
				Universal coverage for diagnostic tests and imaging for CVDs	**+1**	Tests/tools such as CT scan, MRI scan, other diagnostic imaging tests, ECG, etc. are 70% covered by NHI (The scope of Japan's prospective payment system does not cover hospitalisation, laboratory tests, diagnostic imaging, medication, injection and treatment fees that are above 10,000 Yen). PHI is usually used to cover the remaining cost of diagnostics. (Source: Expert interview)
				Universal coverage for CVD essential medicines	**+1**	There's a universal coverage for CVD essential medicines.[12]
5	Existence of a population based registry	**0-1**	**1**	Existence of national registries established for CVD	**+1**	Japan's national CVD registry, JROAD, primarily covers large hospitals and relies on claims-based data, often lacking accuracy due to limited automation quality. As a result, manual data entry by medical clerks is needed to ensure reliability. Small to medium-sized healthcare facilities are underrepresented, limiting the registry's comprehensiveness. Plans are underway to develop a central database alongside efforts to Standardise electronic medical records.[13]

No.	Sub-domains			Indicators		Justifications
Domain 1a: Overall national CVD policy and planning landscape						
6	Inclusivity and equitable policy formulation	**0-1**	**1**	Policies/strategies/plans/ progammes addressing equitable access to care to CVD	**+1**	Policies/progammes addressing equitable access to care to CVD exist. Japan's national insurance ensures equitable access to healthcare, with patients' out-of-pocket expenses ranging from 10% to 30% of total costs, covering treatment and rehabilitation. A maximum limit for OOP payments is set based on income to prevent catastrophic expenses. However, gender disparities, noted in guidelines, remain unaddressed in current programme implementation.[14]
Domain 1b: Heart failure policy and planning landscape						
7	Heart failure dedicated policies/strategies/plans	**0-1**	**0**	Heart failure dedicated policies/strategies/plans	**+0**	Heart failure-specific policies/ strategies/plans don't exist.
8	Priority & specificity of heart failure in the national CVD/NCD policies/strategies/plans	**0-3**	**0**	Priority & specificity of heart failure in the national CVD/NCD policies/strategies/plans	**+0**	Not specified.
				Inclusion of desired outcomes/ targets for heart failure control	**+0**	Not specified.
9	National heart failure strategy implementation	**0-2**	**1**	Percentage of healthcare regions or facilities implementing national heart failure care guidelines, such as standardised treatment protocols and follow-up care	**+1**	< 50% healthcare regions or facilities implementing national heart failure care guidelines (subject to hospitals/clinics' sizes and roles). (Source: Expert interview)

No.	Sub-domains			Indicators		Justifications
Domain 1b: Heart failure policy and planning landscape						
10	Policy support for preventive care	**0-2**	**2**	National policies focused on primary prevention of heart failure (e.g., salt reduction, improved diabetes care, HT management)	**+1**	Health promotion targets[15]: • Smoking in over 15s decrease by 3.6%. • Physical inactivity decrease by 1.3%. • Alcohol intake decrease by 5%. • Obesity decrease by 0.63%. • HT decrease to 23.4%. • Diet (fruit and vegetable intake) decrease to 88%.
				National policies focused on secondary prevention of heart failure (biomarkers etc.)	**+1**	Secondary prevention progammes are robust, with multi-disciplinary approaches.[16]
11	HF research and innovation	**0-4**	**3**	Funding for heart failure research: Annual investment in heart failure-specific clinical trials, basic science research, and public health research	**+0**	No annual investment is observed in heart failure-specific clinical trials, basic science research, and public health research.
				Clinical trial participation: Eligible heart failure patients enrolled in clinical trials e.g., for new therapies or medical devices	**+1**	Eligible heart failure patients are enrolled in clinical trials for new therapies or medical devices. Examples: Corvia medical, Inc., a privately-held company with a first-in-class structural heart device to treat heart failure, today announced the first Japanese patients were randomised in Toyama and Hyogo under a clinical trial authorization from the Pharmaceutical and Medical Device Agency (PMDA) in the REDUCE LAP-HF II trial[17] The IASD® is the world's first transcatheter device for treatment of heart failure with preserved (HFpEF) and mid-range (HFmrEF) ejection fraction.
				Translation of research into practice: Time-to-adoption for new guidelines, therapies, and technologies from clinical trials to everyday practice	**+2**	Typical time-to-adoption for new guidelines, therapies, and technologies from clinical trials to everyday practice is from 1 to 3 years (Source: Expert interview)

No.	Sub-domains			Indicators		Justifications
Domain 1b: Heart failure policy and planning landscape						
12	HF financing	**0-4**	**4**	Insurance coverage for heart failure Care (Public)	**+2**	• Citizen national Health Insurance (CHI): Mandatory contributions (30% individual, 70% government) for residents under 75 (self-employed, unemployed, retirees). • Employment-based health insurance: Covers ~59% of the population; employer-employee contributions vary by fund and prefecture (employees). • Elderly health insurance: For those ≥75; premiums deducted from pensions, funded by government subsidies. • High-cost medical expense benefit: Reimburses costs above a monthly income-based threshold (low-income patients). • Public social assistance: Free care for low-income individuals, funded by national and local budgets.
				Insurance coverage for heart failure care (Private & alternatives)	**+2**	1. Private health insurance: Approximately 70% of the population holds secondary/ voluntary private health insurance policies that aim to supplement medical costs (Affording individuals). 2. PSPs & organisations: PSPs and organisations such as Japan heart foundation provide further medical and financial assistance (Low-income/disaster relief).

No.	Sub-domains			Indicators		Justifications
Domain 1b: Heart failure policy and planning landscape						
13	Presence of heart failure registries	**0-1**	**1**	Presence of heart failure registries	**+1**	Heart failure registries currently exist. Examples: • JCARE-CARD: Prospective study of 2,675 patients with worsening heart failure (HF) across 164 teaching hospitals, collecting data on demographics, treatment, and outcomes, providing insights into HF management in Japan[18]. • ATTEND registry: Largest study of hospitalized heart failure (HHF) in Japan, focusing on acute decompensated heart failure syndromes[19]. • Disease management and outcomes in acute heart failure: Study using de-identified data from 2013–2017, analyzing treatment patterns and hospitalisation outcomes of patients with acute heart failure in Japan[20]. • JROAD-DPC: Nationwide claims database of 198,861 HF patients from 683 hospitals, analyzing hospital performance factors and their impact on 7-day, 30-day, and in-hospital mortality[21]. • 3 large-scale AHF registries (ATTEND/WET-HF/REALITY-AHF): A project tracking patient trends, in-hospital management, and long-term outcomes of AHF patients from 2007 to 2015, involving data from 9,075 patients across three registries[22].

No.	Sub-domains			Indicators		Justifications
Domain 1b: Heart failure policy and planning landscape						
14	Existence of heart failure clinical guidelines	**0-3**	**3**	Existence of clinical guidelines	**+1**	• 2017: JCS 2017/JHFS 2017 Guideline on diagnosis and treatment of acute and chronic heart failure. • 2021: JCS/JHFS 2021 guideline focused update on diagnosis and treatment of acute and chronic HF (comprehensively revised in Mar 2025). • 2021: JCS/JHFS 2021 statement on palliative care in CVDs.
				Currency of clinical guidelines	**+2**	Japanese Circulation Society (JCS) heart failure (HF) guidelines underwent a complete revision in Mar 2025[23]. These revised guidelines were published simultaneously in two medical journals: • Circ J (Circulation Journal) – the official journal of the Japanese circulation society. • J Card Fail (Journal of Cardiac Failure) – an international journal focused on heart failure research.
15	HF health equity	**0-2**	**0**	Patient navigation progammes: Heart failure patients from underserved backgrounds enrolled in patient navigation progammes to improve access to care and follow-up	**+0**	Patient navigation progammes don't exist for underserved communities.
				Community-based care progammes: Community-based heart failure management progammes designed to support at-risk groups (e.g., community health workers, peer support groups)	**+0**	Community-based care progammes don't exist for risk groups.

No.	Sub-domains			Indicators		Justifications
Domain 2: Heart failure prevention & screening						
16	Heart failure screening guidelines	**0-7**	**6**	National heart failure clinical guidelines coverage	**+1**	National heart failure clinical guidelines cover screening for heart failure: • JCS 2017/JHFS 2017 guideline on diagnosis and treatment of acute and chronic heart failure: Among currently available biomarkers for heart failure, BNP and NT-proBNP have been used extensively for HF screening.[24] • JCS/JHFS 2021 statement on palliative Care in CVDs: Uses various tools and items for comprehensive assessment of HF patients, including NYHA classification of HF (measured by levels of NT-proBNP), HRQOL, and screening of cognitive function.[25]
				# of biomarkers included in heart failure screening guidelines (e.g. BNP/i NT-proBNP, Troponin, Soluble ST2, Galectin-3, MR-proANP)	**+1**	The BNP/NT-proBNP statement jointly written by JHFS (Japanese heart failure Society), HFA (Heart failure Association of the European society of cardiology) & HFSA (Heart Failure Society of America), which will be submitted to JCF[26,27,28]: • Plasma BNP and serum NT-proBNP (Grade of Recommendation (MINDS): B, level of evidence (MINDS): II). • Plasma atrial (A-type) natriuretic peptide (ANP) (Grade of recommendation (MINDS): C1, Level of evidence (MINDS): III).

No.	Sub-domains			Indicators		Justifications
Domain 2: Heart failure prevention & screening						
16	Heart failure screening guidelines	**0-7**	**6**	Inclusion of biomarker testing in screening guidelines	**+1**	NT-proBNP is highly endorsed to be used across the care continuum according to the 'JCS 2017/JHFS 2017 guideline on diagnosis and treatment of acute and chronic heart failure'[29]. There is also increased endorsement for NT-proBNP monitoring for palliative care through the guideline 'JCS/JHFS 2021 Statement on palliative care in CVDs.'[30]
				Inclusion of HT management	**+1**	National heart failure clinical guidelines cover HT management [31,32,33].
				Inclusion of diabetes control in HF	**+1**	national heart failure clinical guidelines cover diabetes control [34,35,36].
				Inclusion of screening for high-risk populations (e.g., older adults, patients with CAD, diabetes, or HT) for early signs of HF or related risk factors	**+1**	National heart failure clinical guidelines cover screening for high-risk populations[37,38,39].
17	Heart failure screening funding	**0-4**	**2**	Existence of publicly funded/ reimbursed screening test for heart failure	**+1**	Heart failure screening is partially funded/reimbursed. Screening for HF is reimbursed by the measurement of BNP or TTE. (Source: Expert interview)
				Funding for HF screening for T2DM patients	**+0**	Screening for T2DM patients is not funded/reimbursed. (Source: Expert interview)
				Financing mechanism for biomarkers in HF screening	**+1**	Tests using HF biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP) are reimbursed, likely to be covered by employment-based health insurance and private insurance; however wide scale adoption and coverage is yet to be realised. (Source: Expert interview)

No.	Sub-domains			Indicators		Justifications
Domain 3: Heart failure diagnosis & healthcare system capacity						
18	Heart failure diagnosis guidelines	**0-4**	**3**	National heart failure clinical guidelines coverage	**+1**	National heart failure clinical guidelines cover diagnosis for heart failure • The JCS 2017/JHFS 2017 guideline recommends diagnosing heart failure by assessing symptoms, medical and family history, physical findings, ECG, and chest X-ray, followed by measuring BNP or NT-proBNP levels in the blood.[40] • The JCS/JHFS 2021 guideline update on HF diagnosis and treatment follows the same recommendations as the JCS 2017/JHFS 2017 guideline.[41]
				# of biomarkers included in heart failure diagnosis guidelines (e.g. BNP/ NT-proBNP, Troponin, Soluble ST2, Galectin-3, MR-proANP)	**+1**	Plasma BNP and serum NT-proBNP Plasma atrial (A-type) natriuretic peptide (ANP)
				Inclusion of biomarker testing in diagnostic guidelines	**+1**	• NT-proBNP is highly endorsed to be used across the care continuum according to the 'JCS 2017/JHFS 2017 guideline on diagnosis and treatment of acute and chronic heart failure'.[42] • There is also increased endorsement for NT-proBNP monitoring for palliative care through the guideline 'JCS/JHFS 2021 statement on palliative care in CVDs'. BNP/NT-proBNP statemet by JHFS will be submitted to JCF.[43]
19	Capacity of/availability of/access to diagnostic services	**0-8**	**8**	MRI	**+4**	High. (>0.43 machines per ten thousands of population)
				CT	**+4**	High. (>0.87 machines per ten thousands of population)

No.	Sub-domains			Indicators		Justifications
Domain 3: Heart failure diagnosis & healthcare system capacity						
20	HF biomarker testing rate (Percentage of patients with suspected heart failure undergoing biomarkers (e.g., BNP, NT-proBNP) to confirm diagnosis)	**0-12**	**8**	Use of HF biomarkers at emergency care in public institutions	**+2**	50% of patients with suspected HF get a test using HF biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP) (Source: Expert interview).
				Use of HF biomarkers at emergency care in private institutions	**+2**	50% of patients with suspected HF get a test using HF biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP) (Source: Expert interview).
				Use of HF biomarkers at primary care centers in public institutions	**+2**	50% of patients with suspected HF get a test using HF biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP) (Source: Expert interview).
				Use of HF biomarkers at primary care centers in private institutions	**+2**	50% of patients with suspected HF get a test using HF biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP) (Source: Expert interview).
21	Capacity of workforce/availability of HF specialists (adjusted for regional distribution)	**0-4**	**4**	Cardiologists	**+4**	High (>0.90 staffs per ten thousands of population).
22	Multidisciplinary heart failure care team availability	**0-1**	**1**	Hospitals and clinics offering care from a multidisciplinary team, including cardiologists, dietitians, psychologists, and rehabilitation specialists	**+1**	Hospitals and clinics offering care from a multidisciplinary team, including cardiologists, dietitians, psychologists, and rehabilitation specialists. Multidisciplinary HF care was implemented in 78.5% of inpatients and 32.6% of outpatients. Inpatient teams typically included doctors, nurses, cardiologists, physical therapists, pharmacists, dietitians, and social workers; Outpatient teams involved similar roles, with the addition of certified chronic HF nurses[44]. Japan's first review on multidisciplinary HF care notes limited domestic references as the approach was still in its early stages[45].

No.	Sub-domains			Indicators		Justifications
Domain 3: Heart failure diagnosis & healthcare system capacity						
23	Heart failure diagnostics funding coverage	**0-3**	**3**	Existence of publicly funded/ reimbursed diagnostics test for heart failure	**+2**	Heart failure diagnostics is fully funded/reimbursed. (Source: Expert interview)
				Financing mechanism for biomarkers in HF diagnostics	**+1**	Diagnostic tests using HF biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP) are reimbursed. (Source: Expert interview)
Domain 4: Heart failure treatment monitoring and access						
24	Heart failure treatment monitoring guidelines	**0-8**	**7**	National heart failure clinical guidelines coverage	**+1**	• JCS 2017/JHFS 2017 guideline on diagnosis and treatment of acute and chronic heart failure: BNP (or NT-proBNP) plays a substantial role as a marker to monitor the efficacy of treatment over time in individual patients who may not compare with others.[46] • JCS/JHFS 2021 guideline focused update on diagnosis and treatment of acute and chronic HF: Use of a remote monitoring system in which biological data, including patient's blood pressure and body weight, are sent from home to medical institutions via telephone or the Internet to improve self-care and avoid readmission.[47] • JCS/JHFS 2021 statement on palliative care in CVDs: Patients with severe HF who are NYHA IV or have high levels of NT-proBNP (>10,000 pg/mL) have a poor prognosis; BNP and NT-proBNP are also used for risk classification of IPAH/ HPAH (Group I pulmonary HT) based on severity level.[48]

No.	Sub-domains			Indicators		Justifications
Domain 4: Heart failure treatment monitoring and access						
24	Heart failure treatment monitoring guidelines	**0-8**	**7**	Involvement of multi-disciplinary team	**+1**	• Recommendation in disease management: Multidisciplinary team-based education and support to improve treatment adherence and self-care for patients, family members, and caregivers. (Grade of recommendations MINDS: A, level of evidence MINDS:I).[49,50,51] • It is mentioned that: "It is also important that patients are managed continuously in hospitals, local communities, and their home by multidisciplinary approach involving diverse HCPs, including physicians, nurses, pharmacists, dieticians, and physical therapists and hospital-clinic collaborations).[52,53,54]
				Linkage to supportive/ palliative care	**+1**	Guidelines include referral pathway to supportive/palliative care services.[55,56,57]

No.	Sub-domains			Indicators		Justifications
Domain 4: Heart failure treatment monitoring and access						
24	Heart failure treatment monitoring guidelines	**0-8**	**7**	# of biomarkers included in heart failure treatment/ monitoring guidelines (e.g. BNP/NT-proBNP, Troponin, Soluble ST2, Galectin-3, MR-proANP)	**+2**	Grade of recommendation MINDS, Level of evidence MINDS from the guidelines.[58,59,60] **1. For severity** – Plasma BNP and serum NT-proBNP (A, I). – Plasma atrial (A-type) natriuretic peptide (ANP) (B, II). – Myocardial troponins (T, I)* and plasma noradrenaline (B, II). – Aldosterone# and plasma renin activity (B, III). – Neurohumoral factors (other than above) (C1, V). **2. For prognosis assessment** – Plasma BNP and serum NT-proBNP (A, I). – Plasma atrial (A-type) natriuretic peptide (ANP) (B, II). – Myocardial troponins (T, I)* and plasma noradrenaline (B, II). – Aldosterone# and plasma renin activity (B, III). – Neurohumoral factors (other than above) (C1, V). **3. For efficacy evaluation** – Plasma BNP and serum NT-proBNP (B, II). – Plasma atrial (A-type) natriuretic peptide (ANP) (C1, III).
				Inclusion of biomarker testing in treatment monitoring guidelines		NT-proBNP is highly endorsed for use across the care continuum according to the 'JCS 2017/JHFS 2017 Guideline on diagnosis and treatment of acute and chronic heart failure'[61]. There is also increased endorsement for NT-proBNP monitoring for palliative care through the guideline 'JCS/JHFS 2021 statement on palliative care in CVDs'.[62]

No.	Sub-domains			Indicators		Justifications
Domain 4: Heart failure treatment monitoring and access						
24	Heart failure treatment monitoring guidelines	**0-8**	**7**	Inclusion of timeliness of heart failure care in the national HF clinical guideline (e.g., Heart failure patients receiving care within 24 hours of hospital admission or referral for outpatient care (especially critical in emergency or exacerbation settings))	**+0**	National heart failure clinical guidelines don't cover timeliness of heart failure care.[63,64,65]
				Inclusion of emergency care protocols (e.g., Availability and utilisation of standardised heart failure care protocols in emergency departments (e.g., early use of diuretics, anticoagulation for arrhythmia))	**+1**	National heart failure clinical guidelines cover emergency care protocols.[66,67,68]
25	Availability of/access to different types of drug therapy	**0-1**	**0**	Availability/access to heart failure therapy	**+0**	Not all (100%) of the heart failure drugs listed on the WHO essential HF drug List of 2023 are included in the most current national essential drugs list (NEDL).[69]
26	Prescription of Guideline-Directed Medical Therapy (GDMT): eligible heart failure patients (EF < 40%) prescribed key medications	**0-8**	**8**	ACE inhibitors/ARBs/ARNI	**+2**	The rate of HF patients being treated with the medication is ≥ 50%. (Source: Expert interview)
				beta-blockers	**+2**	The rate of HF patients being treated with the medication is ≥ 50%. (Source: Expert interview)
				MRAs	**+2**	The rate of HF patients being treated with the medication is ≥ 50%. (Source: Expert interview)
				SGLT2 inhibitors	**+2**	The rate of HF patients being treated with the medication is ≥ 50%. (Source: Expert interview)

No.	Sub-domains			Indicators		Justifications
Domain 4: Heart failure treatment monitoring and access						
27	Implementation of new therapies	**0-1**	**1**	Adoption of newer heart failure therapies (e.g., SGLT2 inhibitors, ARNI)	**+1**	In Japan, SGLT2 inhibitors like dapagliflozin (Forxiga) are now widely recommended as a class I, Level A treatment for patients with chronic heart failure with reduced ejection fraction (HFrEF), both with and without type 2 diabetes (T2D).[70]
28	Use of implantable devices	**0-3**	**3**	ICDs	**+1**	The Japanese government approved ICDs over 20 years ago and they are commonly implanted in patients with significant heart conditions.[71]
				CRT	**+1**	CRT devices with a defibrillator (CRT-D) became available in Japan since 2006.[72]
				LVAD	**+1**	The implantable LVAD has been utilised in Japan since 2011 under the indication of bridge to transplant (BTT). After almost 10 year lag, DT has finally been approved and reimbursed in May 2021 in Japan.
29	Home health medication monitoring: Heart failure patients in home health progammes receiving regular medication reviews and adjustments	**0-1**	**1**	Availability of home health medication monitoring/remote patient monitoring for people with HF	**+1**	Home health medication monitoring/remote patient monitoring is available for people with HF. However, adoption remains slow due to concerns over initial investments, educational costs, and the need to support patients, especially the elderly, in using new tools.[73] E.g., The HOMES-HF study was the first multicenter, open-label, randomised, controlled trial (RCT) to elucidate the effectiveness of home telemonitoring of physiological data, such as body weight, blood pressure, and pulse rate, for Japanese patients with heart failure.[74]

No.	Sub-domains			Indicators		Justifications
Domain 4: Heart failure treatment monitoring and access						
30	Heart failure drugs funding coverage	**0-4**	**4**	Existence of publicly funded/ reimbursed drug therapy for heart failure	**+2**	All drugs included in the WHO essential meds list for heart failure are fully funded/ reimbursed. (Source: Expert interview)
				Funding for HF management/ treatment using rapid optimisation, supported by NT-proBNP testing for HF therapies (STRONG HF)	**+1**	Funding for HF management/ treatment using rapid optimisation, supported by NT-proBNP testing for HF therapies (STRONG HF) is funded/reimbursed (once per month reimbursed). (Source: Expert interview)
				Financing mechanism for biomarkers in HF treatment monitoring	**+1**	Similar to diagnosis, there is high level of reimbursement for NT-proBNP used for monitoring, especially for those covered by employment-based health insurance and private insurance. (Source: Expert interview)
Domain 5: Heart failure advocacy, awareness and education						
31	Heart failure patient engagement and advocacy	**0-4**	**0**	Existence of patient organisations	**+0**	No patient organisation/patient advocacy group which cover heart failure exist.
				Participation in national heart failure policy & plan development	**+0**	No patient organisation/patient advocacy group which cover heart failure exist.
				Collaborations/participation in joint progammes with government	**+0**	No patient organisation/patient advocacy group which cover heart failure exist.

No.	Sub-domains			Indicators		Justifications
Domain 5: Heart failure advocacy, awareness and education						
32	Heart failure civil society engagement and advocacy	**0-6**	**3**	Existence of civil society organisations (NGOs/Advocacy associations etc.)	**+2**	• Japanese heart failure Society (JHFS): Promotes heart failure research, knowledge exchange, and public awareness to advance medicine and health in Japan. • Japan heart foundation: supports awareness, education, and research funding for heart diseases, including heart failure. • Japanese Circulation Society (JCS): Advances cardiovascular care and develops clinical guidelines, including for heart failure. NPO Nippon heart failure network: Promotes HF awareness and education among general public and patients, provides mentorship progammes for young HF physicians, conducts basic research and clinical studies related to HF.
				Participation in national CVD/ HF policy & plan development	**+0**	No civil society which covers heart failure participates in developing the national CVD/HF policy & plan.
				Collaborations/participation in joint HF progammes with government	**+0**	No collaboration and joint programme/initiative, including lobbying efforts, exist between civil societies and policy groups/ministries/government bodies exists.
				Collaborations/participation in joint progammes with the private sector	**+0**	There is limited evidence of formal collaborations between civil society organisations focused specifically on heart failure and private sector entities. While there are general collaborations within broader NCD efforts, specific joint progammes targeting heart failure with private sector involvement were not identified.

No.	Sub-domains			Indicators		Justifications
Domain 5: Heart failure advocacy, awareness and education						
32	Heart failure civil society engagement and advocacy	**0-6**	**3**	Contributions towards clinical guidelines development		• The Japanese heart failure society, Japanese circular society, along with several more societies were involved in developing clinical guidelines for managing heart failure: "JCS/JHFS 2021 guideline focused update on diagnosis and treatment of acute and chronic heart failure" • Japan circular society published clinical guidelines for heart failure topic: "Diagnosis and treatment of acute and chronic heart failure" • Japanese heart failure society published "Guidelines regarding management for heart failure using blood BNP and NT-proBNP levels"
33	Heart failure educational initiatives	**0-8**	**6**	Availability of patient education progammes and support resources by the government	**+2**	Educative progammes/resources specific for heart failure run by the government exist.
				Availability of patient education progammes and support resources by the civil society or patient organisations	**+2**	Educative progammes/resources specific for heart failure run by the civil society or patient organisations exist e.g., by JHFS, NPO Nippon heart failure network shares important heart failure information with patients and their families through monthly remote seminars.

No.	Sub-domains			Indicators		Justifications
Domain 5: Heart failure advocacy, awareness and education						
33	Heart failure educational initiatives	**0-8**	**6**	Existence of community-based outreach progammes	**+1**	Example: In 1985, the Japan heart foundation designated August 10th as "Healthy Heart Day", holding annual heart disease prevention events around that date. Since 2021, the Japan circulation society, Japanese circulation association, and Japan heart foundation have collaborated, joined by the Japan AED Foundation in 2023. Together, the four organisations promoted "Healthy Heart Week 2023" from July 29 to August 10 with various awareness events.
				Educational progammes for healthcare providers	**+1**	The Japanese heart foundation offers practical medical information to support healthcare professionals in clinical settings.
34	Continuous HF policy improvement progammes	**0-3**	**3**	Existence of HF continuous policy improvement progammes (policy committee meeting, pre- and post-campaign surveys, etc.)	**+1**	There is continuous programme such as "Annual scientific meeting of the Japanese heart failure society" which is conducted annually by Japanese heart failure society.[75]
				Frequency of HF continuous policy improvement progammes	**+2**	Progammes conducted on an ad-hoc basis.

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South Korea

Heart failure territory snapshot

Domains	Overall national CVD policy and planning landscape	Heart failure policy and planning landscape	Heart failure prevention & screening	Heart failure diagnosis & healthcare system capacity	Heart failure treatment monitoring and access	Heart failure advocacy, awareness and education
South Korea						

High | Moderately high | Moderately low | Low

Top opportunities for improvement

01. Strengthen HF-specific policy development

- **Challenges:** The absence of HF-specific policies within the CVD framework limits targeted interventions.
- **Target stakeholders for driving actions:** Ministry of Health and Welfare (MOHW), national Health Insurance Service (NHIS), Korean Society of heart failure (KSHF).
- **Opportunities:**
  - Develop a national HF strategy: MoHW should create a dedicated HF action plan within the 2nd Comprehensive CVD management plan (2023–2027), setting specific HF reduction targets (e.g., reduce crude mortality rate from 10.9% to 8% by 2030). Include measurable outcomes for prevalence, hospital readmissions, and early diagnosis rates.
  - Establish an HF task force: Form a multi-stakeholder task force (MoHW, NHIS, KSHF, and patient representatives) to oversee HF policy development and implementation.
  - Incentivize regional implementation: Provide financial incentives to regional cardio-cerebrovascular centers (RCCs) achieving >75% adherence to HF care guidelines, addressing the current low implementation rate.

02. trengthen HF-specific policy development

- **Issues:** HF awareness remains low in Korea, with only 47.1% of people understanding what HF is and just 11.5% aware of preventive measures[1]. Although many (67.4%) believe they may develop CVD in their lifetime, detailed knowledge of prevention is limited. Progress on lifestyle risk factors like alcohol use and physical inactivity has also stagnated, undermining primary intervention[2].
- **Target stakeholders for driving actions:** MOHW, KSHF, NHIS
- **Opportunities:**
  - Launch a national HF awareness campaign: MOHW and KSHF should collaborate on a multi-channel campaign to promote HF symptoms, prevention, and early detection. Engage mass media for HF awareness, leveraging Korea's strong celebrity and entertainment culture. Government-backed campaigns can use familiar public figures and health progammes to deliver HF prevention messages and promote healthy behaviours. For broader reach, consider integrating HF-related storylines into K-dramas-an effective way to raise awareness and normalize conversations about heart health among diverse audiences.
  - Integrate HF education into schools: MOHW should mandate HF education in secondary school curricula, focusing on symptom recognition and lifestyle modification (e.g., reducing salt intake, increasing physical activity). This addresses the document's suggestion to build long-term awareness from a young age.
  - Expand community-based progammes: Fund community health centers to deliver HF education workshops targeting older adults and rural populations, where awareness is lowest (only 55.6% of comorbid patients recognise HF symptoms). Use mobile apps to provide interactive self-management tools.
  - Patient Education and Lifestyle Counseling: Include HF education as part of routine patient interactions, training healthcare professionals to counsel patients-especially those with high risk-on recognizing early HF signs and adopting preventive habits especially regarding lifestyles and eating/exercise habits.

03. Expand reimbursement for HF screening and diagnostics

- **Issues:** While the KSHF recommends NT-proBNP testing for early HF detection, the NHSP continues to rely on basic tests, and there is currently no reimbursement for screening HF in high-risk groups such as patients with T2D. This gap in coverage significantly limits the potential for early diagnosis and intervention.
- **Target stakeholders for driving actions:** NHISM, Ministry of finance.
- **Opportunities:**
  - Fund NT-proBNP screening for high-risk groups: NHIS should reimburse NT-proBNP testing for patients with T2DM, HT, or prior CVD, aligning with KSHF guidelines. This could reduce delayed diagnoses, given 49%+ of newly diagnosed HF patients have comorbidities[3].
  - Pilot cost-effectiveness studies: Ministry of finance should fund studies to evaluate the long-term cost savings of early HF screening.
  - Subsidize advanced diagnostics in rural areas: Allocate budget to equip rural Regional Cardiocerebrovascular Center (RCCs) with echocardiography and biomarker testing capabilities, addressing disparities in diagnostic access.

04. Improve integrated care and workforce capacity

- **Issues:** Fragmented care models, low cardiologist availability and lack of nurse-led coordination limit effective HF management.
- **Target stakeholders for driving actions:** MOHW, NHIS.
- **Opportunities:**
  - Pilot nurse-led HF care progammes: Pilot a nurse-led HF care coordination programme with clearly defined roles, adapted to Korea's medical system constraints. While only doctors can prescribe and order tests, nurses can support patient education, monitor vital signs, promote treatment adherence, and guide self-management. For task-sharing to succeed, Korea needs clearer role delineation, formal institutional support, and investment in nurse training-addressing current tensions around physician assistant roles and workload imbalances.
  - Pilot STRONG-HF rapid optimisation protocol: MoHW and NHIS should support pilot by 2027 in 12 tertiary hospitals, implementing the STRONG-HF protocol for rapid GDMT up-titration (ACEi/ARBs, beta-blockers, MRAs, SGLT2 inhibitors) within 2 weeks post-discharge, guided by NT-proBNP monitoring every 1–3 months. Train 600 clinicians to ensure adherence, targeting a 20% reduction in 180-day readmissions.
  - Develop a clinician-facing dashboard to support the entire HF care journey: The dashboard should integrate risk prediction models and clinical prompts to assist healthcare providers in timely and accurate diagnosis, especially during early stages or when HF is suspected based on comorbidities or symptoms. It should provide structured support for care planning, including recommended diagnostic tests based on patient profiles, individualized medication titration, scheduling of follow-up visits, and reminders aligned with evidence-based guidelines. Additionally, the tool should map a patient's HF journey, highlighting critical intervention points, flagging deterioration risks, and enabling clinicians to make data-informed decisions for more proactive and personalised care.

05. Foster patient and civil society engagement

- **Issue:** Absence of HF patient organisations and limited collaboration between civil society and government restrict advocacy and patient-centered care.
- **Target stakeholders for driving actions:** MOHW, KSHF.
- **Opportunities:**
  - Establish HF patient advocacy groups: MoHW and KSHF should support the creation of a national HF patient organisation by 2027, enabling patient input in policy development and care design.
  - Strengthen government-CSO collaboration: MoHW should formalize partnerships with KSHF and Korean society of cardiology for joint HF progammes, such as annual policy reviews and awareness campaigns, to bridge the collaboration gap.

06. Other opportunities for improvement to address current gaps and improve overall HF care

- **Palliative care integration:** The guidelines lack referral pathways to palliative care. MOHW should update guidelines to include palliative care protocols for advanced HF patients, with NHIS reimbursing consultations.
- **Data linkage for registries:** MoHW should support to integrate KorHF and KorAHF registries with NHIS claims data, improving real-world evidence for policy and treatment optimisation.

Prevalence, incidence, mortality rate

Metrics	South Korea
Age-standardised prevalence rate (%, 2019)	0.34%[4]
Age-standardised incidence rate (per 100,000 population, 2020)	572[5]
Crude mortality rate at 1 year (%, 2020)	10.9%[6]

Economic burdens

Metrics	South Korea
Total cost per patient per year (USD, 2014-2015)	$2,380[7]
Inpatient cost per patient per year (USD, 2016)	$1,511[8]
Length of stay (days, 2014)	12.2[9]

Scorecard results

No.	Sub-domains			Indicators		Justifications
Domain 1a: Overall national CVD policy and planning landscape						
1	Existence and operational status of a national CVD policies/ strategies/plans	**0-3**	**3**	Existence and operational status of a national CVD policies/strategies/plans	**+2**	Operational national CVD policies/strategies/plans exist • CVD Prevention and management act (2017): provides the legal framework for CVD prevention and control in Korea, mandating structured national planning.[10,11] • 2nd Comprehensive CVD management plan (2023–2027): focused on patient-centered care, emergency response systems, and scientific policymaking.
				Currency of the national CVD policies/strategies/plans	**+1**	The latest recent policy (The 2nd Comprehensive plan for cardiovascular disease management (2023-2027)) was updated in the last 5 years (2023).
2	Scope and specificity of the national CVD policies/strategies /plans	**0-2**	**1**	Specific CVD reduction targets	**+0**	Policies/strategies/plans don't have specific CVD reduction targets.
				Objectives or strategies for management of acute and chronic CVD	**+1**	Policies/strategies/plans cover management of acute and chronic CVD. E.g., 2nd chronic disease programme (2023–2027): Expands education and screening for high-risk groups (~USD 130/patient), with tests like ECG, BNP, and carotid ultrasound.

No.	Sub-domains			Indicators		Justifications
Domain 1a: Overall national CVD policy and planning landscape						
3	Coordinating mechanism for implementation	**0-2**	**2**	Dedicated national CVD progammes/initiatives	**+1**	Policies/strategies/plans have national CVD progammes/ initiatives. Examples: • Comprehensive plan for cardiovascular disease management: Establishment of regional-local cardio-cerebrovascular centers (RCCs) to improve CVD care accessibility in rural areas[12]. • Integrated community health promotion plan: Local public health centers set health promotion objectives aligned with national policies to improve residents' health and environment[13]. • National general health screening programme: Includes screenings for CVD, HT, diabetes, dyslipidemia (HDL, LDL, triglycerides), obesity (waist circumference), and lifestyle assessments (since 2009)[14].
				Joint national and regional CVD coordination mechanisms	**+1**	There is a coordination between state and subnational governments specific to CVD. (Source: Expert interview)

No.	Sub-domains			Indicators		Justifications
Domain 1a: Overall national CVD policy and planning landscape						
4	CVD financing	**0-4**	**4**	Dedicated budget to CVD progammes	**+1**	CVD research budget is approximately USD 4.3B[15].
				Universal coverage for screening for CVD	**+1**	There's a universal coverage for screening for CVD. Korea offers free health checkups to adults over 20 through the national health screening and national health insurance cardiovascular disease prevention examination; In 2021, the screening rate reached 74.2%, covering key CVD risk factors, leading to high diagnosis rates; However, dyslipidemia remains a significant health burden, with a lower diagnosis rate due to low public awareness[16].
				Universal coverage for diagnostic tests and imaging for CVDs	**+1**	There's a universal coverage for diagnostic tests and imaging for CVDs. Basic tests are reimbursed under the NHIS at a rate of about USD 40, covering physician consultation, anthropometric measurements, blood and urine tests, etc. (Source: Expert interview)
				Universal coverage for CVD essential medicines	**+1**	There's a universal coverage for CVD essential medicines. Korea ensures affordable access to medicines through price reduction policies and a positive listing system for prescription drugs, improving cost-effectiveness and maintaining a steady supply for patients[17].
5	Existence of a population based registry	**0-1**	**1**	Existence of national registries established for CVD	**+1**	Korea has two national registries-KAMIR and KRAMI-to support clinical guidelines, research, patient care, and policymaking. However, limited data linkage and independent management reduce their overall effectiveness[18].

No.	Sub-domains			Indicators		Justifications
Domain 1a: Overall national CVD policy and planning landscape						
6	Inclusivity and equitable policy formulation	**0-1**	**1**	Policies/strategies/plans/ progammes addressing equitable access to care to CVD	**+1**	Policies/progammes addressing equitable access to care to CVD exist. E.g., Comprehensive plan for cardiovascular disease management: Establishes regional-local cardio-cerebrovascular centers (RCCs) to improve access to CVD care in rural areas[19].
Domain 1b: Heart failure policy and planning landscape						
7	Heart failure dedicated policies/ strategies/plans	**0-1**	**0**	Heart failure dedicated policies/strategies/plans	**+0**	Heart failure-specific policies/ strategies/plans don't exist.
8	Priority & specificity of heart failure in the national CVD/NCD policies/strategies/plans	**0-3**	**1**	Priority & specificity of heart failure in the national CVD/NCD policies/strategies/plans	**+1**	Not specified.
				Inclusion of desired outcomes/ targets for heart failure control	**+0**	Not specified.
9	National heart failure strategy Implementation	**0-2**	**1**	Percentage of healthcare regions or facilities implementing national heart failure care guidelines, such as standardised treatment protocols and follow-up care	**+1**	< 50% healthcare regions or facilities implementing national heart failure care guidelines. (Source: Expert interview)
10	Policy support for preventive care	**0-2**	**2**	National policies focused on primary prevention of heart failure (e.g., salt reduction, improved diabetes care, HT management)	**+1**	Primary prevention targets[20]: • Smoking decrease by 11.7%. • Physical activity increase by 5.5%. • Alcohol intake decrease by 3%. • HT decrease by 1%. • Diabetes decrease by 1%. However, progress toward achieving alcohol consumption and physical activity targets remains stagnant, with a lack of policies addressing these risk factors. Similarly, step-down care is lacking in rural areas making management of CVD post-acute treatment a challenge.

No.	Sub-domains			Indicators		Justifications
Domain 1b: Heart failure policy and planning landscape						
10	Policy support for preventive care	**0-2**	**2**	National policies focused on secondary prevention of heart failure (biomarkers etc.)	**+1**	Secondary prevention focuses on lifestyle modification, risk factor management, and CVD risk screening through regional cerebrovascular centers (RCCs). General practitioners play a key role in long-term CVD management, collaborating with community health centers and private clinics to provide continuous care for patients with HT and diabetes[21].
11	HF research and innovation	**0-4**	**4**	Funding for heart failure research: Annual investment in heart failure-specific clinical trials, basic science research, and public health research	**+1**	Annual investment is made in heart failure-specific clinical trials, basic science research, and public health research. Cardiovascular research is supported by the Ministry of Health and Welfare (MoHW) and the Ministry of Science and ICT (MSIT). MoHW funds research through Korea Health Industry Development Institute (KHIDI) and KCDC, while MSIT supports basic and translational research via the national Research Foundation (NRF); Additional grants come from cardiovascular societies, including the KSHF, private foundations, and industry sponsors.[22,23]
				Clinical trial participation: Eligible heart failure patients enrolled in clinical trials e.g., for new therapies or medical devices	**+1**	Eligible heart failure patients are enrolled in clinical trials for new therapies or medical devices. E.g., Pilot Study on spironolactone withdrawal in HF with Improved EF: A randomised controlled pilot trial evaluating the safety and impact of discontinuing spironolactone in patients with heart failure and improved ejection fraction, focusing on risk of re-deterioration in left ventricular function[24].

No.	Sub-domains			Indicators		Justifications
Domain 1b: Heart failure policy and planning landscape						
11	HF research and innovation	**0-4**	**4**	Translation of research into practice: Time-to-adoption for new guidelines, therapies, and technologies from clinical trials to everyday practice	**+2**	Typical time-to-adoption for new guidelines, therapies, and technologies from clinical trials to everyday practice is from 1 to 3 years. (Source: Expert interview)
12	HF financing	**0-4**	**2**	Insurance coverage for heart failure care (Public)	**+1**	• National Health Insurance Service (NHIS): Single-payer system covering 97% of the population, funded by payroll taxes, personal contributions, government subsidies, and tobacco surcharges. • Medical aid: For low-income individuals, jointly funded by central and local governments with eligibility criteria set by the Ministry of Health and welfare. (Source: Expert interview)
				Insurance coverage for heart failure care (Private & alternatives)	**+1**	• Private health insurance: Held by ~77% of the population to supplement public coverage; guided by government policies. • Charities & Patient Support Progammes (PSPs): Financial aid from manufacturers (e.g., Abbott), charity foundations (e.g., Korea Heart Foundation (KHF)), and assistance progammes for select patients. (Source: Expert interview)
13	Presence of heart failure registries	**0-1**	**1**	Presence of heart failure registries	**+1**	HF registries exist[25] • Korea heart failure registry (KorHF-registry). • Korean acute heart failure Registry (KorAHF-registry). • Prospective observational multicenter cohort study (KorHF III) organised by the KSHF.

No.	Sub-domains			Indicators		Justifications
Domain 1b: Heart failure policy and planning landscape						
14	Existence of heart failure clinical guidelines	**0-3**	**3**	Existence of clinical guidelines	**+1**	• Korean guidelines for diagnosis and management of chronic heart failure (2017)[26]. • Korean society of heart failure guidelines for the management of heart failure: Definition and diagnosis (2023)[27].
				Currency of clinical guidelines	**+2**	The latest guideline was updated in the past 2 years (2023).
15	HF health equity	**0-2**	**0**	Patient navigation progammes: Heart failure patients from underserved backgrounds enrolled in patient navigation progammes to improve access to care and follow-up	**+0**	Patient navigation progammes don't exist for underserved communities.
				Community-based care progammes: Community-based heart failure management progammes designed to support at-risk groups (e.g., community health workers, peer support groups)	**+0**	Community-based care progammes don't exist for risk groups.
Domain 2: Heart failure prevention & screening						
16	Heart failure screening guidelines	**0-7**	**5**	National heart failure clinical guidelines coverage	**+1**	• 2017 Chronic heart failure guidelines: Recommend BNP/proBNP-based screening[28]. • 2023 heart failure guidelines: Suggest BNP/NT-proBNP testing for at-risk patients and multi-biomarker strategies for HF risk stratification[29].
				# of biomarkers included in heart failure screening guidelines (e.g. BNP/NT-proBNP, Troponin, Soluble ST2, Galectin-3, MR-proANP)	**+1**	BNP and NT-proBNP.
				Inclusion of biomarker testing in screening guidelines	**+1**	While the Korean society of heart failure guidelines for the management of heart failure endorse NT-proBNP tests for screening, the NHSP recommends more basic tests instead[30,31]. (Source: Expert interview)

No.	Sub-domains			Indicators		Justifications
Domain 2: Heart failure prevention & screening						
16	Heart failure screening guidelines	**0-7**	**5**	Inclusion of HT management	**+1**	National heart failure clinical guidelines cover HT management.
				Inclusion of diabetes control in HF	**+1**	National heart failure clinical guidelines cover diabetes control.
				Inclusion of screening for high-risk populations (e.g., older adults, patients with CAD, diabetes, or HT) for early signs of HF or related risk factors	**+0**	National heart failure clinical guidelines don't cover screening for high-risk populations.
17	Heart failure screening funding	**0-4**	**0**	Existence of publicly funded/ reimbursed screening test for heart failure	**+0**	Heart failure screening is not funded/reimbursed. (Source: Expert interview)
				Funding for HF screening for T2DM patients	**+0**	Screening for T2DM patients is not funded/reimbursed. (Source: Expert interview)
				Financing mechanism for biomarkers in HF screening	**+0**	Tests using HF biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP) are out of pocket. Basic tests are reimbursed under the NHIS at a rate of about USD 40, covering physician consultation, anthropometric measurements, blood and urine tests, etc. NT-proBNP tests cannot be thus covered due to price cap. (Source: Expert interview)

No.	Sub-domains			Indicators		Justifications
Domain 3: Heart failure diagnosis & healthcare system capacity						
18	Heart failure diagnosis guidelines	**0-4**	**4**	National heart failure clinical guidelines coverage	**+1**	**1. 2017 Guidelines[32]:** – Initial examination: Electrocardiography (ECG) and Complete Blood Count (CBC). – BNP/proBNP Levels: Highly recommended and now mandatory for suspected HF. **2. 2023 Guidelines[33]:** – Diagnostic tests: Blood tests for diagnosis and prognosis. – Chest radiography: Essential for differentiating HF. – Echocardiography: Required to assess heart function. BNP/NT-proBNP: Recommended as the first test for diagnosing or excluding HF.
				# of biomarkers included in heart failure diagnosis guidelines (e.g. BNP/ NT-proBNP, Troponin, Soluble ST2, Galectin-3, MR-proANP)	**+2**	BNP/pro BNP, troponin, soluble suppression of tumorigenicity-2 (sST2), galectin-3, high sensitivity C-reactive protein (hs-CRP), and growth-differentiation factor-15 (GDF-15).
				Inclusion of biomarker testing in diagnostic guidelines	**+1**	Both the Korean guidelines for diagnosis and management of chronic heart failure and the Korean society of heart failure guidelines for the management of heart failure highly recommend NT-proBNP tests, suggesting them as mandatory for diagnosis.
19	Capacity of/availability of/access to diagnostic services	**0-8**	**5**	MRI	**+3**	Moderately high. (>0.28-0.43 machines per ten thousands of population)
				CT	**+2**	Moderately low. (>0.30-0.58 machines per ten thousands of population)

No.	Sub-domains			Indicators		Justifications
Domain 3: Heart failure diagnosis & healthcare system capacity						
20	HF biomarker testing rate (Percentage of patients with suspected heart failure undergoing biomarkers (e.g., BNP, NT-proBNP) to confirm diagnosis)	**0-12**	**8**	Use of HF biomarkers at emergency care in public institutions	**+3**	≥ 80% of patients with suspected HF get a test using HF biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP). (Source: Expert interview)
				Use of HF biomarkers at emergency care in private institutions	**+3**	≥ 80% of patients with suspected HF get a test using HF biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP). (Source: Expert interview)
				Use of HF biomarkers at primary care centers in public institutions	**+1**	≤ 20% of patients with suspected HF get a test using HF biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP). (Source: Expert interview)
				Use of HF biomarkers at primary care centers in private institutions	**+1**	≤ 20% of patients with suspected HF get a test using HF biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP). (Source: Expert interview)
21	Capacity of workforce/ availability of HF specialists (adjusted for regional distribution)	**0-4**	**1**	Cardiologists	**+1**	Low. (0-0.42 staffs per ten thousands of population)
22	Multidisciplinary heart failure care team availability	**0-1**	**1**	Hospitals and clinics offering care from a multidisciplinary team, including cardiologists, dietitians, psychologists, and rehabilitation specialists	**+1**	Hospitals and clinics offering care from a multidisciplinary team, including cardiologists, dietitians, psychologists, and rehabilitation specialists. E.g., Severance Hospital has multidisciplinary team approach in HF management includes heart rhythm specialist, heart failure specialist, cardiac surgeon, dietitian, paediatrician, cardiac rehabilitation coordinator, cardiac imaging specialist[34].

No.	Sub-domains			Indicators		Justifications
Domain 3: Heart failure diagnosis & healthcare system capacity						
23	Heart failure diagnostics funding coverage	**0-3**	**2**	Existence of publicly funded/ reimbursed diagnostics test for heart failure	**+1**	Heart failure diagnostics is partially funded/reimbursed. (Source: Expert interview)
				Financing mechanism for biomarkers in HF diagnostics	**+1**	Diagnostic tests using HF biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP) are reimbursed. The NHIS reimburses BNP/ NT-proBNP (Code: D4062010) for the differential diagnosis and prognosis of heart failure in patients with breathing difficulties. • Diagnosis and prognosis of heart failure. • The prognosis of acute MI. • Diagnosis and prognosis of pulmonary HT. (Source: Expert interview)
Domain 4: Heart failure treatment monitoring and access						
24	Heart failure treatment monitoring guidelines	**0-8**	**4**	National heart failure clinical guidelines coverage	**+1**	**1. 2017 Guidelines[35]:** – BNP/proBNP levels aid in prognosis prediction and treatment planning. – BNP can indicate clinical improvement in response to therapy. **2. 2023 Guidelines[36]:** – BNP/NT-proBNP levels should be considered in cardiac rehabilitation progammes. – Pre-discharge BNP/ NT-proBNP levels in acute HF patients help predict post-discharge outcomes. – Supports home-based rehab, telehealth, and mobile interventions to improve rehab adherence.

No.	Sub-domains			Indicators		Justifications
Domain 4: Heart failure treatment monitoring and access						
24	Heart failure treatment monitoring guidelines	**0-8**	**4**	Involvement of multi-disciplinary team	**+1**	Guidelines cover shared decision making/treatment of a multidisciplinary HF team.[37,38] • Team management and a multidisciplinary approach should be used to improve cardiac function and quality of life in patients with HF (class of recommendation I, level of evidence A). • Team management and a multidisciplinary approach should be applied to reduce the rate of mortality, morbidity, and readmission due to HF in patients with HF (class of recommendation I, level of evidence A).
				Linkage to supportive/ palliative care	**+0**	Guidelines don't include referral pathway to supportive/palliative care services.
				# of biomarkers included in heart failure treatment/ monitoring guidelines (e.g. BNP/NT-proBNP, Troponin, Soluble ST2, Galectin-3, MR-proANP)	**+1**	BNP/pro BNP.
				Inclusion of biomarker testing in treatment monitoring guidelines	**+1**	Guidelines recommend NT-proBNP tests as indicators of clinical improvement in response to medical treatment and for post-discharge prognosis.
				Inclusion of Timeliness of heart failure care in the national HF clinical guideline (e.g., Heart failure patients receiving care within 24 hours of hospital admission or referral for outpatient care (especially critical in emergency or exacerbation settings))	**+0**	National heart failure clinical guidelines cover timeliness of heart failure care.

No.	Sub-domains			Indicators		Justifications
Domain 4: Heart failure treatment monitoring and access						
24	Heart failure treatment monitoring guidelines	**0-8**	**4**	Inclusion of emergency care protocols (e.g., Availability and utilisation of standardised heart failure care protocols in emergency departments (e.g., early use of diuretics, anticoagulation for arrhythmia))	**+0**	National heart failure clinical guidelines cover emergency care protocols.
25	Availability of/access to different types of drug therapy	**0-1**	**0**	Availability/access to heart failure therapy	**+0**	Not all (100%) of the heart failure drugs listed on the WHO essential HF drug list of 2023 are included in the most current national essential drugs list (NEDL)[39].
26	Prescription of Guideline-Directed Medical Therapy (GDMT): Eligible heart failure patients (EF < 40%) prescribed key medications	**0-8**	**8**	ACE inhibitors/ARBs/ARNI	**+2**	The rate of HF patients being treated with the medication is ≥ 50% (Note: Expert interview).
				beta-blockers	**+2**	The rate of HF patients being treated with the medication is ≥ 50% (Note: Expert interview)
				MRAs	**+2**	The rate of HF patients being treated with the medication is ≥ 50% (Note: Expert interview).
				SGLT2 inhibitors	**+2**	The rate of HF patients being treated with the medication is ≥ 50% (Note: Expert interview)
27	Implementation of new therapies	**0-1**	**1**	Adoption of newer heart failure therapies (e.g., SGLT2 inhibitors, ARNI)	**+1**	In South Korea, SGLT2 inhibitors like empagliflozin and dapagliflozin are actively recommended for the treatment of heart failure, regardless of whether a patient has diabetes, as per the Korean Society of heart failure Guidelines[40].

No.	Sub-domains			Indicators		Justifications
Domain 4: Heart failure treatment monitoring and access						
28	Use of implantable devices	**0-3**	**3**	ICDs	**+1**	The implantation is available and performed in the territory. Total 4620 ICD implantation was performed during 9 years in Korea (2007-2015). Currently widely performed in the territory[41].
				CRT	**+1**	The implantation is available and performed in the territory. In Korea, CRT had been underutilised because of cultural resistance, low HF awareness of physicians, and restrictive insurance coverage. Nonetheless, CRT has increased steadily, doubling in use over the past 5 years[42].
				LVAD	**+1**	The implantation is available and performed in the territory. In September 2018, the Korean national insurance began to cover LVAD for both bridge-to-transplantation and DT[43]. Nationwide, 124 cases have been performed as of 2023[44].
29	Home health medication monitoring: Heart failure patients in home health progammes receiving regular medication reviews and adjustments	**0-1**	**1**	Availability of home health medication monitoring/remote patient monitoring for people with HF	**+1**	Home health medication monitoring/remote patient monitoring is available for people with HF.
30	Heart failure drugs funding coverage	**0-4**	**4**	Existence of publicly funded/ reimbursed drug therapy for heart failure	**+2**	All drugs included in the WHO essential meds list for heart failure are fully funded/ reimbursed. (Source: Expert interview)
				Funding for HF management/ treatment using rapid optimisation, supported by NT-proBNP testing for HF therapies (STRONG HF)	**+1**	Funding for HF management/ treatment using rapid optimisation, supported by NT-proBNP testing for HF therapies (STRONG HF) is funded/reimbursed. (Source: Expert interview)
				Financing mechanism for biomarkers in HF treatment monitoring	**+1**	Tests using HF biomarkers in treatment monitoring (e.g., Natriuretic peptide-BNP or NT pro BNP) are reimbursed. (Source: Expert interview)

No.	Sub-domains			Indicators		Justifications
Domain 5: Heart failure advocacy, awareness and education						
31	Heart failure patient engagement and advocacy	**0-4**	**0**	Existence of patient organisations	**+0**	No patient organisation/patient advocacy group which cover heart failure exist.
				Participation in national heart failure policy & plan development	**+0**	No patient organisation/patient advocacy group which cover heart failure exist.
				Collaborations/participation in joint progammes with government	**+0**	No patient organisation/patient advocacy group which cover heart failure exist.
32	Heart failure civil society engagement and advocacy	**0-6**	**5**	Existence of civil society organisations (NGOs/advocacy associations etc.)	**+2**	• Korean Society of heart failure (KSHF): Established in 2003, KSHF is Korea's leading academic body focused on heart failure. It promotes research, professional education, and knowledge exchange through regular meetings, conferences, and symposiums. • Korean society of cardiology: The Korean society of cardiology aims to advance cardiology by supporting continuous medical education and knowledge-sharing among cardiologists.
				Participation in national CVD/ HF policy & plan development	**+1**	Example: The Korean society of cardiology advocates for a national policy initiative to improve cardiovascular outcomes through health promotion and prevention. This includes expanding and establishing regional cardio-cerebrovascular centers (CCVCs) and setting up new local CCVCs[45].
				Collaborations/participation in joint HF progammes with government	**+0**	No collaboration and joint programme/initiative, including lobbying efforts, exist between civil societies and policy groups/ ministries/government bodies exist[6].

No.	Sub-domains			Indicators		Justifications
Domain 5: Heart failure advocacy, awareness and education						
32	Heart failure civil society engagement and advocacy	**0-6**	**5**	Collaborations/participation in joint progammes with the private sector	**+1**	Collaborations and joint progammes/initiatives, including lobbying efforts, exist between civil societies and the private sector. E.g., KSHF partners with several companies (Bayer, Pfizer, Novartis, Daewoong, etc.)[46].
				Contributions towards clinical guidelines development	**+1**	KSHF published clinical practice guideline: "Korean society of heart failure guidelines for the Management of heart failure: Advanced and acute heart failure"[47].
33	Heart failure educational initiatives	**0-8**	**6**	Availability of patient education progammes and support resources by the government	**+1**	Only general CVD educative programme/resource run by the government exist. E.g., The Korea Disease Control and Prevention Agency (KDCA) raises awareness and provides education on managing heart failure and other CVDs; For individuals with HT and/or diabetes, KDCA offers community-based progammes aimed at enhancing self-management skills to prevent cardio-cerebrovascular diseases, which carry a significant socioeconomic burden; These progammes include education and counselling services focused on medication adherence, nutritional management, physical activity, and other key aspects of disease self-management[48].
				Availability of patient education progammes and support resources by the civil society or patient organisations	**+1**	Only general CVD educative programme/resource run by the civil society or patient organisations exist.

No.	Sub-domains			Indicators		Justifications
Domain 5: Heart failure advocacy, awareness and education						
33	Heart failure educational initiatives	**0-8**	**6**	Existence of community-based outreach progammes	**+2**	Community based outreach services programme/public awareness campaign specific for heart failure exist. Example: The KSHF designates March as HF awareness week and actively promotes awareness through a range of initiatives, including press conferences, viral video campaigns, public lectures, educational progammes, and public surveys on HF.
				Educational progammes for healthcare providers	**+2**	Clinical heart failure-specific educational progammes targeted towards healthcare providers exist. Example: KSHF offers professional education and facilitates knowledge exchange in heart failure research and treatment through regular meetings, conferences, and symposiums.
34	Continuous HF policy improvement progammes	**0-3**	**3**	Existence of HF continuous policy improvement progammes (policy committee meeting, pre- and post-campaign surveys, etc.)	**+1**	Continuous HF policy improvement progammes (policy committee meeting, pre- and post-campaign surveys, etc.) exist.
				Frequency of HF continuous policy improvement progammes	**+2**	Progammes conducted with a well-defined schedule (e.g., quarterly or after each campaign). E.g., Korean society of cardiology holds cardiology conferences, symposium, and educational lectures annually, also published Korean circulation journal monthly.

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Heart failure territory snapshot

Domains	Overall national CVD policy and planning landscape	Heart failure policy and planning landscape	Heart failure prevention & screening	Heart failure diagnosis & healthcare system capacity	Heart failure treatment monitoring and access	Heart failure advocacy, awareness and education
Taiwan						

High | Moderately high | Moderately low | Low

Enhance biomarker utilisation for early detection

01. Strengthen HF-specific policy development

- **Challenges:** Though HF care teams are widespread and diagnostic tools like NT-proBNP and hsTnT are available, clinical adoption for early detection of HF remains limited. Low biomarker testing in primary care (<20%) due to clinician reluctance and limited POCT infrastructure.
- **Target stakeholders for driving actions:** Ministry of Health and Welfare (MOHW), National Health Insurance Administration (NHIA).
- **Opportunities:**
  - Launch clinician training progammes: NHIA and Taiwan Society of Cardiology (TSOC) should support interdisciplinary workshops for 5,000 primary care providers by 2028, using local case studies to build familiarity and confidence in biomarker use. Position biomarkers as essential diagnostic tools in both primary care and cardiology settings by demonstrating their role in the early detection of underdiagnosed cardiovascular risk factors, such as hyperlipidemia and heart failure. Their ability to uncover latent cardiovascular burden enables earlier intervention and more effective downstream care planning, improving patient outcomes and reducing long-term healthcare costs.
  - Expand POCT Infrastructure: MOHW should equip primary care clinics with NT-proBNP and hsTnT POCT, increasing testing rates to 50%.
  - Integrate biomarkers into NHIA reimbursement: NHIA should fully reimburse NT-proBNP screening for high-risk groups (e.g., diabetes, HT patients), to reduce delayed diagnoses.

02. Improve clinical adherence and follow-up system

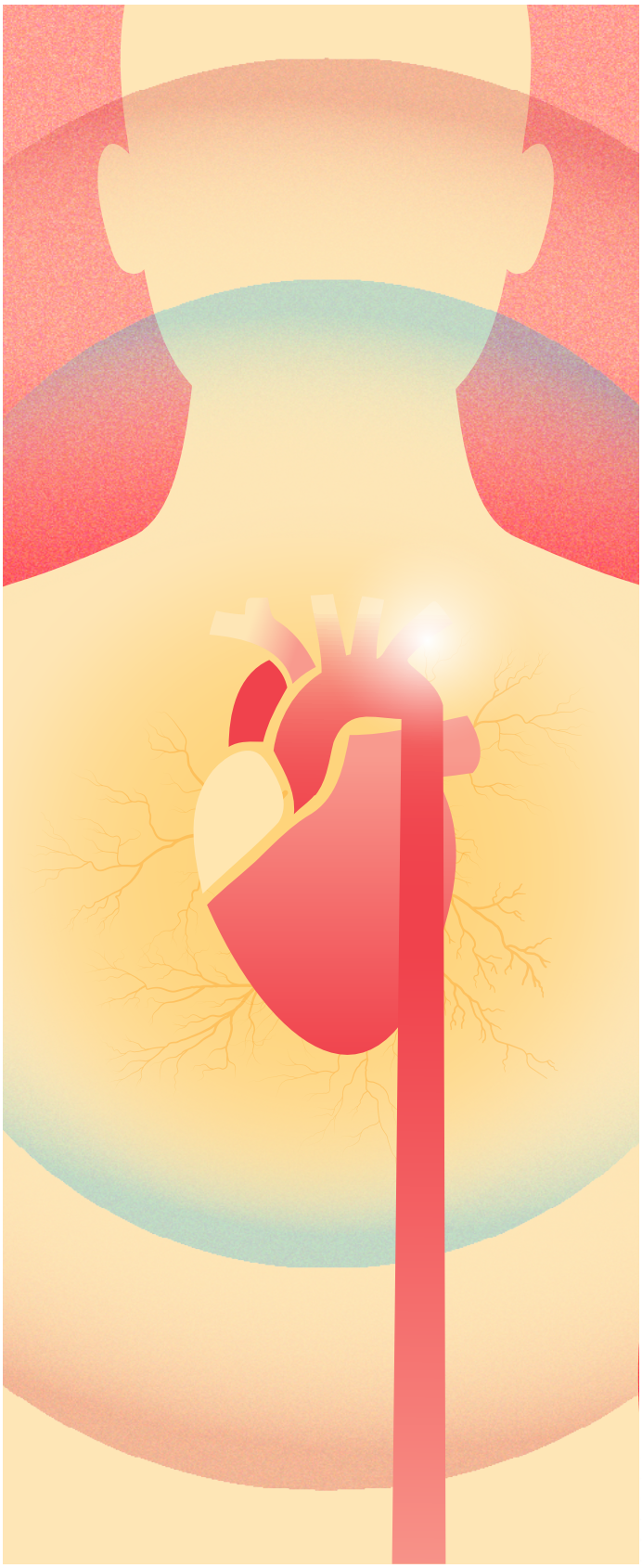
- **Issues:** Clinical inertia and weak follow-up mechanisms reduce guideline adherence and care continuity.
- **Target stakeholders for driving actions:** MOHW, NHIA.
- **Opportunities:**
  - Develop Digital HF Registries: MOHW should enhance the TSOC-HFrEF registry by 2027, integrating NHI claims data and real-time alerts for follow-ups and NT-proBNP re-testing.
  - Implement telemonitoring progammes: NHIA should scale telemonitoring for HF patients by 2028, covering 30% of patients with wearable devices for remote medication adjustments, building on the 2018–2019 study's success.
  - Strengthen multidisciplinary care: Support 20 HF-PAC programme expansions by 2027, ensuring cardiologists, dietitians, and nurses collaborate via shared digital platforms.
  - Pilot STRONG-HF rapid optimisation Protocol: MOHW and NHIA should support pilot by 2027 in 15 hospitals, implementing the STRONG-HF protocol for rapid GDMT up-titration (ACEi/ARBs, beta-blockers, MRAs, SGLT2 inhibitors) within 2 weeks post-discharge, guided by NT-proBNP monitoring every 1–3 months. Train 1,000 clinicians to ensure adherence, targeting a 20% reduction in 180-day readmissions.

03. Boost patient awareness and engagement

- **Issues:** Absence of HF patient organisations and community outreach limits awareness and self-management.
- **Target stakeholders for driving actions:** MOHW, TSOC.
- **Opportunities:**
  - National HF awareness campaign: Promote patient awareness initiatives that close diagnosis and treatment gaps by empowering patients to recognise symptoms and request appropriate testing. MOHW should support annually for a campaign targeting at-risk groups (e.g., diabetes patients) via TV, social media, and the chronic disease risk calculator, aiming for 80% awareness among adults by 2030.
  - Establish HF patient advocacy groups: TSOC should support a national HF patient organisation by 2028, enabling patient input in policy and peer support networks.
  - Expand Community Education: train 2,000 community health workers by 2028 to deliver HF education in rural areas, addressing stigma and improving adherence.

04. Other opportunities for improvement to address current gaps and improve overall HF care:

- Emergency care protocols: Guidelines lack emergency HF protocols. MOHW should update TSOC guidelines by 2026 to include diuretic and anticoagulation standards.
- Timeliness of care: Incorporate 24-hour care protocols in guidelines to reduce readmissions, leveraging HF-PAC's framework.
- Palliative care pathways: Strengthen referral pathways to palliative care with NHIA reimbursing consultations.



Prevalence, incidence, mortality rate

Metrics	Taiwan
Age-standardised prevalence rate (%, 2016)	1.40%[1]
Age-standardised incidence rate (per 100,000 population, 2016)	219[2]
Crude mortality rate at 1 year (%, 2010-2015)	8.5%[3]

Economic burdens

Metrics	Taiwan
Total cost per patient per year (USD, 2014-2015)	$4,513[4]
Inpatient cost per patient per year (USD, 2016)	$2,388[5]
Length of stay (days, 2016)	9-12.5[6]

Scorecard results

No.	Sub-domains		Indicators		Justifications
Domain 1a: Overall national CVD policy and planning landscape					
1	Existence and operational status of a national CVD policies/ strategies/plans	**0-3** **3**	Existence and operational status of a national CVD policies/strategies/plans	**+2**	Operational national CVD policies/strategies/plans exist • National chronic disease strategy: Aims to manage multiple chronic diseases simultaneously through collaboration among clinical departments, with a focus on strengthening prevention, diagnosis, and early treatment to reduce long-term health burdens. • Adult preventive care "Health Plus" plan: Targets early detection and prevention of chronic diseases among middle-aged and elderly individuals through subsidised health examinations every three years (or annually for high-risk groups), emphasising the identification of key risk factors such as HT, hyperlipidaemia, and diabetes. • CVD roadmap: Provides a national framework to reduce the overall burden of CVD by enhancing screening and early intervention among high-risk populations, including patients with CKD, chronic inflammatory diseases, familial hypercholesterolemia, and a family history of premature MI. • Post-acute integrated care plan (HF-PAC): Establishes a comprehensive outpatient model for heart failure patients transitioning from acute treatment to rehabilitation and long-term care, involving structured follow-ups by multidisciplinary teams, proactive home monitoring, and support to reduce readmission risk.

No.	Sub-domains			Indicators		Justifications
Domain 1a: Overall national CVD policy and planning landscape						
1	Existence and operational status of a national CVD policies/ strategies/plans	**0-3**	**3**	Currency of the national CVD policies/strategies/plans	**+1**	The latest relevant one was last updated within the last 5 years (National chronic disease strategy (2023)).
2	Scope and specificity of the national CVD policies/ strategies/plans	**0-2**	**2**	Specific CVD reduction targets	**+1**	In line with global health initiatives, Taiwan has also pursued the "25 by 25" goal, which aims for a 25% reduction in premature mortality from non-communicable diseases, including CVD, by 2025[7].
				Objectives or strategies for management of acute and chronic CVD	**+1**	Strategies in place for management of acute & chronic CVD, e.g., national chronic disease strategy; Post-acute integrated care plan.
3	Coordinating mechanism for implementation	**0-2**	**1**	Dedicated national CVD progammes/initiatives	**+1**	Policies/strategies/plans have national CVD progammes/ initiatives. E.g., To mark World Heart Day, Taiwan's NHIA partnered with nine major associations to roll out clinical pathways for Atherosclerotic Cardiovascular Disease (ASCVD) risk classification and lipid management, aiming to improve CVD prevention and treatment nationwide[8].
				Joint national and regional CVD coordination mechanisms	**+0**	There is no coordination between state and subnational governments specific to CVD.
4	CVD financing	**0-4**	**3**	Dedicated budget to CVD progammes	**+0**	There's no dedicated budget to CVD progammes. (Source: Expert interview)
				Universal coverage for screening for CVD	**+1**	There's a universal coverage for screening for CVD. While specific reimbursement amount is unavailable, NHI covers preventive care, including adult health checkups, and basic screening tools. (Source: Expert interview)

No.	Sub-domains			Indicators		Justifications
Domain 1a: Overall national CVD policy and planning landscape						
4	CVD financing	**0-4**	**3**	Universal coverage for diagnostic tests and imaging for CVDs	**+1**	There's a universal coverage for diagnostic tests and imaging for CVDs. Tests =/tools e.g., Treadmill exercise test, myocardial perfusion imaging, stress echocardiography, invasive coronary angiography, cardiac biomarkers are covered by NHI (inpatient & outpatient, both primary and specialty care). (Source: Expert interview)
				Universal coverage for CVD essential medicines	**+1**	There's a universal coverage for CVD essential medicines. The NHI provides comprehensive coverage except for advanced drugs and procedures[9].
5	Existence of a population based registry	**0-1**	**0**	Existence of national registries established for CVD	**+1**	Nationwide CVD registry exists.
6	Inclusivity and equitable policy formulation	**0-1**	**1**	Policies/strategies/plans/ progammes addressing equitable access to care to CVD	**+1**	Progammes and policies addressing equitable access to care to CVD are included in nationwide insurance system. (Source: Expert interview)
Domain 1b: Heart failure policy and planning landscape						
7	Heart failure dedicated policies/strategies/plans	**0-1**	**1**	Heart failure dedicated policies/strategies/plans	**+1**	The heart failure post-acute care (HF-PAC) programme in Taiwan was founded and initiated since 2017[10].
8	Priority & specificity of heart failure in the national CVD/NCD policies/strategies/plans	**0-3**	**2**	Priority & specificity of heart failure in the national CVD/NCD policies/strategies/plans	**+1**	The heart failure post-acute care (HF-PAC) programme in Taiwan provides relevant criteria for specific policies and plans of HF care. (Source: Expert interview)
				Inclusion of desired outcomes/ targets for heart failure control	**+1**	The Joint Commission of Taiwan (JCT) provides a resource sharing platform for healthcare partners through institutional accreditation for HF care[11].

No.	Sub-domains			Indicators		Justifications
Domain 1b: Heart failure policy and planning landscape						
9	National heart failure strategy implementation	**0-2**	**2**	Percentage of healthcare regions or facilities implementing national heart failure care guidelines, such as standardised treatment protocols and follow-up care	**+2**	≥50% healthcare regions or facilities implementing national heart failure care guidelines. (Source: Expert interview)
10	Policy support for preventive care	**0-2**	**2**	National policies focused on primary prevention of heart failure (e.g., salt reduction, improved diabetes care, HT management)	**+1**	First national cardiovascular disease prevention programme (2018-2022). This programme sets control targets for hyperlipidaemia, HT, and hyperglycaemia for both the general population and high-risk groups[12].
				National policies focused on secondary prevention of heart failure (biomarkers etc.)	**+1**	Policies/strategies/plans have strategy on screening for HF risk factors e.g., First national cardiovascular disease prevention programme (2018-2022).
11	HF research and innovation	**0-4**	**4**	Funding for heart failure research: Annual investment in heart failure-specific clinical trials, basic science research, and public health research	**+1**	Annual investment is made in heart failure-specific clinical trials, basic science research, and public health research. Examples: • The national Health Research Institute (NHRI) offers integrated research grants in health and medical sciences, with CVD as one of the key focus areas. Similarly, Taipei Medical University provides research funding progammes that support studies primarily aimed at cardiovascular risk management.
				Clinical trial participation: Eligible heart failure patients enrolled in clinical trials e.g., for new therapies or medical devices	**+1**	Eligible heart failure patients are enrolled in clinical trials for new therapies or medical devices. E.g., Fusion pacing in HFpEF: This study evaluates the safety and effects of a new Fusion Pacing method in HFpEF patients (EF >50%) over 4 months, aiming to improve cardiac efficiency; participation lasts around 8 months[13].

No.	Sub-domains			Indicators		Justifications
Domain 1b: Heart failure policy and planning landscape						
11	HF research and innovation	**0-4**	**4**	Translation of research into practice: Time-to-adoption for new guidelines, therapies, and technologies from clinical trials to everyday practice	**+2**	Typical time-to-adoption for new guidelines, therapies, and technologies from clinical trials to everyday practice is from 1 to 3 years. (Source: Expert interview)
12	HF financing	**0-4**	**2**	Insurance coverage for heart failure care (Public)	**+1**	• National Health Insurance (NHI): Funded by individuals, employers, and government through premiums (incl. nonpayroll income), tobacco taxes, and lottery taxes: – Government subsidies: Offered to civil servants, union members, teachers, low-income households, military personnel, veterans, and dependents. – Financial assistance: Available for low-income individuals or those facing temporary financial hardship (e.g., relief fund loans, installment plans). – Catastrophic illness certificates: Co-payment exemptions for 30 conditions, including certain CVDs (e.g., type 1 diabetes, acute stroke), for eligible vulnerable groups. • Occupational injury/disease scheme: Labor-insured patients receive full co-pay exemption and 50% inpatient cost coverage (up to 30 days).

No.	Sub-domains			Indicators		Justifications
Domain 1b: Heart failure policy and planning landscape						
12	HF financing	**0-4**	**2**	Insurance coverage for heart failure Care (Private & Alternatives)	**+1**	• Private health insurance: For-profit insurers offer policies with disease-specific cash benefits and coverage for non-publicly funded devices, mainly for those who can afford it. • Charities & patient support progammes (PSPs): Pharmaceutical companies may assist users of their products; low-income patients may be referred to charities by the NHI administration for premium support.
13	Presence of heart failure registries	**0-1**	**1**	Presence of heart failure registries	**+1**	Nationwide registries on HF had been conducted. The Taiwan society of cardiology heart failure registry 2020 is a comprehensive and meticulous effort to demonstrate the epidemiology, adherence to guidelines, clinical outcomes, and disease progression of Taiwanese patients with HF in contemporary clinical practice[14]. The TSOC-HFrEF registry provides important insights into the current clinical characteristics and management of hospitalized decompensated systolic HF patients in Taiwan[15].

No.	Sub-domains			Indicators		Justifications
Domain 1b: Heart failure policy and planning landscape						
14	Existence of heart failure clinical guidelines	**0-3**	**3**	Existence of clinical guidelines	**+1**	Taiwan society of cardiology guideline for diagnosis & treatment of heart failure (2019, 2023, 2024)[16,17]. Guidelines of the Taiwan society of cardiology on the diagnosis and management of chronic coronary syndrome (2023).
				Currency of clinical guidelines	**+2**	The HF clinical guideline was updated till 2024 covering full spectrum of HF (both HFrEF and HFpEF).
15	HF health equity	**0-2**	**2**	Patient navigation progammes: Heart failure patients from underserved backgrounds enrolled in patient navigation progammes to improve access to care and follow-up.	**+1**	Patient navigation progammes exist for underserved communities e.g., Heart failure patients from underserved backgrounds are enrolled in patient navigation progammes to improve access to care and follow-up. E.g., The Integrated Delivery System (IDS), launched by the NHI, enhances healthcare access in rural and offshore areas by fostering collaboration between hospitals, public health centers, and clinics, ensuring regular primary care[18].
				Community-based care progammes: Community-based heart failure management progammes designed to support at-risk groups (e.g., community health workers, peer support groups)	**+1**	Community-based care progammes exist for risk groups. E.g., To mark World Heart Day, NHIA partnered with nine major associations to implement clinical pathways for ASCVD risk and lipid management. It also launched the 888 Plan to include 80% of patients with HT, hyperglycaemia, or hyperlipidaemia in shared care, ensure 80% receive lifestyle guidance, and achieve 80% control rates for these conditions[19].

No.	Sub-domains			Indicators		Justifications
Domain 2: Heart failure prevention & screening						
16	Heart failure screening guidelines	**0-7**	**7**	National heart failure clinical guidelines coverage	**+1**	National heart failure clinical guidelines cover screening for heart failure. Taiwan society of cardiology guideline for diagnosis & treatment of heart failure (2019) has no specific guideline for screening. However, guidelines of the Taiwan society of cardiology on the diagnosis and management of chronic coronary syndrome (2023) – including HF: Resting ECG and chest X-ray are recommended for screening; the biomarker-based "ABC-CCS" prediction model utilises NT-proBNP, hs-TnI or hs-TnT, and LDL-C to predict CV death and other CV outcomes[20].
				# of biomarkers included in heart failure screening guidelines (e.g. BNP/ NT-proBNP, Troponin, Soluble ST2, Galectin-3, MR-proANP)	**+2**	NT-proBNP, Hs-TnI or Hs-TnT, LDL-C.
				Inclusion of biomarker testing in screening guidelines	**+1**	Biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP) are mentioned or recommended as screening tools in the national heart failure screening guidelines.
				Inclusion of HT management	**+1**	National heart failure clinical guidelines cover HT management[21].
				Inclusion of diabetes control in HF	**+1**	National heart failure clinical guidelines cover diabetes control[22].
				Inclusion of screening for high-risk populations (e.g., older adults, patients with CAD, diabetes, or HT) for early signs of HF or related risk factors	**+1**	National heart failure clinical guidelines cover screening for high-risk populations[23].

No.	Sub-domains			Indicators		Justifications
Domain 2: Heart failure prevention & screening						
17	Heart failure screening funding	**0-4**	**3**	Existence of publicly funded/ reimbursed screening test for heart failure	**+1**	Heart failure screening is partially funded/reimbursed. (Source: Expert interview)
				Funding for HF screening for T2DM patients	**+1**	Screening for T2DM patients is funded/reimbursed. In Taiwan, all medical expenses from outpatient or inpatient services are covered under a nationwide insurance system with a global budget. Screening for heart failure using BNP, NT-proBNP, or hs-Troponins is reimbursed across clinical settings, unless done as part of a self-paid health check-up without medical indications. (Source: Expert interview)
				Financing mechanism for biomarkers in HF screening	**+1**	Tests using HF biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP) are reimbursed.

No.	Sub-domains			Indicators		Justifications
Domain 3: Heart failure diagnosis & healthcare system capacity						
18	Heart failure diagnosis guidelines	**0-4**	**4**	National heart failure clinical guidelines coverage	**+1**	• Taiwan society of cardiology guideline for diagnosis & treatment of heart failure (2019): For severe HF, 3D echocardiography is recommended. Routine evaluations should include HF biomarkers (BNP/ proBNP) for diagnosis and prognosis. Cardiac troponins are also recommended for suspected or newly diagnosed HF. Biomarkers are more convenient than echocardiography for initial diagnosis in outpatient or ED settings[24]. • Taiwan society of cardiology guidelines on diagnosis and management of chronic coronary syndrome (2023): First-line diagnostic tests include coronary CT angiography (CCTA). Troponin is essential for diagnosing myocardial injury or infarction[25].
				# of biomarkers included in heart failure diagnosis guidelines (e.g. BNP/ NT-proBNP, Troponin, Soluble ST2, Galectin-3, MR-proANP)	**+2**	BNP, NT-proBNP, High sensitivity troponin, ST-2, Galectin-3.
				Inclusion of biomarker testing in diagnostic guidelines	**+1**	NT-proBNP tests are highly recommended for diagnosis by local guidelines in Taiwan[26].
19	Capacity of/availability of/access to diagnostic services	**0-8**	**2**	MRI	**+1**	Low. (0-0.14 machines per ten thousands of population)
				CT	**+1**	Low. (0-0.30 machines per ten thousands of population)

No.	Sub-domains			Indicators		Justifications
Domain 3: Heart failure diagnosis & healthcare system capacity						
20	HF biomarker testing rate (Percentage of patients with suspected heart failure undergoing biomarkers (e.g., BNP, NT-proBNP) to confirm diagnosis)	**0-12**	**8**	Use of HF biomarkers at emergency care in public institutions	**+3**	≥ 80% of patients with suspected HF get a test using HF biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP). (Source: Expert interview)
				Use of HF biomarkers at emergency care in private institutions	**+3**	≥ 80% of patients with suspected HF get a test using HF biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP). (Source: Expert interview)
				Use of HF biomarkers at primary care centers in public institutions	**+1**	≤ 20% of patients with suspected HF get a test using HF biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP). (Source: Expert interview)
				Use of HF biomarkers at primary care centers in private institutions	**+1**	≤ 20% of patients with suspected HF get a test using HF biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP). (Source: Expert interview)
21	Capacity of workforce/availability of HF specialists (adjusted for regional distribution)	**0-4**	**3**	Cardiologists	**+3**	Moderately high (>0.66-0.90 staffs per ten thousands of population).
22	Multidisciplinary heart failure care team availability	**0-1**	**1**	Hospitals and clinics offering care from a multidisciplinary team, including cardiologists, dietitians, psychologists, and rehabilitation specialists	**+1**	Hospitals and clinics offering care from a multidisciplinary team, including cardiologists, dietitians, psychologists, and rehabilitation specialists.
23	Heart failure diagnostics funding coverage	**0-3**	**2**	Existence of publicly funded/ reimbursed diagnostics test for heart failure	**+1**	Heart failure diagnostics is partially funded/reimbursed. (Source: Expert interview)
				Financing mechanism for biomarkers in HF diagnostics	**+1**	Diagnostic tests using HF biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP) are reimbursed. (Source: Expert interview)

No.	Sub-domains			Indicators		Justifications
Domain 4: Heart failure treatment monitoring and access						
24	Heart failure treatment monitoring guidelies	**0-8**	**5**	National heart failure clinical guidelines coverage	**+1**	Taiwan society of cardiology guideline for diagnosis & treatment of heart failure (2019): The use of BNP/proBNP as a prognostic predictor is recommended to monitor the effectiveness of HF therapy before hospital discharge; For patients with newly diagnosed HF, troponins can be measured to evaluate the possible etiology and predict the prognosis[27].
				Involvement of multi-disciplinary team	**+1**	Concept of shared decision making/treatment of a multidisciplinary HF team is proposed in local HF guidelines.
				Linkage to supportive/ palliative care	**+1**	Guidelines include referral pathway to supportive/palliative care services[28].
				# of biomarkers included in heart failure treatment/ monitoring guidelines (e.g. BNP/NT-proBNP, Troponin, Soluble ST2, Galectin-3, MR-proANP)	**+1**	BNP, NT-proBNP, High sensitivity troponin.
				Inclusion of biomarker testing in treatment monitoring guidelines	**+1**	The Taiwan society of cardiology suggests using BNP/proBNP to monitor HF therapy effectiveness before hospital discharge; Troponins are recommended for newly diagnosed HF patients to assess etiology and prognosis[29].

No.	Sub-domains			Indicators		Justifications
Domain 4: Heart failure treatment monitoring and access						
24	Heart failure treatment monitoring guidelies	**0-8**	**5**	Inclusion of timeliness of heart failure care in the national HF clinical guideline (e.g., Heart failure patients receiving care within 24 hours of hospital admission or referral for outpatient care (especially critical in emergency or exacerbation settings))	**+0**	National heart failure clinical guidelines cover timeliness of heart failure care.
				Inclusion of emergency care Protocols (e.g., Availability and utilisation of standardised heart failure care protocols in emergency departments (e.g., early use of diuretics, anticoagulation for arrhythmia))	**+0**	National heart failure clinical guidelines cover timeliness of heart failure care.
25	Availability of/access to different types of drug therapy	**0-1**	**1**	Availability/access to heart failure therapy	**+1**	All (100%) of the heart failure drugs listed on the WHO Essential HF drug List of 2023 are included in the most current national essential drugs list (NEDL).
26	Prescription of Guideline-Directed Medical Therapy (GDMT): eligible heart failure patients (EF < 40%) prescribed key medications	**0-8**	**7**	ACE inhibitors/ARBs/ARNI	**+2**	The rate of HF patients being treated with the medication is ≥ 50%. (Source: Expert interview)
				beta-blockers	**+2**	The rate of HF patients being treated with the medication is ≥ 50%. (Source: Expert interview)
				MRAs	**+2**	The rate of HF patients being treated with the medication is ≥ 50%. (Source: Expert interview)
				SGLT2 inhibitors	**+1**	The rate of HF patients being treated with the medication is < 50%. (Source: Expert interview)

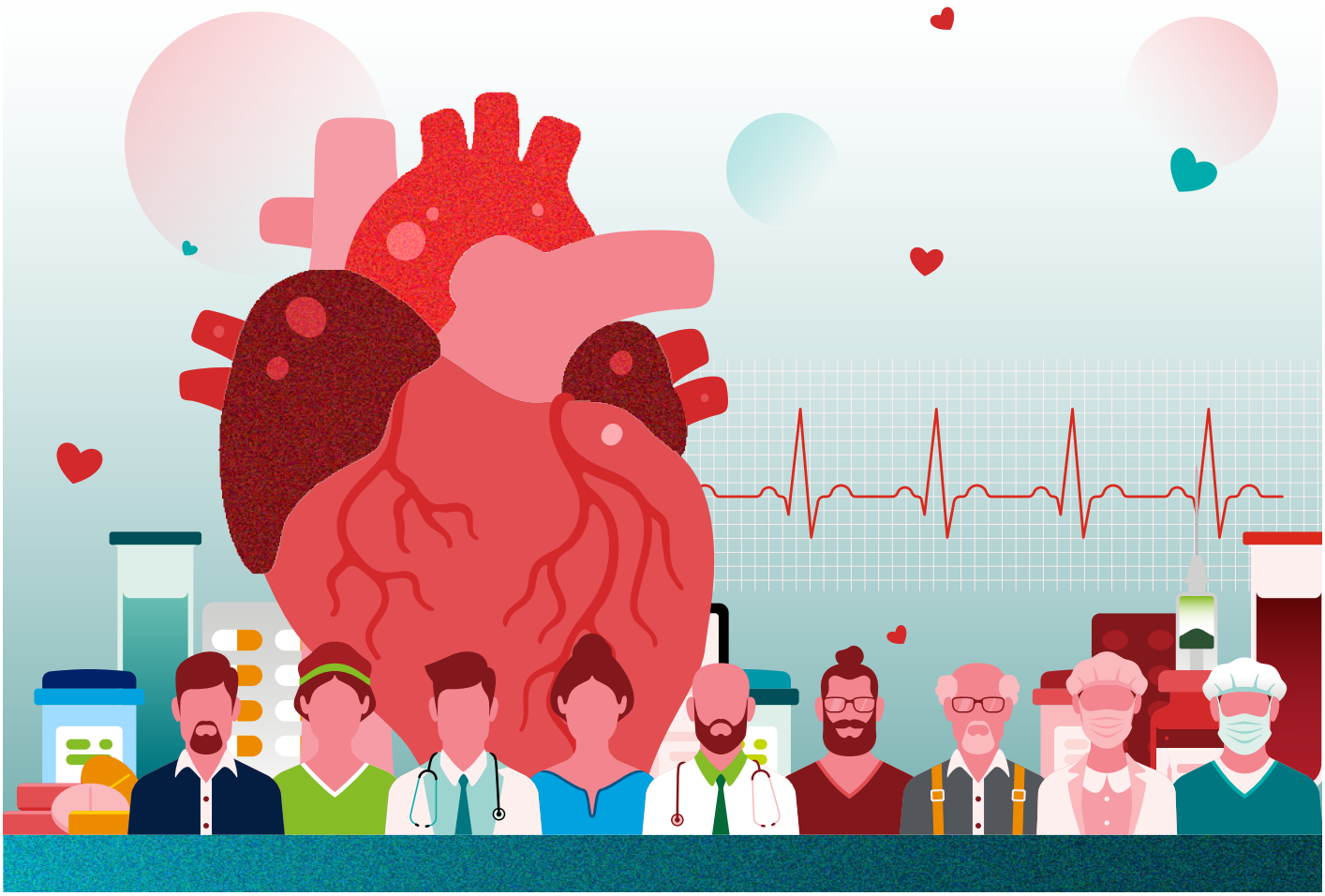
No.	Sub-domains			Indicators		Justifications
Domain 4: Heart failure treatment monitoring and access						
27	Implementation of new therapies	**0-1**	**1**	Adoption of newer heart failure therapies (e.g., SGLT2 inhibitors, ARNI)	**+1**	Adoption of adoption of newer heart failure therapies (e.g., SGLT2 inhibitors, ARNI) is observed in the territory. E.g., SGLT2 inhibitors were approved in Taiwan in 2016[30].
28	Use of implantable devices	**0-3**	**3**	ICDs	**+1**	The implantation is available and performed in the territory[31].
				CRT	**+1**	The implantation is available and performed in the territory. The implantation rate of CRT was 1.9% in Taiwanese acute decompensated HF patients[32].
				LVAD	**+1**	The implantation is available and performed in the territory. LVAD has been performed in major hospitals in Taiwan e.g., Taipei Veterans General Hospital (TPEVGH)[33].
29	Home health medication monitoring: Heart failure patients in home health progammes receiving regular medication reviews and adjustments	**0-1**	**1**	Availability of home health medication monitoring/remote patient monitoring for people with HF	**1**	Home health medication monitoring/remote patient monitoring is available for people with HF. E.g., A study on elderly HF patients (age ≥65, LVEF <40%) from 2018 to 2019: The intervention group participated in outpatient cardiac rehabilitation and home exercise, with telemonitoring of exercise parameters. Results showed improved cardiac function, increased functional capacity, and reduced readmission rates after six months of post-acute HF management[34].

No.	Sub-domains			Indicators		Justifications
Domain 4: Heart failure treatment monitoring and access						
30	Heart failure drugs funding coverage	**0-4**	**3**	Existence of publicly funded/ reimbursed drug therapy for heart failure	**+1**	Some drugs included in the WHO essential meds list for heart failure are funded/reimburse. (Source: Expert interview)
				Funding for HF management/ treatment using rapid optimisation, supported by NT-proBNP testing for HF therapies (STRONG HF)	**+1**	Funding for HF management/ treatment using rapid optimisation, supported by NT-proBNP testing for HF therapies (STRONG HF) is funded/reimbursed. HF patiensts follow-up testing can be conducted 1 to 3 months after treatment. Once the condition is stable, testing can be performed every 6 months. (Source: Expert interview)
				Financing mechanism for biomarkers in HF treatment monitoring	**+1**	Tests using HF biomarkers in treatment monitoring (e.g., Natriuretic peptide-BNP or NT pro BNP) are reimbursed. (Source: Expert interview)

No.	Sub-domains			Indicators		Justifications
Domain 5: Heart failure advocacy, awareness and education						
31	Heart failure patient engagement and advocacy	**0-4**	**0**	Existence of patient organisations	**+0**	No patient organisation/patient advocacy group which cover heart failure exist.
				Participation in national heart failure policy & plan development	**+0**	No patient organisation/patient advocacy group which cover heart failure exist.
				Collaborations/participation in joint progammes with government	**+0**	No patient organisation/patient advocacy group which cover heart failure exist.
32	Heart failure civil society engagement and advocacy	**0-6**	**5**	Existence of civil society organisations (NGOs/advocacy associations etc.)	**+1**	Example: Taiwan Society of Cardiology (TSOC) promotes cardiology research, sponsors academic lectures and seminars, trains cardiology specialists and helps the government review policies and guidelines for the treatment of cardiac diseases[35].
				Participation in national CVD/ HF policy & plan development	**+1**	TSOC contributes to the development of clinical guidelines and participates in HF/CVD policy discussion.
				Collaborations/participation in joint HF progammes with government	**+1**	Collaborations and joint progammes/initiatives, including lobbying efforts, exist between civil societies and policy groups/ ministries/government bodies. E.g., The national Health Insurance Administration (NHIA), in collaboration with nine major associations such as the Taiwan heart foundation and Taiwan society of cardiology, is implementing clinical pathways for ASCVD risk classification and lipid management to improve CVD prevention and treatment across Taiwan[36].

No.	Sub-domains			Indicators		Justifications
Domain 5: Heart failure advocacy, awareness and education						
32	Heart failure civil society engagement and advocacy	**0-6**	**5**	Collaborations/participation in joint progammes with the private sector	**+1**	Collaborations and joint progammes/initiatives, including lobbying efforts, exist between civil societies and the private sector. E.g., TSOC often works with private sector partners, such as pharmaceutical and medical device companies, to deliver conferences and educational progammes (e.g. Abbott, Sanofi)[37].
				Contributions towards clinical guidelines development	**+1**	TSOC helps the government review policies and guidelines for the treatment of cardiac diseases. E.g., "2024 Guidelines of the Taiwan society of cardiology for the diagnosis and treatment of heart failure with preserved ejection fraction".
33	Heart failure educational initiatives	**0-8**	**5**	Availability of patient education progammes and support resources by the government	**+1**	Only general CVD educative programme/resource run by the government exist. E.g., Chronic disease risk calculator: The health promotion administration developed an online tool for individuals aged 35-70 to estimate their 10-year risk of coronary heart disease, stroke, and major cardiovascular events using health exam data[38].
				Availability of patient education progammes and support resources by the civil society or patient organisations	**+2**	General CVD and HF educative progammes/resources run by the civil society or patient organisations exist. E.g., Organisations like the Taiwanese Association of diabetes educators and the chinese Taipei diabetes association offer education and resources for patients managing diabetes, a significant risk factor for CV.
				Existence of community-based outreach progammes	**+0**	No programme exists.
				Educational progammes for healthcare providers	**+2**	Clinical general CVD and HF educational progammes targeting towards healthcare providers exist.

No.	Sub-domains			Indicators		Justifications
Domain 5: Heart failure advocacy, awareness and education						
34	Continuous HF policy improvement progammes	**0-3**	**3**	Existence of HF continuous policy improvement progammes (policy committee meeting, pre-and post-campaign surveys, etc.)	**+1**	The Joint Commission of Taiwan (JCT) is an accreditation body in healthcare established in 1999 which aimed to provide HF continuous quality and policy improvement progammes in Taiwan[39].
				Frequency of HF continuous policy improvement progammes	**+2**	Continuous HF policy improvement progammes (policy committee meeting, pre- and post-campaign surveys, etc.) are available with a well-defined schedule.



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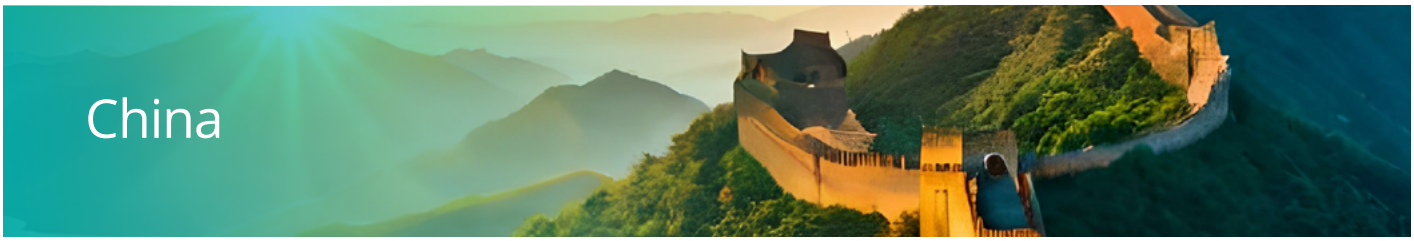

China

Middle-income territories

Heart failure territory snapshot

Domains	Overall national CVD policy and planning landscape	Heart failure policy and planning landscape	Heart failure prevention & screening	Heart failure diagnosis & healthcare system capacity	Heart failure treatment monitoring and access	Heart failure advocacy, awareness and education
China						

High | Moderately high | Moderately low | Low

Top opportunities for improvement

01. Bridge urban-rural disparities in heart failure care access

- **Challenges:** Over 80% of medical resources and cardiovascular specialists are concentrated in urban centers, leaving rural populations with limited access to HF screening, diagnosis, and treatment[1]. Despite national progammes like the new rural cooperative medical scheme and internet + health care initiative, gaps remain in workforce distribution, diagnostic availability, and continuity of HF care in less-developed regions.
- **Target stakeholders for driving actions:** Ministry of Health (MoH), National Healthcare Security Administration (NHSA).
- **Opportunities:**
  - Expand telecardiology platforms: The Chinese government has been actively promoting the development of internet hospitals and telemedicine services as part of its "Health China" strategy, aiming to bridge the urban-rural healthcare gap[2]. Given the existing digital infrastructure and policy backing, MoH should support by 2028 to scale Internet + health care telecardiology platforms to 70% of rural community health centers (CHCs), ensuring stable internet and mobile diagnostic units.
  - Incentivize rural specialists: NHSA should support by 2035 to provide subsidies for cardiologists and nurses relocating to rural areas, reducing workforce disparities. This aligns well with the broader national plan, for example, the national health commission aims to reduce the rural-urban healthcare gap by 2035, with initiatives such as waiving tuition fees for medical students who commit to serving in rural areas[3].
  - Standardise Referral Systems: MoH should develop digital referral protocols for 5,000 CHCs by 2027, linking rural patients to urban hospitals for specialist consultations, which is in line with national objectives mandated by The national Health Commission regarding consolidating the hierarchical diagnosis and treatment system, aiming for a smooth two-way referral system within "compact medical alliances" by the end of 2025 and province-level referral systems by 2027[4].

02. Strengthen rural diagnostic and workforce capacity

- **Issues:** Limited access to diagnostics and trained providers in rural areas hinders early HF detection.
- **Target stakeholders for driving actions:** MoH, Ministry of Finance.
- **Opportunities:**
  - Deploy mobile diagnostic units: Ministry of finance should support mobile units with POCT (e.g., NT-proBNP, troponin) for rural CHCs by 2028, increasing diagnostic coverage by 40%.
  - Train rural providers: MoH should implement standardised training progammes for 10,000 community-based health workers (CHWs) and primary care to recognise HF symptoms, perform basic diagnostics including biomarker use, and initiate timely referrals if needed.

03. Ensure equitable insurance and post-acute care

- **Issues:** Incomplete insurance coverage for HF services and lack of rural post-acute care increase readmissions.
- **Target stakeholders for driving actions:** NHSA, MoH.
- **Opportunities:**
  - Expand New Rural Cooperative Medical Scheme (NRCMS Coverage): Currently, NRCMS coverage for chronic and post-acute care is limited, and patients often incur high out-of-pocket costs. NHSA should include HF emergency services, hospitalisation, and cardiac rehabilitation in NRCMS, to cover at least 50% of rural patients by 2030.
  - Develop Rural CR Facilities: MoH should support 200 cardiac rehabilitation centers in secondary hospitals by 2028, prioritising underserved provinces.
  - Strengthen EMS Systems: By 2027 to equip 300 rural CHCs with emergency medical services (EMS) for acute HF events with central-local coordination.

04. Enhance step-down care and secondary prevention

- **Issues:** There is a significant issue with low awareness of secondary prevention guidelines among healthcare professionals, e.g., in Shanxi province, less than 50% of physicians are familiar with them[5]. This, coupled with low adherence to key medications like statins and antiplatelets, undermines effective HF management and secondary prevention, particularly in rural and lower-tier hospitals[6]. The use of key cardiac biomarkers, essential for diagnosing and risk-stratifying heart failure, is limited, and clinicians are often unaware of how to effectively use these biomarkers for early diagnosis and guideline-directed medical therapy (GDMT).
- **Target stakeholders for driving actions:** MoH, NHSA.
- **Opportunities:**
  - Establish national Step-Down Care Framework: MoH should develop a policy by 2026 mandating step-down care in secondary/tertiary hospitals, integrating multidisciplinary teams.
  - Pilot STRONG-HF rapid optimisation protocol: MoH and NHSA should support pilot by 2027 in 20 secondary hospitals across 5 provinces, implementing the STRONG-HF protocol for rapid GDMT up-titration (ACEi/ARBs, beta-blockers, MRAs, SGLT2 inhibitors) within 2 weeks post-discharge, guided by NT-proBNP monitoring every 1-3 months. Train clinicians to ensure adherence, targeting a 20% reduction in 180-day readmissions.
  - Scale digital adherence tools: NHSA should support by 2028 to deploy mobile apps and wearables for 30% of HF patients, with CHW-led follow-ups to improve GDMT adherence.
  - Accredit Rural HF Centers: Support accredited HF centers in rural areas by 2028, ensuring standardised post-discharge care.

05. Expand biomarker utilisation and clinician training

- **Issue:** Limited access to and awareness of cardiac biomarkers (e.g., CK-MB, troponin) in rural hospitals.
- **Target stakeholders for driving actions:** MoH, NHSA.
- **Opportunities:**
  - Increase biomarker funding: NHSA should support annually to procure NT-proBNP and troponin tests for 80% of secondary hospitals by 2030.
  - Train clinicians on biomarkers: MoH should support continuing education for 15,000 clinicians by 2028, emphasising biomarker-based diagnostics and GDMT optimisation.
  - Integrate biomarkers into protocols: Update national HF guidelines by 2026 to mandate biomarker use in emergency and outpatient settings.

06. Foster patient engagement and advocacy

- **Issue:** Low patient awareness and lack of HF advocacy groups hinder adherence and self-management.
- **Target stakeholders for driving actions:** MoH, Chinese Cardiovascular Association (CCA).
- **Opportunities:**
  - Launch national HF Awareness Campaign: MoH and CCA should support annually in campaigns targeting rural populations via WeChat and community events, aiming for 70% awareness by 2029.
  - Establish HF Patient Groups: CCA should support province-level HF advocacy groups by 2027, empowering patients to engage in policy and peer support.

07. Other opportunities for improvement to address current gaps and improve overall HF care:

- National HF registry: MoH should support by 2027 to create a centralised HF registry, integrating urban and rural data to inform policy.
- Palliative care pathways: Update guidelines by 2026 to include palliative care referrals, with NHSA reimbursing consultations.
- Emergency care protocols: MoH should mandate standardised HF emergency protocols in 500 hospitals by 2027, including diuretic and anticoagulation guidelines.

Prevalence, incidence, mortality rate

Metrics	China
Age-standardised prevalence rate (%, 2019)	1.03%[7]
Age-standardised incidence rate (per 100,000 population, 2019)	275[8]
Crude mortality rate at 1 year (%, 2020)	16.9%[9]

Economic burdens

Metrics	China
Total cost per patient per year (USD, 2014)	$4,457[10]
Inpatient cost per patient per year (USD, 2014)	$2,924[11]
Length of stay (days, 2015)	9[12]

Scorecard results

No.	Sub-domains		Indicators		Justifications
Domain 1a: Overall national CVD policy and planning landscape					
1	Existence and operational status of a national CVD policies/ strategies/plans	**0-3** **3**	Existence and operational status of a national CVD policies/strategies/plans	**+2**	• Implementation plan for the prevention and treatment of cardiovascular and cerebrovascular diseases (2023–2030)[13]: Establishes a nationwide CVD and CeVD system by 2030 with focus on early screening, chronic disease management, and integrated modern–traditional medicine – Last update: 2023 • Thousand counties project (2021–2025)[14]: Upgrades county hospitals to tertiary level by enhancing infrastructure, equipment, and staff training to better manage common diseases like CVD – Last update: 2021 • Action plan to comprehensively improve medical quality (2023–2025)[15]: Targets secondary and tertiary hospitals to standardise technology use, promote preoperative evaluation, and boost multidisciplinary care – Last update: 2024 • National cardiovascular disease management capacity assessment and improvement project (CDQI)[16]: Develops a national standard for cardiac care using AI and big data to assess quality, and promotes integrated patient data sharing – Last update: 2023

No.	Sub-domains			Indicators		Justifications
Domain 1a: Overall national CVD policy and planning landscape						
1	Existence and operational status of a national CVD policies/ strategies/plans	**0-3**	**3**	Existence and operational status of a national CVD policies/strategies/plans		• Improving accessibility to basic healthcare services (2023–2025)[17]: Expands grassroots access to chronic disease care through physician deployment, lifestyle guidance, and digital communication tools – Last update: 2023 • Construction of diabetes prevention and control centre (DPCC) project[18] (2021): Standardises diabetes care nationwide via digital tech and long-term management; piloted in Hunan and now expanding across all hospital levels – Last update: 2021
				Currency of the national CVD policies/strategies/plans	**+1**	Strategies/policies/plans above were updated/in force within last 5 years. (launch/last update in 2020)
2	Scope and specificity of the national CVD policies/ strategies/plans	**0-2**	**2**	Specific CVD reduction targets	**+1**	Target: Reduce CVD mortality rate from 234.4 (2015) to 209.7 per 100,000 residents (2030)[19].
				Objectives or strategies for management of acute and chronic CVD	**+1**	Policies/strategies/plans cover management of acute and chronic CVD. E.g., Improving accessibility to basic healthcare services (2023–2025): Expands grassroots access to chronic disease care through physician deployment, lifestyle guidance, and digital communication tools[20].

No.	Sub-domains			Indicators		Justifications
Domain 1a: Overall national CVD policy and planning landscape						
3	Coordinating mechanism for implementation	**0-2**	**1**	Dedicated national CVD progammes/initiatives	**+1**	Examples: • Healthy China 2030 (HC2030) launched in 2016, HC2030 focuses on preventing NCDs, including CVD, by promoting healthy lifestyles (e.g., national Fitness programme, Healthy diet campaign), improving health literacy, enhancing cardiac emergency response, and strengthening healthcare services[21]. • National chest pain programme also launched in 2016, this programme improves acute chest pain care; over 5,000 hospitals had joined by 2021[22,23].
				Joint national and regional CVD coordination mechanisms	**+0**	There is no coordination between state and subnational governments specific to CVD. (Source: Expert interview)
4	CVD financing	**0-4**	**4**	Dedicated budget to CVD progammes	**+1**	There's a dedicated budget to CVD progammes, amount unspecified[24].
				Universal coverage for screening for CVD	**+1**	There's a universal coverage for screening for CVD. China lacks a national CVD surveillance policy, but the Chinese society of cardiology, Chinese medical association, and national health commission have issued guidelines recommending regular CVD risk assessments for adults over 40, including blood pressure, lipids, glucose, and lifestyle checks. ECGs are advised for high-risk individuals. Provincial screening progammes are implemented with support from community health centers-covering ~95% of the rural population-but workforce shortages hinder broader coverage[25].

No.	Sub-domains			Indicators		Justifications
Domain 1a: Overall national CVD policy and planning landscape						
4	CVD financing	**0-4**	**4**	Universal coverage for diagnostic tests and imaging for CVDs	**+1**	There's a universal coverage for diagnostic tests and imaging for CVDs. Public health insurance in China covers health checks such as blood tests, X-rays, ECGs, and cardiac biomarkers, with copayment rates varying by province[26].
				Universal coverage for CVD essential medicines	**+1**	There's a universal coverage for CVD essential medicines. Most essential CVD medicines are available and reimbursable via public insurance through the national essential drug list and national reimbursement drug list; However, access to some drugs like statins remains limited at the primary care level[27].
5	Existence of a population based registry	**0-1**	**1**	Existence of national registries established for CVD	**+1**	China collects national data on heart diseases, such as stroke, IHDs, and ACS, through multiple registries[28]. The national center for cardiovascular diseases uses these to inform reports and clinical guidelines[29]. Local governments are also integrating CVD data into EMR systems, with many regions already making the transition[30].
6	Inclusivity and equitable policy formulation	**0-1**	**1**	Policies/strategies/plans/ progammes addressing equitable access to care to CVD	**+1**	Rural residents face limited access to CVD services, with 80% of medical resources and most physicians concentrated in cities[31]. The new rural cooperative medical scheme and medical assistance programme aim to narrow this gap through health financing[32]. The Internet + health care initiative offers telemedicine access for rural CVD patients, though service coverage remains unclear[33].

No.	Sub-domains			Indicators		Justifications
Domain 1b: Heart failure policy and planning landscape						
7	Heart failure dedicated policies/ strategies/plans	**0-1**	**0**	Heart failure dedicated policies/strategies/plans	**+0**	Heart failure-specific policies/ strategies/plans don't exist.
8	Priority & specificity of heart failure in the national CVD/NCD policies/strategies/plans	**0-3**	**1**	Priority & specificity of heart failure in the national CVD/NCD policies/strategies/plans	**+1**	Cardiovascular disease quality Initiative (CDQI): The CDQI standardises CVD diagnosis and treatment across all hospital levels to support health China 2030 goals. It sets evaluation criteria for heart failure, chest pain, and AF centers. Key KPIs include BNP/NT-proBNP testing for HF, troponin detection with door-to-wire time under 90 minutes for chest pain, and anticoagulant prescription for AF patients[34].
				Inclusion of desired outcomes/ targets for heart failure control	**+0**	Not specified.
9	National heart failure strategy implementation	**0-2**	**1**	Percentage of healthcare regions or facilities implementing national heart failure care guidelines, such as standardised treatment protocols and follow-up care	**+1**	< 50% healthcare regions or facilities implementing national heart failure care guidelines (Source: Expert interview).
10	Policy support for preventive care	**0-2**	**1**	National policies focused on primary prevention of heart failure (e.g., salt reduction, improved diabetes care, HT management)	**+1**	Targets for primary prevention[35]: • Physical activity: At least 40% of residents participate in regular exercise. • Salt intake: Reduction of salt intake to below 5g per day. • HT awareness: Increase awareness rate of high blood pressure among residents ≥30 years old to at least 65%. • HT management: At least 70% HT management rate of patients. • Blood lipid testing: Annual blood lipid testing for residents ≥35 years old is at least 35%.

No.	Sub-domains			Indicators		Justifications
Domain 1b: Heart failure policy and planning landscape						
10	Policy support for preventive care	**0-2**	**1**	National policies focused on secondary prevention of heart failure (biomarkers etc.)	**+0**	There is a significant issue with low awareness of secondary prevention guidelines among healthcare professionals, particularly in Shanxi province, where less than 50% of physicians are aware of them[36]. This lack of awareness, along with low adherence to secondary prevention medications (such as antiplatelet drugs and statins), hinders effective CVD secondary prevention[37].
11	HF research and innovation	**0-4**	**2**	Funding for heart failure Research: Annual investment in heart failure-specific clinical trials, basic science research, and public health research	**+1**	Annual investment is made in heart failure-specific clinical trials, basic science research, and public health research. E.g., national Natural Science Foundation of China (NSFC) data show that China steadily increased heart failure research funding over 25 years, with a sharp rise from 6.5M RMB (1.0M USD) in 2009 to 51.9M RMB (7.8M USD) in 2016-an annual growth rate of 33%[38].
				Clinical trial participation: Eligible heart failure patients enrolled in clinical trials e.g., for new therapies or medical devices	**+1**	Eligible heart failure patients are enrolled in clinical trials for new therapies or medical devices.
				Translation of research into practice: Time-to-adoption for new guidelines, therapies, and technologies from clinical trials to everyday practice	**+0**	Unpredicted and no standardised adoption timeframe. (Source: Expert interview)

No.	Sub-domains			Indicators		Justifications
Domain 1b: Heart failure policy and planning landscape						
12	HF financing	**0-4**	**2**	Insurance coverage for heart failure care (Public)	**+1**	• Urban Employee Basic Medical Insurance (UEBMI): Mandatory insurance for urban workers, funded by employees and employers; excludes unemployed family members. • Critical Illness Insurance (CII): Government-led programme via commercial insurers to reduce catastrophic health expenditures. • City Supplementary Health Insurance: Local government-funded CHI for low-income individuals; covers pre-existing conditions, unreimbursed drugs, and nursing care. • Urban-Rural Resident Basic Medical Insurance (URRBMI): Voluntary, government-subsidised insurance for rural residents and urban non-employees (e.g., children, students, elderly). • Government subsidies: Provincial health departments define reimbursable products and co-pay levels under local scheme. • Medical aid: Local government- and donation-funded assistance for catastrophic medical costs. (Source: Expert interview)

No.	Sub-domains			Indicators		Justifications
Domain 1b: Heart failure policy and planning landscape						
12	HF financing	**0-4**	**2**	Insurance coverage for heart failure care (Private & alternatives)	**+1**	• Private health insurance: Typically purchased by higher-income individuals or provided by employers; may include chronic disease-specific plans to cover deductibles, co-pays, and broaden access. • Charity & Patient Support Progammes (PSPs): Often led by pharmaceutical/device companies in partnership with charities; e.g., Sanofi and Medtronic donated CGM devices to insulin users in hospitals. (Source: Expert interview)
13	Presence of heart failure registries	**-1**	**1**	Presence of heart failure registries	**+1**	The China-HF registry evaluates heart failure management and outcomes in China[39]. Stage I (2012–2015) results were published in 2017. Stage II (2017–2020) assessed current HF management practices and the impact of quality improvement efforts.
14	Existence of heart failure clinical guidelines	**0-3**	**3**	Existence of clinical guidelines	**+1**	• Chinese guideline on the primary prevention of CVD (2020). • Chinese guidelines for the diagnosis and treatment of heart failure 2018 (updated 2024).
				Currency of clinical guidelines	**+2**	The Chinese guidelines for the diagnosis and treatment of heart failure 2018 has been recently updated in 2024.

No.	Sub-domains			Indicators		Justifications
Domain 1b: Heart failure policy and planning landscape						
15	HF health equity	**0-2**	**0**	Patient navigation progammes: Heart failure patients from underserved backgrounds enrolled in patient navigation progammes to improve access to care and follow-up	**+0**	Patient navigation progammes don't exist for underserved communities.
				Community-based care progammes: Community-based heart failure management progammes designed to support at-risk groups (e.g., community health workers, peer support groups)	**+0**	Community-based care progammes don't exist for risk groups.
Domain 2: Heart failure prevention & screening						
16	Heart failure screening guidelines	**0-7**	**6**	National heart failure clinical guidelines coverage	**+1**	National heart failure clinical guidelines cover screening for heart failure. • Chinese guideline on the primary prevention of CVD: The 10-year ASCVD risk assessment algorithm identifies individuals at high risk of total CVD to guide pharmacological treatment decisions. • Chinese guidelines for the diagnosis and treatment of heart failure (2018): Natriuretic peptide testing is recommended for screening high-risk groups (e.g., HT, diabetes, vascular disease); additional markers like soluble ST2, galectin-3, and growth differentiation factor 15 aid in risk stratification and prognosis assessment.

No.	Sub-domains			Indicators		Justifications
Domain 2: Heart failure prevention & screening						
16	Heart failure screening guidelines	**0-7**	**6**	# of biomarkers included in heart failure screening guidelines (e.g. BNP/ NT-proBNP, Troponin, Soluble ST2, Galectin-3, MR-proANP)	**+2**	Natriuretic peptide testing is recommended for heart failure screening in high-risk groups (e.g., HT, diabetes, vascular disease), while markers like soluble ST2, galectin 3, and growth differentiation factor 15 aid in risk stratification and prognosis assessment.
				Inclusion of biomarker testing in screening guidelines	**+1**	NT-proBNP screening is low, with BNP currently endorsed in the 'Chinese guidelines for the diagnosis and treatment of heart failure 2018'.
				Inclusion of HT management	**+1**	National heart failure clinical guidelines cover HT management.
				Inclusion of diabetes control in HF	**+0**	National heart failure clinical guidelines don't cover diabetes control.
				Inclusion of screening for high-risk populations (e.g., older adults, patients with CAD, diabetes, or HT) for early signs of HF or related risk factors	**+1**	National heart failure clinical guidelines cover screening for high-risk populations.
17	Heart failure screening funding	**0-4**	**2**	Existence of publicly funded/ reimbursed screening test for heart failure	**+1**	Heart failure screening is partially funded/reimbursed. (Source: Expert interview)
				Funding for HF screening for T2DM patients	**+0**	Screening for T2DM patients is not funded/reimbursed. (Source: Expert interview)
				Financing mechanism for biomarkers in HF screening	**+1**	Tests using HF biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP) are reimbursed. (Source: Expert interview)

No.	Sub-domains			Indicators		Justifications
Domain 3: Heart failure diagnosis & healthcare system capacity						
18	Heart failure diagnosis guidelines	**0-4**	**3**	National heart failure clinical guidelines coverage	**+1**	The 2018 Chinese guidelines for heart failure recommend natriuretic peptide testing before discharge to assess the risk of cardiovascular events post-discharge. Additionally, BNP/NT-proBNP, chest X-ray, echocardiography, and dynamic ECG should be performed around 3 months after treatment to evaluate clinical status and condition changes.
				# of biomarkers included in heart failure diagnosis guidelines (e.g. BNP/ NT-proBNP, Troponin, Soluble ST2, Galectin-3, MR-proANP)	**+1**	BNP/NT-proBNP.
				Inclusion of biomarker testing in diagnostic guidelines	**+1**	NT-proBNP and hsTNT for use in diagnosis are highly endorsed by medical associations in the guidelines.
19	Capacity of/availability of/access to diagnostic services	**0-8**	**2**	MRI	**+1**	Low. (0-0.14 machines per ten thousands of population)
				CT	**+1**	Low (0-0.30 machines per ten thousands of population)
20	HF Biomarker testing rate (Percentage of patients with suspected heart failure undergoing biomarkers (e.g., BNP, NT-proBNP) to confirm diagnosis)	**0-12**	**7**	Use of HF biomarkers at emergency care in public institutions	**+3**	≥ 80% of patients with suspected HF get a test using HF biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP). (Source: Expert interview)
				Use of HF biomarkers at emergency care in private institutions	**+2**	= 50% of patients with suspected HF get a test using HF biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP). (Source: Expert interview)
				Use of HF biomarkers at primary care centers in public institutions	**+1**	≤ 20% of patients with suspected HF get a test using HF biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP). (Source: Expert interview)
				Use of HF biomarkers at primary care centers in private institutions	**+1**	≤ 20% of patients with suspected HF get a test using HF biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP). (Source: Expert interview)

No.	Sub-domains			Indicators		Justifications
Domain 3: Heart failure diagnosis & healthcare system capacity						
21	Capacity of workforce/availability of HF specialists (adjusted for regional distribution)	**0-4**	**1**	Cardiologists	**+1**	Low. (0-0.42 staffs per ten thousands of population).
22	Multidisciplinary heart failure care team availability	**0-1**	**1**	Hospitals and clinics offering care from a multidisciplinary team, including cardiologists, dietitians, psychologists, and rehabilitation specialists	**+1**	Multidisciplinary disease management progammes (MDMP) for patients with heart failure (HF) have been delivered, but evidence of their effectiveness in China is limited[40].
23	Heart failure diagnostics funding coverage	**0-3**	**2**	Existence of publicly funded/ reimbursed diagnostics test for heart failure	**+1**	Heart failure diagnostics is partially funded/reimbursed. (Source: Expert interview)
				Financing mechanism for biomarkers in HF diagnostics	**+1**	Diagnostic tests using HF biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP) are reimbursed. (Source: Expert interview)
Domain 4: Heart failure treatment monitoring and access						
24	Heart failure treatment monitoring guidelines	**0-8**	**5**	National heart failure clinical guidelines coverage	**+1**	National heart failure clinical guidelines cover treatment monitoring for heart failure. Natriuretic peptide testing before discharge is recommended to assess the risk of cardiovascular events in patients with heart failure after discharge; If necessary, BNP/NT-proBNP, chest X-ray, echocardiography, dynamic ECG, and other examinations should be performed ~3 months after standardised treatment to assess changes in clinical status and condition.
				Involvement of multi-disciplinary team	**+1**	Guidelines cover shared decision making/treatment of a multidisciplinary HF team.
				Linkage to supportive/ palliative care	**+0**	Guidelines don't include referral pathway to supportive/palliative care services.

No.	Sub-domains			Indicators		Justifications
Domain 4: Heart failure treatment monitoring and access						
24	Heart failure treatment monitoring guidelines	**0-8**	**5**	# of biomarkers included in heart failure treatment/ monitoring guidelines (e.g. BNP/NT-proBNP, Troponin, Soluble ST2, Galectin-3, MR-proANP)	**+1**	NT pro BNP/BNP.
				Inclusion of biomarker testing in treatment monitoring guidelines	**+1**	NT-proBNP monitoring is moderate, with BNP recommended while NT-proBNP is used only if necessary.
				Inclusion of timeliness of heart failure care in the national HF clinical guideline (e.g., Heart failure patients receiving care within 24 hours of hospital admission or referral for outpatient care (especially critical in emergency or exacerbation settings))	**+0**	National heart failure clinical guidelines don't cover timeliness of heart failure care.
				Inclusion of emergency care protocols (e.g., Availability and utilisation of standardised heart failure care protocols in emergency departments (e.g., early use of diuretics, anticoagulation for arrhythmia))	**+1**	National heart failure clinical guidelines cover emergency care protocols. KPIs for HF centers, chest pain centers, and AF centers include measuring BNP/NT-proBNP for heart failure patients, rapid detection of troponin with a door-to-wire time of less than 90 minutes for patients with chest pain, and prescribing anticoagulants for AF.
25	Availability of/access to different types of drug therapy	**0-1**	**0**	Availability/access to heart failure therapy	**+0**	Not all (100%) of the heart failure drugs listed on the WHO Essential HF Drug List of 2023 are included in the most current national essential drugs list (NEDL).

No.	Sub-domains			Indicators		Justifications
Domain 4: Heart failure treatment monitoring and access						
26	Prescription of Guideline-Directed Medical Therapy (GDMT): Eligible heart failure patients (EF < 40%) prescribed key medications	**0-8**	**4**	ACE inhibitors/ARBs/ARNI	**+1**	The rate of HF patients being treated with the medication is < 50%. (Source: Expert interview)
				beta-blockers	**+1**	The rate of HF patients being treated with the medication is < 50%. (Source: Expert interview)
				MRAs	**+1**	The rate of HF patients being treated with the medication is < 50%. (Source: Expert interview)
				SGLT2 inhibitors	**+1**	The rate of HF patients being treated with the medication is < 50%. (Source: Expert interview)
27	Implementation of New Therapies	**0-1**	**1**	Adoption of newer heart failure therapies (e.g., SGLT2 inhibitors, ARNI)	**+1**	Sodium glucose cotransporter 2(SGLT2) inhibitors have been recommended as one of the four foundational therapies for heart failure[41].
28	Use of implantable devices	**0-3**	**3**	ICDs	**+1**	The implantation is available and performed in the territory. The first ICD in China was implanted surgically in 1991, with the first transvenous ICD following in 1996; China has a low prevalence of ICD utilisation (~1.5 device per 1 million people)[42].
				CRT	**+1**	The implantation is available and performed in the territory. In China, CRT has gained wide acceptance as an alternative treatment for HF patients with conduction delay[43].
				LVAD	**+1**	The implantation is available and performed in the territory. In 2000, Beijing Fuwai Hospital and Suzhou CH Biomedical achieved successful results in the first clinical application of the miniaturized fully magnetically levitated left ventricular assist device (LVAD) in China[44].

No.	Sub-domains			Indicators		Justifications
Domain 4: Heart failure treatment monitoring and access						
29	Home health medication monitoring: Heart failure patients in home health progammes receiving regular medication reviews and adjustments	**0-1**	**1**	Availability of home health medication monitoring/remote patient monitoring for people with HF	**+1**	Home health medication monitoring/remote patient monitoring is available for people with HF. E.g., Home-based exercise training via telehealth has proven effective for cardiac rehabilitation in heart failure (HF) patients. However, there are no outpatient-based standard cardiac rehabilitation progammes for HF in China. A recent study examined the feasibility and effectiveness of telehealth-based cardiac rehabilitation in China, showing a significant reduction in resting heart rate (HR) after training, which was sustained for 4 months post-test[45].
30	Heart failure drugs funding coverage	**0-4**	**2**	Existence of publicly funded/ reimbursed drug therapy for heart failure	**+1**	Some drugs included in the WHO essential meds list for heart failure are funded/reimbursed.
				Funding for HF management/ treatment using rapid optimisation, supported by NT-proBNP testing for HF therapies (STRONG HF)	**+1**	Funding for HF management/ treatment using rapid optimisation, supported by NT-proBNP testing for HF therapies (STRONG HF) is funded/reimbursed 01. Diagnosis and prognosis of heart failure 02. Clinical symptoms must be suspected heart failure (Source: Expert interview)
				Financing mechanism for biomarkers in HF treatment monitoring	**+0**	Tests using HF biomarkers in treatment monitoring (e.g., Natriuretic peptide-BNP or NT pro BNP) are out of pocket. There is low reimbursement for NT-proBNP monitoring, remaining at the awareness stage in the public health insurance scheme. (Source: Expert interview)

No.	Sub-domains			Indicators		Justifications
Domain 5: Heart failure advocacy, awareness and education						
31	Heart failure patient engagement and advocacy	**0-4**	**0**	Existence of patient organisations	**+0**	No patient organisation/patient advocacy group which cover heart failure exist.
				Participation in national heart failure policy & plan development	**+0**	No patient organisation/patient advocacy group which cover heart failure exist.
				Collaborations/participation in joint progammes with government	**+0**	No patient organisation/patient advocacy group which cover heart failure exist.
32	Heart failure civil society engagement and advocacy	**0-6**	**5**	Existence of civil society organisations (NGOs/advocacy associations etc.)	**+1**	Examples: • The Chinese Society of Cardiology (CSC): CSC is the leading cardiovascular association in China, focusing on scientific advancement and practical work. It hosts an annual meeting to promote academic exchange and includes a dedicated "Heart failure Group"[46]. • China Cardiovascular Association: This alliance brings together stakeholders from government, academia, healthcare, and industry to collaborate on CVD prevention and treatment through academic exchange, training, public education, and screening. It aims to reduce cardiovascular events and achieve nationwide heart health[47].

No.	Sub-domains			Indicators		Justifications
Domain 5: Heart failure advocacy, awareness and education						
32	Heart failure civil society engagement and advocacy	**0-6**	**5**	Participation in national CVD/ HF policy & plan development	**+1**	One or more civil societies which cover heart failure participate in developing the national CVD/HF policy & plan. E.g., The China Cardiovascular Association unites government bodies, academic institutions, and medical experts to build a national front for CVD prevention and treatment, aiming to accelerate the decline in cardiovascular events and achieve the vision of "cardiovascular health for every Chinese"[48].
				Collaborations/participation in joint HF progammes with government	**+1**	Collaborations and joint progammes/initiatives, including lobbying efforts, exist between patient groups and policy groups/ministries/government bodies. E.g., The China cardiovascular association & government.
				Collaborations/participation in joint progammes with the private sector	**+1**	The China cardiovascular health alliance partners with private companies to promote cardiovascular health through joint efforts in prevention, treatment, research, and education, including public screening campaigns, professional training, and public welfare initiatives to improve care access[49].

No.	Sub-domains			Indicators		Justifications
Domain 5: Heart failure advocacy, awareness and education						
32	Heart failure civil society engagement and advocacy	**0-6**	**5**	Contributions towards clinical guidelines development	**+1**	• The 2018 Chinese guidelines for the diagnosis and treatment of heart failure were developed by the heart failure Group of the Chinese Society of Cardiology (CSC), the Chinese heart failure association, and the editorialbBoard of the chinese journal of cardiology[50]. • The Chinese guideline on the primary prevention of CVD was developed by the Chinese Society of Cardiology (CSC) in collaboration with other leading cardiology associations[51].
33	Heart failure educational initiatives	**0-8**	**4**	Availability of patient education progammes and support resources by the government	**+1**	Only general CVD educative programme/resource run by the government exist. E.g., The China cardiovascular association comprising government stakeholders supports patient education through public health campaigns and screening progammes[52]. It raises awareness of CVD, including heart failure, by providing resources and fostering collaboration among government, academia, and healthcare professionals to ensure effective prevention and management.

No.	Sub-domains			Indicators		Justifications
Domain 5: Heart failure advocacy, awareness and education						
33	Heart failure educational initiatives	**0-8**	**4**	Availability of patient education progammes and support resources by the civil society or patient organisations	**+1**	Only general CVD educative programme/resource run by the civil society or patient organisations exist. E.g., The "Healthy heart, escort for the heart" event, hosted by the cardiovascular disease branch of the Chinese medical association, offers one-on-one consultations to help patients understand and address cardiovascular health issues[53]. The interactive session fostered a positive atmosphere, with patients actively engaging with experts.
				Existence of community-based outreach progammes	**+1**	Community based outreach services programme/public awareness campaign for general CVD exist. E.g., The China cardiovascular association uses World Heart Day to raise awareness, promote healthy lifestyles, and shift focus to preventive healthcare to reduce CVD rates[54].
				Educational progammes for healthcare providers	**+1**	Only clinical general CVD educational progammes targeted towards healthcare providers exist.

No.	Sub-domains			Indicators		Justifications
Domain 5: Heart failure advocacy, awareness and education						
34	Continuous HF policy improvement progammes	**0-3**	**3**	Existence of HF continuous policy improvement progammes (policy committee meeting, pre- and post-campaign surveys, etc.)	**+1**	Continuous HF policy improvement progammes (policy committee meeting, pre- and post-campaign surveys, etc.) exist. E.g., Since 2005, the national center for cardiovascular diseases has compiled the annual "Report on cardiovascular health and diseases in China" to shift CVD prevention from hospitals to communities, using high-quality data from surveys, clinical trials, and community cases to provide a comprehensive update on CVD prevention and treatment[55].
				Frequency of HF continuous policy improvement progammes	**+2**	Progammes conducted with a well-defined schedule (e.g., quarterly or after each campaign)

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Thailand

Heart failure territory snapshot

Domains	Overall national CVD policy and planning landscape	Heart failure policy and planning landscape	Heart failure prevention & screening	Heart failure diagnosis & healthcare system capacity	Heart failure treatment monitoring and access	Heart failure advocacy, awareness and education
Thailand						

High | Moderately High | Moderately Low | Low

Top opportunities for improvement

01. Develop HF-specific policies and guidelines

- **Challenges:** HF is currently addressed under general NCD frameworks, resulting in insufficient visibility, dedicated resources, and strategic action.
- **Target stakeholders for driving actions:** Ministry of Public Health (MOPH), National Health Security Office (NHSO), National Health Commission Office (NHCO).
- **Opportunities:**
  - Establish short-term foundations: MOPH should develop CVD-specific strategies and prioritise HF within the CVD framework; allocate budget to reduce hospitalisations and improve outcomes.
  - Design a long-term national HF strategy: MOPH should target towards establishing a comprehensive, resource-conscious HF action plan covering prevention to rehabilitation.
  - Convene a dedicated CVD task force: Form a multi-sector task force to reduce HF mortality and promote sustainable, evidence-based interventions. Examples of responsible stakeholders include: NHCO, MoPH, Heart association of Thailand, Thai royal college of physicians.

02. Enhance screening and early detection of heart failure

- **Issues:** HF screening remains underdeveloped despite Thailand's strong primary care network and partial reimbursement for diagnostics.
- **Target stakeholders for driving actions:** MoPH, NHSO.
- **Opportunities:**
  - Expand HF guidelines to include biomarker-based screening: Integrate BNP/NT-proBNP screening for high-risk groups in national protocols.
  - Expand reimbursement for NT-proBNP in high-risk groups: Extend coverage for biomarker testing in patients with T2DM or CAD to improve early detection.
  - Pilot STRONG-HF rapid optimisation protocol: MoPH and NHSO should support a pilot by 2028 >10 provincial hospitals, implementing the STRONG-HF protocol for rapid GDMT up-titration (ACEi/ARBs, beta-blockers, MRAs, SGLT2 inhibitors) within 2 weeks post-discharge, guided by NT-proBNP monitoring every 1-3 months. Train clinicians to ensure adherence, targeting a 15% reduction in 180-day readmissions.

03. Strengthen rural diagnostic and workforce capacity

- **Issues:** Limited access to diagnostics and trained providers in rural areas hinders early HF detection.
- **Target stakeholders for driving actions:** MoPH, Digital Government Development Agency (DGA), NHSO, Thai telehealth network, hospitals and university medical centers.
- **Opportunities:**
  - Deploy mobile diagnostic units: MoPH should support mobile units with POCT (e.g., NT-proBNP, troponin) for rural areas to increase diagnostic coverage.
  - Train rural providers: MoPH should implement standardised training progammes for community-based health workers (CHWs) and primary care to recognise HF symptoms, perform basic diagnostics including biomarker use, and initiate timely referrals if needed.
  - Integrate diagnostic tools with telehealth platforms: Equip primary care centers with BNP/NT-proBNP and vital sign tracking linked to hospital systems. Standardise data privacy, interoperability, and clinical protocols. Form an independent task force to coordinate rural telecardiology expansion and ensure equity (NHCO, DGA, MoPH, Telemedicine committee under Thai medical council).

04. Other opportunities for improvement to address current gaps and improve overall HF care:

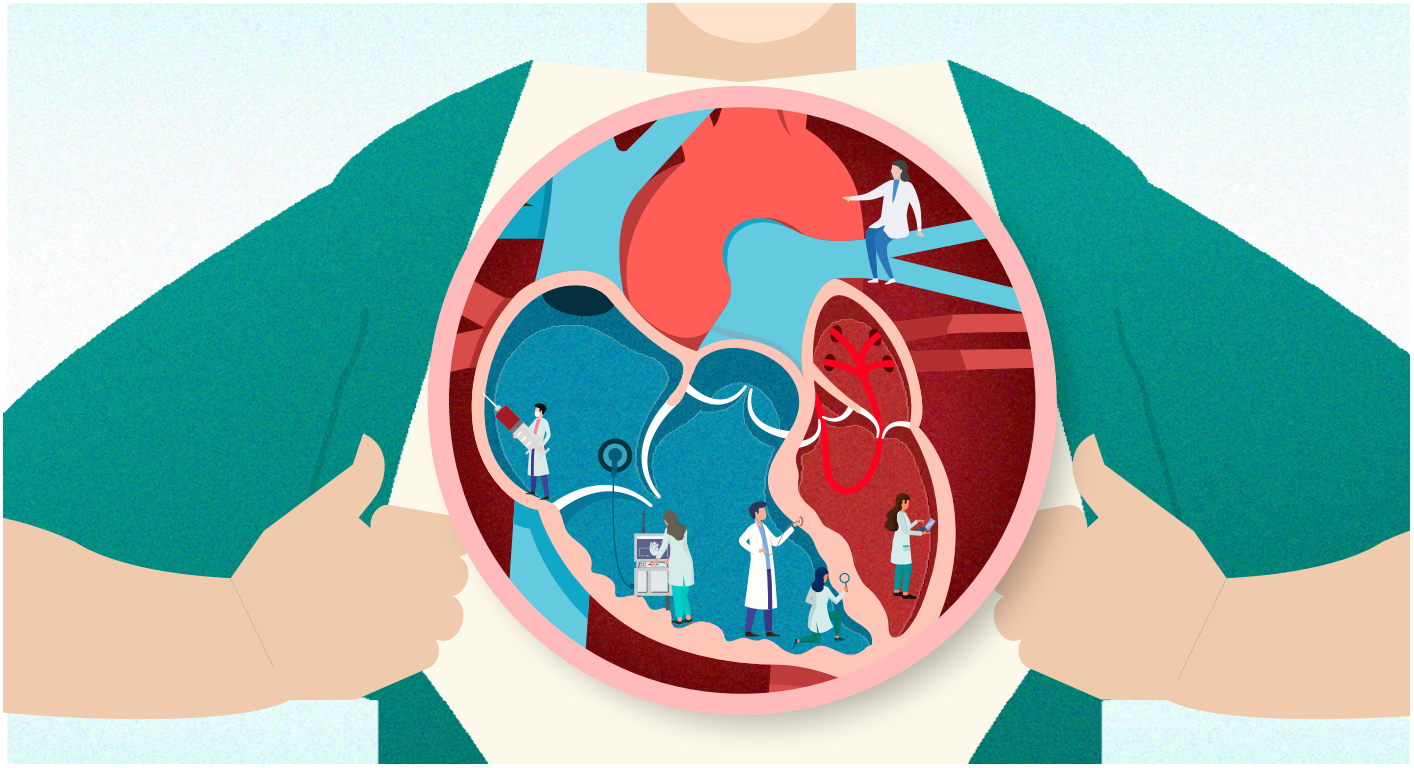
- Emergency care protocols: Guidelines lack emergency HF protocols. MoPH should update guidelines to include diuretic and anticoagulation standards by 2026.

Prevalence, incidence, mortality rate

Metrics	Thailan
Age-standardised prevalence rate (%, 2019)	0.65%[1]
Age-standardised incidence rate (per 100,000 population, 2024)	11740[2]
Crude mortality rate at 1 year (%, 2020)	20.6%[3]

Economic Burdens

Metrics	Thailand
Total cost per patient per year (USD, 2014-2014)	$3,513[4]
Inpatient cost per patient per year (USD, 2016)	N/A
Length of stay (days, 2016)	7.5[5]



Scorecard results

No.	Sub-domains			Indicators		Justifications
Domain 1a: Overall national CVD policy and planning landscape						
1	Existence and operational status of a national CVD policies/ strategies/plans	**0-3**	**2**	Existence and operational status of a national CVD policies/strategies/plans	**+1**	National CVD policies/strategies/ plans exist but are embedded within a broader plan for non-communicable disease • 20-year national strategic plan for public health (2017–2036): Focuses on building healthcare worker capacity, community-based CVD prevention, and reducing mortality rates by ensuring clinical evaluations for CVD risk factors and targeting a mortality rate of under 7% by 2036[6]. • 5-year national NCDs prevention and control plan (2023-2027): Aims to reduce CVD risk through community-based HT screenings, health education, lifestyle promotion, and national surveillance to monitor and evaluate programme effectiveness[7].
				Currency of the national CVD policies/strategies/plans	**+1**	The 5-year national NCDs Prevention and control plan (2023-2027) has been last updated in 2024.
2	Scope and specificity of the national CVD policies/ strategies/plans	**0-2**	**2**	Specific CVD reduction targets	**+1**	The Thai government has set a target to reduce the risk of premature deaths from four major NCDs–CVD, cancer, diabetes and chronic respiratory disease–by 25% by 2025[8].
				Objectives or strategies for management of acute and chronic CVD	**+1**	Policies/strategies/plans cover management of acute and chronic CVD[9,10].

No.	Sub-domains			Indicators		Justifications
Domain 1a: Overall national CVD policy and planning landscape						
3	Coordinating mechanism for implementation	**0-2**	**1**	Dedicated national CVD progammes/initiatives	**+1**	Policies/strategies/plans have national CVD progammes/ initiatives. E,g., ThaiHealth promotion F\ foundation act: Established ThaiHealth as an autonomous agency to promote physical activity and health protection at community and societal levels[11].
				Joint national and regional CVD coordination mechanisms	**+0**	No coordination mechanism between state and subnational governments specific to CVD identified[12].
4	CVD financing	**0-4**	**3**	Dedicated budget to CVD progammes	**+0**	There's no dedicated budget to CVD progammes[13].
				Universal coverage for screening for CVD	**+1**	There's a universal coverage for screening for CVD. Thailand's national screening programme targets residents aged 35 and above and covers CVD risk factors; HT is the most common risk factor screened at MOPH health clinics, followed by dyslipidaemia and diabetes, with HT screening being free of charge under the universal health scheme[14].
				Universal coverage for diagnostic tests and imaging for CVDs	**+1**	There's a universal coverage for diagnostic tests and imaging for CVDs. Thailand's Universal Health Coverage (UCS) includes essential CVD tests-fasting glucose, HbA1C, creatinine, lipid profile, and urine microalbumin-ensuring affordability and access for all citizens[15].

No.	Sub-domains			Indicators		Justifications
Domain 1a: Overall national CVD policy and planning landscape						
4	CVD financing	**0-4**	**3**	Universal coverage for CVD essential medicines	**+1**	There's a universal coverage for CVD essential medicines. Thailand's pharmaceutical benefits scheme covers all drugs on the national list of essential medicines, including common generic CVD drugs, but excludes some fixed-dose combinations; treatment adherence remains low due to polypharmacy and access challenges[16].
5	Existence of a population based registry	**0-1**	**1**	Existence of national registries established for CVD	**+1**	National CVD registries exist and data entry is mandated, but poor data governance prevents integration with electronic health records, limiting their effectiveness[17].
6	Inclusivity and equitable policy formulation	**0-1**	**1**	Policies/strategies/plans/ progammes addressing equitable access to care to CVD	**+1**	Policies/progammes addressing equitable access to care to CVD exist. E.g., To enable rural access to emergency care, the national health security office leads the development of emergency services in Thailand, driving innovations in first-responder EMS units and community-level EMS networks; First-responder units are managed by sub-district administrative offices, with private charity-run ambulance services integrated into provincial EMS systems[18].

No.	Sub-domains			Indicators		Justifications
Domain 1b: Heart failure policy and planning landscape						
7	Heart failure dedicated policies/ strategies/plans	**0-1**	**0**	Heart failure dedicated policies/strategies/plans	**+0**	Heart failure-specific policies/ strategies/plans don't exist.
8	Priority & specificity of heart failure in the national CVD/NCD policies/strategies/plans	**0-3**	**1**	Priority & specificity of heart failure in the national CVD/NCD policies/strategies/plans	**+1**	Heart failure is briefly mentioned as one of the focus areas in the policies/strategies/plans. E.g., 20-year national strategic plan for public health (2017–2036): Heart failure clinics with multidisciplinary teams are established in all hospitals, with over 50% of patients with reduced ejection fraction receiving appropriate treatment[19].
				Inclusion of desired outcomes/ targets for heart failure control	**+0**	Policies/strategies/plans don't have specific, measurable outcomes/targets within a specific timeframe specifically for heart failure control.
9	National heart failure strategy implementation	**0-2**	**2**	Percentage of healthcare regions or facilities implementing national heart failure care guidelines, such as standardised treatment protocols and follow-up care	**+2**	≥ 50% or more healthcare regions or facilities implementing national heart failure care guidelines. (Source: Expert interview)
10	Policy support for preventive care	**0-2**	**1**	National policies focused on primary prevention of heart failure (e.g., salt reduction, improved diabetes care, HT management)	**+1**	Primary prevention target[20] • Tobacco use: Decrease prevalence to less than 15.7%. • Obesity: Prevent increase in obesity. • Physical inactivity: Lower prevalence by 24%. • HT: Decrease prevalence by 12.2%. • Sodium intake: Decrease mean population intake by 24%. • Diabetes: Prevent increase in diabetic cases. • Harmful use of alcohol: Decrease to < 6.7L per person per year.

No.	Sub-domains			Indicators		Justifications
Domain 1b: Heart failure policy and planning landscape						
10	Policy support for preventive care	**0-2**	**1**	National policies focused on secondary prevention of heart failure (biomarkers etc.)	**+0**	National policies/strategies/plans don't have strategy on screening for HF risk factors. Infrequent audits hinder early treatment and the effective implementation of secondary CVD prevention[21].
11	HF research and innovation	**0-4**	**1**	Funding for heart failure Research: Annual investment in heart failure-specific clinical trials, basic science research, and public health research	**+0**	No annual investment is observed in heart failure-specific clinical trials, basic science research, and public health research.
				Clinical trial participation: Eligible heart failure patients enrolled in clinical trials e.g., for new therapies or medical devices	**+1**	Eligible heart failure patients are enrolled in clinical trials for new therapies or medical devices. E.g., A study was conducted to evaluate the effectiveness of AI in assessing left ventricular function for heart failure patients using smartphone-recorded parasternal long axis view cardiac ultrasound video clips[22].
				Translation of Research into Practice: Time-to-adoption for new guidelines, therapies, and technologies from clinical trials to everyday practice	**+0**	Unpredicted and no standardised adoption timeframe.

No.	Sub-domains			Indicators		Justifications
Domain 1b: Heart failure policy and planning landscape						
12	HF financing	**0-4**	**2**	Insurance coverage for heart failure care (Public)	**+1**	• Civil Servant Medical Benefits Scheme (CSMBS): A tax-financed scheme covering ~9% of the population, including government employees and their dependents. • Social Security Scheme (SSS): Covers 16% of the population, consisting of private sector employees without dependents, with a tripartite contribution model and a comprehensive benefits package for outpatient, inpatient, and high-cost treatments at both public and private facilities. • Universal Coverage Scheme (UCS): A tax-financed scheme covering ~76% of the population, providing free healthcare, including primary, preventive, hospitalisation, emergency, and rehabilitation care, for those not covered by CSMBS or SSS. (Source: Expert interview)

No.	Sub-domains			Indicators		Justifications
Domain 1b: Heart failure policy and planning landscape						
12	HF financing	**0-4**	**2**	Insurance coverage for heart failure care (Private & alternatives)	**+1**	• Private health insurance: Leading insurers, such as Cigna, VUMI, GeoBlue, AXA Thailand, IMG Insurance, and Luma, offer plans covering critical illness and hospitalisation. • Charity donation scheme: The Rak Jai Thai programme provides free cardiac surgeries for underprivileged Thai children, while The cardiac children foundation of Thailand offers both medical and non-medical support for children with cardiac diseases. • Patient assistance programme: Manufacturers may collaborate with government, private sectors, or NGOs to provide treatment or financial support for rare diseases.
13	Presence of heart failure registries	**0-1**	**1**	Presence of heart failure registries	+1	The Thai heart failure registry prospectively enrolled patients diagnosed with heart failure from 36 hospitals across Thailand, with follow-up data recorded at 6, 12, 18, and 24 months; The study primarily focused on two outcomes: mortality and HF-related hospitalisations[23].
14	Existence of heart failure clinical guidelines	**0-3**	**3**	Existence of clinical guidelines		• The Royal College of Physicians of Thailand (RCPT) clinical practice guidelines (CPGs) on management of dyslipidaemia for atherosclerotic 2024 cardiovascular disease prevention. • Thai chronic coronary syndromes guidelines 2022. • Heart Failure Council of Thailand (HFCT) 2019 heart failure guideline: Introduction and diagnosis.

No.	Sub-domains			Indicators		Justifications
Domain 1b: Heart failure policy and planning landscape						
14	Existence of heart failure clinical guidelines	**0-3**	**3**	Currency of clinical guidelines	**+2**	The latest relevant guideline has been recently published in 2024 (The Royal College of Physicians of Thailand (RCPT) clinical practice guidelines on management of dyslipidaemia for ASCVD prevention)[24].
15	HF health equity	**0-2**	**0**	Patient navigation progammes: Heart failure patients from underserved backgrounds enrolled in patient navigation progammes to improve access to care and follow-up	**+0**	Patient navigation progammes don't exist for underserved communities.
				Community-based care progammes: Community-based heart failure management progammes designed to support at-risk groups. (e.g., community health workers, peer support groups)	**+0**	Community-based care progammes don't exist for risk groups.
Domain 2: Heart failure prevention & screening						
16	Heart failure screening guidelines	**0-7**	**1**	National heart failure clinical guidelines coverage	**+1**	National heart failure clinical guidelines cover screening for heart failure Thai chronic coronary syndromes guidelines 2021: For suspected Chronic Coronary Syndrome (CCS), perform CBC, creatinine level, eGFR, lipid profile, and use FPG and HbA1c for diabetes screening[25]. (Scope of chronic coronary syndrome covers those with suspected IHD, acute coronary syndrome and heart failure)
				# of biomarkers included in heart failure screening guidelines (e.g. BNP/ NT-proBNP, Troponin, Soluble ST2, Galectin-3, MR-proANP)	**+0**	None.
				Inclusion of biomarker testing in screening guidelines	**+0**	NT-proBNP screening is low, as it is not currently endorsed in guielines.

No.	Sub-domains			Indicators		Justifications
Domain 2: Heart failure prevention & screening						
16	Heart failure screening guidelines	**0-7**	**1**	Inclusion of HT management	**+0**	National heart failure clinical guidelines don't cover HT management.
				Inclusion of diabetes control in HF	**+0**	National heart failure clinical guidelines don't cover diabetes control.
				Inclusion of screening for high-risk populations (e.g., older adults, patients with CAD, diabetes, or HT) for early signs of HF or related risk factors	**+0**	National heart failure clinical guidelines don't cover screening for high-risk populations.
17	Heart failure screening funding	**0-4**	**1**	Existence of publicly funded/ reimbursed screening test for heart failure	**+1**	Heart failure screening is partially funded/reimbursed. (Source: Expert interview)
				Funding for HF screening for T2DM patients	**+0**	Screening for T2DM patients is not funded/reimbursed. (Source: Expert interview)
				Financing mechanism for biomarkers in HF screening	**+0**	Tests using HF biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP) are out of pocket. (Source: Expert interview)

No.	Sub-domains			Indicators		Justifications
Domain 3: Heart failure diagnosis & healthcare system capacity						
18	Heart failure diagnosis guidelines	**0-4**	**3**	National heart failure clinical guidelines coverage	**+1**	National heart failure clinical guidelines cover diagnosis for heart failure. • Thai chronic coronary syndromes guidelines 2021: Diagnosis requires a history of symptoms, physical examination, consideration of comorbidities and quality of life, and additional tests like ECG, X-ray, biochemistry, and echocardiography; Hs-Troponin may be considered[26] • Heart Failure Council of Thailand (HFCT) 2019 heart failure Guideline: Introduction and diagnosis: Heart failure is likely with typical symptoms and signs; blood tests and imaging confirm the diagnosis; abnormal BNP or NT-proBNP levels may aid diagnosis if cardiac abnormalities are unclear[27].
				# of biomarkers included in heart failure diagnosis guidelines (e.g. BNP/NT-proBNP, Troponin, Soluble ST2, Galectin-3, MR-proANP)	**+1**	BNP/proBNP, hs-troponin.
				Inclusion of biomarker testing in diagnostic guidelines	**+1**	NT-proBNP for use in diagnosis has moderate endorsement, with medical associations supporting its use, indicating significant interest; however, general adherence to clinical guidelines remains suboptimal. (Source: Expert interview)
19	Capacity of/availability of/access to diagnostic services	**0-8**	**2**	MRI	**+1**	Low. (0-0.14 machines per ten thousands of population)
				CT	**+1**	Low. (0-0.30 machines per ten thousands of population)

No.	Sub-domains			Indicators		Justifications
Domain 3: Heart failure diagnosis & healthcare system capacity						
20	HF biomarker testing rate (Percentage of patients with suspected heart failure undergoing biomarkers (e.g., BNP, NT-proBNP) to confirm diagnosis)	**0-12**	**7**	Use of HF biomarkers at emergency care in public institutions	**+2**	= 50% of patients with suspected HF get a test using HF biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP). (Source: Expert interview)
				Use of HF biomarkers at emergency care in private institutions	**+3**	≥ 80% of patients with suspected HF get a test using HF biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP). (Source: Expert interview)
				Use of HF biomarkers at primary care centers in public institutions	**+1**	≤ 20% of patients with suspected HF get a test using HF biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP). (Source: Expert interview)
				Use of HF biomarkers at primary care centers in private institutions	**+1**	≤ 20% of patients with suspected HF get a test using HF biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP). (Source: Expert interview)
21	Capacity of workforce/availability of HF specialists (adjusted for regional distribution)	**0-4**	**1**	Cardiologists	**+1**	Low. (0-0.42 staffs per ten thousands of population)
22	Multidisciplinary heart failure care team availability	**0-1**	**1**	Hospitals and clinics offering care from a multidisciplinary team, including cardiologists, dietitians, psychologists, and rehabilitation specialists	**+1**	Hospitals and clinics offering care from a multidisciplinary team, including cardiologists, dietitians, psychologists, and rehabilitation specialists. E.g., Pranangklao hospital in Thailand has multidisciplinary care in the heart failure clinic[28].
23	Heart failure diagnostics funding coverage	**0-3**	**3**	Existence of publicly funded/ reimbursed diagnostics test for heart failure	**+1**	Heart failure diagnostics is partially funded/under the Universal Coverage Health Programme that provides healthcare access to all Thai citizens. (Source: Expert interview)
				Financing mechanism for biomarkers in HF diagnostics	**+1**	Diagnostic tests using HF biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP) are reimbursed but limited to public facilities. (Source: Expert interview)

No.	Sub-domains			Indicators		Justifications
Domain 4: Heart failure treatment monitoring and access						
24	Heart failure treatment monitoring guidelines	**0-8**	**3**	National heart failure clinical guidelines coverage	**+1**	Heart Failure Council of Thailand (HFCT) 2019 heart failure Guideline[29].
				Involvement of multi-disciplinary team	**+0**	Guidelines don't cover shared decision making/treatment of a multidisciplinary HF team.
				Linkage to supportive/palliative care	**+1**	Guidelines include referral pathway to supportive/palliative care services[30,31].
				# of biomarkers included in heart failure treatment/ monitoring guidelines (e.g. BNP/NT-proBNP, Troponin, Soluble ST2, Galectin-3, MR-proANP)	**+0**	Biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP) are not mentioned or recommended as treatment monitoring tools in the national heart failure screening guidelines.
				Inclusion of biomarker testing in treatment monitoring guidelines	**+0**	Biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP) are not mentioned or recommended as treatment monitoring tools in the national heart failure screening guidelines.
				Inclusion of timeliness of heart failure care in the national HF clinical guideline (e.g., Heart failure patients receiving care within 24 hours of hospital admission or referral for outpatient care (especially critical in emergency or exacerbation settings))	**+0**	National heart failure clinical guidelines don't cover timeliness of heart failure care.
				Inclusion of emergency care protocols (e.g., Availability and utilisation of standardised heart failure care protocols in emergency departments (e.g., early use of diuretics, anticoagulation for arrhythmia))	**+0**	National heart failure clinical guidelines don't cover emergency care protocols.
25	Availability of/access to different types of drug therapy	**0-1**	**0**	Availability/access to heart failure therapy	**+0**	Not all (100%) of the heart failure drugs listed on the WHO Essential HF Drug List of 2023 are included in the most current national essential drugs list (NEDL)[32].

No.	Sub-domains			Indicators		Justifications
Domain 4: Heart failure treatment monitoring and access						
26	Prescription of Guideline-Directed Medical Therapy (GDMT): Eligible heart failure patients (EF < 40%) prescribed key medications	**0-8**	**7**	ACE inhibitors/ARBs/ARNI	**+2**	The rate of HF patients being treated with the medication is ≥ 50%. (Source: Expert interview)
				beta-blockers	**+2**	The rate of HF patients being treated with the medication is ≥ 50%. (Source: Expert interview)
				MRAs	**+2**	The rate of HF patients being treated with the medication is ≥ 50%. (Source: Expert interview)
				SGLT2 inhibitors	**+1**	The rate of HF patients being treated with the medication is < 50%. (Source: Expert interview)
27	Implementation of new therapies	**0-1**	**1**	Adoption of newer heart failure therapies (e.g., SGLT2 inhibitors, ARNI)	**+1**	ARNI and SGLT2-I are already included in the clinical guidelines.
28	Use of implantable devices	**0-3**	**3**	ICDs	**+1**	The implantation is available and performed in the territor. E.g., Several well-regarded hospitals in Thailand offer ICD implantation procedures, including Bumrungrad International Hospital, Vejthani hospital, and Bangkok hospital[33].
				CRT	**+1**	The implantation is available and performed in the territory E.g., The procedure has been performed in major hospitals in Thailand[34].
				LVAD	**+1**	The implantation is available and performed in the territory E.g., LVAD has been performed in major & university hospitals in TH such as Bangkok hospital, Samitivej Sukhumvit hospital, Bumrungrad international hospital, etc. (Source: Expert interview)

No.	Sub-domains			Indicators		Justifications
Domain 4: Heart failure treatment monitoring and access						
29	Home health medication monitoring: Heart failure patients in home health progammes receiving regular medication reviews and adjustments	**0-1**	**0**	Availability of home health medication monitoring/remote patient monitoring for people with HF	**+0**	Currently, home health and remote monitoring for heart failure patients are unavailable in Thailand. Telehealth adoption is hindered by technology infrastructure issues, data privacy concerns, and ineffective stakeholder engagement. Regulatory guidelines require patient rights to be fully informed, including limitations of telehealth.
30	Heart failure drugs funding coverage	**0-4**	**3**	Existence of publicly funded/ reimbursed drug therapy for heart failure	**+2**	All drugs included in the WHO essential meds list for heart failure are fully funded/ reimbursed[35].
				Funding for HF management/ treatment using rapid optimisation, supported by NT-proBNP testing for HF therapies (STRONG HF)	**+0**	Not funded. (Source: Expert interview)
				Financing mechanism for biomarkers in HF treatment monitoring	**+0**	There is low reimbursement for NT-proBNP monitoring, remaining at the awareness stage across the public insurance schemes. (Source: Expert interview)
Domain 5: Heart failure advocacy, awareness and education						
31	Heart failure patient engagement and advocacy	**0-4**	**2**	Existence of patient organisations	**+1**	Example: Thai heart foundation under royal patronage is a non-profit organisation focused on raising public awareness and promoting heart disease prevention through community outreach and education[36].
				Participation in national heart failure policy & plan development	**+0**	No information about participation in national HF policy & plan development.
				Collaborations/participation in joint progammes with government	**+1**	Collaborations and joint progammes/initiatives exist between patient groups and policy groups/ministries/ government bodies.

No.	Sub-domains			Indicators		Justifications
Domain 5: Heart failure advocacy, awareness and education						
32	Heart failure civil society engagement and advocacy	**0-6**	**4**	Existence of civil society organisations (NGOs/ Advocacy associations etc.)	**+1**	The heart association of Thailand under the royal patronage of H.M. the King is a professional society dedicated to advancing cardiovascular medicine through research, training, and academic collaboration among healthcare professionals[37].
				Participation in national CVD/ HF policy & plan development	**+0**	No civil society which covers heart failure participates in developing the national CVD/HF policy & plan.
				Collaborations/ participation in joint HF progammes with government	**+1**	Collaborations and joint progammes/initiatives exist between civil societies and policy groups/ministries/ government bodies.
				Collaborations/participation in joint progammes with the private sector	**+1**	The heart association of Thailand collaborates with different private stakeholders for CVD progammes, not HF-specific initiatives.
				Contributions towards clinical guidelines development	**+1**	The heart association of Thailand and Heart Failure Council of Thailand (HFCT) published heart failure guideline "Guidelines for the diagnosis and care of patients with heart failure 2019".

No.	Sub-domains			Indicators		Justifications
Domain 5: Heart failure advocacy, awareness and education						
33	Heart failure educational initiatives	**0-8**	**4**	Availability of patient education progammes and support resources by the government	**+1**	Only general CVD educative programme/resource run by the government exist (but only within the hospitals).
				Availability of patient education progammes and support resources by the civil society or patient organisations	**+1**	Only general CVD educative programme/resource run by the civil society or patient organisations exist. E.g., The heart foundation of Thailand organised the "Heart Conservation Exhibition," offering activities like heart wave tests, blood tests for fat and sugar levels, and blood pressure measurements. The exhibition aimed to educate the public about health and heart disease, with a Food Clinic providing dietary advice, in collaboration with government organisations and the private sector[38].
				Existence of community-based outreach progammes	**+1**	Community based outreach services programme/public awareness campaign for general CVD exist. E.g., The heart foundation of Thailand, funded by the government and in collaboration with the World Heart federation and local partners, organised the World Heart Day event to raise awareness about the importance of healthcare in preventing heart disease[39].
				Educational progammes for healthcare providers	**+1**	Only clinical general CVD educational progammes targeted towards healthcare providers exist. E.g., The heart foundation of Thailand provides training progammes to enhance the knowledge and skills of doctors, nurses, and cardiology practitioners[40].

No.	Sub-domains			Indicators		Justifications
Domain 5: Heart failure advocacy, awareness and education						
34	Continuous HF policy improvement progammes	**0-3**	**3**	Existence of HF continuous policy improvement progammes (policy committee meeting, pre- and post-campaign surveys, etc.)	**+1**	There are heart failure related conferences in Thailand, conducted routinely every month: International Conference on Cardiology and Cardiac Surgery (ICCCS)[41].
				Frequency of HF continuous policy improvement progammes	**+2**	Progammes conducted with a well-defined schedule (e.g., quarterly or after each campaign).

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Vietnam

Heart failure territory snapshot

Domains	Overall national CVD policy and planning landscape	Heart failure policy and planning landscape	Heart failure prevention & screening	Heart failure diagnosis & healthcare system capacity	Heart failure treatment monitoring and access	Heart failure advocacy, awareness and education
Vietnam						

High | Moderately high | Moderately low | Low

Top opportunities for improvement

01. Develop HF-specific policies and guidelines

- **Challenges:** Lack of HF-specific policies and screening guidelines limits targeted interventions.
- **Target stakeholders for driving actions:** Ministry of Health (MoH), Vietnam National Heart Association (VNHA), Vietnam Heart Failure Society (VHFS).
- **Opportunities:**
  - Formulate a national HF action plan: MoH should integrate an HF-specific strategy into the NCD Prevention and Control Strategy (2022–2025), with targets to reduce HF mortality by 10% and increase early diagnosis by 30% by 2030.
  - Refine HF screening guidelines: Update the 2022 HF guidelines to include screening protocols for high-risk groups (e.g., HT, diabetes patients), recommending NT-proBNP testing. VNHA should lead guideline simplification for primary care.
  - Establish an HF policy committee: Create a committee with MoH, VNHA, VHFS, and VSS to review HF policies biennially, ensuring alignment with ESC/AHA standards.

02. Enhance primary care integration and referral systems

- **Issues:** Weak primary care capacity and referral pathways hinder HF management.
- **Target stakeholders for driving actions:** MoH, Vietnam Social Security (VSS).
- **Opportunities:**
  - Strengthen referral pathways: Develop digital referral protocols within Social Health Insurance (SHI) systems to ensure timely and seamless transfer of patients across different healthcare levels (between primary, provincial, and tertiary care). This involves developing clear criteria and communication protocols for referral, enabling primary care providers to efficiently escalate cases that require specialised care, and ensuring feedback loops from specialists to primary care for continuous patient management.
  - Pilot integrated HF clinics: MoH should establish pilot HF clinics in provincial hospitals by 2027, offering diagnostics, treatment, and patient education under one roof. These integrated clinics can serve as hubs linking primary healthcare and tertiary centers, facilitating multidisciplinary management and smoother referral coordination, reducing tertiary hospital burden. Piloting such clinics will help identify best practices, resource needs, and operational challenges before scaling up across the territory.

03. Establish a national data framework

- **Issues:** Absence of HF registries and epidemiological data limits evidence-based HF planning and management.
- **Target stakeholders for driving actions:** MoH, Ministry of Finance.
- **Opportunities:**
  - Establish a national HF registry: MoH should support a centralised HF registry by 2027, integrating data from public/private hospitals and SHI claims. Partner with local universities for data management.
  - Conduct nationwide HF surveys: Initiate comprehensive epidemiological studies across Vietnam by 2026 to gather accurate data on the epidemiology and burdens of HF.
  - Collaborate with local universities, medical research institutions, and international organisations such as WHO to help ensure the collection of representative data specific to Vietnam's population, and provide a foundation for developing targeted interventions.
  - Develop a Vietnam-specific HF prediction model: Evaluate the applicability and relevance of developing a HF prediction model specifically designed for Vietnam. While traditional CVD risk scores exist, HF may involve distinct pathophysiological mechanisms and risk profiles-often linked to metabolic and renal disorders-requiring a differentiated approach. If deemed appropriate, such a prediction tool should incorporate relevant risk factors, such as high rates of HT, diabetes, and obesity, along with genetic, environmental, and lifestyle factors. This can enhance early detection and targeted prevention efforts. Close collaboration with academic and clinical experts across Asia will be critical in validating and adapting existing European and U.S.-based models to ensure regional relevance and clinical utility. Validate with Asian cohorts by 2028.

04. Expand screening and diagnostic funding

- **Issues:** No reimbursement for HF screening, with biomarkers out-of-pocket.
- **Target stakeholders for driving actions:** Ministry of Finance (specifically VSS), MoH.
- **Opportunities:**
  - Reimburse NT-proBNP screening: VSS should cover NT-proBNP testing for high-risk groups under SHI, targeting a 25% increase in early diagnosis by 2030.
  - Evaluate Cost-effectiveness: Assess screening's impact on reducing inpatient costs, supporting VSS budget expansion.
  - Pilot STRONG-HF Rapid Optimisation Protocol: MoH and VSS should support a pilot by 2028 in 10 provincial hospitals, implementing the STRONG-HF protocol for rapid GDMT up-titration (ACEi/ARBs, beta-blockers, MRAs, SGLT2 inhibitors) within 2 weeks post-discharge, guided by NT-proBNP monitoring every 1-3 months. Train clinicians to ensure adherence, targeting a 15% reduction in 180-day readmissions.

05. Boost awareness and education

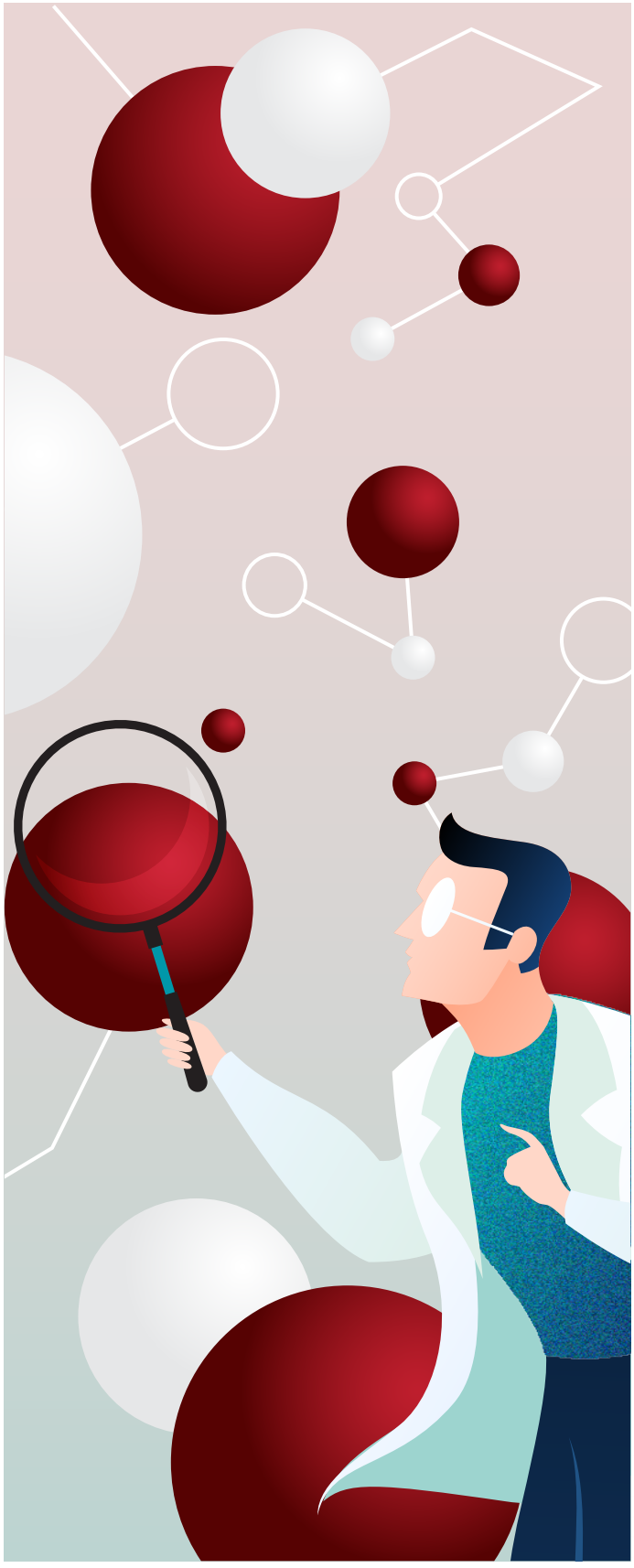
- **Issue:** Limited community outreach and patient education hinder prevention.
- **Target stakeholders for driving actions:** MoH, VNHA, VHFS.
- **Opportunities:**
  - Launch national HF awareness campaign: MoH, VNHA and VNFS should support campaigns using TV, social media, and community health workers (CHWs) to reach 70% of adults by 2029, focusing on HF symptoms and prevention.
  - Train community health workers: by 2028 to lead HF education in rural areas, reducing stigma and improving adherence.

06. Enhance public-private partnership

- **Issue:** Insufficient multi-stakeholder collaboration on HF hampers resource mobilization and effective management strategies.
- **Target stakeholders for driving actions:** MoH, Private Sector.
- **Opportunities:**
  - Mobilize funding and technical support through joint initiatives: Encourage collaboration between government bodies, private hospitals, pharmaceutical companies, and medtech firms to co-invest in heart failure progammes, including screening campaigns, diagnostic tools, and treatment access.
  - Leverage private sector innovation to scale HF solutions: Engage digital health startups and established healthcare companies to develop and deploy cost-effective HF diagnostic tools (e.g., portable echocardiograms, AI-enabled ECG) and telehealth services, particularly for underserved rural areas. Public-private co-pilots can accelerate testing and adoption of these solutions within Vietnam's healthcare system.
  - Establish shared care models and knowledge exchange Platforms:
    - Create structured partnerships between public health facilities and private cardiovascular centers to share clinical protocols, provide continuing education for primary care providers, and jointly manage complex HF cases. These collaborations can improve care coordination, elevate care quality, and reduce the burden on tertiary hospitals.
    - To ensure a more holistic approach, shared care models should also integrate traditional medicine practices and promote lifestyle-based interventions such as tailored exercise progammes. Including traditional medicine, where evidence-based, can help improve patient adherence and cultural acceptability, especially in communities with a strong belief in such practices. Meanwhile, emphasising regular physical activity as part of disease management can significantly improve functional outcomes and quality of life for HF patients. These components should be embedded into care protocols and included in provider training and patient education efforts.

07. Other opportunities for improvement to address current gaps and improve overall HF care:

- Palliative care integration: The guidelines mention palliative care, but pathways are unclear. MoH should define referral protocols for advanced HF patients, with VSS reimbursing consultations.
- Emergency care protocols: Guidelines lack emergency HF protocols. MoH should update guidelines to include diuretic and anticoagulation standards by 2026.
- Telehealth integration: Integrate telemedicine platforms, especially into primary care settings to support healthcare workers in managing heart failure patients:
  - This can include remote consultations with specialists, real-time guidance from cardiologists, and continuous monitoring of patient data to ensure that heart failure management is consistent and up-to-date. However, successful implementation requires first addressing the hesitation among primary care doctors to include HF in telehealth services. Targeted efforts are needed to build their confidence through structured training, mentorship, and clinical decision support tools. By empowering local providers.
  - The knowledge and confidence to manage heart failure effectively, telemedicine can evolve into a trusted tool that enhances care quality and expands access to specialist input without overburdening the system.
  - In Vietnam, telemedicine in HF care could be piloted by leveraging the post-COVID momentum in digital health and aligning with the Central Party Resolution No. 57, which promotes the rapid development of digital platforms and the digital transformation of healthcare. This policy support creates an enabling environment to scale telemedicine solutions, particularly in under-resourced or rural areas where access to cardiology expertise is limited.



Prevalence, incidence, mortality rate

Metrics	Thailan
Age-standardised prevalence rate (%, 2019)	0.67%[1]
Age-standardised incidence rate (per 100,000 population)	N/A
Crude mortality rate at 1 year (%, 2020)	25.8%[2]

Economic burdens

Metrics	Thailand
Total cost per patient per year (USD, 2021)	$964[3]
Inpatient cost per patient per year (USD, 2021)	$858[4]
Length of stay (days, 2021)	9.6[5]

Scorecard results

No.	Sub-domains			Indicators		Justifications
Domain 1a: Overall national CVD policy and planning landscape						
1	Existence and operational status of a national CVD policies/ strategies/plans	**0-3**	**2**	Existence and operational status of a national CVD policies/strategies/plans	**+1**	1. No CVD-specific policies 2. NCD policies covering CVD: – Vietnam's strategy for the prevention of cancer, Cardiovascular disease, Diabetes, COPD, Asthma, and other NCDs (2015–2025)[6]. – National strategy to protect, care for, and improve people's health by 2030, with a vision to 2045[7]. – National strategy for prevention and control of NCDs and mental disorders (2022–2025)[8].
				Currency of the national CVD policies/strategies/plans	**+1**	The most recent relevant policy is the national strategy for prevention and control of NCDs and mental disorders (2022–2025), launched in 2022.
2	Scope and specificity of the national CVD policies/ strategies/plans	**0-2**	**0**	Specific CVD reduction targets	**+0**	No quantifiable targets mentioned in the policies.
				Objectives or strategies for management of acute and chronic CVD	**+0**	No specific objectives or strategies for management of acute and chronic CVD mentioned in the policies.
3	Coordinating mechanism for implementation	**0-2**	**2**	Dedicated national CVD progammes/initiatives	**+1**	National strategies include CVD-related initiatives, such as the NCD Strategy (2021–2025), which sets targets for prevention, detection, and treatment, including essential equipment and drugs at local health facilities, and the Nutrition Strategy (2021–2030), which tackles obesity and chronic disease prevention across all age groups[9].
				Joint national and regional CVD coordination mechanisms	**+1**	Joint national and regional CVD coordination mechanisms are available. (Source: Expert interview)

No.	Sub-domains			Indicators		Justifications
Domain 1a: Overall national CVD policy and planning landscape						
4	CVD financing	**0-4**	**1**	Dedicated budget to CVD progammes	**+0**	There's a dedicated budget to CVD progammes, amount unspecified[10].
				Universal coverage for screening for CVD	**+1**	There's a universal coverage for screening for CVD[11]. The national plan for NCDs 2022–2025 mandates annual blood pressure checks for adults, especially over 40, but lacks coverage for other key CVD risk factors like cholesterol. No national guidelines or community-based screening progammes exist, leading to reactive rather than preventive efforts. Barriers include low public awareness, limited funding, and staff shortages at the primary care level[12].
				Universal coverage for diagnostic tests and imaging for CVDs	**+1**	There's a universal coverage for diagnostic tests and imaging for CVDs[13]. Tests/tools e.g., X-ray, Echocardiogram, ECG, etc. are subsidised based on SHI in government hospitals. PHI offers full/partial coverage depending on the insurance provider. (Source: Expert interview)
				Universal coverage for CVD essential medicines	**+1**	There's a universal coverage for CVD essential medicines[14]. Although CVD drugs on the essential drug list are reimbursable, they are mainly dispensed at secondary care or higher, limiting access at commune health stations. This affects availability of key drugs like ARBs, fixed-dose combinations, and statins. Usage remains suboptimal nationwide, with low in-hospital use of beta-blockers (18.6%) and ACE inhibitors/ARBs (18%)[15].

No.	Sub-domains			Indicators		Justifications
Domain 1a: Overall national CVD policy and planning landscape						
5	Existence of a population based registry	**0-1**	**0**	Existence of national registries established for CVD	**+0**	CVD registries are institution-led and reliant on private funding. There is no national CVD registry or policy for its development, mainly due to limited public funding, inadequate IT infrastructure, and insufficient human resources.
6	Inclusivity and equitable policy formulation	**0-1**	**1**	Policies/strategies/plans/ progammes addressing equitable access to care to CVD[16]	**+1**	Example of equitable care access: To improve rural healthcare access, the Ministry of Health introduced telemedicine during the COVID-19 pandemic, with cardiology among the specialties supported through remote consultations[17].
Domain 1b: Heart failure policy and planning landscape						
7	Heart failure dedicated policies/ strategies/plans	**0-1**	**0**	Heart failure dedicated policies/strategies/plans	**+0**	Although Vietnam does not yet have a dedicated national HF strategy, the 2022 guidelines on diagnosis and treatment of acute and chronic heart failure issued by the Vietnam National Heart Association (VNHA) provide a critical policy foundation. Complementing this, the Vietnam Heart Failure Society (VHFS) has introduced HF management progammes aligned with international standards such as those from the European Society of Cardiology (ESC) and the American Heart Association (AHA), including post-discharge follow-up protocols and multidisciplinary care models.
8	Priority & specificity of heart failure in the national CVD/NCD policies/strategies/plans	**0-3**	**0**	Priority & specificity of heart failure in the national CVD/ NCD policies/strategies/plans	**+0**	Not specified.
				Inclusion of desired outcomes/ targets for heart failure control	**+0**	Not specified.

No.	Sub-domains			Indicators		Justifications
Domain 1b: Heart failure policy and planning landscape						
9	National heart failure strategy implementation	**0-2**	**1**	Percentage of healthcare regions or facilities implementing national heart failure care guidelines, such as standardised treatment protocols and follow-up care	**+1**	50% or more healthcare regions or facilities implement national heart failure care guidelines. (Source: Expert interview)
10	Policy support for preventive care	**0-2**	**1**	National policies focused on primary prevention of heart failure (e.g., salt reduction, improved diabetes care, HT management)	**+1**	The National Noncommunicable Disease (NCD) prevention and management strategy 2021–2025 aims to enhance prevention, surveillance, treatment, and care at the primary level, with defined targets and performance indicators including access to essential drugs and equipment at commune health facilities. Health Promotion Targets (2021–2025[18]): • Smoking: Reduce by 30% to 3.6% in adults and adolescents. • Physical activity: Increase by 10%. • Alcohol consumption: Reduce by 10% in adults, 20% in adolescents. • Obesity: Keep adult rates below 15%. • Salt intake: Reduce by 30%. • HT: Maintain rates below 30%. • High blood cholesterol: Keep below 35%.
				National policies focused on secondary prevention of heart failure (biomarkers etc.)	**+0**	Post-discharge CVD management is suboptimal, increasing the risk of recurrent events. Gaps include the absence of integrated provider networks and limited adoption of multidisciplinary care teams to support continuity across the care pathway[19].

No.	Sub-domains			Indicators		Justifications
Domain 1b: Heart failure policy and planning landscape						
11	HF research and innovation	**0-4**	**1**	Funding for heart failure research: Annual investment in heart failure-specific clinical trials, basic science research, and public health research	**+0**	No annual investment is observed in heart failure-specific clinical trials, basic science research, and public health research.
				Clinical trial participation: Eligible heart failure patients enrolled in clinical trials e.g., for new therapies or medical devices	**+1**	Eligible HF patients are enrolled in clinical trials for new therapies or medical devices. (Source: Expert interview)
				Translation of research into practice: Time-to-adoption for new guidelines, therapies, and technologies from clinical trials to everyday practice	**+0**	Unpredicted and no standardised adoption timeframe. (Source: Expert interview)
12	HF financing	**0-4**	**2**	Insurance coverage for heart failure Care (Public)	**+1**	HF care is partially funded/ reimbursed. (Source: Expert interview) • Out-of-pocket: Patients bear the costs of treatment, devices and related consumables (all). • Social Health Insurance (SHI): As the primary vehicle for public healthcare financing, SHI covers 90% of Vietnam's population. Premiums for the poor, children under 6, elderly above 80, and socially vulnerable groups are fully subsidised by the government (all).

No.	Sub-domains			Indicators		Justifications
Domain 1b: Heart failure policy and planning landscape						
12	HF financing	**0-4**	**2**	Insurance coverage for heart failure care (Private & alternatives)	**+1**	HF care is partially funded/ reimbursed. (Source: Expert interview) • Out-of-pocket: Patients cover all costs for treatment, devices, and consumables. • Private insurance: Around 7% of the population, mainly higher-income individuals, have private health insurance. • Charity schemes: Progammes like VinaCapital Foundation's Heartbeat Vietnam offer free heart surgeries and support for low-income families. • Patient Support Progammes (PSPs): Manufacturers may collaborate with government, private sector, or NGOs to improve CVD care and financial access for low-income patients.
13	Presence of heart failure registries	**0-1**	**1**	Presence of heart failure registries	**+1**	HF registries do not exist.
14	Existence of heart failure clinical guidelines	**0-3**	**3**	Existence of clinical guidelines	**+1**	Diagnostic guide and treatment of acute and chronic heart failure (2022).[20]
				Currency of clinical guidelines	**+2**	The guideline was updated within last 5 years (2022).
15	HF health equity	**0-2**	**1**	Patient navigation progammes: Heart failure patients from underserved backgrounds enrolled in patient navigation progammes to improve access to care and follow-up	**+0**	Patient navigation progammes don't exist for underserved communities. (Source: Expert interview)
				Community-based care progammes: Community-based heart failure management progammes designed to support at-risk groups (e.g., community health workers, peer support groups)	**+1**	Community-based care progammes exist for risk groups. (Source: Expert interview)

No.	Sub-domains			Indicators		Justifications
Domain 2: Heart failure prevention & screening						
16	Heart failure screening guidelines	**0-7**	**0**	National heart failure clinical guidelines coverage	**+0**	National heart failure clinical guideline doesn't cover screening for heart failure[21]. However, opportunistic screening using BNP is common in large hospitals. (Source: Expert interview)
				# of biomarkers included in heart failure screening guidelines (e.g. BNP/ NT-proBNP, Troponin, Soluble ST2, Galectin-3, MR-proANP)	**+0**	National heart failure clinical guideline doesn't cover screening for heart failure.[22]
				Inclusion of biomarker testing in screening guidelines	**+0**	National heart failure clinical guideline doesn't cover screening for heart failure[23].
				Inclusion of HT management	**+0**	National heart failure clinical guideline doesn't cover screening for heart failure[24].
				Inclusion of diabetes control in HF	**+0**	National heart failure clinical guideline doesn't cover screening for heart failure[25].
				Inclusion of screening for high-risk populations (e.g., older adults, patients with CAD, diabetes, or HT) for early signs of HF or related risk factors	**+0**	National heart failure clinical guideline doesn't cover screening for heart failure[26].
17	Heart failure screening funding	**0-4**	**0**	Existence of publicly funded/ reimbursed screening test for heart failure	**+0**	Heart failure screening is not funded/reimbursed. (Source: Expert interview)
				Funding for HF screening for T2DM patients	**+0**	Screening for T2DM patients is not funded/reimbursed. (Source: Expert interview)
				Financing mechanism for biomarkers in HF screening	**+0**	Tests using HF biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP) are out of pocket. (Source: Expert interview)

No.	Sub-domains			Indicators		Justifications
Domain 3: Heart failure diagnosis & healthcare system capacity						
18	Heart failure diagnosis guidelines	**0-4**	**3**	National heart failure clinical guidelines coverage	**+1**	Diagnostic Guide and Treatment of Acute and Chronic heart failure (2022): Diagnosis of heart failure covered in the guideline. It is based on a combination of physical and mental symptoms and laboratory tests and investigations; Recommended laboratory investigation methods include the use of 12-lead ECG, echocardiography, chest X-ray, and routine blood tests to determine the diagnosis of HF; BNP and NT-proBNP tests are also recommended to determine diagnosis and rule out HF[27].
				# of biomarkers included in heart failure diagnosis guidelines (e.g. BNP/ NT-proBNP, Troponin, Soluble ST2, Galectin-3, MR-proANP)	**+1**	BNP, NT-proBNP, Troponin[28].
				Inclusion of biomarker testing in diagnostic guidelines	**+1**	NT-proBNP tests are recommended to determine diagnosis and rule out HF in the guideline[29].
19	Capacity of/availability of/access to diagnostic services	**0-8**	**2**	MRI	**+1**	Low availability. (0-0.14 machines per ten thousands of population)
				CT	**+1**	Low availability. (0-0.14 machines per ten thousands of population)
20	HF Biomarker testing rate (Percentage of patients with suspected heart failure undergoing biomarkers (e.g., BNP, NT-proBNP) to confirm diagnosis)	**0-12**	**6**	Use of HF biomarkers at emergency care in public institutions	**+2**	50% of patients with suspected HF get a test using HF biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP). (Source: Expert interview)
				Use of HF biomarkers at emergency care in private institutions	**+2**	50% of patients with suspected HF get a test using HF biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP). (Source: Expert interview)

No.	Sub-domains			Indicators		Justifications
Domain 3: Heart failure diagnosis & healthcare system capacity						
20	HF Biomarker testing rate (Percentage of patients with suspected heart failure undergoing biomarkers (e.g., BNP, NT-proBNP) to confirm diagnosis)	**0-12**	**6**	Use of HF biomarkers at primary care centers in public institutions	**+1**	<20% of patients with suspected HF get a test using HF biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP), The adoption of point-of-care devices is improving BNP utilisation in primary care. (Source: Expert interview)
				Use of HF biomarkers at primary care centers in private institutions	**+1**	<20% of patients with suspected HF get a test using HF biomarkers, The adoption of point-of-care devices is improving BNP utilisation in primary care (e.g., Natriuretic peptide-BNP or NT pro BNP). (Source: Expert interview)
21	Capacity of workforce/availability of HF specialists (adjusted for regional distribution)	**0-4**	**1**	Cardiologists	**+1**	Low. (0-0.42 staffs per ten thousands of population)
22	Multidisciplinary heart failure care team availability	**0-1**	**1**	Hospitals and clinics offering care from a multidisciplinary team, including cardiologists, dietitians, psychologists, and rehabilitation specialists	**+1**	Hospitals and clinics offering care from a multidisciplinary team, including cardiologists, dietitians, psychologists, and rehabilitation specialists. (Source: Expert interview)
23	Heart failure diagnostics funding coverage	**0-3**	**2**	Existence of publicly funded/ reimbursed diagnostics test for heart failure	**+1**	Heart failure diagnostics is partially funded/reimbursed. (Source: Expert interview)
				Financing mechanism for biomarkers in HF diagnostics	**+1**	Diagnostic tests using HF biomarkers (e.g., Natriuretic peptide-BNP or NT pro BNP) are reimbursed. (Source: Expert interview)

No.	Sub-domains			Indicators		Justifications
Domain 4: Heart failure treatment monitoring and access						
24	Heart failure treatment monitoring guidelines	**0-8**	**4**	National heart failure clinical guidelines coverage	**+1**	Diagnostic guide and treatment of Acute and Chronic heart failure (2022): Treatment monitoring of heart failure covered in the guideline. Routine blood tests (e.g., checking levels of urea, electrolytes, lipids) and liver function assessments are recommended to support the treatment process; BNP and NT-proBNP tests were also mentioned for monitoring HF patients post-discharge[30].
				Involvement of multi-disciplinary team	**+0**	Guideline doesn't cover shared decision making/treatment of a multidisciplinary HF team[31].
				Linkage to supportive/ palliative care	**+1**	Guideline includes referral pathway to supportive/palliative care services[32].
				# of biomarkers included in heart failure treatment/ monitoring guidelines (e.g. BNP/NT-proBNP, Troponin, Soluble ST2, Galectin-3, MR-proANP)	**+1**	NT pro BNP/BNP[33].
				Inclusion of biomarker testing in treatment monitoring guidelines	**+1**	While NT-proBNP tests are mentioned for monitoring in the diagnostic guide and treatment of acute and chronic heart failure (2022), the guidelines recommend tests such as routine blood tests and liver function assessments[34].

No.	Sub-domains			Indicators		Justifications
Domain 4: Heart failure treatment monitoring and access						
24	Heart failure treatment monitoring guidelines	**0-8**	**4**	Inclusion of timeliness of heart failure care in the national HF clinical guideline (e.g., Heart failure patients receiving care within 24 hours of hospital admission or referral for outpatient care (especially critical in emergency or exacerbation settings))	**+0**	Not specified[35].
				Inclusion of emergency care protocols (e.g., Availability and utilisation of standardised heart failure care protocols in emergency departments (e.g., early use of diuretics, anticoagulation for arrhythmia))	**+0**	Not specified[36].
25	Availability of/access to different types of drug therapy	**0-1**	**0**	Availability/access to heart failure therapy	**+0**	Not all (100%) of the heart failure drugs listed on the WHO Essential HF drug list of 2023 are included in the most current national essential drugs list (NEDL)[37].
26	Prescription of Guideline-Directed Medical Therapy (GDMT): Eligible heart failure patients (EF < 40%) prescribed key medications	**0-8**	**4**	ACE inhibitors/ARBs/ARNI	**+1**	The rate of HF patients being treated with the medication is < 50%. ARNI usage higher in urban insured cohorts. (Source: Expert interview)
				beta-blockers	**+1**	The rate of HF patients being treated with the medication is < 50%. (Source: Expert interview)
				MRAs	**+1**	The rate of HF patients being treated with the medication is < 50%. (Source: Expert interview)
				SGLT2 inhibitors	**+1**	The rate of HF patients being treated with the medication is < 50%.

No.	Sub-domains			Indicators		Justifications
Domain 4: Heart failure treatment monitoring and access						
27	Implementation of new therapies	**0-1**	**1**	Adoption of newer heart failure therapies (e.g., SGLT2 inhibitors, ARNI)	**+1**	Adoption of adoption of newer heart failure therapies (e.g., SGLT2 inhibitors, ARNI) is observed in the territory. E.g., SGLT2 inhibitors are increasingly considered a key treatment option for patients with heart failure, particularly those with reduced ejection fraction (HFrEF)[38].
28	Use of implantable devices	**0-3**	**3**	ICDs	**+1**	The implantation is available and performed in the territory[39].
				CRT	**+1**	The implantation is available and performed in the territory[40].
				LVAD	**+1**	The implantation is available and performed in the territory[41].
29	Home health medication monitoring: Heart failure patients in home health progammes receiving regular medication reviews and adjustments	**0-1**	**1**	Availability of home health medication monitoring/remote patient monitoring for people with HF	**+1**	Home health medication monitoring/remote patient monitoring is available for people with HF[42].
30	Heart failure drugs funding coverage	**0-4**	**2**	Existence of publicly funded/ reimbursed drug therapy for heart failure	**+1**	Some drugs included in the WHO essential meds list for heart failure are funded/reimbursed. (Source: Expert interview)
				Funding for HF management/ treatment using rapid optimisation, supported by NT-proBNP testing for HF therapies (STRONG HF)	**+1**	Funding for HF management/ treatment using rapid optimisation, supported by NT-proBNP testing for HF therapies (STRONG HF) is funded/reimbursed, but limited to public facilities. (Source: Expert interview)
				Financing mechanism for biomarkers in HF treatment monitoring	**+0**	The use of NT-proBNP for monitoring heart failure patients is in its early stages among payers and is typically not reimbursed for monitoring purpose. (Source: Expert interview)

No.	Sub-domains			Indicators		Justifications
Domain 5: Heart failure advocacy, awareness and education						
31	Heart failure patient engagement and advocacy	**0-4**	**0**	Existence of patient organisations	**+0**	No patient organisation/patient advocacy group which covers HF exists.
				Participation in national heart failure policy & plan development	**+0**	No patient organisation/patient advocacy group which covers HF exists.
				Collaborations/participation in joint progammes with government	**+0**	No patient organisation/patient advocacy group which covers HF exists.
32	Heart failure civil society engagement and advocacy	**0-6**	**6**	Existence of civil society organisations (NGOs/advocacy associations etc.)	**+2**	The Vietnam National Heart Association (VNHA); Vietnam heart failure Society.
				Participation in national CVD/ HF policy & plan development	**+1**	No patient organisation which covers heart failure participates in developing the national heart failure policy and plan development.
				Collaborations /participation in joint HF progammes with government	**+1**	Collaborations and joint progammes/initiatives, including lobbying efforts, don't exist between patient groups and policy groups/ministries/ government bodies.
				Collaborations/participation in joint progammes with the private sector	**+1**	Collaborations and joint progammes/initiatives, including lobbying efforts, exist between civil societies and the private sector. E.g., • Pfizer & VNHA: Partnering on the Population Cardiovascular Health project (2023–2025)[43]. • PATH & Novartis foundation: Piloting a scalable HT care model to improve BP control[44].
				Contributions towards clinical guidelines development	**+1**	VNHA published "Recommendations for the diagnosis and treatment of acute and chronic heart failure 2022".

No.	Sub-domains			Indicators		Justifications
Domain 5: Heart failure advocacy, awareness and education						
33	Heart failure educational initiatives	**0-8**	**3**	Availability of patient education progammes and support resources by the government	**+1**	No CVD/HF educative programme/resource run by the government exist.
				Availability of patient education progammes and support resources by the civil society or patient organisations	**+1**	• VHFS has rolled out patient-focused education and awareness progammes in line with global best practices for HF care. • VNHA Community Education: VNHA supports public health education through various resources. Online tools & materials: 100 Questions about cardiovascular disease, Living with hypertension handbook, CAREME programme introduction, and a cardiovascular risk assessment tool.
				Existence of community-based outreach progammes	**+0**	No CVD/HF community-based outreach programme exists.
				Educational progammes for healthcare providers	**+2**	HF educational progammes targeted towards healthcare providers exist. E.g., The Tâm Điểm series is a weekly cardiology webinar programme organised by VNHA, featuring in-depth discussions on updated and specialised topics such as heart failure, arrhythmias, CAD, stroke, COVID-19, and the latest guidelines from ESC, AHA, and ACC[45].

No.	Sub-domains			Indicators		Justifications
Domain 5: Heart failure advocacy, awareness and education						
34	Continuous HF policy improvement progammes	**0-3**	**3**	Existence of HF continuous policy improvement progammes (policy committee meeting, pre- and post-campaign surveys, etc.)	**+1**	Continuous HF policy improvement progammes (policy committee meeting, pre- and post-campaign surveys, etc.) exist. E.g., The Vietnam society of cardiology hosts a national congress biennially and organises 20–30 seminars annually, along with public talks and World Heart Day events. Its official publication, the Vietnam journal of cardiology, is issued quarterly, alongside other scientific materials like disease lists and treatment guidelines.
				Frequency of HF continuous policy improvement progammes	**+2**	Progammes conducted with a well-defined schedule (e.g., quarterly or after each campaign).

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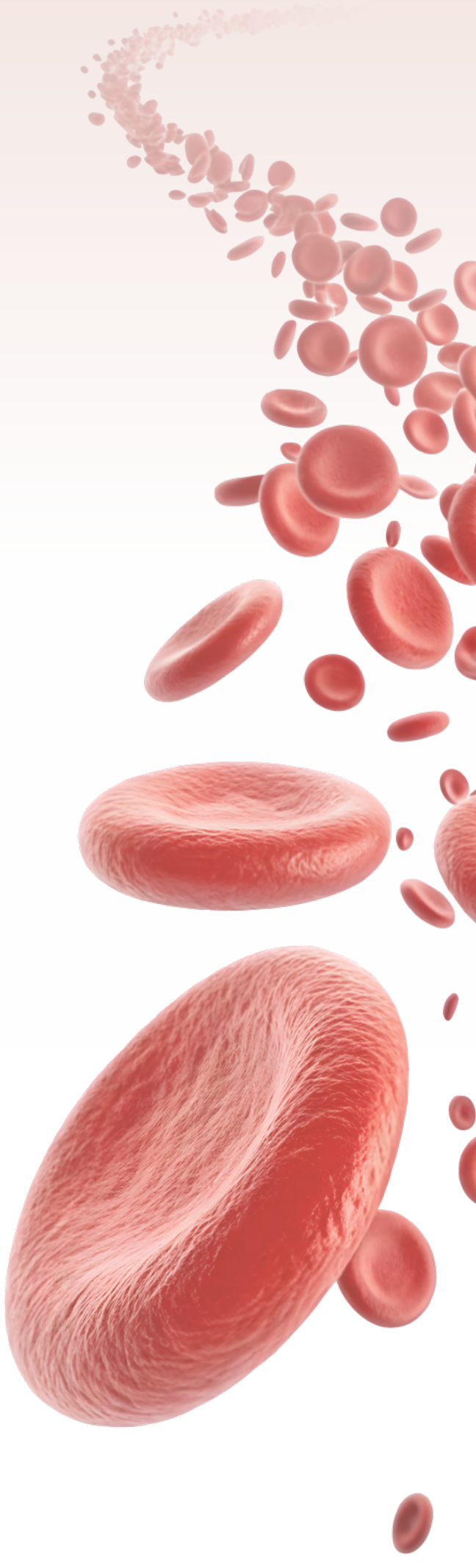

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