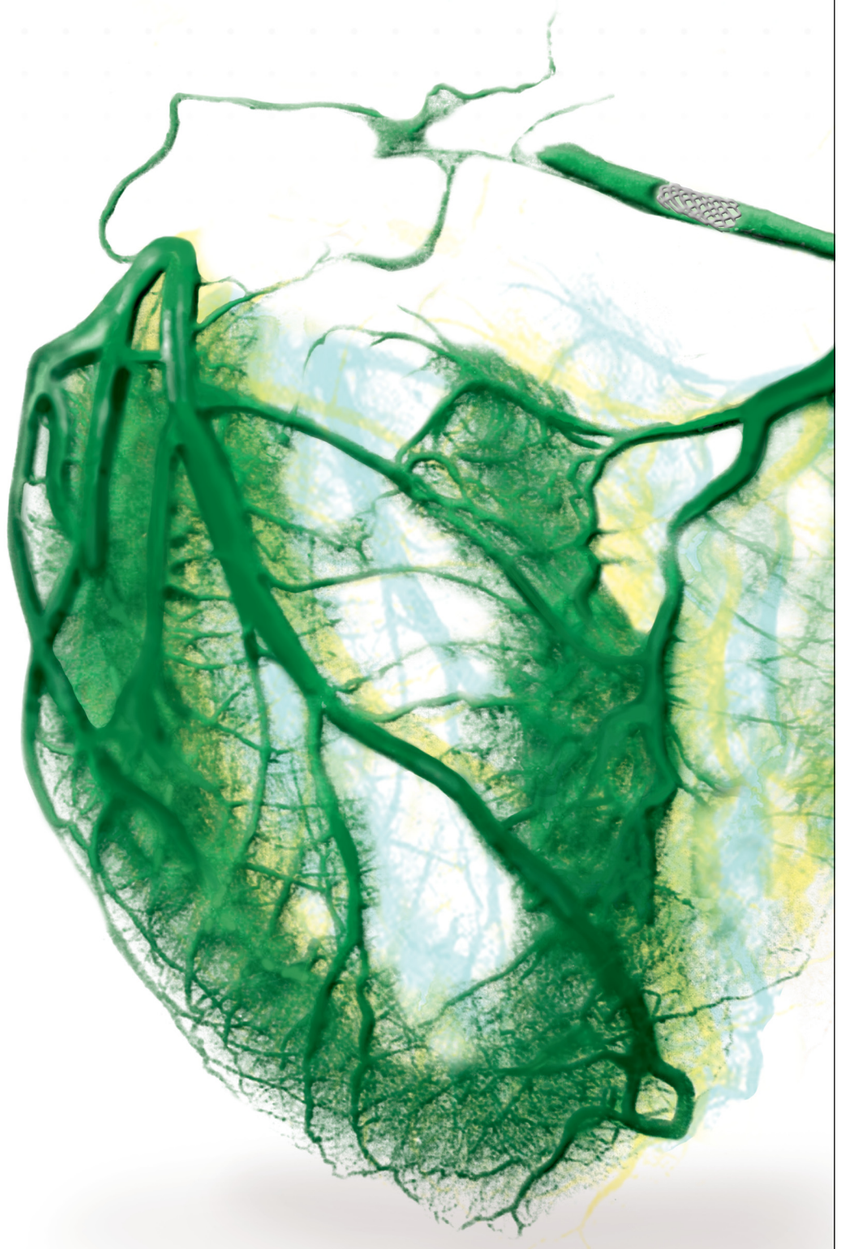
HOSPITAL AUTHORITY

STRATEGIC SERVICE FRAMEWORK FOR

CORONARY HEART DISEASE



醫院管理局
HOSPITAL AUTHORITY

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FOREWORD

Coronary heart disease is a major cause of morbidity and mortality in Hong Kong and the number of coronary heart disease patients managed by the Hospital Authority is set to increase dramatically.

With thanks to the hard work of our staff, there is much in our cardiac services that we can be proud of, in face of the rising tide of service demand. Building on this high level of staff commitment and the momentum that has developed over the years, the timing and readiness of HA's cardiac service is at a point where care for coronary heart disease patients can be further optimised.

I am therefore delighted that the Hospital Authority is publishing this Strategic Service Framework for Coronary Heart Disease, as the blueprint that will shape and enhance its cardiac services in the years to come. This is in response to the challenges ahead and it highlights the importance of robust planning to guide the development of services.

With the immense contribution from our experts in the development this framework, it offers ST-elevation myocardial infarction as a focus for future service advancements. This focus will stimulate service enhancements along the coronary heart disease pathway, help in setting service development priorities and guide the annual planning of the Hospital Authority.

My sincere gratitude goes to the wide range of staff, stakeholders and community partners who have contributed to the development of this Framework. With their support as foundations, I am confident that this Framework will pave the way to better patient care.

Dr P Y LEUNG
Chief Executive
Hospital Authority

PREFACE

Hong Kong, like other cities over the world, is seeing an ageing population and escalating burden from chronic diseases. Related to these, we are observing rising volume and complexity of coronary heart disease. This presents an immense challenge to the Hospital Authority.

To overcome these challenges, the Hospital Authority's Strategic Service Framework for Coronary Heart Disease has been jointly prepared by the Service Planning team of the Strategy and Planning Division and the Integrated Care Programs team of the Cluster Services Division. It describes focused strategies to guide and enhance public hospital cardiac services.

In the process of Framework development, healthcare professionals including senior cardiologists, cardiothoracic surgeons, family physicians, nurses, pharmacists, and allied health professionals from across the Hospital Authority took on the task to review our current cardiac services and propose strategies that cover the breadth of the continuum of care. This Framework represents the outcome of their enthusiastic participation, meticulous deliberation and forward-thinking propositions.

The central theme of the Framework is on enhancing services for the care of ST-elevation myocardial infarction patients. It describes specific service priorities, action plans and monitoring schemes to make improvements. The proposed strategies and service directions span the patient journey, from the identification of high risk patients for coronary heart disease in primary care settings to comprehensive cardiac rehabilitation within and outside of the hospital.

We wish to acknowledge the staunch support and work of the members of the Hospital Authority Taskforce on the Strategic Service Framework for Coronary Heart Disease. In addition, we would like to express our sincere appreciation to the members of the Working Groups and patient groups who provided in-depth analysis of the present situation for the Taskforce to consider. We are also extremely grateful to everyone who took time to provide suggestions and feedback during consultation of the draft Framework. These responses and comments were all carefully considered and invaluable in refining the Framework and crystallising the future directions.

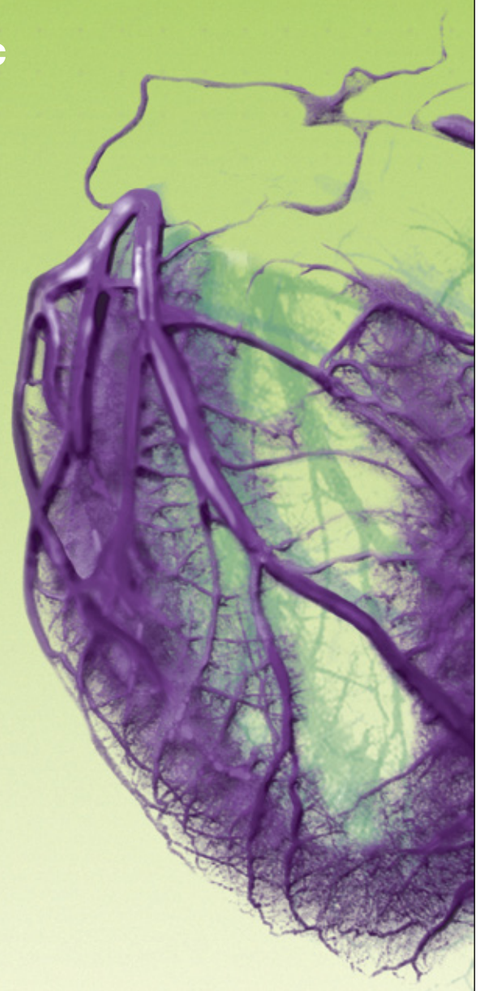
We look forward to implementation of the Framework where we aim for consistently high standards in cardiac care in the public hospitals of Hong Kong.

Dr S V LO
Director, Strategy and Planning Division
Hospital Authority Head Office

Dr W L CHEUNG
Director, Cluster Services Division
Hospital Authority Head Office

EXECUTIVE SUMMARY

The Hospital Authority (HA) Strategic Service Framework for Coronary Heart Disease (the Framework) is a strategic document that describes the overarching plans for the development and organisation of HA's coronary heart disease (CHD) services over the next five to ten years.



Hong Kong has observed a progressive rise in CHD. It encompasses a broad spectrum of patients and gradation of disease, spanning primary care, emergency and acute, through to rehabilitation and community settings. The main reasons for this rise are ageing population, escalating burden of chronic diseases, and changing lifestyles that cause issues such as obesity and reduction in physical activity. Further to these, technological advancements in identification of high risk cases, early diagnosis of heart attacks, as well as their contemporary treatment options place additional pressures on the health system to provide prompt responses. Aspiring towards high quality and safe care for patients therefore requires the seamless integration of services and collaborations between healthcare professionals along the patient journey to meet their holistic needs.

Through a process of reviewing current services, studying of international standards and discussing the future models of care by physicians, surgeons, nurses, pharmacists and allied health professionals, specific aspects of the CHD pathway have been identified for improvement. These include better chronic disease management, enhancing primary percutaneous coronary intervention (PCI) services, improving cardiac rehabilitation services, development of standardised protocols, as well as manpower planning. In particular, treatment and management of acute myocardial infarction (AMI) and specifically ST-elevation myocardial infarction (STEMI) is identified as a service driver. It acts as a focal point, which through its development along the clinical pathway can prime enhancements in other areas of cardiac care. One of the key areas to develop is cluster-based cardiac teams, where critical service volumes are required to build expertise in both acute and elective interventional services. To support this, there will be investments in establishing cardiac catheterisation laboratories. Their establishment will be aligned with the cluster-based networking of primary PCI services.

The Framework is conceptualised as a clinical pathway, seeking to take into account the patient care continuum and the roles and contributions of different healthcare professionals. The overall direction of this Framework has been guided by the expected role and strategic directions of HA, so that services can be delivered with a common purpose and alignment. The Framework describes the identified challenges across the CHD pathway, followed by the strategies and operational priorities to address these. Finally, specific action plans on AMI, set within the wider context of CHD, are outlined together with blueprints on other key cardiac service developments.

Planning Process

Formulation of the Framework has been overseen by an expert Taskforce, consisting of senior doctors involved in HA cardiac services, including cardiologists, cardiothoracic surgeons, emergency medicine specialists, rehabilitation specialists, radiologists, as well as family physicians. Nurses, pharmacists and allied health professionals were also members of the Taskforce. In addition, advice and direction was sought during development of the Framework from members of the Directors' Meeting.

Broad staff engagement was an important part of the planning process. The approach adopted in the Framework's development includes formation of working groups under the Taskforce to review distinct parts of the clinical pathway, organisation of a workshop facilitated by an overseas expert to discuss issues identified by the working groups, visiting hospital sites and meeting with frontline staff, and briefings to patient representatives / groups. Furthermore, a meeting was held specifically to explore acute cardiology service development in HA.

The Framework was made available in February 2013 as a consultation document to around 200 key stakeholders across HA, to solicit feedback and suggestions. Overall, comments and suggestions were supportive of the major service directions. All consultation responses were carefully reviewed and discussed by the Taskforce and used as a basis to refine the Framework.

Following formulation, the Framework was submitted to the Directors' Meeting, followed by the Medical Services Development Committee, for approval.

Current Cardiac Services in HA

The HA provides a comprehensive range of primary care services, as well as hospital in-patient and out-patient cardiac services. They range from diagnostic procedures, percutaneous interventions, cardiac surgery, specialised out-patient consultations and rehabilitation programmes.

There are programmes in HA's General Out-patient Clinic (GOPC) services specifically to manage diabetes mellitus and hypertension patients. There are also specialty services provided through HA's Specialist Out-patient Clinics (SOPC). Cardiac subspecialty beds and coronary care units are available to care for in-patients. Furthermore, there are also hospitals already running extended hours primary PCI services to treat STEMI cases. In addition, cardiologists of various hospitals have developed cardiac in-patient and out-patient rehabilitation.

However, with rapid developments in technology, as well as the rise in service demand, the current service configuration will be unable to satisfy the needs of patients and expectations from the public. Services and infrastructure across different clusters will need to be aligned and provisions for different hospitals allocated, based on overall cluster service volumes and expertise.

Key Challenges in HA CHD Services

CHD is a progressive disease encompassing a broad spectrum of patients, from high risk patients in the primary care setting, through to those presenting with heart attack as a life-threatening medical emergency. Taking into account this continuum, the main challenges identified are presented in the sequence of the patient journey. In addition, issues that encompass the whole pathway, such as workforce, performance monitoring and advances and innovation, are also presented.

Preventive Care

- Increasing demand for chronic disease management in primary care and acute hospital services.

Hospital Services for Emergency and Elective Care

- Lack of integration, collaboration and coordination of service, both horizontally (across hospitals) and vertically (from primary care to tertiary to rehabilitative care). Results of this include:
  - Variation in the provision of a primary PCI service across HA for STEMI patients.
  - Variable development of structured cardiac rehabilitation programmes and variable coverage for cardiac patients.

Community Partnerships

- The need to strengthen community partnerships, patient and carer education and engagement to complement and support HA services.

Workforce

- The need to strengthen manpower provision to manage increasing service demand.

Performance Monitoring

- The need for alignment of routine data at the system level to facilitate review and improvements in patient outcomes, service quality and safety.

Advances and Innovation

- Advances and innovations in cardiac services creating new opportunities for patient care, set within the context of the wider priorities of HA and rising service demand.

Framework Strategies

To address the above challenges, the HA will adopt an incremental and coordinated approach to systematically reduce and manage upstream caseloads, optimise the HA's emergency reperfusion strategy for heart attack patients requiring life-saving interventions, and better support the downstream rehabilitation needs of patients and their management in the community. To do this, the primary strategy is to develop and organise services with a focus on STEMI; aiming at strengthening collaborations and partnerships, enhancing service quality, safety and effectiveness, and seeking to strengthen the workforce.

The cornerstone of the strategies is to consolidate the cardiac service with a view to improving health outcomes for CHD patients, enhancing the capacity of service provision, concentrating expertise for better quality of care, including timeliness and accessibility. The two key principles underpinning this are:

- Formation of cluster-based cardiac teams to support service sustainability and sufficient service volumes, as essential pre-requisites to build expertise in both acute and elective interventional services.
- A networked cardiac service being the foundation for future service developments. The basis of this principle is consolidation and standardisation of HA's cardiac service.

The strategic objectives and operational priorities are summarised below.

Enhancement of Preventive Care

Early identification of those at-risk of CHD, coupled with chronic disease management, is a crucial component to secondary prevention and managing rising demand. The HA will:

- Continue to enhance the HA multi-disciplinary risk assessment and management programme (RAMP) for patients with diabetes and uncontrolled hypertension, to help manage upstream risk-factors for CHD and caseloads.
- Reinforce the key role of the protocol-driven smoking cessation and counseling services in HA's GOPCs to enhance patients' access to professional input and pharmacotherapy, for smoking abstinence.
- Develop automated electronic risk-scoring platforms to support primary care physicians in identifying high risk individuals and streamline decision-making by exploring evidence-based CHD risk stratification tools.

- Develop protocols for onward referral and special investigations between primary and secondary care.
- Improve prescribing coverage of secondary prevention medicines for CHD patients, including review of current prescribing rates and promulgating successful prescribing and compliance activities, enhancing patient knowledge of medicines, and where appropriate leverage the HA mechanism for review of the drug formulary in different out-patient settings.

Enhancement of Provision for Primary PCI

The objective will be to develop a 24-hour primary PCI service for the whole of Hong Kong, through a networking system, to support the provision of an overall optimised reperfusion strategy for STEMI patients. The HA will:

- Develop cluster-based cardiac services for pooling of expertise as well as service developments.
- Undertake phased expansion of the current primary PCI service with the prerequisite of an assessment of cluster service volumes and cluster-based coordination of expertise. Each cluster will have one hospital funded to deliver 12-hour primary PCI, Monday to Friday, except Kowloon West Cluster where the intention is to include both Princess Margaret Hospital and Kwong Wah Hospital. The six other hospitals are Queen Mary Hospital, Queen Elizabeth Hospital, Prince of Wales Hospital, Pamela Youde Nethersole Eastern Hospital, United Christian Hospital, and Tuen Mun Hospital.
- Develop and update territory-wide standardised evidence-based guidelines and protocols for AMI / STEMI, strengthen network approaches to cardiac care, and to streamline and coordinate workflows across HA departments and specialties, such as A&E, cardiology, cardiothoracic surgery and radiology.
- Put in place standard reporting of service performance and patient outcomes to enable regular review of the quality and safety of primary PCI service developments and assess their impact and sustainability on other cardiac service areas, such as cardiothoracic surgery and radiology.

- Promote multi-disciplinary approaches to care, such as “heart teams”, for the collaborative assessment and joint-decision making of treatment and management plans, in discussion with the patient.
- Strategically align the provision of cardiac infrastructure, such as cardiac catheterisation laboratories or coronary care unit beds, to match with cluster-based coordination of expertise and cluster service demands.
- Undertake detailed analysis for the planning, delineation, timing and setting-up of designated centres for 24-hour primary PCI, to support decision at corporate level.

Development of Comprehensive Cardiac Rehabilitation

The HA will improve the provision of structured cardiac rehabilitation programmes for patients from both cardiology and cardiothoracic surgery streams. The plan is to:

- Develop a cluster-based network model for cardiac rehabilitation, within the wider context and direction for medical rehabilitation.
- Formulate the core components of a comprehensive structured cardiac rehabilitation programme, which take into account the bio-psycho-social needs of patients and carers, with input from a range of multi-disciplinary professionals.
- Within the context of the programme, develop referral guidelines and pathways to streamline patient flows and improve navigation between services.
- Ensure appropriate flexibility to enable local tailoring of cardiac rehabilitation services to best meet the needs of patients and support delivery of care by staff, so as to improve patient recruitment.
- Align rehabilitation service developments with other HA initiatives to ensure services are complementary and efficient, such as with existing public primary care programmes, and meeting the needs of patients and their carers.

Development of Community Partnerships, Education and Engagement

CHD services are ideally positioned to forge stronger partnerships with patients and their carers across the care pathway and to strengthen community collaborations to build on the principle of patient-centred care. The HA will:

- Design clinical pathways and service developments which are patient-centred, for example supporting involvement of patients and carers in multi-disciplinary care planning and the decision-making process.
- Support development of staff knowledge and skills, such as communication, to facilitate more effective patient and carer engagement and their participation as co-producers of care.
- Develop patient information, education and communication strategies to support staff in patient and carer empowerment, so as to enhance their experience, recovery and self-management.
- Explore the possibility of mobilising patient and self-help groups, volunteers and non-government organisations to complement HA services in supporting the transition of CHD in-patients back into the community, by providing for their holistic needs and disease maintenance.
- Utilise HA platforms to brief patient groups and representatives and gather feedback on cardiac service developments, such as the Patient Advisory Committee.
- Leverage information sharing platforms, such as the HA Smart Patient website to support patient empowerment and better self-care.

Improvements in Clinical Practice

Development of clinical pathways in this Framework goes hand-in-hand with a transparent system to regularly assess the quality of patient care against agreed standards. Of particular importance, the primary PCI service as an emergency intervention for STEMI should be subjected to regular scrutiny, to ensure it is safe and of high quality. To support improvements in clinical practice the aim is to:

- Identify a set of service quality and patient outcome indicators, to enable routine systematic review and assessment of CHD services.
- Ensure capability of hospitals to provide standardised data for routine service monitoring, as a pre-requisite to establishment of extended hours primary PCI services.
- Promulgate a culture of continuous service improvement, transparency and learning.
- Consider the applicability of staff proficiency and accreditation in the local context to support service quality, as well as professional staff needs.
- Leverage HA developments in information and communications technology to support workflows and multi-disciplinary approaches to care to enhance patient care.
- Align adoption of new technologies and treatment options for CHD services within the HA's strategic approach to technology planning and management, as well as mechanism for review and updates to the HA Drug Formulary.

Build Capacity

People are the most precious resource to HA and the issue of workforce is distinct and cuts across all services. The HA Strategic Plan 2012-2017 outlines the strategies and directions HA will be pursuing, including how HA will retain, attract and motivate its staff. Specifically, for CHD services HA will:

- Within the wider context of workforce planning, support the development of the HA workforce with the right mix of skills and professions.
- Adopt cluster-based approaches to the cardiac workforce to enable greater flexibility in the planning and organisation of cardiac services and resources, enabling pooling of talents and sharing of workload and allow teaming up for both expertise, as well as administration.

- Prioritise service developments, so that they are paced to reflect the need to develop staffing levels, skills, changes in workflows and deployment, and which take into account the impact of service developments on other areas of cardiac services.
- Work with clinical staff to determine the necessary cluster staffing requirements to roll-out primary PCI services and to explore whether options, such as part-time involvement of private interventionists in HA, are viable ways to support implementation of these strategies.
- Support staff training and continuing professional development, and leverage opportunities which emerge through adoption of pathway approaches to care, such as staff exposure outside traditional places of work, to enhance skill-sets, knowledge and capability for cross-working and multi-tasking.
- Promote sharing of expertise among different healthcare professionals to support better patient care, such as medicines management by Pharmacists, or principles of behavioural change by Clinical Psychologists.
- Explore effective modes of staff recognition and incentives that are appropriate in the public healthcare sector to recognise good performance.

Implementation and Monitoring

The strategies and directions outlined in this Framework will be a significant catalyst for CHD service developments across the patient pathway. Implementation will be incremental, to take into account the priorities of HA and readiness of key enablers, such as cluster-based cardiac teams and provision for networking of PCI services within clusters. For some of the strategies outlined, such as 24-hour networked primary PCI, these will require further detailed discussions to determine the service delivery model and how best to move forward.

Change will be led by frontline professionals involved in cardiac services, with the leadership to steer overall service developments in clusters provided by HA Head Office, senior cluster management and clinical leaders. The HA annual planning process will be the mechanism through which resources will be sought to support implementation of the Framework and overall strategies.

Monitoring of this Framework will be on several levels. Firstly, by the regular HA performance monitoring mechanism through outcome deliverables tied in with resources made available through the HA annual planning mechanism. Secondly, through the development of an operational plan for the Framework, key implementation milestones will be mapped and progress evaluated. Thirdly, introduction of standardised clinical pathways coupled with selected service and outcome measures will support regular review and monitoring of the success of the Framework strategies.

Conclusion

The strategies described are built on the dedication of everyone involved in HA's cardiac services. This Framework is part of the ongoing journey of service improvement, to address both current challenges and those anticipated in the future. Its success relies on the continuous support of everyone aiming towards this same goal.

冠心病服務策略

摘要

醫院管理局《冠心病服務策略》（服務策略）訂定本局未來五至十年冠狀動脈心臟病（冠心病）服務的整體發展綱領，是一份重要的策略性文件。

冠心病在香港漸趨普遍，患者類別不同、病情亦各異；涉及的範疇亦包括基層、急症，以至復康及社區各方面的服務。冠心病趨升的主要原因包括人口老化、慢性疾病數字上升，因生活模式轉變，比如缺少運動，而引致的肥胖等。科技進步雖然有助檢測高危個案，令我們可以及早利用現代技術治療突發性心臟病，但卻加重了醫療系統的壓力。因此，在治理過程中，醫護人員必須緊密合作，才能為病人提供優質和全面的服務。

參與制訂本服務策略的人仕包括醫生、護士、藥劑師及專職醫療人員。他們仔細檢討現行服務、研究相關的國際標準和探討未來的服務模式，然後訂出以下改善冠心病服務的主要方向，包括：改良慢性疾病管理、加強緊急冠狀動脈介入治療（俗稱「通波仔」）服務、改善心臟復康服務、統一治療程序以及改善人手規劃。其中，急性心肌梗塞（AMI），尤其是ST時段上升心肌梗塞（STEMI）的治療和護理將起決定性作用，因為透過建立合適的協作流程，將可推動其他心臟科服務的發展。因此，本計劃的其中一個主要建議是設立以聯網為基礎的心臟科團隊，讓醫護人員透過處理一定數量的病症，從而掌握緊急及非緊急介入治療的技術。有見及此，醫管局將投入資源，因應聯網的緊急「通波仔」服務網絡，設立心導管室。

本服務策略以病人的治理流程為基礎，以醫管局的策略方向為依歸，顧及病人在不同階段的需要以及各專業醫護人員的角色，確保各項服務能互相協調，朝著共同目標發展。本服務策略臚列冠心病治理流程的各項挑戰、相應的對策與執行優次，此外，本服務策略亦會在冠心病服務整體發展的基礎上，概述落實提升AMI治療的計劃，以及其他主要心臟服務的發展藍圖。

規劃過程

本服務策略由醫管局心臟科資深醫生組成的專責小組制訂，成員包括心臟專科醫生、心胸外科醫生、急症專科醫生、復康專科醫生、放射科醫生和家庭醫學醫生等。其他參與工作的成員包括護士、藥劑師以及專職醫療人員。在擬訂本服務策略時，專責小組亦曾徵詢總監會議成員的意見。

員工的廣泛參與，是規劃過程重要的一環。在草擬過程中，專責小組曾就臨床治理流程的各個環節成立工作小組，詳細審視有關工作，然後舉辦工作坊，邀請海外專家討論工作小組提出的問題。專責小組亦曾視察醫院、探訪前線人員，以及向病人代表和病友組織作簡介等。我們亦曾就醫管局心臟科急症服務的發展，召開了一次特別會議。

本服務策略於2013年2月以諮詢文件形式發放給約200位醫管局的持份者，以蒐集他們的意見。持份者普遍對本服務策略的主要服務方針表示支持。專責小組仔細審閱各項建議後，對初稿作出相應修訂，然後將修訂稿先後呈交醫管局醫療服務發展委員會及總監會議審批，最後通過落實。

醫管局現有的心臟科服務

醫管局目前提供全面的基層醫療服務及心臟科住院和門診服務，包括診斷、介入治療、心臟手術、專科門診及復康計劃。

醫管局的普通科門診有專為糖尿病及高血壓病人而設的服務計劃，專科門診診所亦提供相關的服務，住院病人亦可獲得心臟科專科病床及冠心病護理部的服務。此外，部分醫院亦已延長為STEMI病人提供緊急「通波仔」服務的時間以及推行住院及日間心臟病人復康計劃。

不過，隨著科技發展日新月異、服務需求與日俱增，現有的服務配套將不足以滿足病人的需求和公眾的期望，因此，醫管局必須統一規劃各聯網的服務及設施，再因應聯網的服務量和專長，調整各醫院所分配的資源。

醫管局冠心病服務的主要挑戰

冠心病是一種漸進性疾病，病人層面非常廣闊，既有居於社區的高危病人，亦有急性心肌梗塞的危急病人。以下除列出每個階段所面對的問題外，亦會介紹整體冠心病服務的挑戰，例如人手規劃、表現監察、對醫療科技發展及創新的要求等：

預防護理

- 在基健及急症醫院層面，對慢性疾病管理的需要與日俱增

緊急及非緊急的醫院服務

- 無論是跨醫院的橫向服務，抑或涵蓋由基層、第三層至復康護理的縱向服務均協調不足、有缺整合，結果導致：
  - 醫管局不同機構對 STEMI 病人提供的緊急「通波仔」服務不盡相同
  - 心臟復康計劃的發展和覆蓋率亦欠一致

社區協作

- 有需要加強社區協作，促進病人及其照顧者的教育和參與，以配合醫管局的服務。

人手規劃

- 有需要增加人手，以應付不斷增加的服務需求。

表現監察

- 有需要統一系統內的數據，以協助審視和改進治療成效、提高服務質素及安全性。

醫療科技發展及創新

- 心臟病治療科技發展一日千里，為病人帶來新希望，也同時凸顯醫管局判斷服務優次及資源分配的重要性。

應對策略

為應付上述的各項挑戰，醫管局會逐步提升預防能力，減少可避免的「上游」個案以及改善急性心肌梗塞病人的治療策略；以及加強對「下游」病人的復康支援及社區護理。就此，我們的主要策略是發展以STEMI為主的服務，包括加強夥伴協作，提高服務質素、安全性和成效，以及增加人手。

此策略以整合心臟科服務為基礎，目標是改善冠心病的治療成效、加強服務能力、集中專業技術人手，以提供更優質、更適時和更便捷的服務，以下為兩項主要的原則：

- 建立以聯網為基礎的心臟科團隊，確保有足夠的服務量，以及服務的可持續發展；以作為緊急及非緊急介入服務培育人才的先決條件。
- 建立心臟科服務網絡，作為服務發展的基礎，亦以此原則去整理和統一醫管局的心臟科服務。

有關的策略目標及落實優次概述如下。

加強預防護理

預防和控制需求上升的主要對策是盡早檢測冠心病風險，再配合良好的慢性疾病管理，就此，醫管局將會推行以下措施：

- 繼續加強為糖尿病和高血壓病人而設的跨專業「風險評估及治理計劃」，發揮把關作用，減低患冠心病的風險。
- 加強普通科門診診所的戒煙服務和輔導計劃，為病人提供專業戒煙意見及藥物治療。
- 在基健層面建立自動電子風險評估平台，協助醫生辨別高風險人士，提高診治效率。
- 制訂基層與中層醫療的轉介及特別診治程序。
- 改善冠心病預防藥物的使用，包括檢討現時的處方率、分享有效的配方模式、增進病人對藥物的認識；並在適當情況下，通過醫管局既有機制檢討藥物名冊在不同門診部門的使用情況。

加強緊急「通波仔」服務

醫管局將積極發展全港性的24小時緊急「通波仔」服務網絡，為STEMI病人提供最有效的治療：

- 發展以聯網為基礎的心臟科服務，以便集中專業技術和服務發展。
- 根據聯網的服務量以及專業醫護人手的安排，逐步擴大現有的緊急「通波仔」服務。除九龍西醫院聯網外，其他聯網均有一間醫院提供星期一至五12小時緊急「通波仔」的服務，此八間醫院分別為：瑪麗醫院、伊利沙伯醫院、威爾斯親王醫院、東區尤德夫人那打素醫院、基督教聯合醫院、屯門醫院、瑪嘉烈醫院及廣華醫院。
- 制訂及更新以實證為基礎的AMI/STEMI指引及程序，加強網絡為本的心臟科護理，以及理順各部門和專科，例如急症室、心臟科、心胸外科及放射科的協作流程。
- 定期檢討服務表現及病人療效，以評估緊急「通波仔」服務的質素及安全性，以及對其他心臟科服務，例如心胸外科及放射科的影響。
- 建立「心臟科團隊」，推動跨專業護理，讓不同專業人員，透過與病人共同商議後，可進行聯合評估，並共同制訂治療和護理計劃。
- 整合心臟科基建設施，例如心導管室或冠心病護理病床等，以配合不同聯網的專業技術安排和服務需求。
- 仔細分析24小時緊急「通波仔」服務的規劃、分工、推行時機以及設施配套，以協助作出整體決策。

發展全面的心臟科復康服務

醫管局會為心臟科及心胸外科病人加強以下各項心臟科復康服務：

- 根據醫管局的整體復康服務發展方針，制訂以聯網為本的心臟科復康計劃模式。
- 因應病人及其照顧者的生理、心理和社交需要，再參考專業人員的意見，制訂全面的心臟科復康計劃。
- 制訂心臟科復康計劃的轉介指引和流程，以調控病人流量，加強服務銜接。
- 確保聯網有適當的彈性調整心臟科復康服務，以滿足病人的需要和協助職員提供更佳服務，從而提高病人的參與意欲。
- 配合醫管局的其他基層護理計劃，確保服務有效率地互相補足，並且切合病人及其照顧者的需要。

推動社區夥伴協作、加強教育及社區參與

理想的冠心病服務必須是以病人為本，在治理流程中能與病人及其照顧者建立密切的夥伴關係，並加強社區協作。就此，醫管局會：

- 制訂以病人為本的臨床治理流程及服務發展方針，例如鼓勵病人及其照顧者參與跨專業護理規劃和決策過程。
- 鼓勵員工增進知識及改善溝通技巧等，以促進病人及其照顧者的協作及參與。
- 制訂病人資訊、教育及溝通策略，協助同事推行病人及照顧者的自強計劃，令病人體驗更佳的治療和康復過程，以及掌握自我管理技巧。
- 研究如何推動病人及自助團體、義工和非政府機構配合醫管局的服務，向冠心病患者提供全面的護理及疾病管理服務，幫助他們出院後重返正常生活。
- 透過醫管局病人諮詢委員會等平台，向病人團體及代表提供心臟科服務的最新資訊，並蒐集他們的意見。
- 利用醫管局「智友站」等資訊分享平台，協助病人加強自我護理能力。

改善臨床實踐

醫管局有需要設立一套質素評估系統，定期檢討病人護理質素，方可發展本服務策略所載列的臨床治理流程，尤其是作為STEMI緊急介入治療的緊急「通波仔」服務，更必須受到定期監管，以確保服務優質安全。在加強臨床服務方面，醫管局會：

- 訂定服務質素及病人療效指標，以便定期和有系統地檢討及評估冠心病服務成效。
- 要求醫院提供標準數據，以進行恆常監察，並以此作為考慮擴展醫院緊急「通波仔」服務的先決條件。
- 推廣改善服務、高透明度及持續學習的工作文化。
- 考慮推行醫院員工能力及評核認可，以助維持服務質素及切合專業人員的需要。
- 善用醫管局的資訊及科技平台，改善工作流程及跨專業護理的溝通，從而加強病人護理。
- 配合醫管局的醫療科技規劃和管理，以及醫管局藥物名冊的檢討與更新機制，採納治理冠心病的現代科技和治療方法。

加強服務能力

員工是醫管局最寶貴的資源，他們對醫療服務的影響更是舉足輕重。醫管局《2012至2017年策略計劃》載列醫管局的未來策略及方向，其中包括如何挽留人才、吸引人才和推動員工。就冠心病服務而言，醫管局會：

- 配合醫管局整體的人手規劃，因應冠心病服務所需的專業技能建立工作團隊。
- 以聯網為基礎規劃心臟科人手，彈性地規劃心臟科服務及資源分配，並集中醫護與管理人才、分擔工作。
- 考慮人手安排與技能發展、工作流程及分配的需要，以及對其他心臟科服務的影響，從而訂出服務發展優次。
- 與聯網臨床人員商議推行緊急「通波仔」服務所需的人手，並研究在醫管局架構內聘請私家醫生任兼職等方案是否可行和有效。

- 支持員工培訓及持續專業發展；藉著推行治理流程模式，員工將有更多機會接觸傳統工作崗位以外的知識，加強跨崗位及多工同步的工作技能。
- 鼓勵醫護人員積極交流心得，例如由藥劑師介紹藥物管理知識、臨床心理學家講解行為轉變的原則等，以為病人提供更佳的護理服務。
- 研究更多適用於公營醫療機構的嘉許和獎勵方式，以肯定表現優異的員工。

執行及監察

醫管局將根據本服務策略所載列的策略及方向推動冠心病服務的發展。我們會按部就班，因應政策的優次及成熟程度（例如聯網心臟科團隊及聯網間的「通波仔」服務網絡）而推行。部分策略措施，例如24小時聯網緊急「通波仔」服務，由於牽涉面廣，仍待深入討論才能釐定服務模式及推展方向。

上述服務變革將由心臟科前線同事帶領，而聯網的整體服務發展則由醫管局總辦事處、聯網高級管理層及臨床服務主管等策導，並通過醫管局周年工作規劃機制取得所需資源，以推行有關的策略措施。

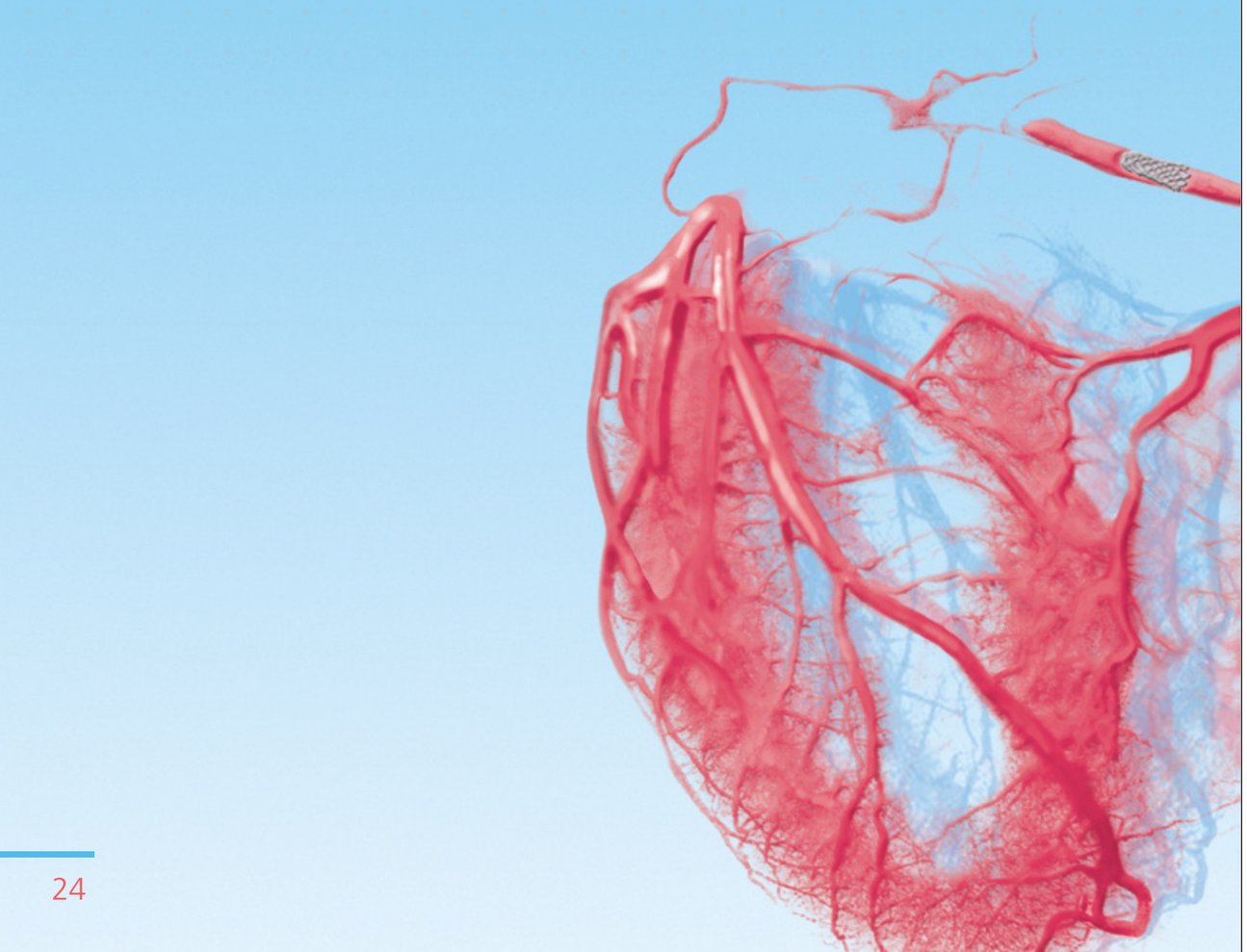
我們將在不同層面監察本服務策略的措施。首先，對經醫管局年度工作規劃撥款推行的措施，我們會透過常規機制監察有關措施的推行成效。其次，我們會根據本服務策略制訂具體工作計劃，當中列明主要的里程碑，以便評估。第三，通過標準化的臨床治理流程及部分服務與成效評估措施，將可定期檢討及監察本服務策略的落實情況。

總結

本服務策略所述的策略是醫管局心臟科同仁積極參與和熱誠討論的成果。出版本服務策略是我們持續改善服務的其中一項工作，希望能應付當下以及未來的挑戰。這項工作任重道遠，必須有賴各方不懈支持，才得以成功落實。

INTRODUCTION

The Strategic Service Framework for Coronary Heart Disease is a guiding document setting out the overall strategies and directions for HA to develop and enhance its CHD services.



The Framework has been developed by professionals involved in the delivery of services across the CHD pathway, including doctors, nurses, pharmacists and allied health professionals. This Framework, in response to the recognition of the growing importance and impact of CHD to HA, outlines strategies for priority service developments across the CHD pathway over the next five to ten years.

CHD is a major cause of mortality in Hong Kong. For example, over the last decade, annual numbers of deaths from CHD have risen by almost 50%, to 4 643 registered deaths in 2010. CHD accounts for just over one-tenth of all deaths in Hong Kong, with a significant percentage of these (43%) due to Acute Myocardial Infarction (AMI) (or heart attack).[1]

In addition, CHD is also a major cause of morbidity and the burden of disease continues to rise in Hong Kong. For example, in HA the numbers of patients being treated for CHD has been projected to rise from 205 000 in 2012 to 258 000 by 2017, an increase of 26%.[2] However, taking into account patients being treated privately, or those undiagnosed and unaware of having CHD, the number of people in Hong Kong with CHD is expected to be much greater.

The local scene reflects CHD disease trends reported internationally, particularly as more people live longer - many of whom with chronic diseases.[3] Coupled with ongoing advances in diagnostics, treatment and management, there are greater options to help prevent new cases of heart disease, manage those diagnosed, and utilise treatments which can dramatically reduce the risk of dying from AMI, as well as support those during recovery and rehabilitation. Thus for HA, service demand is likely to come from both increases in numbers of patients with CHD (new and existing), as well as from those with identified risk factors for CHD.

The rise in numbers of patients with CHD is likely to impact on service demand for preventive care in the HA primary care setting, through to secondary care (both emergency and elective services), recovery and rehabilitation. Thus, robust strategic planning will better prepare HA to meet the challenge of the rising tide of service demand from CHD.

1 HA Statistical Reports: 2010-2011 and 2001-2002.

2 HA Strategic Service Plan 2012-2017 (Including in-patients, out-patients and patients seen in Specialist Out-patient Clinics, General Out-patient Clinics and Family Medicine Specialist Clinics).

3 The global burden of disease: 2004 update (2008). World Health Organisation.

About the Strategic Service Framework for Coronary Heart Disease

Formulation of the Framework has been shaped by a number of factors, which through consideration by the Taskforce on the Framework have led to identified service development priorities.

Firstly, HA should provide **the right care, by the right person, at the right time and place**. This is the recognition that CHD encompasses a broad spectrum of patients and gradation of disease - from high risk patients in primary care settings, through to those at hospital with heart attack as life-threatening medical emergencies. This therefore necessitates a range of healthcare professionals and services to support different patient needs along the care pathway, often in multi-disciplinary collaborations.

Secondly, HA should focus on **(i)** acute and emergency care; **(ii)** services for low income groups and the underprivileged; **(iii)** illnesses that entail high cost, advanced technology and multi-disciplinary professional teamwork in their treatment; and **(iv)** training of health care professionals as depicted in the Food and Health Bureau report "Building a Healthy Tomorrow" (2005). The Framework has been developed within the context of these expected roles and strategic directions of HA.

Taking these into account, the Taskforce on the HA Strategic Service Framework for Coronary Heart Disease sought to identify specific areas or components along the CHD pathway that could make a significant contribution to overall improvements in patient care. Thus, through their focused development, these components act to catalyse enhancements in other aspects of cardiac services.

By distilling and prioritising the major themes, together with support from a strong published evidence-base, the Taskforce identified provision of HA services for ST-elevation myocardial infarction (STEMI) patients as a key driver in the CHD pathway. It could act as a development focus and stimulate overall improvements in CHD care.

The provision of effective STEMI management necessitates involvement of a range of services from across multiple specialties and the success of treatment relies largely on multi-disciplinary collaborations with timely intervention. Therefore, management of these patients acts as the catalyst for development of services across much of the CHD pathway, from upstream preventative care, through to joint decision-making on treatment plans, as well as structured rehabilitation, and community partners' participation.

Within HA, cardiac services are reaching a point where service capability and technological readiness are synergising to make possible further advances in the delivery of better patient care for STEMI. In addition, by further nurturing the key enablers for this service, such as workforce, these will also directly and indirectly support the provision of care for other groups of cardiac patients across the wider CHD pathway.

The International Scene – AMI

AMI (or heart attack) (Appendix 1) is a medical emergency which follows a sudden reduction in, or cessation of, blood flow down a coronary artery due to narrowing or blockage. The two types of myocardial infarction are named according to the appearance of the electrocardiogram (ECG), as STEMI and non-ST segment elevation myocardial infarction (NSTEMI).[4] Early identification of STEMI patients is essential for rapid treatment decisions. This is because time critical reperfusion strategies to restore normal coronary blood flow are required to maximise salvage of functional heart muscle, which significantly improves prognosis and outcomes.

Since survival followed by speedy reperfusion is the goal of emergency care for STEMI, this begins with early recognition by the patient of the signs and symptoms of heart attack and prompt seeking of medical attention. In addition, time critical treatment and management strategies for heart attack require highly coordinated approaches, often among different organisations, departments and teams within a healthcare system. Involvement can be from ambulance / emergency medical services (EMS), through to the Accident and Emergency Department (AED), Cardiology, Critical Care and Cardiothoracic Surgery support.[5,6,7]

4 Thygesen, K., et al (2012). Third universal definition of myocardial infarction. European Heart Journal (2012) 33, 2551–2567

5 A Guide to Implementing Primary Angioplasty (2009). NHS Improvement.

6 2013 ACCF / AHA Guideline for the Management of ST-Elevation Myocardial Infarction (2013). A Report of the American College of Cardiology Foundation / American Heart Association Task Force on Practice Guidelines. Journal of the American College of Cardiology.

7 Guidelines on myocardial revascularization (2010). Task Force on Myocardial Revascularization of the European Society of Cardiology (ESC) and the European Association for Cardio-Thoracic Surgery (EACTS). European Heart Journal.

Pre-hospital Care

As the treatment goal for STEMI patients is to reduce total ischaemic time, direct care begins at first medical contact for those who have called the emergency services. Internationally, a number of healthcare systems have developed clearly defined networks with pre-hospital protocols which provide a coherent ambulance / EMS response with that of receiving hospitals to facilitate provision of an optimised reperfusion strategy. These include ambulance / EMS personnel undertaking pre-hospital ECG and making diagnosis, or transmission of ECG for interpretation at the AED, activation of the system with decision on whether to transport a patient direct to a PCI–capable (primary diversion) or non PCI-capable hospital. Furthermore, direct transport to the Cardiac Catheterisation Laboratory (CCL) to perform primary PCI (bypassing the AED), for those patients who do not require emergent stabilisation upon arrival, are also strategies employed to reduce total ischaemic time.[8,9]

However, a proportion of patients with heart attack also present to hospitals by themselves, or are transported to non-PCI capable hospitals. Therefore, decisions on whether to transport patients immediately to a PCI-capable hospital or administer fibrinolytic therapy must be made, based on clearly defined criteria, well-coordinated and established protocols.[10,11]

Hospital Services for Emergency Care

For patients presenting to the AED with symptoms suggestive of heart attack, they receive high priority triage including ECG, close monitoring and rapid assessment to diagnose STEMI, with decision on and adoption of the most appropriate reperfusion therapy.

In terms of treatment, timely primary PCI is now considered the gold standard for STEMI, being superior to thrombolytics in coronary reperfusion success and survival rates, reducing the possibility of reinfarction, recurrent ischaemia and risk of stroke.[12,13,14]

8 2013 ACCF / AHA Guideline for the Management of ST-Elevation Myocardial Infarction (2013). A Report of the American College of Cardiology Foundation / American Heart Association Task Force on Practice Guidelines. Journal of the American College of Cardiology.
9 Myocardial Ischaemia National Audit Project (2012). National Institute for Cardiovascular Outcomes Research.
10 Ibid.
11 Guidelines on myocardial revascularization (2010). Task Force on Myocardial Revascularization of the European Society of Cardiology (ESC) and the European Association for Cardio-Thoracic Surgery (EACTS). European Heart Journal.
12 Henning R. et al (2003). A comparison of coronary angioplasty with fibrinolytic therapy in acute myocardial infarction. N Engl J Med, 2003; 349:733-742.
13 2013 ACCF / AHA Guideline for the Management of ST-Elevation Myocardial Infarction (2013). A Report of the American College of Cardiology Foundation / American Heart Association Task Force on Practice Guidelines. Journal of the American College of Cardiology.
14 Hartwell D (2005). Clinical effectiveness and cost-effectiveness of immediate angioplasty for acute myocardial infarction: systematic review and economic evaluation. Health Technol Assess. 2005 May;9(17):1-99, iii-iv.

In addition, admission of AMI / STEMI patients to more specialised levels of care and monitoring provided by Coronary Care Units (CCUs) show significant benefits to patient outcomes.[15,16]

On recovery from the acute phase, patients may be transferred to general wards or cardiac specialty beds for care, as well as receive ongoing tests and interventions. More recent guidelines emphasise a multi-disciplinary team approach to care planning of post-AMI patients, such as between interventional cardiologists and cardiothoracic surgeons, to jointly-assess and decide further revascularisation options in partnership with the patient.

For monitoring of hospital performance related to management of STEMI patients, measures such as “door-to-needle time” for thrombolytic therapy and “door-to-balloon time” for primary PCI have been used as care quality indicators. Major influences on delays to treatment include the time to initiate help and diagnosis, as well as access to a CCL procedure room.[17,18]

15 Saitto C, et al. (2004). Outcome of patients with cardiac diseases admitted to coronary care units: a report from Lazio, Italy. Med Care, 2004 Feb;42(2):147-54.
16 Herlitz J, et al. (2008). Epidemiology of acute myocardial infarction with the emphasis on patients who did not reach the coronary care unit and non-AMI admissions. International Journal of Cardiology, 128 (2008) 342–349.
17 Berger PB., et al (1999). Relationship between delay in performing direct coronary angioplasty and early clinical outcome in patients with acute myocardial infarction: results from the global use of strategies to open occluded arteries in Acute Coronary Syndromes (GUSTO-IIb) trial. Circulation, 1999 Jul 6;100(1):14-20.
18 Bradley EH., et al (2006). Strategies for reducing the door-to-balloon time in acute myocardial infarction. N Engl J Med, 2006;355:2308-20.

Cardiac Rehabilitation

Finally, as part of post-AMI management, structured cardiac rehabilitation and use of secondary prevention medicines are clinically-effective to improve patient outcomes.[19,20]

For patients with CHD, rehabilitation in the form of "structured cardiac rehabilitation programmes" is delivered by multi-disciplinary teams. The aim is to improve physical and psychological function and reconditioning, with a focus on secondary prevention and lifestyle modification. For maximum effectiveness rehabilitation should start as soon as the patient is stabilised in the acute setting. In addition, rehabilitative care should integrate across acute, out-patient and community services, with timely access to intensive acute rehabilitation and long-term follow-up.

As such, cardiac rehabilitation is characterised by a continuum of rehabilitation services that spans in-patient (Phase 1), early post-discharge and out-patient (Phase 2), out-patient to community setting (Phase 3) and long term maintenance in the community (Phase 4). The out-patient phase is typically characterised by a structured programme of assessment and review, supervised exercise and with education, counselling and referral in relation to lifestyle and risk factor modification, psychological support, as well as to reduce cardiac misconceptions.[21]

19 Heran BS, et al. (2011). Exercise-based cardiac rehabilitation for coronary heart disease. Cochrane Database of Systematic Reviews.

20 Cooper A., et al. (2007). Clinical guidelines and evidence review for post myocardial infarction: Secondary prevention in primary and secondary care for patients following a myocardial infarction. London: National Collaborating Centre for Primary Care and Royal College of General Practitioners.

21 Cardiac Rehabilitation. A national clinical guideline (2002). Scottish Intercollegiate Guidelines Network.

Framework Scope

This Framework will guide the overall development and organisation of HA CHD services. Its scope precludes the overall CHD health service developments in Hong Kong, such as the wider role of the Government, private services and independent sectors. However, the HA plays a significant role in the provision of cardiac services in Hong Kong and reference is made to the overall burden of CHD. Therefore, where appropriate, acknowledgement is made to the role of other organisations.

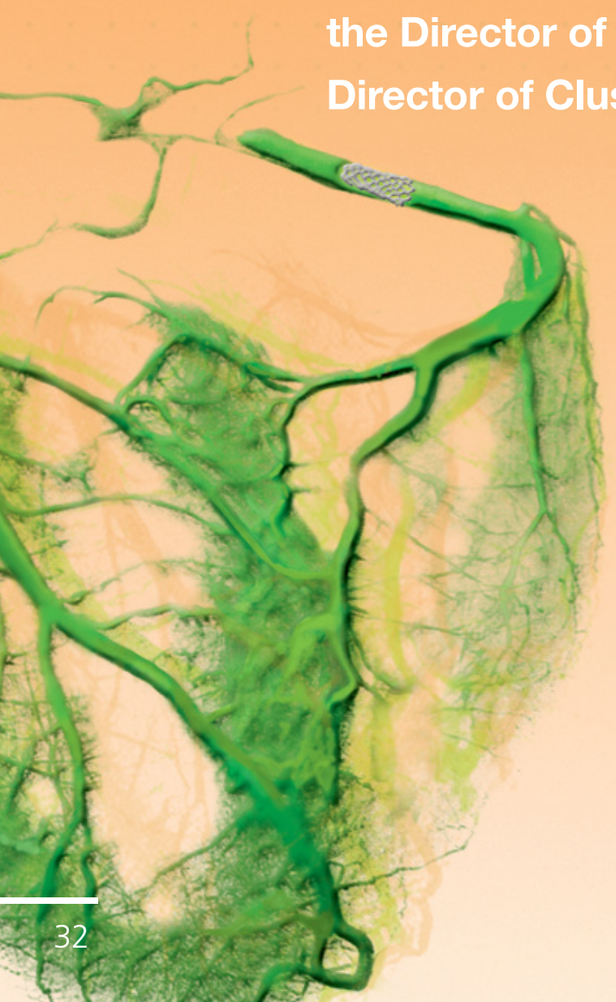
The Framework provides a description of the strategic directions that HA will embark on to address the key CHD service challenges identified. While specific operational details for implementation are beyond the scope of this Framework, it provides an overarching blueprint for HA clinicians and executives to align and coordinate their service development initiatives through the annual planning process.

Finally, taking into account the views of clinicians and other healthcare professionals during the development process, the Framework has specific action plans on AMI, set within the wider context of CHD. Other suggestions on key cardiac service developments, such as cardiothoracic surgery and radiology services, are also described.

PLANNING PROCESS

Governance

Development of the Framework has been conducted under the guidance of a Taskforce under the co-chairmanship of the Director of Strategy & Planning and the Director of Cluster Services of HA.



The terms of reference and membership of the Taskforce are in Appendix 2. Work of the Taskforce was supplemented by three Working Groups, which examined specific service issues and development priorities in HA, including primary, acute and rehabilitation care (Appendix 3). Advice during development of the Framework was sought from the members of the Directors' Meeting. Following formulation, the Framework was submitted to the Directors' Meeting, followed by the Medical Services Development Committee for approval.

Methodology

A highly participative and broad engagement approach has been adopted in development of the Framework. This involved briefings to the HA Clinical Coordinating Committees (COC) of Medicine and Accident & Emergency, the Central Committee on Cardiac Service (CC (Cardiac)), as well as over 15 hospital site visit meetings with frontline healthcare professionals from various specialties involved in CHD care.

Following a series of working group meetings examining HA CHD services in the primary care, acute and rehabilitation setting, a workshop supported by an international expert in cardiac service design, with attendance of over 66 HA professionals, was held to map future service directions. In addition, the emergency PCI service was particularly looked into, to explore specific developments of the acute cardiology service. The working group and workshop members identified particular challenges and opportunities in HA's CHD services, which if addressed could make significant contributions to improving patient care. These included workforce, performance monitoring, advances and innovation and other components along the clinical pathway.

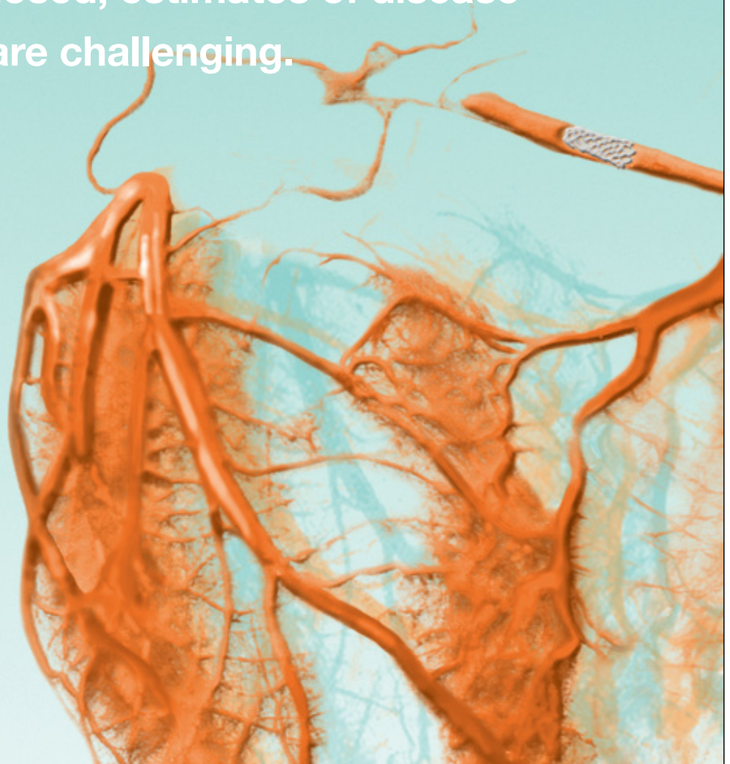
From 27 February 2013 to 2 April 2013 the draft Framework was made available as a consultation document to around 200 key stakeholders across HA, to solicit feedback and suggestions. Stakeholders included senior management, executives, physicians, surgeons, nurses, pharmacists and allied health professionals in HA, as well as COCs and CCs (including A&E, Cardiac, Family Medicine, Medicine, Surgery, Pharmaceutical Services, Radiology, Rehabilitation), and Specialty Groups (such as Cardiology, Cardiothoracic Surgery, Nursing). Responses received were carefully analysed and discussed by the Taskforce and used as a basis to refine the Framework.

In addition, members of the HA Patient Advisory Committee and cardiac patient group representatives were consulted on the Framework strategies and upcoming HA cardiac service developments, on 26 March and 8 May 2013 respectively.

CURRENT SITUATION

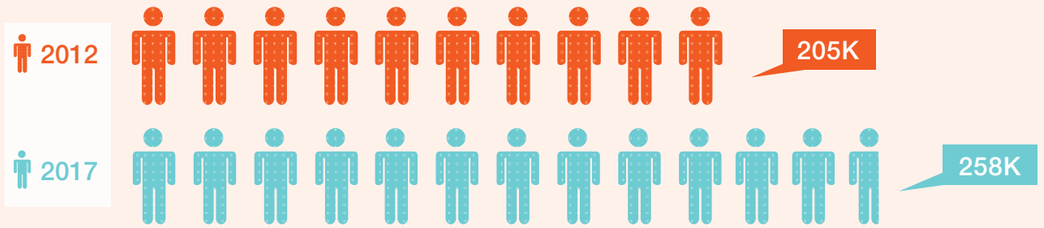
Coronary Heart Disease in Hong Kong

CHD remains the second leading cause of death in Hong Kong and continues to be a major disease burden. Since both local and international experience demonstrates that a large proportion of people with CHD are unaware of their condition and undiagnosed, estimates of disease prevalence are challenging.



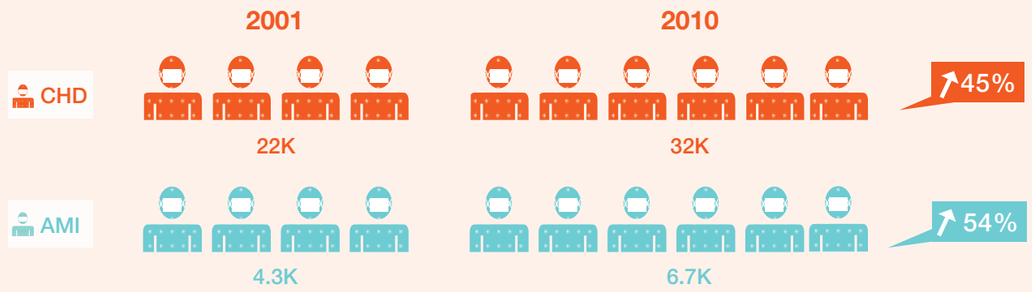
Current HA data reveals that in 2012 there were around 205 000 patients being treated for CHD, covering both in-patient and out-patient settings. In addition, it is projected that the number of patients being treated by HA for CHD will increase by 26% over the next five years to around 258 000 (Figure 1).[22]

Figure 1. Projected increase in CHD patients treated in HA (2012 and 2017)



To further illustrate the rising burden to HA, since 2001 the number of in-patient discharges and deaths due to CHD has risen by 45%, to around 31 974 in 2010. For AMI, the increase is even more profound, with a rise of 54% in HA in-patient discharges and deaths between 2001 and 2010 (4 325 compared to 6 668, respectively) (Figure 2). Thus, indications are towards a rising tide of CHD burden in HA.

Figure 2. Relative increase in number of in-patient discharges and deaths due to CHD and AMI, between 2001 and 2010 in HA



The local scene reflects disease trends internationally, particularly as more people are living longer with chronic diseases, such as CHD. The World Health Organisation has ranked CHD second in the top causes of disability and premature death in the world by 2030.[23]

22 HA Strategic Service Plan 2012-2017 (Including in-patients, out-patients and patients seen in Specialist Out-patient Clinics, General Out-patient Clinics and Family Medicine Specialist Clinics).

23 The global burden of disease: 2004 update (2008). World Health Organisation.

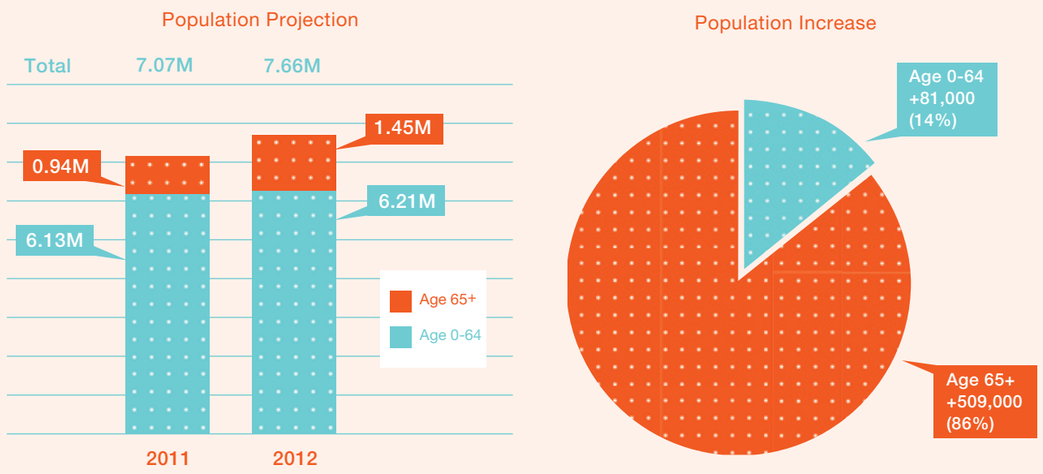
Factors Contributing to the Burden of CHD in Hong Kong

CHD is moderated by a number of determinants, some non-modifiable, such as age, sex and family history, whereas others are modifiable, such as diabetes mellitus (DM), hypertension (HT), smoking, abnormal blood lipid profile, obesity, lack of physical exercise, poor diet and stress. A brief overview CHD risk factors are given below:

Population Ageing

Prevalence of CHD increases with age and the population of Hong Kong is ageing. Between 2011 and 2021 the Hong Kong population is projected to grow by just over 8%. However, there is a disproportionate increase in the elderly, with the number of people aged 65 years or over increasing by 54% over the same period (0.94 million to 1.45 million) (Figure 3).[24] One reason for this is that life expectancies at birth are increasing. In 2011, life expectancies were estimated at 80.5 years for men and 86.7 years for women, but in 2021 they are projected to be 82.3 years and 88.5 years, respectively.[25]

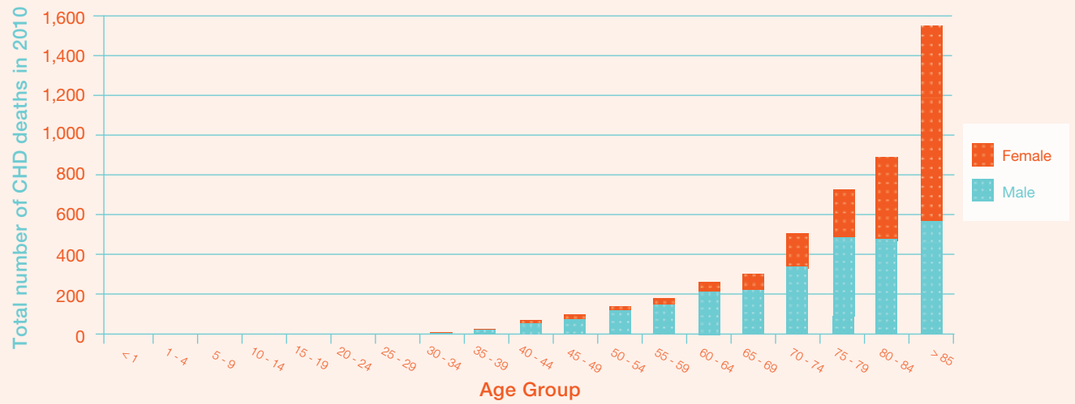
Figure 3. Demographic change, year 2011 to 2021[26]



24 Hong Kong Population Projections 2012-2041 (2012). Census and Statistics Department, Government of the HKSAR.
25 Hong Kong Life Tables 2006-2041 (2012). Census and Statistics Department, Government of the HKSAR.
26 Hong Kong Population Projections 2012-2041 (2012). Census and Statistics Department, Government of the HKSAR.

Since prevalence of CHD increases with age, the rapid ageing population of Hong Kong suggests a steep rise in the number of people living with CHD - and for longer. For example, Figure 4 shows the total number of CHD deaths by age group and sex in Hong Kong. It shows a rapid increase in number of deaths from CHD in older age groups. In addition, although more men than women die from CHD, the difference narrows with advancing age.

Figure 4. Total number of CHD deaths by age group and sex, 2010[27]



Also, HA data shows that elderly patients are often sicker or have more complex medical conditions, which result in higher numbers of admissions and longer lengths of stay.[28] Taken together, the rise in elderly with CHD is set to pose a formidable challenge to the public healthcare system.

Biomedical and Behavioural Risk Factors

A significant burden of CHD is attributed to behavioural factors, including unhealthy diet, physical inactivity and smoking. Biomedical factors, such as obesity, DM, HT and dyslipidaemia are also known to contribute to CHD. Since the effects of these modifiable risk factors on CHD accumulate with increasing age, it is essential that they are reduced or managed as much as possible to help prevent disease onset and progression.

The number of people in Hong Kong with preventable or modifiable risk factors for CHD is significant and likely to be underestimated as many people are unaware of their condition. These are summarised below:

27 Census and Statistics Department, Government of the HKSAR.
28 HA Strategic Plan 2012-2017.

Diabetes

Diabetes is a substantial risk factor for CHD, with diabetics at two to five times the risk of developing CHD compared to those with normal blood glucose levels.[29] DM currently affects around one in ten people in Hong Kong, with incidence increasing and an estimated half of all cases undiagnosed.[30]

Hypertension

Hypertension is often under-diagnosed and under-managed. Local data suggests around 27% of persons aged 15 years or over in Hong Kong are hypertensive, with around half unaware of having raised blood pressure.[31]

Dyslipidaemia

Average cholesterol level in a population is associated with CHD risk.[32] The 2003/04 Heart Health Survey found that around a third of local persons aged 15 to 84 years-old investigated had sub-optimal cholesterol concentrations.[33]

Overweight and Obesity

Obesity increases the risk of a number of diseases including DM, HT and CHD. In Hong Kong approximately 38% of the population aged 18-64 years-old are classified as either overweight or obese (based on Asian reference of BMI≥23).[34]

Smoking

Smoking significantly increases risk of CHD and impact on disease progression is even greater in individuals with DM or HT. Approximately 11% of the Hong Kong population aged 18 to 64 years-old are current smokers, with a significantly higher percentage of smoking amongst men compared with women (19% compared to 4%).[35]

29 Dunn, N. (2008). Prevention of coronary heart disease in general practice. Oxford Journals: InnovAiT (1):14-25.
30 Hong Kong Reference Framework for Diabetes Care for Adults in Primary Care Settings (2010). Department of Health, Government of the HKSAR.
31 Hong Kong Reference Framework for Hypertension Care for Adults in Primary Care Settings (2010). Department of Health, Government of the HKSAR.
32 Dunn N. (2008). Prevention of coronary heart disease in general practice. Oxford Journals: InnovAiT (1):14-25.
33 Cholesterol at borderline high or above
34 Behavioural Risk Factor Survey April 2012 (January 2013). Surveillance and Epidemiology Branch, Centre for Health Protection, Department of Health.
35 Ibid.

Unhealthy Diet

The relationship between diet and CHD is complex, with a poor unbalanced diet contributing to disease. It is estimated that around 82% of adults aged 18 to 64 years-old do not meet current WHO recommendations on daily fruit or vegetable consumption.[36]

Physical Inactivity

Regular physical activity lowers the risk of CHD and physically inactive people have about twice the risk of CHD of active people.[37] In Hong Kong most people are sedentary, with around 60% of adults aged 18 to 64 years-old not meeting the WHO's recommendation on level of physical activity.[38]

Co-morbidities

The presence of multiple co-morbidities in an individual, such as DM and HT, amplify the risk of CHD and AMI. Furthermore, since these chronic conditions share similar aetiology, there is a strong imperative to first reduce the level of risk factors for these diseases and second to control and manage these chronic diseases early when they occur, to help control service demand upstream in the patient pathway.

To illustrate the burden of multiple co-morbidities, data regarding chronic disease patients in HA (CHD, DM or HT) in 2010 reveal that among all CHD cases, 34% were diabetic, 87% hypertensive, and 89% with DM or HT. For all DM cases around 16% had CHD, whereas for HT patients 15% had CHD.[39]

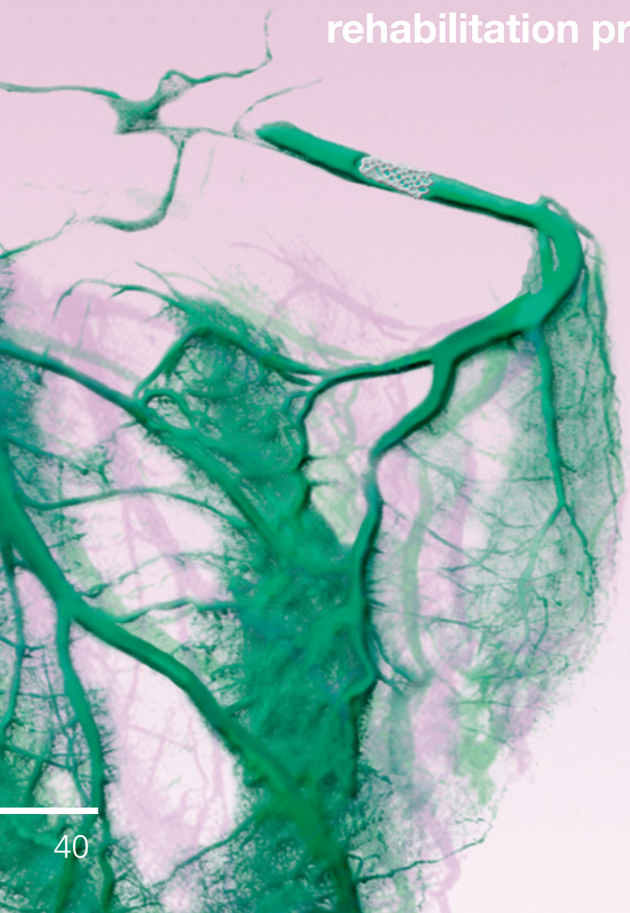
Summary

CHD is a significant growing burden of disease to HA. With a rapidly ageing population and presence of risk factors for CHD, this is likely to drive up service demand - from management in the primary care setting, emergency and acute interventions, through to rehabilitation and ongoing care. In addition, within the HA system there are already substantial numbers of patients with DM and HT, or those with multiple co-morbidities at risk of CHD and AMI. Proactive disease management approaches for these patients has potential to moderate rising service demand upstream in the CHD pathway, by reducing or delaying disease progression and identifying those at greatest risk for more specialist management and intervention.

36 Ibid.
37 Dunn, N. (2008). Prevention of coronary heart disease in general practice. Oxford Journals: InnovAiT (1):14-25.
38 Ibid.
39 HA Statistics and Workforce Planning Department (refers to chronic disease patients ever defined as having CHD, diabetes, hypertension in 2010 or before and still alive in 2010).

CURRENT CARDIAC SERVICES IN HA

The HA provides a comprehensive range of primary care services, as well as hospital in-patient and out-patient cardiac services, ranging from diagnostic procedures, percutaneous interventions, cardiac surgery, specialised out-patient consultations and rehabilitation programmes.



Chronic Disease Management

General Out-patient Clinic Services

The HA provides primary care through its GOPC service, which targets the elderly, low income individuals and patients with chronic diseases. Patients under the care of GOPCs can be broadly divided into two main categories, namely chronic disease patients with stable conditions (e.g. DM, HT) and episodic disease patients with relatively mild symptoms (e.g. influenza, colds).

Over the past few years multi-disciplinary approaches to care have been developed and chronic disease management programmes provided for targeted conditions, such as DM and HT. For example, since 2009 the HA has initiated the Risk Assessment and Management Programme (RAMP) as a protocol driven programme for diabetic patients with or without HT in GOPCs. The aim is to enhance chronic disease management in primary care through risk assessment, complication screening and empowerment, as well as secondary prevention and management, through multi-disciplinary approaches.

Recent evaluations of the RAMP demonstrate higher levels of patient satisfaction, significant improvements in HbA1c, target blood pressure, reductions in low-density lipoprotein cholesterol, and projected reduced risk of cardiovascular morbidity and mortality.[40,41] In addition, in 2011/12 the RAMP has been extended to cover HT patients with uncontrolled blood-pressure.

40 Evaluation of Quality of Care, HA Chronic Disease Management Programmes: Multi-disciplinary Risk Assessment and Management Programme (RAMP). Final Report (2012). Department of Family Medicine and Primary Care, The University of Hong Kong.

41 Evaluation Study of Stakeholder satisfaction of Multi-disciplinary Risk Assessment and Management Programme (RAMP). Final Report (2012). The Jockey Club School of Public Health and Primary Care, The Chinese University of Hong Kong.

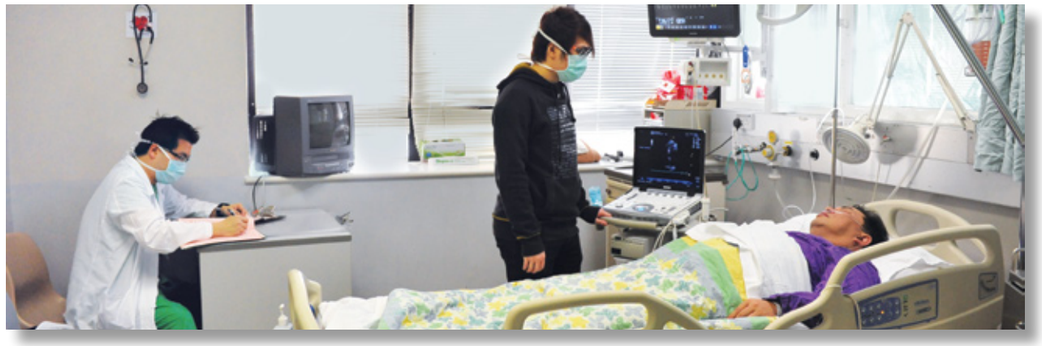
Specialist Out-patient Clinic Services

The cardiology SOPC is one of the sub-specialty clinics under Medical SOPC. Cardiology out-patient clinics provide the main bulk of ambulatory care for patients with all forms of cardiovascular diseases and serve as the entry point for non-urgent new patients to be assessed by specialists.

Cardiology SOPC service demand has been significant and is rising. For SOPC attendances, between 2005/06 and 2011/12 there has been a 7% increase in cardiology SOPC attendances, compared to 9% in medical specialty SOPC attendances. In 2011/12 cardiology SOPC attendances represented around 13% of all medical SOPC attendances.[42]

Hospital Services for Emergency and Elective Care

The HA is the main in-patient cardiac service provider in Hong Kong. In 2010, the HA accounted for around 86% of all CHD in-patient discharges and deaths in Hong Kong hospitals. For AMI, the percentage is even higher, with 96% of discharges and deaths being in HA hospitals. CHD patients accounted for 31 974 in-patient discharges and deaths, and 157 200 patient bed days (2.1% of HA total) in 2010.[43,44] The HA provides a comprehensive urgent invasive in-patient cardiac service including PCI (either primary, emergency, urgent or elective PCI),[45] cardio-thoracic surgical services, urgent life-support device insertion (such as intra-aortic balloon pump and cardio-pulmonary bypass), as well as urgent device implantation (such as pacemaker and implantable cardioverter-defibrillators).



42 HA Executive Information System.
43 HA Statistical Reports: 2010-2011.
44 HA Statistics and Workforce Planning Department Website. Accessed November 2012.
45 Based on the HA Cardiac Survey 2011/12, the following definitions were used: Primary PCI - PCI done for the purpose of primary revascularization for patients presented with STEMI; Emergency PCI - PCI done as soon as possible (excluding primary PCI); Urgent PCI - PCI done within the same hospital stay; Elective PCI - PCI done on an elective basis.

Cardiac Sub-specialty Beds

In HA there are currently 283 cardiac sub-specialty beds to provide specialist care. They include step-down care of stabilised patients from CCU, initiation of cardiac rehabilitation programmes for recovering AMI / Acute Coronary Syndrome (ACS) patients, peri-procedural management of CCL cases, as well as special cardiac interventions (e.g. cardiac pacing). Furthermore, to support streamlined patient flow and shorten hospital stay, the HA started to provide cardiac day procedure beds in 2001/02 and it has gradually risen to 50 beds by 2011/12, supporting patients undergoing a range of diagnostic and interventional procedures, such as elective angiography and angioplasty, as well as electrophysiology studies and device implantation on an ambulatory basis.[46]

Coronary Care Units

There are 16 hospitals providing CCU services for close monitoring, intensive support and specialised interventions for critically ill patients, such as for AMI / STEMI, as well as peri-operative care for cardiac surgery patients, while one hospital provides care via its High Dependency Unit. In total, there are 92 CCU beds across HA and all hospitals with CCLs facilities possess CCU beds.[47]

The CCU is staffed by specialist multi-disciplinary teams, including cardiologists and specialist cardiac nurses. Of importance, CCU bed availability during the day and at night is directly related to the level of cardiac nursing staff, due to the intensiveness of monitoring and treatment.

Although the number of CCU beds has increased over the last few years, from 81 beds in 2005/06 to 92 in 2011/12,[48] the CCU admission rate of AMI / ACS episodes dropped from 36% in 2006/07 to 29% in 2011/12.[49] In general, this is believed to be caused by rising numbers of cardiac cases with increasing complexity admitted to CCU in HA; with patients being older, sicker and with more complex needs. In addition, with advances in technology and treatment there are also increasing demands on staff regarding the intensity of care given.

46 HA Cardiac Survey 2011/12.
47 Ibid.
48 The CCU beds of RHTSK are subsumed in cardiac ICU and the number is floating.
49 HA Clinical Data Analysis and Report System (CDARS). AMI / ACS patients admitted to RHTSK CCU beds data are not reflected as they are not captured in the system.

PCI Services

Recent service statistics show that there were 6 166 PCIs performed in HA in 2011/12, reflecting year-on-year increases in service demand. Of the total number of PCIs performed around 6% were as primary PCI for STEMI, 6% as emergency, 26% as urgent and 62% on an elective basis.[50] The waiting time for elective PCI ranges from 4 weeks to 24 weeks. Across HA, the volume of PCI procedures varies by almost 10-fold between hospitals, reflecting different patterns of demand, different service capacities and different service delivery models.

As of 31 March 2013, the HA has 13 hospitals with capability for PCI. The majority of PCI capable hospitals provide a primary PCI services for STEMI on an "in-hours" basis. Currently there are four hospitals in three clusters providing routine extended hours primary PCI services (12 hours per day, Monday to Friday). These include Queen Mary Hospital, Queen Elizabeth Hospital, Pamela Youde Nethersole Eastern Hospital and Ruttonjee Hospital. In addition, Queen Mary Hospital is piloting 24-hours primary PCI coverage.

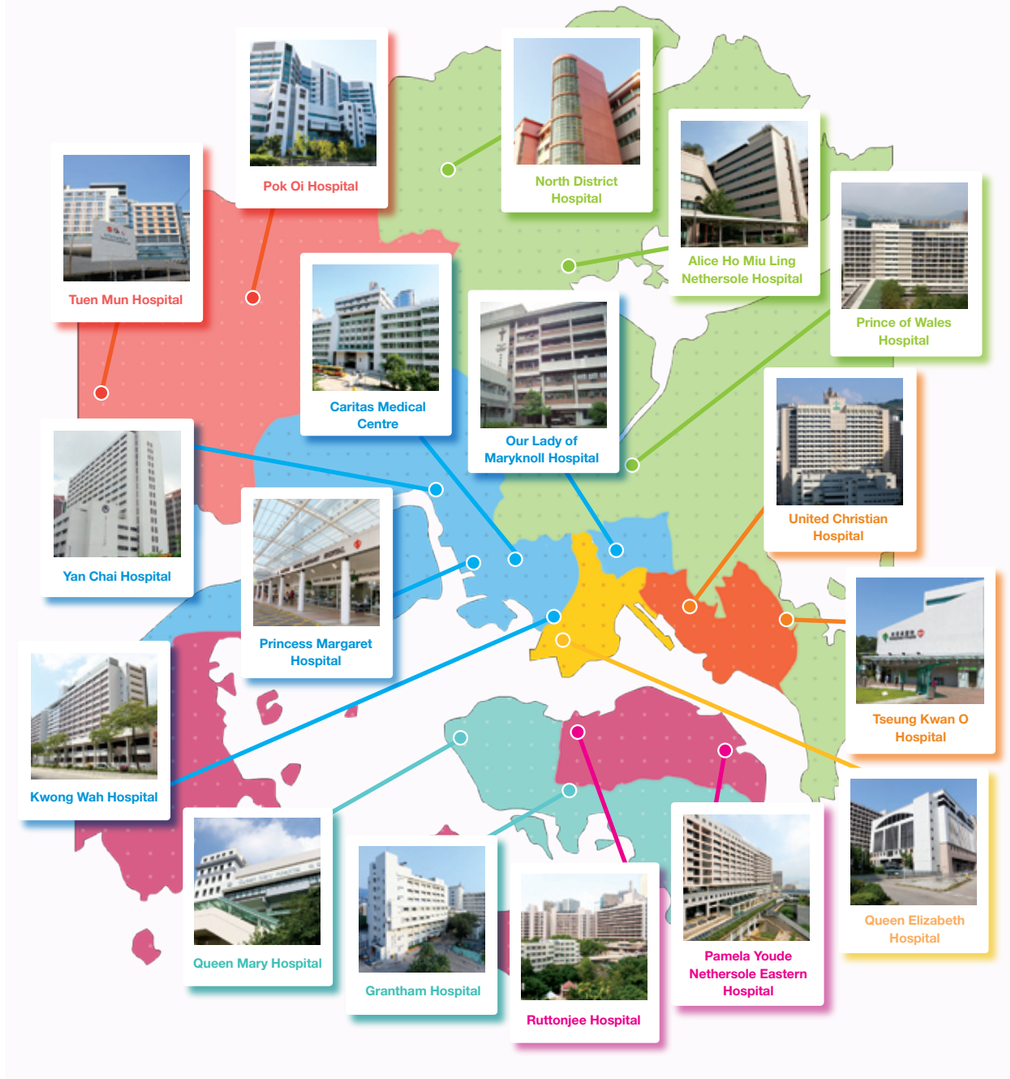
In general, outside of the CCL operating hours, primary PCI may be performed on a case-by-case basis, if there are specific indications (e.g. contraindication to thrombolytic therapy or haemodynamic instability). Otherwise, thrombolytic therapy is normally offered as the first-line therapy. In 2011/12 there were 356 primary PCIs performed within HA.[51]

Historically, there has been significant investment in cardiac service infrastructure in HA and much of this has been on a hospital-by-hospital basis. As a consequence, different hospitals purporting to have cardiac services (Figure 5) have different service profiles, staffing, and service level capabilities.

Taking into account sharing of facilities, there are 14.3 CCL procedure rooms across HA, in 13 hospitals (31 March 2013).[52] There is at least one hospital per cluster equipped with a CCL for diagnostics and interventions, and in general CCLs are used for both coronary and electrophysiological diagnostic studies, as well as interventions. The variable distribution of CCLs amongst HA hospitals means that the level and complexity of interventional services offered varies.

Currently, there are four cluster regional hospitals with two CCL procedure rooms each (namely Queen Mary Hospital (QMH), Queen Elizabeth Hospital (QEH), Pamela Youde Nethersole Eastern Hospital (PYNEH) and Prince of Wales Hospital (PWH)). The remaining three cluster regional hospitals, Princess Margaret Hospital (PMH), United Christian Hospital (UCH) and Tuen Mun Hospital (TMH), possess single CCL procedure rooms. In addition, Kwong Wah Hospital (KWH), as well as Grantham Hospital (GH), has a single CCL procedure room. There are four hospitals in which facilities are shared with Radiology Departments in order to perform catheterisation and PCI procedures (Ruttonjee Hospital (RH), Caritas Medical Centre (CMC), Pok Oi Hospital (POH), and North District Hospital (NDH)). Finally, four hospitals with cardiology teams do not have CCL facilities (Yan Chai Hospital (YCH), Tseung Kwan O Hospital (TKOH), Our Lady of Maryknoll Hospital (OLMH) and Alice Ho Miu Ling Nethersole Hospital (AHNH)).

Figure 5. HA hospitals with cardiology teams



50 Based on the HA Cardiac Survey 2011/12, the following definitions were used: Primary PCI - PCI done for the purpose of primary revascularization for patients presented with STEMI; Emergency PCI - PCI done as soon as possible (excluding primary PCI); Urgent PCI - PCI done within same hospital stay; Elective PCI - PCI done on an elective basis.

51 HA Cardiac Survey 2011/12.

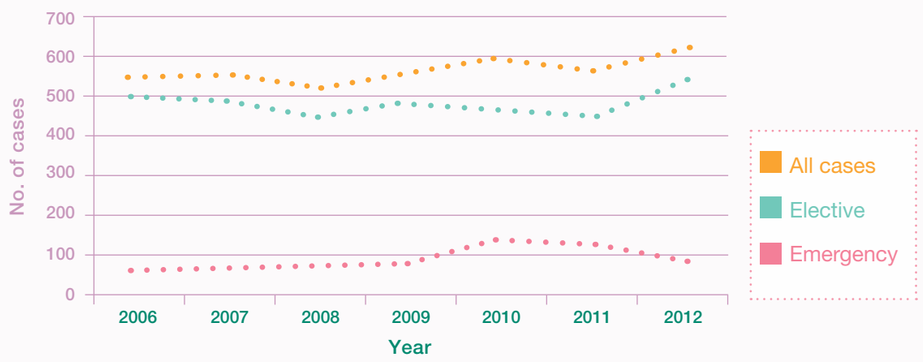
52 Refers to full-time equivalent procedure rooms available, as some procedure rooms are shared with other departments, such as Radiology.

Cardiothoracic Surgery Services

There are three cardiothoracic surgical centres in HA; namely, QMH, QEH and PWH. To better align service arrangements, a referral network system is maintained for both cardiac and thoracic surgery in HA. QMH also provides paediatric cardiothoracic surgical services and heart-lung transplant services for HA.

There has been a steady increase in the number of coronary artery bypass graft (CABG) surgeries performed in HA (Figure 6), from around 550 in 2006 to 610 in 2012. The proportion of emergency CABG of all cases has also increased over the years, from around 11% in 2006-2008 to around 19% in 2010-2012.[53]

Figure 6. CABG Surgery performed by HA Cardiothoracic Surgery Teams (2006 to 2012)



Cardiothoracic surgery has a particularly important role within the CHD pathway, as part of an optimised systems-wide revascularisation strategy. In particular, cardiothoracic surgical teams have an important role in joint assessment and decision-making with cardiology for the planning of patient revascularisation and management. In addition, cardiothoracic surgery has a crucial back-up function to PCI services, including CABG for failed primary PCI patients or coronary anatomy not amenable to PCI, and surgical repair of mechanical defects, such as ventricular septal, papillary muscle, or free-wall rupture. Given the importance of cardiothoracic surgical support to PCI, international guidelines provide specific recommendations and criteria where there is establishment of PCI programmes at hospitals without onsite cardiac surgery.[54]

Cardiac Imaging

Advances in imaging technologies have led to increase in the potential application of a range of cardiac imaging modalities for the risk stratification, diagnosis, and prognostication to guide patient management across the CHD pathway. These include, Computed Tomography, Magnetic Resonance Imaging and Nuclear Cardiology, which provide the capability for anatomical and functional imaging.

Other Elective Services

Invasive interventional therapies that can be provided on an elective day-patient basis include PCI, electrophysiology studies and arrhythmia management by catheter ablation therapy, as well as elective device implantation, such as pacemaker and implantable cardioverter-defibrillators. In addition, non-invasive services also provided on an out-patient basis include diagnostic testing (such as stress testing, echocardiogram and Holter). Table 1 shows the annual total volume of procedures performed in HA.

Table 1. Total volume of procedures for diagnostic and other interventional services (2011/12)[55]

Transthoracic Echocardiogram	Transoesophageal Echocardiogram	Stress Echo	Exercise Stress Test	Holter	Electrophysiology Study	Ablation	Pacemaker Implantation*	Implantable Cardioverter Defibrillator*
50 076	1 296	763	12 645	21 601	818	574	1 657	204

*Includes procedures in OT or shared facilities in hospitals without CCL

53 Operating Theatre Records System, HA (Extracted 9 May 2013)

54 2011 ACCF / AHA / SCAI Guideline for Percutaneous Coronary Intervention (2011). Journal of the American College of Cardiology.

55 HA Cardiac Survey 2011/12.

Cardiac Rehabilitation

Despite evidence on positive clinical outcomes, the coverage of cardiac rehabilitation services in HA has been lagging behind the development of acute services. As a result, there is considerable variation across hospitals and clusters in terms of the scope and comprehensiveness of rehabilitation. Currently around 13 out of 17 cardiac teams in HA have access to cardiac rehabilitation phase 1, and 12 out of 17 to phase 2. Furthermore, despite the rise in numbers of CHD / AMI patients, the total number of patients in phase 1 rehabilitation is comparatively low. For example, in 2011/12 around 3 440 cardiac patients were reported to have received phase 1 rehabilitation, which was the lowest in four years.[56] Also, analysis of cardiac patients eligible for rehabilitation in HA (including AMI, angina, cardiac surgery, heart failure, as well as those at significant risk of CHD) showed that less than 20% receive phase 1 rehabilitation.[57]

Workforce

People are the most precious resource to HA and the issue of workforce is distinct and cuts across all services. People are the key to providing high quality services across the patient pathway and the agents of change to improve care in the future. Similar to infrastructure, development of the cardiac workforce has been on a hospital-by-hospital basis.

Doctors

In 2011/12 there were a total of 104 cardiologists and 33 cardiology fellows in training in HA (1.47 cardiologists per 100 000 population).[58] Of the 104 cardiologists, there were 43 interventionists trained to perform PCI and 22 interventionists specialised in diagnostic electrophysiological studies and interventions. This represents an increase in cardiology specialist strength

56 HA Cardiac Survey 2011/12.
57 HA CDARS 2010/11 and HA Cardiac Survey 2010/11.
58 Based on 2011 mid-year population, HA Statistics and Workforce Planning Department.

since 2010/11, in which the number of cardiologists was 84 (1.19 cardiologists per 100 000 population).[59] Overall, cardiologists (excluding fellows in training) represent around 10% of Medicine and Geriatrics Doctors in HA. Across the HA clusters the relative number of cardiologists varies.[60] The current hospital-based workforce has impact on cardiology specialty training. Doctors are often required to specially arrange attachments in different hospitals to obtain the expected exposure in different fields of cardiac specialty activities.

Nurses

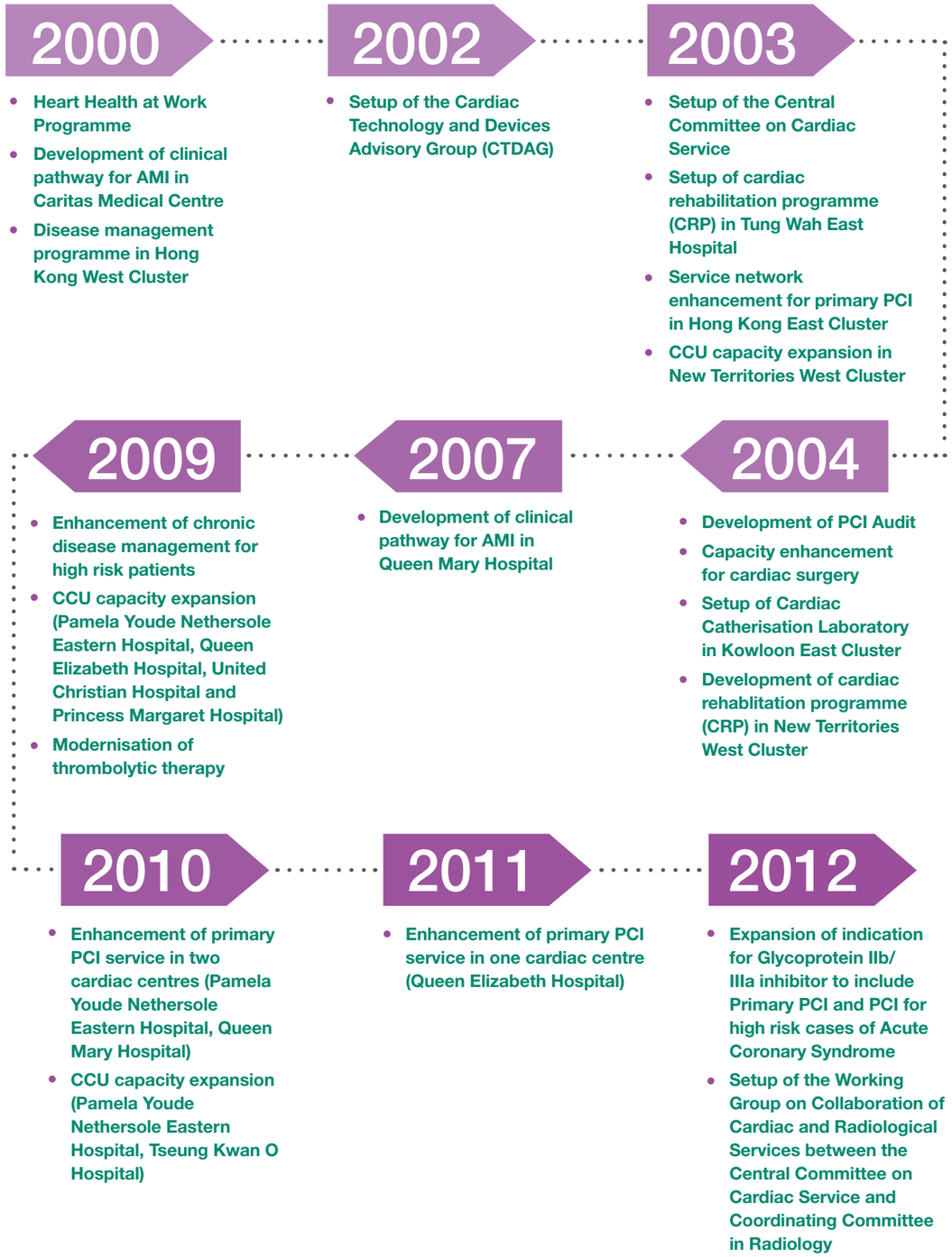
In 2011/12, there were 365 HA nurses dedicated to cardiac services. Similar to doctors, their relative number varies across the clusters. Of these around 200 nurses were in CCUs and 46 nurses in CCLs. Overall, there were 2.19 nurses per CCU bed (similar to the COC (Nursing) standard of 2.1 nurses per HDU bed) and 3.23 nurses per CCL procedure room.[61] Finally, for the specialty of Cardiothoracic Surgery in HA, there are currently around 20 perfusionists.[62]

Summary of Recent Developments in HA CHD Services

In light of the growing burden of CHD, efforts have been made over the past decade on disease prevention, enhancing cardiac care capacity across the patient pathway, and adoption of new and innovative technologies and information systems in coping with the increasing burden. A summary of HA developments is given in figure 7.

59 Ibid.
60 HA Cardiac Survey 2010/11 and 2011/12.
61 HA Cardiac Survey 2011/12. Refers to nurses dedicated to cardiac services (i.e., with majority of their time spent on cardiac activities – both invasive and non-invasive) in the hospital, including the following: CCU, CCL, cardiac rehabilitation, echo, electro-diagnostic unit and other cardiac nurses.
62 Nursing Services Department, Hospital Authority Head Office (May 2013)

Figure 7. Development in HA CHD services in recent years



Non-Hospital Authority Services

Apart from healthcare services provided by the HA, a range of other health and social care services are provided by Government departments, which play an integral role in supporting better population health and patient care.

The Department of Health (DH) has a key role in health promotion and disease prevention. The DH has developed a strategic framework on prevention and control of non-communicable diseases (NCD) in Hong Kong, with subsequent action plans to promote healthy diet, physical activity and reduce alcohol-related harm. Under the DH a number of agencies, units and offices have been set-up to collaboratively enhance disease surveillance, run prevention programmes, promote public health education and risk communication, enhance primary health care to elderly, and develop primary care services in Hong Kong. These include the Centre for Health Protection, Elderly Service, Central Health Education Unit and Primary Care Office (PCO).[63]

The PCO, set-up under the DH in 2010, supports the coordinated development of primary care in Hong Kong and implementation of primary care development strategies. It is a joint office involving Food and Health Bureau, DH and HA. Of particular note, the PCO has published reference frameworks for the care of major chronic diseases, such as DM and HT, as well as for older patients. These provide a common reference to healthcare professionals for the provision of evidence-based care in the community, patient empowerment and education, and to raise awareness of the importance of chronic disease prevention and health promotion.

The Social Welfare Department of the Labour and Welfare Bureau stations Medical Social Workers (MSWs) in some public hospitals and specialist out-patient clinics to provide psycho-social interventions to patients and their families. In addition to helping to address social and emotional needs of patients, MSWs also support patients and their families through facilitating the linking-up of community medical and social services and assistance in applications for financial assistance.[64]

63 Department of Health, The Government of the HKSAR. Website accessed May 2013.
64 Social Welfare Department, The Government of the HKSAR. Website accessed May 2013.

KEY CHALLENGES
IN HA CORONARY HEART DISEASE SERVICES

From the discussions with senior cardiologists, cardiothoracic surgeons, nurses, pharmacists and allied health professionals, as well as senior executives and management of HA, a number of key challenges emerge in relation to CHD and the AMI / STEMI pathway, which if addressed could make improvements to patient care and outcomes.

These include issues specific to parts within the STEMI pathway, as well as those which cut across different aspects of the pathway, including workforce, performance monitoring and technological advancements.

Chronic Disease Management

Volume of Chronic Disease Patients in Primary Care

Primary Care has an important role upstream in the CHD pathway, particularly in raising awareness of CHD, its prevention, early detection, emergency response, risk assessment and management. According to 2011/12 data, there are almost 600 000 chronic disease patients being looked after by HA's GOPCs.[65] Among them, the majority are those with DM and HT, representing a significant number of patients in HA with major risk factors for CHD. Given the 4.7% projected average annual growth of chronic disease patients in GOPCs, structured multi-disciplinary chronic disease management is pivotal to manage this huge volume of patients, especially when the contact time between patients and service providers is limited.

Furthermore, taking into account the wider out-patient and in-patient setting, it is projected that between 2012 and 2017 the number of patients being treated for DM by HA will increase by 29%, from 427 000 to 549 000 patients.[66] Also, it is projected that between 2012 and 2017 the number of patients being treated for HT will increase by 29%, from 1 163 000 to 1 498 000.[67] Collectively the rising number of DM and HT patients will not only be a significant burden to HA in their own right, but further illustrates the enormous numbers of patients with significant risk factors for CHD.

Risk Stratification and Referral in General Out-patient Clinics

The current HA system does not facilitate the primary care service to provide an upstream response to help manage service demand. These include strategies to help those at increased CHD risk to reduce it, as well as to achieve more rigorous risk factor control in high-risk individuals. It is because this necessitates standard criteria-based protocols, coupled with risk scoring to facilitate decision-making in the primary care setting, linked to timely referral of patients for diagnostic investigations or assessment by specialist teams.

65 HA Statistics and Workforce Planning Department.
66 HA Strategic Plan 2012-2017.
67 HA Strategic Plan 2012-2017.

None-the-less, there is an imperative to achieve better disease control and monitoring of complications, in order to avoid preventable referrals to SOPCs, or presentation of patients to the AED when disease has progressed significantly.

Prescribing of Secondary Prevention Medicines

Within HA the prescribing rates in AMI patients for anti-platelet agents, lipid control drugs, as well as drugs to control blood pressure and improve heart function[68] at discharge are low and with cluster variations. The evidence to support medicines management to control chronic diseases, such as CHD, hypertension and diabetes are well established. In some countries, prescribing rates of these drugs, such as aspirin, statins, ACE-inhibitors and beta-blockers are well over 90%.[69] The challenge is how to enhance the prescribing of these secondary prevention medicines in HA, to levels known to be achievable in other health systems.

In addition, the full potential of HA's GOPCs in supporting uptake and compliance of secondary prevention medicines for CHD patients has yet to be realised, since there are some medications not available from the GOPC formulary. This means suitable patients are unable to be discharged from hospital SOPCs for ongoing management in the community setting.

Awareness of Heart Attack Symptoms among At-Risk Patients and Carers

Often a significant contributor to the time between symptom onset and treatment for AMI / STEMI is the decision to call for medical assistance by the patient or their family.[70] Therefore, in addition to promoting patient awareness of chronic disease management in at-risk individuals in the primary care setting, there is also a need to promote awareness among patients of the early symptoms and appropriate emergency response to conditions such as AMI. This will allow effective interventions to be undertaken in a timely fashion to provide the most benefit.

68 Clinical Practice Guideline (Management of STEMI) (2009). HA CC (Cardiac) (2009).

69 Myocardial Ischaemia National Audit Project (2011). National Institute for Cardiovascular Outcomes Research.

70 2013 ACCF / AHA Guideline for the Management of ST-Elevation Myocardial Infarction (2013). A Report of the American College of Cardiology Foundation / American Heart Association Task Force on Practice Guidelines. Journal of the American College of Cardiology.

Hospital Services for Emergency and Elective Care

Pre-hospital Care for STEMI and Accident & Emergency Department

Locally, the provision of emergency ambulance services is under the Fire Services Department. As the development of optimal reperfusion strategies in HA matures for STEMI patients, this will require consideration and discussions of the role of the emergency ambulance service, and how best services can develop to support patient care. An example will be to further support pre-hospital management of STEMI patients within the context of a networked primary PCI service in HA, such as pre-hospital ECG and direct triage of patients to designated centres.

Independent Service Provision

The current cardiac service is hospital-based. The integration, collaboration and coordination of service, both horizontally (across hospitals) and vertically (from primary to tertiary to rehabilitation care) is lacking. There is a need to consolidate the service with a view to improving the health outcome of CHD patients, enhancing capacity of service provision and concentrating expertise for a better quality of care, in terms of timeliness, accessibility and outcomes.

Coverage of Primary PCI for STEMI

Timely primary PCI for STEMI could be life-saving and has been proved to be superior to thrombolytic therapy. The development of primary PCI in HA is moving in the direction as in most advanced countries of the world. However, the ratio of patients whom are indicated and receive primary PCI across HA is relatively low. One of the contributing reasons for this is the capacity of hospital-based cardiac teams to provide extended hours services.

Currently, four HA hospitals are providing routine extended hours primary PCI services, with the remainder of hospitals with CCLs operating 9am to 5pm, Monday to Friday. Although adoption of primary PCI for STEMI is increasing across HA, its use is still constrained, with around 6% of all PCIs performed as primary PCI.[71] This compares to some other countries where the percentage of primary PCI (out of all PCIs) are as high as 39%.[72] In these countries primary PCI may be able to be offered routinely to as many as 70-80% of all STEMI patients. In contrast, for STEMI patients presenting to HA hospitals outside of normal primary PCI service hours, thrombolytic therapy is the main first-line treatment option. By better coordination of service coverage, HA could enable more STEMI patients to receive this treatment as part of an optimised reperfusion strategy.

Timeliness of Primary PCI for STEMI

Salvaging functional myocardium in STEMI patients is time critical, with patient outcomes inversely related to the time to restoration of blood flow through the affected coronary artery. Time to reperfusion can be considered as consisting of two elements:

(i) the time from symptom onset to presentation at hospital; and

(ii) the time from presentation at a hospital's AED to reperfusion – the so called "door-to-balloon time" (DTBT) for primary PCI.

71 HA Cardiac Survey 2011/12.

72 Widimsky, et al. (2010). Reperfusion therapy for STEMI in Europe: description of the current situation in 30 countries. European Heart Journal, 31; 943-957.

Current guidelines recommend that patients with STEMI who present within 12 hours of symptom onset and who do not have contraindications should receive immediate reperfusion therapy.[73,74] A study into the performance of primary PCI services at one of HA's regional hospitals identified that one of the reasons STEMI patients did not receive reperfusion was because their presentation was outside the recommended time-frame for treatment.[75] Many of these patients were diabetic and often from Old Age Homes. It was suggested that these patients may not have prominent ischaemic symptoms and may not seek medical assistance immediately.[76] Therefore, helping them to improve recognition of the signs and symptoms of AMI would be of benefit by enabling them to seek medical assistance more promptly and to receive reperfusion therapy within the recommended timeframe.

The second time critical component is under the direct control of HA hospital services – the time from patient presentation to reperfusion. The American College of Cardiology / American Heart Association (ACC / AHA) guidelines recommend a DTBT time of 90 minutes.[77] However, this can be a challenging objective and locally the DTBT for some STEMI patients is over this target.[78]

Factors in the hospital setting that can contribute to longer times to reperfusion include time to diagnosis and access to a CCL. Also, as might be expected, times to reperfusion are generally longer outside of office hours,[79] since longer times are required to activate the CCL.

Finally, it is worth noting that not all STEMI patients present through the AED. Some may develop symptoms of AMI whilst in hospital for other conditions. Strategies to improve times to reperfusion should also take into account these patients.[80,81]

73 2013 ACCF / AHA Guideline for the Management of ST-Elevation Myocardial Infarction (2013). A Report of the American College of Cardiology Foundation / American Heart Association Task Force on Practice Guidelines. Journal of the American College of Cardiology.

74 Clinical Practice Guideline (Management of STEMI) (2009). HA CC (Cardiac).

75 Wu KL, et al. (2012). Reperfusion strategy for ST-segment elevation myocardial infarction: trend over a 10-year period. Hong Kong Medical Journal, 18(4) 276-353.

76 Wu KL, et al. (2012). Reperfusion strategy for ST-segment elevation myocardial infarction: trend over a 10-year period. Hong Kong Medical Journal, 18(4) 276-353.

77 2009 Focus Update: ACC / AHA guidelines for the management of patients with ST-elevation Myocardial Infarction. Journal of the American College of Cardiology, 54(23).

78 Cheung SH, et al. (2010). Primary percutaneous coronary intervention for ST-elevation myocardial infarction: performance with focus on timeliness of treatment. Hong Kong Medical Journal, 16: 347-53.

79 Wu KL, et al. (2012). Reperfusion strategy for ST-segment elevation myocardial infarction: trend over a 10-year period. Hong Kong Medical Journal, 18(4) 276-353.

80 2013 ACCF / AHA Guideline for the Management of ST-Elevation Myocardial Infarction (2013). A Report of the American College of Cardiology Foundation / American Heart Association Task Force on Practice Guidelines. Journal of the American College of Cardiology.

81 Myocardial Ischaemia National Audit Project (2012). National Institute for Cardiovascular Outcomes Research

Provision of Cardiac Catheterisation Laboratories

The timing is now opportune to consider a cluster-based collaborative strategy for the future deployment and configuration of CCL facilities across HA. The current provision of CCL facilities across HA hospitals vary, reflecting the different pace at which individual hospitals adopt technology and services, in response to differing priorities and demands. However, as the demand for elective and non-elective services provided in CCLs increases, a cluster-based strategy will help to manage cluster service demands and support staff in delivering prompt and appropriate care.

During discussions with senior cardiologists, nurses and other frontline staff, specific challenges related to CCLs were highlighted, especially if coverage of primary PCI is to be enhanced. In particular, the provisioning of single CCL procedure rooms in hospitals which provide emergency PCI services can create challenges in the management of competing service demands. This is best illustrated when STEMI patients require primary PCI. In the presence of a single CCL, which is running an elective schedule, this can result in the STEMI patient having to wait for the CCL to become available before receiving PCI, or in some cases receiving thrombolytic as an alternative treatment. On the other hand, the emergency case can significantly disrupt the elective schedule, thus having a knock-on effect for a number of other patients, as well as staff.

In addition, another challenge associated with a single CCL procedure room is disruption caused if equipment fails, or maintenance is required, which has the potential to place the CCL out-of-service for a period of time. This affects the ability of the cardiac team to provide elective and non-elective procedures.

As well as numbers of CCL procedure rooms in a hospital, their position is also important. For primary PCI, the position of the CCL in relation to the AED contributes to time-critical reperfusion. In addition, the spatial relationship of the CCL with the CCU, Operating Theatres and wards is also an important consideration in supporting patient care and staff workflows. This can be a particular challenge in existing hospitals, where space is often at a premium and so the location of the CCL is in the best option available.

These challenges highlight the critical importance of appropriate facilities planning which support service needs, staff, and are aligned with overall cardiac service strategies and priorities.

Provision of Coronary Care Unit Beds

Over the years there has been progressive investment and increases in the number of CCU beds in HA hospitals. However, with the numbers of cardiac patients eligible for CCU admission continuing to increase and the complexity of cases also escalating, the demand is greater than bed supply. This has meant that over the last few years CCU coverage of eligible cardiac patients has declined. In some instances cardiac patients are managed elsewhere in the hospital, such as HDU beds, but this can put pressure on these areas of the hospital.

Also, the provisioning of CCU beds and their location within the hospital setting is dependent on space availability and flexibility, which can be a logistic challenge.

Cardiothoracic Surgery Services

Internationally the rates of emergency CABG after PCI reflect a low but persistent demand for CABG services to support PCI interventions,[82,83] in addition to the continuing role in treatment of post-infarct patients, as well as elective. However, the long-term impact of PCI on CABG procedural volumes remains to be determined.[84,85]

82 National Audit of Percutaneous Coronary Interventional Procedures Public Report (2013). National Institute for Cardiovascular Outcomes Research.

83 Dawkins, KD., et al. (2005). Percutaneous coronary intervention: recommendations for good practice and training. Heart.

84 Molina, JAD., Heng BH. Global Trends in Cardiology and Cardiothoracic Surgery – An Opportunity or a Threat? (2009). Ann Acad Med Singapore.

85 Esptein, AJ., et al. (2011). Coronary Revascularization Trends in the United States: 2001–2008. JAMA.

Nonetheless, along with improvements in life-expectancy, patients presenting for surgery are typically older; often with more co-morbidity and presenting with more complex case-mix. Thus, procedures now include combined valve and graft, double valve procedures and a proportion of repeat procedures. Locally there is a need to determine whether similar trends in cardiothoracic surgical service demand are occurring in HA. Given the active development of emergency reperfusion strategies in HA for STEMI, there is an explicit need to consider the wider impact of these service developments on demand for cardiothoracic surgical services and any changes to the surgical case-mix.

Cardiac Rehabilitation

Coverage and Content of Cardiac Rehabilitation

Over the last few years HA cardiac rehabilitation services have been developing. However, as the number of eligible patients for cardiac rehabilitation increases and the evidence on what constitutes effective interventions grows,[86] there is still more that can be done to improve coverage and uptake. During discussions with clinicians, nurses, pharmacists and allied health professionals, three key challenges to services were highlighted. The first was that across HA there were differences in the facilities providing cardiac rehabilitation, which influenced the level or type of rehabilitation offered and hence programme content. The second challenge was how to improve referral and uptake into cardiac rehabilitation. The third challenge was the competing demand on time, in particular for allied health professionals in delivering cardiac rehabilitation to different patient groups whom may have different needs and objectives.

Patient Education and Engagement

With developments in STEMI care, the speed of treatment can be both impressive and shocking to patients. Patients treated with primary PCI tend to have shorter hospital stay than those treated with thrombolytics. An unintended consequence of this is that there is less time for healthcare professionals to provide the patient and their families with information and undertake phase 1 rehabilitation. For some patients there may be the experience of shock, disbelief, fear or denial, whereas for others their illness may be perceived as being acute and self-limiting, rather than a long-term chronic disease. This has the potential to reduce the impact of information and advice on the importance of lifestyle change and rehabilitation.[87]

86 Cardiac Rehabilitation. A national clinical guideline (2002). Scottish Intercollegiate Guidelines Network:

87 Astin F (2008). Primary angioplasty for heart attack: mismatch between expectations and reality. Journal of Advanced Nursing, 65(1), 72-83.

With the rising number of CHD patients in Hong Kong, many of the challenges identified by frontline healthcare professionals involved in cardiac rehabilitation services are likely to be magnified further. Therefore, exploring ways to develop cardiac rehabilitation in parallel with acute services will be important.

Workforce

Similar to the rest of HA, cardiac service workload has been increasing, both in the acute in-patient setting, but also in out-patient and community settings. A key challenge is how to support staff in the face of growing service demand across the care continuum. The HA has recognised such challenges to the workforce and has formulated strategies for the next five years to retain, attract and motivate staff.[88]

Development of the cardiac workforce on a hospital-by-hospital basis is not conducive to managing rising service demand and further enhancing service quality. In primary PCI for STEMI, international evidence has shown it requires a critical case-load for a centre to manage patients safely and with quality, as well as to build expertise. Cluster-based coordination for the cardiac specialty workforce is thus favoured.

Doctors

Clinicians continue to face rising service demand across the in-patient and out-patient setting. For cardiologists, demands come from both cardiac patients, as well as from their commitments under the wider auspice of General Medicine within hospitals.

88 HA Strategic Plan 2012-2017.

In addition, there is the need to cater for the change in the preferred mode of treatment. In the past, thrombolytic drug infusion was the gold standard for acute myocardial infarction. However, the criteria for diagnosing AMI have been revised (using new serum markers like troponin levels), allowing prompt diagnosis. Together with the advent of primary PCI technology and the cardiology community confirming its benefits over thrombolytic therapy, cardiologists are now more often expected to perform interventions for STEMI cases. It is well accepted that a critical case load is required to be able to build expertise to safely treat patients. Thus, cases as well as specialists will need to be pooled within a cluster to facilitate the development of this service.

As cardiac and cardiothoracic surgery services develop and treatments and interventions become more available, this can also increase the pool of eligible patients, contributing to higher demand for services. Furthermore, advances in technology can mean that some cardiac procedures evolve towards more minimally invasive techniques. While this can help reduce patient recovery time, these procedures can be complex and require greater time to perform. This has an impact on caseload and physician, surgeon and other staff time.

Therefore, in the strategic planning of CHD services by HA there is a necessity for the close involvement and collaboration of cardiologists and cardiothoracic surgeons in order to ensure proposals are sustainable and ready to proceed. This also needs to take in to account the significant lead-time required to train both cardiologists and cardiothoracic surgeons. In particular, into the future there will be a need to ensure succession planning is built within the cardiology and cardiothoracic surgery service.

Nurses

For nurses, many of the staffing challenges mirror those of the doctors, since there is a close working relationship between the two professions. However, it is important to note that nursing capacity directly influences number of operational beds. In particular, CCU beds and cardiac sub-specialty beds both in-hours and out-of-hours. Currently, the overall HA nurse to CCU bed ratio is 2.19:1,[89] which is in-line with the standard of COC (Nursing) for HDU beds, although in some clusters this ratio is lower. Moreover, as the CCU increasingly admits more complex patients requiring more advanced treatments, there may be a need to consider further the intensity of the nursing workload and nurse to CCU bed ratio. Similarly, close monitoring of the impact of developments in primary PCI services, such as on cardiothoracic surgery will inform perfusionist capacity in HA.

Pharmacists and Allied Health Professionals

Pharmacists and allied health professionals play an important role in the multi-disciplinary approach to patient care. For CHD patients, their role expands across the in-patient and out-patient setting, from emergency intervention, through to rehabilitation. For example, radiographers play an important role in the CCL. However, PCI requires a significant commitment on time by radiographers, which is balanced against the competing demands from other services in the hospital. Similarly, taking cardiac rehabilitation as an example, involvement of a range of healthcare professionals is important to deliver a comprehensive rehabilitation programme, such as pharmacists, physiotherapists, occupational therapists, dietitians, and clinical psychologists. Workforce planning is thus an important challenge and requires careful consideration.

89 HA Cardiac Survey 2011/12.

Performance Monitoring

Monitoring of Cardiac Service Performance and Patient Outcomes

Currently, local data on the provision, delivery and performance of cardiac services in HA are collected at the hospital-level, but data are not routinely aligned to enable a system-wide analysis for the CHD pathway. The majority of data related to the cardiac service is generated at a system-level through survey and studies, rather than being an integrated part of HA's monitoring system.

Advances and Innovation

Advances in CHD Treatment and Management

Cardiology and cardiothoracic surgery are rapidly developing fields of medicine. There have been significant medical advances in the treatment and management of CHD in the last few decades and more are expected in the coming years, such as advances in PCI technology and minimally invasive surgery.[90] Whilst many advances have helped to reduce collateral damage from interventions and improve patient recovery and outcomes, there can be a trade-off with often longer procedural times and hence impacts on services capacity and throughput.

The coming years will continue to be an exciting time for HA cardiac services. Although HA generally implements technologies that are accepted and broadly available in the market, cardiac services will need to continue to develop more flexibly, so that they are well positioned to accommodate the next generation of technologies and treatments, as they are introduced by HA. This is of particular importance, since many of the strategies laid out in this Framework will take time to realise and apply equally to elective, as well as non-elective care.

90 Sg2 Intelligence: Cardiovascular Service Line Forecast 2012.

Summary

Although this section has highlighted some of the challenges facing CHD services, already much has been accomplished in improving HA's cardiac services. This Framework capitalises on these strong foundations and extends them further, through the discussions and deliberations with senior clinical leaders and other healthcare professionals involved in HA cardiac services and their views on improving patient care.

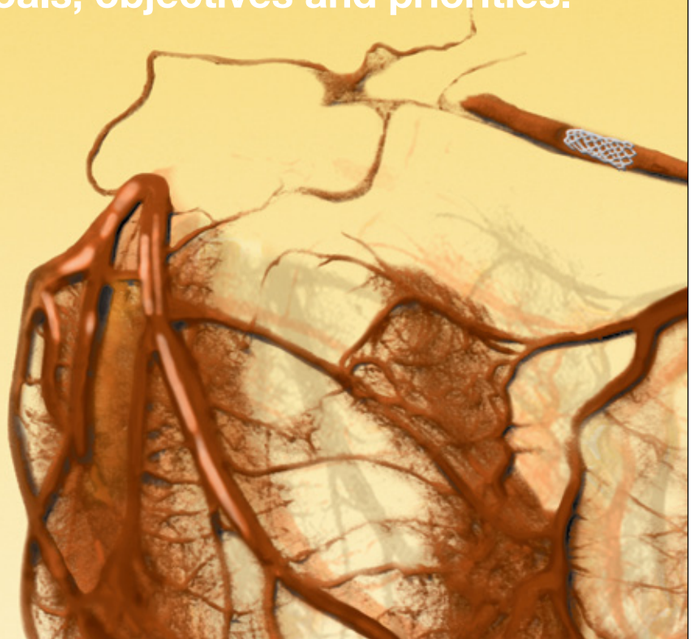
Using a pathway approach, and focusing on AMI / STEMI, four key challenges have emerged. They are **(i)** the projected increase in chronic disease patients with risk factors for CHD, **(ii)** coverage of timely primary PCI for STEMI, **(iii)** post-AMI rehabilitation (in particular the provision of structured rehabilitation programmes), and **(iv)** uptake of secondary prevention medicines as part of the long-term management strategy for CHD patients.

Addressing these service challenges requires a comprehensive strategic approach. By strategically tackling them will help ensure resources are well-matched to deliver sustainable services in the years to come.

STRATEGIC SERVICE FRAMEWORK FOR CORONARY HEART DISEASE

The Framework adopts a patient pathway approach and aligns with the overall HA service directions and priorities of HA, as outlined in the HA Strategic Plan 2012-17. It therefore supports the HA vision of Healthy People, Happy Staff, Trusted by the Community.

Through the process of Framework formulation a number of clear themes have emerged regarding development of HA's cardiac services, which form the basis of the strategic goals, objectives and priorities.



Principles Underpinning the Framework

Two key principles underpinning the Framework strategies, which will align and guide the development of HA's CHD services are:

- Formation of cluster-based cardiac teams to support service sustainability and sufficient service volumes, as essential pre-requisites to build expertise in both acute and elective interventional services.
- A networked cardiac service being the foundation for future service developments. The basis of this principle is consolidation and standardisation of HA's cardiac service.

The principles aim towards driving improving health outcomes for CHD patients, enhancing the capacity of service coverage, concentrating expertise for better quality of care, including timeliness and accessibility.

Framework Themes

The Framework seeks to enhance HA's service coverage for CHD and in particular AMI / STEMI patients, across key components of the patient pathway. This is achieved through strengthening services for preventive care, enhancement of provision for primary PCI for STEMI, development of comprehensive rehabilitation and development of community partnerships, education and engagement.

Another theme is the enhancement of service quality, safety and effectiveness through clinical practice improvements in patient outcomes and service quality, staff proficiency and utilisation of innovative and advanced technology and medicines.

Lastly, as outlined as a key principle, the key enabler for the strategies is development of a cluster-based cardiac team to sustain the future cardiac service and to meet rising demand.

In the coming years HA will seek to improve coverage of its services for CHD patients and in particular optimise its reperfusion strategy, to address the key challenges. The objective is to reduce upstream caseloads, enhance the number of AMI / STEMI patients receiving time-critical life-saving care, as well as to better support the downstream needs of these patients. For this to happen, a coordinated and systematic approach will be adopted to incrementally develop HA cardiac services over time. The Framework is summarised in the following table, with details of the strategic objectives and operational priorities subsequently outlined.

Table 2. Summary of strategic goals, objectives and operational priorities of the Framework

Strategic Goals *(What we want to achieve)*	***Strategic Objectives*** *(Where we are going)*	***Operational Priorities*** *(How we get there)*
Improve Service Coverage	Enhancement of Preventive Care	Enhancement of provision for comprehensive health risk assessment for patients followed-up in GOPCs
		Increase in coverage of secondary prevention medicines
	Enhancement of Provision for Primary PCI for STEMI	24-hour primary PCI for STEMI through phased expansion and networking
		Standardisation of the AMI / STEMI pathway
		Synergy with other cardiac services
		Alignment of Cardiac Catheterisation Laboratory provision with cluster-based primary PCI service development
		Enhancement of provision for Coronary Care Unit Beds
	Development of Comprehensive Cardiac Rehabilitation	Expansion of Cardiac Rehabilitation coverage
		Standardisation of Cardiac Rehabilitation programme content
Strengthen Collaborations and Partnerships	Development of Community Partnerships, Education and Engagement	Engagement of patients and their families as partners in care
		Development of community partnerships
Enhance Service Quality, Safety and Effectiveness	Improvements in Clinical Practice	Enhancement of patient outcomes and service quality
		Enhancement of staff proficiency
		Utilisation of innovative and advanced technology and medicines
Strengthen Workforce	Build Capacity	Strengthening of a sustainable workforce through cluster-based cardiac teams
		Enhancement of training and career development
		Enhancement of staff recognition

Enhancement of Preventive Care

Enhancement of Provision for Comprehensive Risk Assessment in GOPCs

Chronic disease management is a crucial component to secondary prevention and early identification of CHD. Two major contributors to CHD are DM and HT. Strengthening HA's GOPC disease management programmes, such as the multi-disciplinary RAMP for patients with DM and HT, could help to reduce upstream caseloads. Featuring comprehensive health risk assessment and management provided by multidisciplinary teams, consisting of doctors, nurses, dietitians, podiatrists and physiotherapists, these protocol-driven programmes delivered in the GOPC setting aim to delay the onset of disease complications and enhance disease control. The initiative is paramount in reducing the patient load of CHD to be referred to secondary care, thereby helping to address a key challenge faced by HA's cardiac service.

Within the GOPC setting facilitating evidence-based CHD risk stratification, such as through automated risk-scoring platforms (e.g. European Society of Cardiology Coronary Risk Evaluation SCORE, Framingham risk score or the UK Prospective Diabetes Study Risk Engine) has significant potential in supporting evaluation of patient risk and decisions related to referral for further assessment and special investigations. This requires support by clear referral pathways and established protocols to ensure the right patients receive timely evaluation and seamless management.

Increase in Coverage of Secondary Prevention Medicines

Enabling CHD patients to make the best possible use of their medicines through improved compliance provides an effective way to control and prevent disease progression and improve quality of life. However, this begins with enhancing prescribing of medicines for CHD patients.

The HA will seek to enhance the proportion of eligible AMI / STEMI patients prescribed secondary prevention medicines, including anti-platelet agents, ACE-inhibitors, beta-blockers, and statins. Specifically, a focus will be on clusters with relatively lower prescribing rates and seeking ways to reduce this variation by first understanding the underlying reasons and then mitigating them.

In addition to improving prescribing rates, the HA will aim to better understand CHD patient drug compliance. Given the potential number of medicines a patient may receive, and especially for elderly patients or those with multiple co-morbidities, it will be important to ensure CHD patients receive good medicines management to support compliance and minimise drug interactions. For example, during rehabilitation, programme content can reinforce good medicines management. In addition, rehabilitation sessions potentially provide different opportunities for pharmacists and other healthcare professionals to identify and target patients requiring more intensive medicines management, as well as those unable to control their risk factors, such as HT or DM, by drug therapy. Collectively these can help stabilise disease progression in large numbers of CHD patients and help reduce the likelihood of the need for more intensive or acute hospital care.

Enhancement of Provision for Primary PCI for STEMI

The objective will be to develop a 24-hour primary PCI service for the whole of Hong Kong through a networking system. The delineation and setting-up of designated centres in HA for 24-hour primary PCI will aim to provide specialised expertise with adequate technological and infrastructure support to STEMI patients, and with appropriate service volume to sustain good outcomes.

24-hour Primary PCI for STEMI Through Phased Expansion and Networking

The cardiac service will be arranged as cluster-based provision. Clusters will then be networked for pooling of expertise and development, as well as provision for a 24-hour primary PCI service. The goal will be taken forward through an incremental approach.

As a first step, and with consideration of cluster service volume, and the presence of an AED as a key part of the AMI / STEMI pathway, the seven regional hospitals of HA (QMH, QEH, PWH, PYNEH, PMH, UCH and TMH) will develop their service to deliver extended 12-hour primary PCI, Monday to Friday. In addition, due to population size and service volume within the KWC, KWH will also develop an extended 12-hour primary PCI service, Monday to Friday. Underpinning this will be the transition of hospital-based cardiac teams to a cluster-based cardiac workforce because critical service volumes are required to build expertise, in particular for acute interventional services. This is an essential pre-requisite component to enhanced coverage of primary PCI for STEMI, as well as part of the strategy to help manage increases in the overall cardiac service workload.

In order to move towards designated networked 24-hour primary PCI centres, the HA will further review its service demand and site capabilities to facilitate decision-making on specific locations. This will include consideration of factors such as access, expected patient volume, cluster-based / cross-cluster cardiac workforce readiness and availability of supporting services, impact on non-emergency services, how CCLs will be alerted and activated, as well as patient referral / transfer guidelines, protocols and diversion strategies.[91] In addition, deliberations on the relative merits of co-locating 24-hour primary PCI sites with Cardiothoracic Surgery will be essential, taking into consideration local needs as well as international evidence. Nonetheless, a well-coordinated network approach will be critical to ensure seamless service delivery to patients, which is high quality and safe.

In addition to aligning to cluster-based cardiac teams, another essential pre-requisite for development of primary PCI for STEMI is the appropriate provisioning of CCLs. Provisioning of CCLs will move away from previous hospital-by-hospital development and will be guided by the strategic directions and operational priorities outlined in this Framework. In particular, the priority for future CCL development will be to support enhancement of primary PCI for STEMI. This includes taking an HA-wide planning perspective for the investment on establishing CCLs. Furthermore, for the hospitals planned for enhanced primary PCI service, the provision of two procedure rooms in the CCL allows for greater flexibility and management of emergency cases alongside elective caseloads.

91 A guide to implementing primary angioplasty (2009). NHS Improvement.

Finally, for development of extended hours primary PCI for STEMI, hospitals must be able to provide regular standardised reporting of service quality and patient outcomes, such as through PCI Audit Reports, to ensure they are safe, effective and to help monitor the impact on other HA services.

Standardisation of the AMI / STEMI Pathway

To facilitate the delivery of consistent and effective care, the HA will develop and regularly update standardised guidelines and protocols for the care and management of CHD and AMI patients. The evidence-base on high quality and effective care is clear and variations in care will be minimised wherever possible. The CC (Cardiac) has issued Clinical Practice Guidelines for Management of ST-elevation Myocardial Infarction, based on international best practice, which can be used as a basis to align services and support the further establishment of protocols.

As the HA moves towards a more cluster-based coordinated network and multi-disciplinary approaches to cardiac care, the streamlining of patient flows, and particularly protocols and pathways in relation to those aspects of emergency interventions which are time-critical, will be important. Not only will this help contribute to improvements in the quality of care, patient experience and outcomes, but will also help to reduce unnecessary workloads and enable better mapping of staff resources across the care pathway. Already hospitals which have established evidence-based primary PCI programmes, which are linked to ongoing review and key improvement initiatives, have shown improvements in service delivery and patient outcomes.[92]

Moreover, in relation to 24-hour primary PCI for STEMI, it is often cited that the implementation of a simple protocol is likely to lead to better outcomes, since more complex pathways and decision-making processes have the potential to increase the chance of confusion or errors.[93]

In addition to the immediate management of STEMI, the guidelines and protocols will also provide directions for seamless transitions of care and management of service demand by establishing agreed referral and networking pathways to rehabilitation, specialist out-patient and eventually general out-patient and community care.

92 Wu KL, et al. (2012). Reperfusion strategy for ST-segment elevation myocardial infarction: trend over a 10-year period. Hong Kong Medical Journal, 18:276-83.

93 A guide to implementing primary angioplasty (2009). NHS Improvement.

Synergy with Other Cardiac Services

The establishment of extended hours and 24-hour primary PCI at designated centres in HA will be well coordinated with other hospital services, including consideration of elective workloads, to ensure delivery is efficient, effective and minimises impact. There will need to be close monitoring as to whether the introduction of extended hours primary PCI will lead to substantial increase in the total number of PCIs performed and consequent impact on elective work.

Experience from overseas has shown that unless the pre-existing level of PCI is particularly low, then the absolute number of PCIs performed remains stable. The main reason for this is that introducing a strategy of primary PCI brings forward the procedure to a time when the patient has most to gain, rather than being undertaken as an elective procedure a short period after thrombolytic therapy.[94]

However, primary PCI is different from other forms of PCI. It is likely that patients are sicker and complications may occur more frequently. Close monitoring of the phased expansion of primary PCI will be critical to gauge the total impact on the cardiothoracic surgery, radiology, rehabilitation and allied health workload and inform how these can develop collaboratively to deliver comprehensive patient care.

Within the wider context of the CHD pathway, the development of cardiology services requires close collaboration with, in particular, cardiothoracic surgery to support a sustainable system of care and optimisation of revascularisation strategies. Recent international guidelines emphasise a multi-disciplinary approach involving interventional cardiologists and cardiac surgeons, as part of a “heart team”, to collaboratively assess a patient’s condition, revascularisation options and determine the most appropriate interventional strategy, including through discussion with the patient. Not only does this provide a more patient-centred approach, but helps incorporate a balanced multi-disciplinary decision-making process in care planning.[95,96,97]

In addition to the collaboration with cardiothoracic surgery, development of the CHD pathway also requires close collaboration with Radiology. For example, post-AMI functional cardiac imaging can play a role in guiding patient management and joint-decision making, helping to ensure appropriate evidence-based care plans are formulated. Such multi-disciplinary collaborations between relevant specialties will be enhanced and strengthened as part of the overall strategy to support comprehensive care and to streamline patient pathways.

94 A guide to implementing primary angioplasty (2009). NHS Improvement.

95 2011 ACCF / AHA guideline for coronary artery bypass graft surgery. A report of the American College of Cardiology Foundation / American Heart Association Task Force on Practice Guidelines (2011). Journal of the American College of Cardiology.

96 Guidelines on myocardial revascularization (2010). Task Force on Myocardial Revascularization of the European Society of Cardiology (ESC) and the European Association for Cardio-Thoracic Surgery (EACTS). European Heart Journal.

97 Mohr F.W., et al (2013). Coronary artery bypass graft surgery versus percutaneous coronary intervention in patients with three-vessel disease and left main coronary disease: 5-year follow-up of the randomised, clinical SYNTAX trial. Lancet; 381: 629–38

Alignment of Cardiac Catheterisation Laboratory Provision with Cluster-based Primary PCI Service Development

The development of cardiac services requires integrated planning of facilities and equipment, so that they are appropriate and support high quality care. Also, given the significant investment required for facilities such as CCLs, it is essential they are well planned and aligned with the strategies and priorities for cardiac service development. For CCLs, planning will take into consideration the following:

- The number of procedure rooms and CCL in HA must be aligned to service volumes and activities, in order to ensure appropriate caseloads and utilisation – in particular to handle the expansion of the primary PCI service. Evidence shows that sites which perform higher volumes of PCI procedures have better patient outcomes, than those with lower volumes.[98,99]
- Hospitals providing primary PCI services are more resilient with two procedure rooms in the CCL, as this enables greater flexibility in managing emergency cases and minimising disruption to elective schedules.
- Opportunities, such as during hospital (re)development projects, will aim to support time critical patient pathways, workflow and functional relationships with key services, such as between AED, CCL, and the CCU, where relevant.

Enhancement of Provision for Coronary Care Unit Beds

Despite recent increases in the number of CCU beds, demand has surpassed supply, resulting in decreasing AMI admission rates. Overall, the HA will continue to take a strategic approach to building up CCU bed capacity, so as to improve the proportion of AMI / STEMI patients admitted. Resources will be allocated via the annual planning exercise, with due assessment of the programmes and with regard to the strategies and priorities of the Framework.

98 Hackett D. (2003). How many cath labs do we need? Heart 89:827-829

99 A guide to implementing primary angioplasty (2009). NHS Improvement.

Development of Comprehensive Cardiac Rehabilitation

Enhancing the coverage and uptake of cardiac rehabilitation is also a key challenge to support better patient outcomes. The HA will improve the provision of structured cardiac rehabilitation programmes for patients from both cardiology and cardiothoracic surgery streams. Coupled with the use of secondary prevention medicines, one of the key objectives is to help reduce the complications of CHD by stabilising disease progression, thereby cutting down on the number of avoidable hospital admissions and the need for hospital or specialist care. Not only will this help improve patient and carer outcomes and quality of life, but also support HA staff through managing demand.

Expansion of Cardiac Rehabilitation Coverage

Structured multi-disciplinary cardiac rehabilitation will be developed via a cluster-based model of service coordination. The aim will be for each cluster to have a well-coordinated and networked rehabilitation programme embedded into the patient pathway, for patients whom have undergone different revascularisation strategies (i.e. PCI, CABG). By doing so, this ensures that each cluster can find its own solution to delivering cardiac rehabilitation, but congruent with the wider directions set out by HA for rehabilitation.

Firstly, all hospitals with acute cardiac services for AMI / STEMI patients should have a standardised in-patient programme of phase 1 cardiac rehabilitation. This is to provide information and education to patients and their families about their condition and need for lifestyle change, as well as to reinforce ongoing long-term chronic disease management and medication compliance.

Secondly, phase 2 cardiac rehabilitation will be delivered with multi-professional input, be structured and time-limited. Standardised criteria-based referral protocols, with clearly defined professional responsibilities will be developed to support better referral and improved uptake of patients into phase 2 rehabilitation programmes.

To support patient and family referral from the in-patient to out-patient setting, clear communication will be required. The HA will promote effective care and discharge planning and timely structured referral for cardiac rehabilitation to support patient recovery and secondary

prevention. In the development of these plans the cardiac rehabilitation team, including rehabilitation physicians, nurses, pharmacists and allied health professionals, will play a key role.

Finally, for transition to phases 3 and 4 rehabilitation, partnerships will be further developed with patient groups, volunteers and NGOs to further support CHD patients in the community and particularly towards the long-term management and maintenance of their disease. This will be of particular importance for elderly patients, or those with multiple co-morbidities, who may need extra support in the community. Rehabilitation physicians are well positioned, with their knowledge and expertise, to support the strengthening of collaborations with community partners.

Standardisation of Cardiac Rehabilitation Programme Content

There is a need to develop high impact and focused rehabilitation programmes and communication strategies that take into account the bio-psycho-social needs of patients. As advances in patient care result in shorter lengths of in-patient stay, there is a need to be able to communicate effectively and successfully encourage enrollment of patients into rehabilitation programmes. The HA will aim to systematically develop standardised communication materials with frontline healthcare professionals as tools to support engagement of patients and their families.

As with the acute care pathway, rehabilitation will be standardised and aligned to promulgate best practice. The HA will work with cardiologists, cardiothoracic surgeons, rehabilitation specialists and other healthcare professionals involved in rehabilitation to develop guidelines to specify the core components of a comprehensive structured cardiac rehabilitation programme, including duration and target participants.

On the other hand, while the overall framework for cardiac rehabilitation will be standardised, sufficient flexibility will be incorporated to enable tailoring of services to meet the individual needs of patients, as part of the drive to encourage programme uptake and completion. For example, flexibility in the timing of cardiac rehabilitation, such as in evenings and weekends may better meet the needs of younger patients or those in work, or family members whom may have a role in patient lifestyle change.

Development of Community Partnerships, Education and Engagement

CHD services are ideally positioned to forge stronger partnerships with patients and their families across the care pathway and to build on the principle of patient-centred care. In addition, collaborations with community partners present a multitude of opportunities and possibilities for working together to benefit patients, while at the same time helping HA to improve its service quality and manage demand.

Engagement of Patients and their Families as Partners in Care

Being able to effectively communicate and engage patients and their families as co-producers of their care is an increasingly important component of high quality healthcare. This patient-centred approach contributes to enhancing the experience of the care received, as well as empowering patients and their families for greater roles in self-care and management. Collectively, these can support better patient outcomes and help to moderate the demand on HA services.

As an example, for CHD services the importance of good patient engagement is paramount. In particular, developing the skills and knowledge to enable healthcare staff to better understand the motivations and abilities of patients and their families in changing their lifestyle and behavior will be important.

The HA will promote the concept of patients and their carers being active partners in care, through enhancing staff communication skills and ways to engage patients, such as their involvement in care and discharge planning. In particular, for AMI / STEMI timely provision of health information to meet the needs of patients and their families is vital. It helps reinforce the importance of structured rehabilitation and the need for lifestyle change and secondary prevention.

The development of standardised cardiac rehabilitation programmes will help align multi-disciplinary team input and clear referral and communication across care settings to support better patient care. In addition, more standardised pathways and referral will enable patients and their families to more clearly navigate their care across different settings and by different professionals.

Finally, as patients transition back into the community, the use of other information media, such as the HA's Smart Patient website will be used to supplement information sharing and to support patients and their families.

Development of Community Partnerships

The HA values the contribution its community partners and volunteers play in patient care. They can help support CHD patients within the community through education, self-help groups and mutual support, all of which can promote self-care and help reduce avoidable hospital admissions. For CHD patients, the HA will explore the development of community partnerships to help support the needs of CHD patients.

Improvements in Clinical Practice

For CHD services, as clinical pathways are developed and strengthened these can further form the basis on which to develop measures to determine how well different parts of the pathway are performing, along with respective outcomes. Routine monitoring of carefully selected measures across the patient pathway will be a powerful tool to support continuous service improvements by frontline professionals, by identifying and targeting those areas which will have the most impact on patient outcomes.

Enhancement of Patient Outcomes and Service Quality

In parallel with developing services for CHD and AMI patients, the HA will explore ways to routinely measure improvements in patient outcomes, and link these with key activities along the patient pathway, to support service improvements. The aim will be to embed these into everyday workflows to minimise additional work to frontline staff, but to support them in continuing to deliver high quality care to their patients.

Based on guidelines of care and international practice, the HA will seek to carefully select a set of service quality and patient outcome measures. These will be used to support targeted service improvements, particularly in those areas which make the most difference to patient outcomes. The ethos will be of striving for continuous service improvement, transparency and learning. A strong basis to start is the key performance criteria set out by the CC (Cardiac).[100] In addition, other examples of quality indicators and outcome measures used by other health systems, which may be considered, include:

Service quality:

- Proportion of CHD patients taking aspirin, an alternative anti-platelet therapy or anti-coagulant
- Proportion of AMI patients eligible who receive primary PCI as a means of revascularisation
- Door-to-balloon time for primary PCI
- Proportion of AMI patients admitted to a CCU
- Proportion of AMI patients who are prescribed secondary prevention medicines at hospital discharge, such as statins, beta-blockers, ACE-inhibitors, anti-platelet drugs
- Proportion of AMI patients enrolled in a structured cardiac rehabilitation programme

Outcomes:

- Mortality due to CHD per 100 000 population
- CHD prevalence rate per 100 000 population
- Incidence of AMI per 100 000 population
- In-hospital mortality of AMI

100 Clinical Practice Guideline (Management of STEMI) (2009) HA CC (Cardiac).

An evaluation and reporting mechanism will be established to facilitate service improvement. Timely routine access and the capacity to analyse and report back to HA executives and frontline clinicians will be an important component to improving service delivery, which has been demonstrated overseas.[101,102]

Enhancement of Staff Proficiency

In developing PCI services, the HA will consider the impact on service volumes and how these will support staff proficiency, particular in the context of a cluster-based cardiac workforce and international standards. Centres and operators performing higher numbers of PCI procedures have been shown to have better patient outcomes.[103] Internationally, there are recommended standards on the number of PCI procedures performed by centres and operators to maintain proficiency and better patient outcomes,[104,105,106] which have been reviewed in various platforms during the Framework engagement process.

Utilisation of Innovative and Advanced Technology and Medicines

Cardiology, cardiothoracic surgery and other related specialties are progressing in terms of innovative and advanced technology, drugs and therapies. Consequently, the introduction of new technologies, devices and drugs, for acute and non-acute CHD patients will be in alignment with the overarching HA process for their planning, management and funding. This will help ensure appropriate adoption of modern technologies and treatments within the wider priorities of HA, to ensure efficient use of resources and support ongoing risk management through their coordinated introduction, safe and effective use.

As information and communications technology (ICT) develops across HA, opportunities will be sought to further leverage these to support cardiac services. In many respects cardiology has been at the forefront of digitised images, such as recording and archiving of angiography and angioplasty images. Indeed, Radiology departments in HA deal with substantial amount of digitised images daily.

101 Myocardial Ischaemia National Audit Project (2011). National Institute for Cardiovascular Outcomes Research.
102 National Audit of Angioplasty Procedures (2011). The NHS Information Centre.
103 Dawkins KD (2005). Percutaneous coronary intervention: recommendations for good practice and training. Heart. 91(suppl VI):vi1-vi27.
104 Ibid.
105 A guide to implementing primary angioplasty (2009). NHS Improvement.
106 2011 ACCF/AHA/SCAI 2005 Guideline for Percutaneous Coronary Intervention (2011). A report of the American College of Cardiology Foundation.American Heart Association Task Force on Practice Guidelines and the Society for Cardiovascular Angiography and Interventions. JACC.

Perhaps one of the most important potential future applications of ICT in support of HA cardiac services for AMI / STEMI patients is pre-hospital ECG and transmission, linked to a pre-alert system to activate the CCL and necessary recall of hospital personnel whilst a patient is en-route. This can facilitate rapid diagnosis and decision-making and improve workflow efficiency, to reduce total ischemic time and support better patient outcomes.

Additionally, into the future there will be greater scope for enabling remote access by clinicians to healthcare images, to enable shared decision-making. A key example is the sharing of digitised images between cardiology and cardiothoracic surgery teams in real-time, to support shared decision-making on revascularisation strategies and care planning.

Build Capacity

The HA Strategic Plan 2012-2017 outlines the strategies and directions HA will be pursuing, including how HA will retain, attract and motivate its staff. Similarly, along with the development of cardiac services, the HA will seek to engage and nurture its staff to help ensure an environment which is supportive and an attractive place to work.

Strengthening of a Sustainable Workforce through Cluster-based Cardiac Teams

Although this Framework places much emphasis on the targeted development of cardiac services, particularly underlying this is the importance of workforce planning and staff development. Orientation to cluster-based cardiac teams will be a key component to support sustainable service delivery and the strategies outlined in this Framework. Cluster-based approaches to workforce will support streamlined cluster-wide programmes of care, promote better collaboration and cross-working between hospital teams, as well as management of resources and facilities. Furthermore, a cluster-based approach will enable sharing of workload, pooling of expertise and talents, that will help ensure more flexible and sustainable models of care and the responsiveness of the workforce to meet patient and service needs.

Looking towards the future, the HA aims to retain and motivate high calibre physicians, surgeons, nurses, pharmacists and allied health professionals, and at the same time attract those with experience from outside HA, as well as the next generation of healthcare professionals.

To help manage increasing workload on clinical staff, in addition to the development of cluster-based cardiac teams, the HA will help ensure that the way in which cardiac services develop are prioritised, taking into account clinical workload and resources. This means service developments will be paced to reflect the need to develop staffing levels, skills, or changes in workflows and deployment. The strategies to support this include:

- The HA will use workforce planning, which takes into account population growth and ageing, as well as changes in service demand and future models of service delivery to better support the development of a workforce with the right mix of skills and professions.
- The planned configuration of cardiac infrastructure and facilities will be aligned with staffing strategies, such as cluster-based cardiac workforce, to ensure service volumes are appropriate, sustainable and balanced with manageable workloads. For example, better defining the staff competence and levels in facilities such as CCL and CCU.
- Staffing resources can be intensive for particular service enhancements, such as extended hours primary PCI. The HA will work with clinical staff to determine the necessary cluster staffing requirements to roll out these services and whether options such as part-time involvement of private interventionists in HA, are viable ways to support implementation of these strategies.

Enhancement of Training and Career Development

The HA will continue to support staff training and development opportunities. Continuing professional development is important to staff job satisfaction and expanding the repertoire of skills is important for career development. For example, in cardiothoracic surgery the career development of perfusionists is taking reference to the career progression model for nurses in HA, with a training programme available through one of the Universities in Hong Kong for Diploma in Cardiovascular Perfusion Technology.

As a greater emphasis is placed on adopting “pathway approaches” to care, and with orientation to cluster-based cardiac teams, the HA will take advantage of the potential to enable staff to gain exposure to different aspects of patient care outside their traditional places of work, thereby enhancing skill-sets, knowledge, and the ability to multi-task. For example, the AMI / STEMI pathway provides opportunities for nurses to gain exposure from CCL through to CCU and rehabilitation. These will further contribute to supporting multi-disciplinary work, building up relationships across professions and disciplines, as well as enhancing better understanding and collaborations across continuums of care.

Development of a multi-skilled cardiac workforce, with greater potential for cross-working, will build flexibility into the system to enable re-purposing of staff and enable delegation of responsibilities. This can further help ensure effective deployment of workforce and that staffing resources are well-matched with expertise and the level of care required.

Furthermore, skillsets and knowledge can be supplemented through sharing of expertise to enhance quality of care by different professionals. Potential platforms include further dissemination of the principles of medicine management by Pharmacists, or of behavioural change and applications in rehabilitation and recovery by Clinical Psychologists.

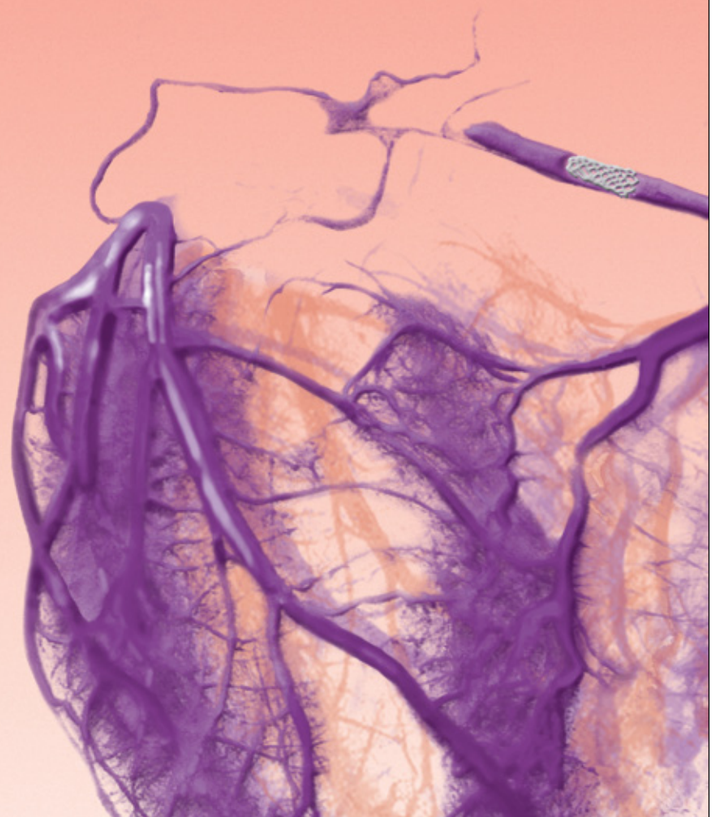
Enhancement of Staff Recognition

Within the wider context of HA, there are continuing efforts to recognise and support staff with well-structured performance management and appraisal. Furthermore, over the coming years the HA will be exploring effective modes of recognition and incentives that are appropriate in the public healthcare sector to recognise good performance.[107]

107 HA Strategic Plan 2012-2017.

IMPLEMENTATION

This Framework has a development focus on optimising AMI / STEMI care, as a driver to stimulate overall improvements in the CHD service delivery model by HA, spanning chronic disease management through to rehabilitation.



The strategies and directions outlined will require different levels of resources and lengths of time for implementation. Implementation will purposefully be incremental, to take into account the priorities of HA and readiness of key enablers, such as workforce.

Although this Framework sets the overall directions and ultimate goals for AMI / STEMI services, further discussions among key HA stakeholders will be required to determine the specific operational details and implications of changes in the service delivery model and how best to move forward. The CC (Cardiac) and its sub-committees are well placed to develop an operational plan to ensure the strategies outlined are implemented in the coming five to ten years.

Change will be led by frontline professionals involved in cardiac services, with the leadership to steer overall service developments in clusters provided by HA Head Office, senior cluster management and clinical leaders. The HA annual planning process will be the mechanism through which resources will be sought to support implementation of the Framework and overall strategies.

The strategies outlined in this Framework represent progression in service development. They capitalise on initiatives that have been embarked upon already by HA and its cardiac professionals, as well as seek to strengthen and promulgate high quality care and practice. Although the Framework is primarily an overarching strategic document, proposals for implementation are given below.

Enhancement of Preventive Care

Enhancement of Provision for Comprehensive Risk Assessment in GOPCs

The initiative of HA's RAMP shall be enhanced. Multi-disciplinary teams of healthcare professionals in GOPCs will continue to provide structured evidence-based health risk assessment and targeted chronic disease management for patients with DM and uncontrolled HT.

On the other hand, the expansion of smoking cessation and counseling services in HA GOPCs enhance patients' access to professional input for smoking abstinence. Featuring professional counseling by specially trained nurses, pharmacists and occupational therapists, as well as pharmacotherapy, the protocol driven smoking cessation service continues to play a key role in preventive care of CHD.

RAMP is regularly audited to ensure safe and effective service. The COC (FM) will continue to review the international and local evidence-base to inform decisions on the enhancement of existing programmes and further adoption of chronic disease prevention and management strategies.

For development of automation of risk scoring, to help identification and risk-stratification of CHD patients to inform decision-making, it is proposed that the COC (FM) work with cardiologists to explore the further application in the primary care setting to enhance patient care and workflow efficiency.

Complementary to this, COC (Radiology) is developing protocols and guidelines to inform special investigations from cardiac imaging. Building on this, the CC (Cardiac), COC (FM) and COC (Radiology) should work together to identify and develop shared protocols for the referral and assessment of CHD patients, to support timely access to investigations, workflows and decisions for onward management.

Increase Coverage of Secondary Prevention Medicines

With regard to improving the prescribing of secondary prevention medicines for CHD patients, a step-wise approach will be undertaken by the CC (Cardiac), in particular for secondary prevention after AMI.

Firstly, there will be review on the prescribing of secondary prevention medicines for CHD / post-AMI patients and identification of services which have relatively lower rates. Secondly, underlying reasons for any relatively suboptimal prescribing rates will be identified. In addition, for cardiac centres with relatively higher prescribing rates, the factors which have contributed to success will be understood and promulgated. The aim will be to mitigate the underlying causes of lower prescribing, as part of the initiative to improve patient care. Thirdly, in parallel with strategies to improve service quality, it is suggested that the CC (Cardiac), with executive support from Head Office, to work on key performance indicators which can be used to regularly review and support improvements in prescribing.

Also, in developing cardiac rehabilitation programmes the CC (Cardiac) and CC (Rehabilitation), along with COC (Pharm), are suggested to work together to ensure patient medicine management components are built into standardised programme content, to enhance patient drug compliance, safety and optimise drug efficacy.

The CC (Cardiac) and COC (FM) are also suggested to work together with the Central Pharmacy Office, through the HA mechanism for reviewing the drug formulary, to support appropriate patient discharge from Specialist Out-patient Clinics.

Enhancement of Provision for Primary PCI for STEMI

24-hour Primary PCI for STEMI Through Phased Expansion

Phased expansion and roll-out of extended hours primary PCI for STEMI, towards the goal of a 24-hour networked service, will be led by the CC (Cardiac). The key underpinning principles of this strategic objective and priority are:

- Formation of cluster-based cardiac teams to support service sustainability and sufficient service volumes, as essential pre-requisites to build expertise in both acute and elective interventional services.
- A networked cardiac service being the foundation for future service developments. The basis of this principle is consolidation and standardisation of HA's cardiac service.

Extended hours services (12-hour primary PCI, Monday to Friday) will be rolled out at the seven cluster regional hospitals and KWH. In addition to QMH, QEH and PYNEH, HA approval with funding in 2013/14 will enable UCH, PMH and PWH to rollout 12-hour primary PCI services. It is intended that TMH as well as KWH will also develop extended 12-hour primary PCI over the next five years. These developments will go hand-in-hand with arrangements for cluster-based cardiac teams.

Next phase will see the establishment of a network model for a 24-hour Primary PCI service, operating 365 days per year, for the whole of Hong Kong. The planning, delineation, timing, and setting-up of designated centres for 24-hour primary PCI requires detailed analysis and discussions. This will ensure all essential pre-requisite components of a cluster-based workforce and infrastructure are at a state of readiness to provide a sustainable service model, with adequate expertise and sufficient patient volumes to support good outcomes. It is proposed that the CC (Cardiac), with collaborative input from COC (A&E) and COC (Surgery), formulates a proposed evidence-based service model, to help inform discussions and decision at the corporate level on the number and location of 24-hour primary PCI centres in HA.

Finally, although the provisioning of cardiac infrastructure requires long-term capital planning that leads to construction and service commencement of facilities, in the immediate term the principles and strategic priorities outlined in this Framework will be used as the basis to inform the design and planning process of hospital (re)development projects with cardiac components. Subject to HA prioritisation and funding, examples of enhancing the provision of CCL facilities may include TKOH, TMH, UCH, and PMH in the next five years.

Standardisation of the AMI / STEMI Pathway

Building on guidelines developed by the CC (Cardiac), patient pathways and protocols across hospitals for AMI / STEMI will be reviewed and refined to support evolving pathways and workflows. The alignment of pathways and protocols will need to match with development of services within clusters. This includes interface arrangements with cardiothoracic surgery in support of developments in primary PCI. The CC (Cardiac) will need to determine the frequency of guideline and protocol review, to reflect the pace of cardiac service enhancements.

Standardisation of AMI / STEMI pathways will help to support the complementary development of emergency and elective caseloads over the next five years and beyond. In addition, the development of guidelines for NSTEMI patients, as part of the wider spectrum of Acute Coronary Syndrome, would also enable greater alignment in care standards for this significant group of CHD patients.

Over the next five years, regular reporting by the CC (Cardiac) of the impact of extended 12-hour primary PCI on the wider cardiac service will be necessary to determine whether there have been specific shifts in service demand across the patient pathway. Such reporting will allow identification of those areas which may require additional support and planning according the HA mechanism, and provide intelligence for the consideration of networked 24-hour primary PCI services. This could be through the CC (Cardiac) forming a primary PCI sub-committee for planning, oversight, and regular reporting for this important service development.

Synergy with Other Cardiac Services

Incremental development of the HA primary PCI service provides opportunity to gauge the impact on other services, such as cardiothoracic surgery and explore how collaboration between specialties can be enhanced to optimise patient care and manage workloads.

Details of the collaboration and multi-disciplinary models of care, such as “heart teams”, should be developed by the CC (Cardiac) and COC (Surgery) Specialty Group in Cardiothoracic Surgery. In addition, involvement of the COC (Radiology) should inform use of cardiac imaging modalities and development of appropriate shared referral protocols and guidelines, based on evidence-based guidelines and best practices. The current Working Group on Collaboration of Cardiac and Radiological Services set-up between CC (Cardiac) and COC (Radiology) should be leveraged to support development of these initiatives. Collectively these platforms can potentially inform the HA’s Central Technology Office on technology adoption, as part of HA’s strategic approach to technology planning and management.

Development of Comprehensive Cardiac Rehabilitation

Standardisation and Expansion of Cardiac Rehabilitation Programmes

Planning to identify the cluster-based service delivery model for comprehensive cardiac rehabilitation and the resultant service configuration in each cluster will be undertaken. This will inform the planning and allocation of resources by HA.

In 2013/14 the HA will undertake a stock-take and review of the organisation and integration of medical rehabilitation overall, which will inform the development of cardiac rehabilitation services. Subject to the outcome of the above review and subsequent endorsed directions on medical rehabilitation, development of cardiac rehabilitation programmes will support that of acute cardiac services. This will require CC (Cardiac) taking an active and leading role with CC (Rehabilitation).

In the next five years referral guidelines and pathways into cardiac rehabilitation, programme content, as well as multi-disciplinary discharge planning, will be developed, aligned and implemented across the clusters. The development of comprehensive multi-disciplinary cardiac rehabilitation needs to include surgical revascularisation patients, as well as those from cardiology.

Planning of programme content will take into consideration the needs of patients and their families, as well as other HA initiatives, to ensure services are complementary and efficient. For example, cardiac services are well placed to strengthen benefits to CHD patients through existing public primary care programmes which have been enhanced in recent years, e.g. the smoking cessation service. Collectively these will help to manage the risk factors for CHD progression, support patient self-management and help to prevent, delay or reduce the occurrence of complications of disease in the future. This will foster alignment of initiatives and prevent duplication across different HA settings to support service demand and staff workflows.

Development of Community Partnerships, Education and Engagement

Engagement of Patients and their Families as Partners in Care

The HA will seek to mobilise patient groups, volunteers and NGOs in supporting care delivery.[108] For example, the establishment of a Patient Advisory Committee under the HA management provides a platform for regular feedback and input from patient groups on HA service developments. This corporate initiative provides valuable opportunities for HA's cardiac service to take a more collaborative approach with patient groups and community partners to seek their input in the development of services. In particular, as cardiac services are developed the CC (Cardiac), with executive support of Head Office, will seek to brief relevant patient groups on specific components of service plans, to solicit their views and suggestions.

108 HA Strategic Plan 2012-2017.

The concept of patient-centred care will be incorporated as a key element across the different parts of the CHD patient pathway. Multi-disciplinary decision-making and care planning will include the patient and their family wherever possible. Furthermore, the provision of patient information, education and communication strategies, developed as part of a standardised approach to care will be essential to support optimal patient care and recovery. This not only includes patients, but family members and formal and informal caregivers, enabling all involved to have a much better understanding of the needs of the patient to enhance their recovery and coping.

To further support patient empowerment for better self-care, the well-received Smart Patient Website will continue to expand in terms of content and features. With support from this one-stop information sharing platform, a wider umbrella of chronic disease patients will be engaged to participate in preventive care.

Development of Community Partnerships

In collaboration with NGOs the HA is expanding programmes to engage and support target patient groups, to support chronic disease management, self-care and to help reduce avoidable hospital admissions, such as for DM, HT, CHD and chronic pulmonary disease. Coupled with the existing HA Smart Patient Website, and Community Health Call Centre Chronic Disease Management Programme (for DM patients), these will help to relieve cardiac service demand through enhancing self-management of chronic disease in the community, and by reducing, delaying or preventing onset of secondary complications.

Improvements in Clinical Practice

Enhancement of Patient Outcomes and Service Quality

Across the CHD pathway the CC (Cardiac) has a key role in developing service standards and performance monitoring.

The importance placed on the capability of hospitals to provide standardised data for routine service monitoring, especially for PCI (e.g. the use of Generic Result Reporting), is such that it is considered a pre-requisite to the establishment of extended hours primary PCI. This is of particular importance for STEMI care, where service quality has a major impact on patient outcomes. Standardisation of the pathway enables development of key performance indicators and benchmarking, supporting a culture of continuous service improvement and transparency. With executive support of Head Office, quality indicators for CHD services and their regular reporting will be established to support clinical practice and risk management activities. Key performance criteria outlined by the CC (Cardiac),[109] or those suggested within this Framework, would provide a strong foundation for consideration.

Enhancement of Staff Proficiency

Internationally there are recommendations on procedural volumes for PCI centres and individual operators to maintain proficiency in support of better patient outcomes. It is thus important to realise the strategic value of a cluster-based cardiac team that allows expertise to build-up. In the development and deliberation of the proposed models of networked 24-hour primary PCI, the CC (Cardiac) is suggested to also consider maintenance of staff proficiency and accreditation in the local context to ensure service quality, as well as professional staff needs.

Utilisation of Innovative and Advanced Technology and Medicines

Adoption of modern technology and new treatment options for CHD services will be set within the wider context of HA's strategic approach to technology planning and management, as well as review and updates to the HA Drug Formulary. The CC (Cardiac), its Cardiac Technology and Devices Advisory Committee (CTDAG) and Quality Assurance Sub-committee will need to plan through the mechanism set out by the Central Technology Office for the adoption of technology. Similarly, technology advances in cardiothoracic surgery and cardiac imaging will require the relevant COCs to plan through the HA mechanism. There are also mechanisms for the review of drug formulary via the Central Pharmacy Office.

109 Clinical Practice Guideline on Management of STEMI) (2009). HA CC (Cardiac).

Build Capacity

Strengthening a Sustainable Workforce Through Cluster-based Cardiac Teams

Cluster-based approaches to cardiac workforce will enable greater flexibility in the planning and organisation of cardiac services and resources, enhancing service resilience and sustainability. This pooling of talents will also contribute to the sharing of workload and allow teaming up for both expertise as well as administration. Furthermore, a cluster-based cardiac workforce has the potential to enable additional opportunities for career development and maintenance of proficiency.

Notwithstanding orientation to cluster-based modes of working, the challenges of workforce are not confined to cardiac services, but reflect a wider HA issue. Thus, development of the cardiac workforce must be set within the context of corporate strategies to support workforce – medical, nursing, pharmacist and allied health.

The HA Strategic Plan 2012-2017 described strategies to relieve workload of clinical staff, improve terms and conditions, enhance training and development, strengthen career development and grade management, offer more flexibility and choices in employment, as well as increase manpower supply and promoting good management and leadership. For example, employing more part-time clinicians, allocating trainees to priority areas, as well as deployment of clerical staff to help relieve frontline staff from non-clinical duties are just some of the initiatives being taken forward by HA.

MONITORING

A key underlying component outlined in this Framework is continuous service improvement and embedding key measures within the patient pathway, to enable the effective monitoring of the success of strategies outlined in delivering high quality and effective patient care. Monitoring of this Framework will be on several levels.

Firstly, outcome deliverables which are tied in with resources made available through the HA annual planning mechanism shall be examined by the regular HA performance monitoring mechanism.

Secondly, through development of an operational plan for the Framework, key implementation milestones of the strategy over the next five to ten years can be mapped and progress evaluated through the HA standard mechanism. The operational plan will help to ensure shared ownership of cardiac service developments, their alignment and support programme proposals for the annual planning process.

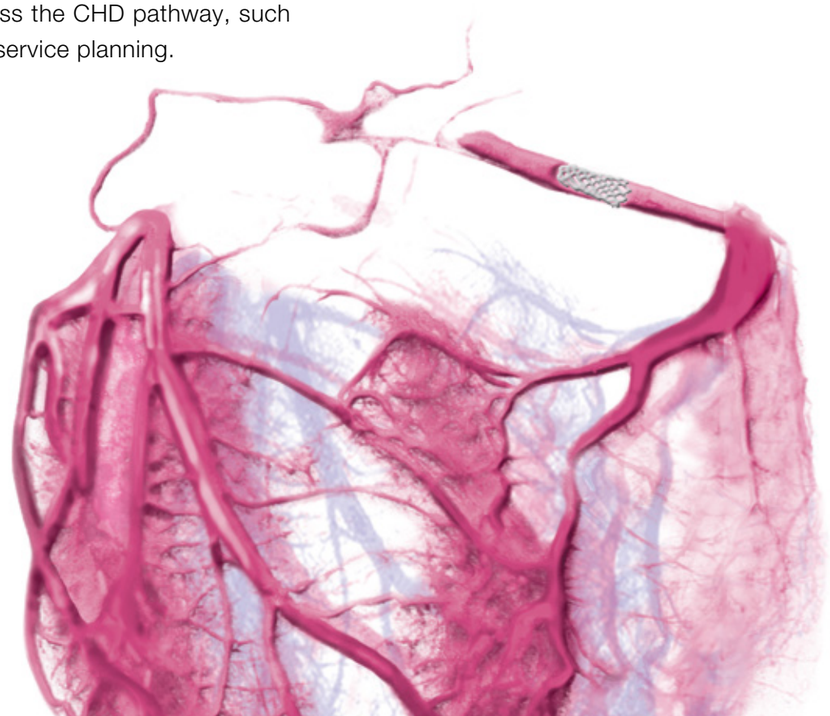
Thirdly, introduction of standardised multi-disciplinary clinical pathways, coupled with agreed selected service and outcome measures, will support regular review and monitoring of the success of the Framework strategies. This will enable transparent and continuous service improvement across the care pathway, supporting a culture of learning and experience sharing. In addition, it will support assessment of changes in workload across the CHD pathway, such as for cardiothoracic surgery and cardiac imaging, to inform future service planning.

CONCLUSION

This Framework sets out key strategies and service developments proposed by cardiologists, cardiothoracic surgeons, radiologists, nurses, pharmacists, and allied health professionals, to improve the HA CHD pathway. To provide a strategic focus for service development the AMI / STEMI pathway was identified as a key driver which can stimulate enhancements in other areas of the CHD pathway.

The strategies were built on the dedication of everyone involved in HA's cardiac service and capitalise on the momentum that has developed over the years to improve and optimise care. The timing and readiness of HA's cardiac service is at a point where care for CHD patients can be further transformed from chronic disease management in the out-patient setting, through to acute care, rehabilitation and ongoing support within the community.

This Framework is part of the ongoing journey of service improvement. It sets the overall strategies, so that frontline services can develop with a common purpose and alignment to support safe, effective and high quality care. It will also support our staff, whose extraordinary contributions to better patient care are the foundations and backbone through which this Framework will succeed.



Appendix 1: Definition of Acute Myocardial Infarction

Definition of Acute Myocardial Infarction

Criteria for acute myocardial infarction

The term acute myocardial infarction (MI) should be used when there is evidence of myocardial necrosis in a clinical setting consistent with acute myocardial ischaemia. Under these conditions any one of the following criteria meets the diagnosis for MI:

- Detection of a rise and/or fall of cardiac biomarker values [preferably cardiac troponin (cTn)] with at least one value above the 99th percentile upper reference limit (URL) and with at least one of the following:
  - Symptoms of ischaemia.
  - New or presumed new significant ST-segment–T wave (ST–T) changes or new left bundle branch block (LBBB).
  - Development of pathological Q waves in the ECG.
  - Imaging evidence of new loss of viable myocardium or new regional wall motion abnormality.
  - Identification of an intracoronary thrombus by angiography or autopsy.
- Cardiac death with symptoms suggestive of myocardial ischaemia and presumed new ischaemic ECG changes or new LBBB,but death occurred before cardiac biomarkers were obtained, or before cardiac biomarker values would be increased.
- Percutaneous coronary intervention (PCI) related MI is arbitrarily defined by elevation of cTn values (>5 x 99th percentile URL) in patients with normal baseline values (≤99th percentile URL) or a rise of cTn values >20% if the baseline values are elevated and are stable or falling. In addition, either (i) symptoms suggestive of myocardial ischaemia or (ii) new ischaemic ECG changes or (iii) angiographic findings consistent with a procedural complication or (iv) imaging demonstration of new loss of viable myocardium or new regional wall motion abnormality are required.
- Stent thrombosis associated with MI when detected by coronary angiography or autopsy in the setting of myocardial ischaemia and with a rise and/or fall of cardiac biomarker values with at least one value above the 99th percentile URL.
- Coronary artery bypass grafting (CABG) related MI is arbitrarily defined by elevation of cardiac biomarker values (>10 x 99th percentile URL) in patients with normal baseline cTn values (≤99th percentile URL). In addition, either (i) new pathological Q waves or new LBBB, or (ii) angiographic documented new graft or new native coronary artery occlusion, or (iii) imaging evidence of new loss of viable myocardium or new regional wall motion abnormality.

Criteria for prior myocardial infarction

Any one of the following criteria meets the diagnosis for prior MI:

- Pathological Q waves with or without symptoms in the absence of non-ischaemic causes.
- Imaging evidence of a region of loss of viable myocardium that is thinned and fails to contract, in the absence of a non-ischaemic cause.
- Pathological findings of a prior MI.

Electrocardiogram manifestations of acute myocardial ischaemia (in the absence of left ventricular hypertrophy, left bundle branch block)

ST elevation

New ST elevation at the J point in two contiguous leads with the cut-points: ≥0.1 mV in all leads other than leads V2–V3 where the following cut points apply:≥0.2 mV in men ≥40 years;≥0.25 mV in men<40 years, or ≥0.15 mV in women.

ST depression and T wave changes

New horizontal or down-sloping ST depression ≥0.05 mV in two contiguous leads and/or T inversion ≥0.1 mV in two contiguous leads with prominent R wave or R/S ratio >1.

Source: Third universal definition of myocardial infarction. Thygesen K, et al. (2012). Writing Group on behalf of the Joint ESC/ACCF/AHA/WHF Task Force for the Universal Definition of Myocardial Infarction. European Heart Journal, 33, 2551–2567.

Appendix 2: Terms of Reference and Membership of the Taskforce on the Strategic Service Framework for Coronary Heart Disease

Terms of Reference

1. To consider current and future service needs for CHD services in HA.
2. To map strategies and priority CHD services to address major anticipated gaps over the next five to ten years.
3. To propose the future service model(s) to enhance quality and outcomes of CHD services in HA.

Membership (as at April 2013)

Co-chairs

Dr S V LO	Director (Strategy and Planning), HA Head Office
Dr W L CHEUNG	Director (Cluster Services), HA Head Office

Members

Dr S T LAU	Consultant (Medicine and Geriatrics), Princess Margaret Hospital (up to Aug 2012) Part-time Consultant (Medicine and Geriatrics), Princess Margaret Hospital (from Oct 2012)
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Prof C M YU	Professor of Medicine, Prince of Wales Hospital / Chinese University of Hong Kong
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Secretary

Dr Douglas WEST	Manager (Service Plan Development), HA Head Office (up to 22 Apr 2012) Manager (Strategy and Service Planning), HA Head Office (from 23 Apr 2012)

Appendix 3: Terms of Reference and Membership of the Working Groups on the Strategic Service Framework for Coronary Heart Disease

Terms of Reference

1. To identify strengths and weaknesses of current HA CHD services and care pathways.
2. To suggest strategies, priority services, and future model(s) of CHD care to address major anticipated gaps over the next five to ten years.
3. To advise the SSF CHD Taskforce on development of patient-centred, sustainable, evidence-based care.

Membership (as at April 2013)

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Appendix 4: Abbreviations

AED	Accident and Emergency Department
AMI	Acute myocardial infarction
BP	Blood pressure
CABG	Coronary artery bypass graft
CC	Central Committee
COC	Clinical Coordinating Committee
CCL	Cardiac Catheterisation Laboratory
CCU	Coronary Care Unit
CDARS	Clinical Data Analysis and Report System
CHD	Coronary heart disease
CTDAG	Cardiac Technology and Devices Advisory Committee
DM	Diabetes mellitus
DTBT	Door-to-balloon time
ECG	Electrocardiogram
EPS	Electrophysiology Study
GOPC	General Out-patient Clinic
HA	Hosiptal Authority
HDU	High Dependency Unit
HT	Hypertension
NGOs	Non-government organisation
NSTEMI	Non-ST segment elevation myocardial infarction
PCI	Percutaneous coronary intervention
SOPC	Specialist Out-patient Clinic
STEMI	ST-elevation myocardial infarction
The Framework	HA Strategic Service Framework for Coronary Heart Disease
TEE	Transoesophageal Echocardiogram
TTE	Transthoracic Echocardiogram
WHO	World Health Organisation

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