National Strategic Plan

For

Cardiovascular Disease Services (Cardiology)

in

Myanmar

2019

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1. Introduction

As Myanmar is quickly moving forward on the path of socioeconomic development, there is a shift in epidemiological transition towards non-communicable diseases. Cardiovascular Disease is now in rising trend in Myanmar, affecting both urban and rural areas. Increasing prevalence of cardiovascular risk factors poses an immense pressure of cardiovascular diseases in both hospital care and community. Prevention of Non Communicable Diseases as well as early diagnosis and prompt treatment of cardiovascular diseases and structural heart diseases play a pivotal role in comprehensive care.

Premature deaths from cardiovascular diseases range from 4% in high-income countries to 42 % in low-income countries indicating inequalities in morbidity and mortality with availability of efficient health care services.

According to Hospital Statistics Report (2014-2016) by Ministry of Health and Sports, Myanmar, morbidity and mortality among hospitalized patients attributed by cardiovascular diseases is 5.7 % and 20.6 % respectively.

In order to reduce the overall cardiovascular disease burden across the country, the services providing need to be expanded and upgraded. Establishing the basic infrastructure, recruitment and training of manpower, and upgrading the quality of care in international standards play a crucial role. Thus, the national strategic plans must be endorsed to fulfill the future needs for the standard care in cardiovascular medicine.

2. Objectives

General Objective

To reduce cardiovascular morbidity mortality and in Myanmar by development and implementation of a comprehensive and integrated cardiovascular care system across the country

Specific Objectives

1. To strengthen the health care services for cardiovascular diseases at supra-regional centers
2. To strengthen the health care services for cardiovascular diseases at regional centers
3. To strengthen the health care delivery for people with high cardiovascular risk by developing the guideline for cost effective measures for primary prevention

3. Objective 1: To strengthen the health care services for cardiovascular diseases at supra-regional centers

3.1. Criteria of Center of Excellence

Supra-regional Cardiovascular Disease Center must be a part of university hospital with strong leadership in teaching and research. There should be a national guideline on management of acute and chronic CVD conditions. It is the responsibility of the supra-regional centers to provide integrated care pathways, standard operation procedures (SOPs) and quality assurance for the care provided in the regions under the support. National Cardiology Outcomes Database/ Registry must be developed. The data return from every CVD center must be mandatory.

3.2. Essential needs for center of excellence

A center of excellence is a program within a healthcare institution which is assembled to supply an exceptionally high concentration of expertise and related resources centered on a particular area of cardiology, delivering the care in a comprehensive, interdisciplinary fashion to afford the best patient outcomes possible.

3.3. Strategies

(1) To train fully competent cardiologists by acquirement of knowledge, skills, attitude and behavior of a cardiologist who will be able to work as a consultant specialist (local structured training 3 years plus oversea training 1 year) (Annex1Cardiology Doctorate Curriculum). The institution needs to produce more and more of ethically minded, committed, technically competent cardiologist to lead a future Center of Excellence Cardiac Center in Myanmar.

(2) To set up the cardiology department with sub-specialties such as Echocardiography, Interventional Cardiology, Electrophysiology and Pacing, Structural Heart Disease Intervention, Cardiac Rehabilitation and Heart Failure, Nuclear Cardiology, Cardiac imaging and Research Cardiology

(3) Collaboration with renowned oversea cardiac centers for achieving technical skill training in sub-specialties

(4) To train the Allied Professionals to facilitate the set-up of sub-specialties (Annex 2 Curriculum for Allied Professionals)

(5) To fulfill the demand of operational round-the-clock service for cardiac patients in full range of diagnostic, therapeutic, preventive and rehabilitative cardiac service (Annex 3 Cardiac Rehabilitation)

3.4. Action Plan to set up Center of Excellence, Department of Cardiology, Yangon General Hospital (New Specialist Yangon General Hospital) University of Medicine (1), Yangon

3.4.1. Vision and Mission

Vision

- To become Center of Excellence in Medical Education, health service and research in the field of Cardiology

Mission

- To achieve the highest standard of medical profession by producing fully competent Cardiologists and Allied Professionals to cover health care and collaborative research

3.4.2. Action Plan to fulfill the essential infrastructures for cardiovascular center of excellence, Department of Cardiology, Yangon General Hospital, University of Medicine (1)

(It will be engaged with New Yangon Specialist Hospital development project.)

Requirements	**Existing and future plan**
Supra-regional Cardiovascular Disease Center must be a part of university hospital with strong leadership in teaching and research.	Department of Cardiology, Yangon General Hospital, affiliated with University of Medicine (1). Local Cardiology Training program has been established. To expend the area of Cardiology Research engaged with University of Medicine 1 and Department of Medical Research.
There should be a national guideline on management of acute and chronic CVD conditions.	Existing guidelines must be revised. (within 6 months from 2019)
It is the responsibility to provide integrated care pathways, standard operation procedures (SOPs) and quality assurance for the care provided in the regions under the support.	Integrated care pathways will be formed with respective regional centers in accordance with regional plan. SOPs will be documented. (within 6 months from 2019)
National Cardiology Outcomes Database/ Registry must be developed. The data return from every CVD center must be mandatory.	Departmental database will be reformed in 2019. Database of NYSH will be established in 2022/2023 in accordance with HMIS, MOHS.

3.4.3. Action Plan for Strategy 1

Strategy	Action Plan
To train fully competent cardiologists by acquirement of knowledge, skills, attitude and behavior of a cardiologist who will be able to work as a consultant specialist. The institution needs to produce more and more of ethically minded, committed, technically competent cardiologist to lead a future Center of Excellence Cardiac Center in Myanmar.	According to Dr.Med.Sc (Cardiology) Curriculum with WPBA, commencing in 2019 (Curriculum has been established, refer to Annex) Existing training - local structured training 3 years plus oversea training 1 year (currently)

3.4.3.1. Professional Training for Cardiology

Training system in cardiology is important to harmonize the standard of specialists. It must be initiated and endorsed by government body (MOHS) in association with medical professional body (MMC, MAMS) to set up the framework for training.

3.4.3.2. Existing Training Period

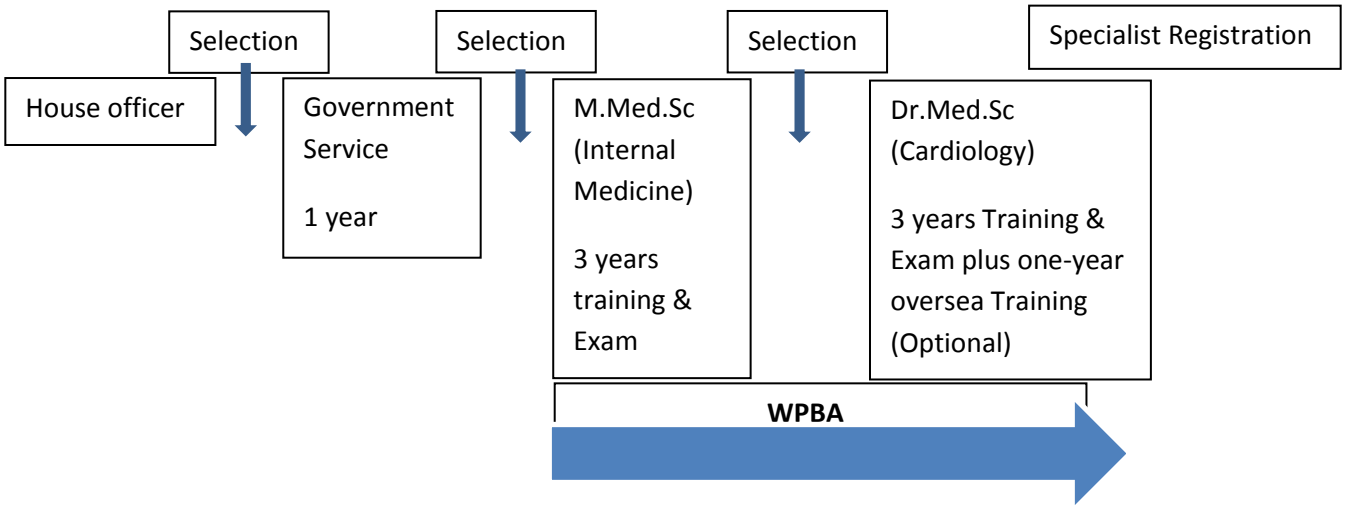

Fig. Outline of carrier development of a Cardiology Specialist

3.4.4. Action for Strategy 2 – To set up the cardiology department with sub-specialties such as Echocardiography, Interventional Cardiology, Electrophysiology and Pacing, Structural Heart Disease Intervention, Cardiac Rehabilitation and Heart Failure, Nuclear Cardiology, Cardiac imaging and Research Cardiology

3.4.4.1. Man Power

Department	Man Power (Existing)	Man Power (Minimum Target)
Echocardiography and Non-invasive Cardiology	Running with existing manpower	Incharge1, Consultant 2
Interventional Cardiology	Incharge1, Consultant 3	Incharge1, Consultant 7
Electrophysiology and Pacing	Incharge1, Consultant 2	Incharge1, Consultant 5
Structural Heart Disease Intervention	Partially started with existing manpower	Incharge1, Consultant 3
Heart Failure & Cardiac Rehabilitation	Running with existing manpower	Incharge1, Consultant 2
Nuclear Cardiology	One person already trained	Incharge1, Consultant 1
Cardiac imaging (CT, MRI)	One person already trained	Incharge1, Consultant 1
Research Cardiology	Belongs to all sub-specialties and Dr.Med.Sc (Cardiology Course)	Belongs to all sub-specialties

3.4.4.2. Logistics

Department	Logistics (Existing)	Logistics (Minimum Target)
Echocardiography and Non-invasive	ETT 2, Holter 3, Echo 4, 24 hr BP monitor 1	Additional Echo 2, ETT 1 (NYSH) May need to be replaced (wear and tear)
Interventional Cardiology	Cath Lab 2	Cath Lab -2 (Cardiology) Additional Cath Lab- 1 Shared with Neuro (NYSH) 2022
Electrophysiology and Pacing	One setting for conventional EP and one for 3D	Transferring from existing and new additional 3D May need to be replaced (wear and tear)
Structural Heart Disease Intervention	Same as interventional cardiology	
Heart Failure & Cardiac Rehabilitation	Nil	New set up proposed by physical medicine (NYSH plan), Development of Heart Failure clinic and Department of Cardiac Rehabilitation
Nuclear Cardiology	Belongs to nuclear medicine department , YGH	Separate machine for Cardiology (NYSH, 2022 onwards) Need new building
Cardiac imaging (CT, MRI)	Belongs to radiology department , YGH	CT 1, MRI 1 (NYSH, 2022)

3.4.4.3. Consumables Supply

Consumables Supply (Existing)	Consumables Supply (Future Plan)
Consumables supplied by MOHS cover one-third of the existing workload (shared with patients' own expense)	Sustainable consumables supply should be considered. Need to develop a system

3.4.5. Action for Strategy 3 - Collaboration with renowned oversea cardiac centers for achieving technical skill training in sub-specialties

Specialties	Oversea cardiac centers (Existing)	Plan
Echocardiography and Non-invasive	National Heart Center, Singapore	Expanding
Interventional Cardiology	Nation Heart Center, Singapore Nation Heart Center (IJN), Malaysia Tan Tock Seng Hospital, Singapore Anam Korea University Hospital, Republic of Korea Open heart International, Australia Medical School University of Zurich, Switzerland, Hanoi Medical University Hospital, Vietnam	Expanding
Electrophysiology and Pacing	National Heart Center, Singapore National University Hospital, Singapore Royal Adelaide Hospital, Westmead Hospital, Australia Taiwan Veterans General Hospital, Taiwan	Expanding
Structural Heart Disease Intervention	Hanoi Medical University Hospital, Vietnam	Expanding

Heart Failure and Cardiac Rehabilitation	National Heart Center Singapore	Expanding
Nuclear Cardiology	Tan Tock Seng Hospital, Singapore	Expanding
Cardiac imaging (CT, MRI)	Tan Tock Seng Hospital, Singapore	Expanding
Research Cardiology	Need to collaborate with international centers for aiming to have publications (Involvement of Multicenter research) Local research : M.Med.Sc (Internal Medicine) M.Med.Sc (Emergency Medicine), M.Med.Sc (Cardiac Surgery) Dr.Med.Sc (Cardiology & Cardiovascular Surgery) and implementation research	Expanding

3.4.6. Action for Strategy 4 - To train the Allied Professionals to facilitate the set-up of sub-specialties

	Existing	**Future Plan**
Training for Allied Professionals (Nursing)	Allied professional diploma course will be started in 2019 intake in Nursing Institute, Yangon. Curriculum approved	Curriculum approved and established.
Training for Allied Professionals (technician)	Nil	Need to set up the curriculum at University of Medical Technology (2020/2021???)

3.4.7. Action for Strategy 5 - To fulfill the demand of operational round-the-clock service for cardiac patients in full range of diagnostic, therapeutic, preventive and rehabilitative cardiac service

Services	Existing	Future Plan
	24/7 round-the-clock	24/7 round-the-clock
Cardiac Intervention Service (Primary + Elective PCI)	24/7 round-the-clock for Primary PCI except high risk cases	High risk cases will be performed with 24/7 cardiac surgical team back up (2022/2023 onwards)
Electrophysiological study & Radio frequency Ablation Service	Elective	Elective
Cardiac Implantation Devices	Elective	Elective
Heart Failure and Cardiac Rehabilitation service	Elective	Elective
Nuclear and CT, MRI Imaging service	Elective (MRI – not available)	CT, MRI - 24/7 round-the-clock (2022 onwards)

3.4.8. Organizational Design

Position	Existing	Future Plan	
		DOH	UM1
Professor and Head	1	1	
Professor	1	1	1
Senior Consultant/ Associate Professor	4	4	2
Consultant/ Lecturer	8	10	4
Medical Officer (Specialist)/ Assistant Lecturer & Medical Officer	12	16	8
Sister	2	2	
Senior Staff Nurse	12	18	
Staff Nurse	24	35	
Nurse Aid	1	6	
Technical Officer	Nil	1	
Radiographer	4	8	
Worker	8	12	
Clinical Engineer/Biomedical Engineer	Nil	2	

3.4.9. Check-lists for Features of Center of Excellence

	Existing	**Future Plan**
Organization Design	√	√
Servicescape Design		NYSH design will be fulfilled (2022)
Personnel	√	√
Medical Care	√	√
Marketing		
Finance	MOHS	MOHS

3.4.10. Training of Physicians / medical doctors and nursing staffs from regional areas

Training course	**Existing**	**Future Plan**
CCU training for doctors	Two-month training	According to regional plan
CCU training for nurses	Two-month training	According to regional plan
Refresher course	Twice a year	According to regional plan
Referral Network	Depends on individual preference	Need to set up a systematic referral network with regional centers

***** Engaged with regional proposal/plan

3.4.11. Partnership

- Collaboration with NCD Control and Prevention Department for Primary Prevention of Cardiovascular diseases
- Collaboration with Medical Research Department
- Collaboration with Private Cardiac Center
- Collaboration with Social Organizations
- Collaboration with related ministries and organizations

3.4.12. Monitoring and Evaluation

- Monitoring and evaluation will be based on assessing the achievement every 2 years
- If target is not achieved, to revise and reset the timeline.

3.4.13. Targets

No	**Activity (Training)**	**Base year**	**5 year plan period**					**Total**
		2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	2023-2024	
1	**Cardiologists**	13	+3	+3	+3	+3	+3	28
2	**Cardiac Nurses**	38	5	48/5	53/5	58/5	63/5	63
3	**Allied professionals**	4	+1/1	+1	+1	+1	+1	10
4	**CCU training of doctors and nurses ***	24	+ 24	+24	+24	+24	+24	144
5	**Refresher courses ***	2	+2	+2	+2	+2	+2	12

3.5. Action Plan to set up Center of Excellence in supra-regional, Cardiovascular Medicine Department, Mandalay General Hospital, University of Medicine, Mandalay

3.5.1. Vision and Mission

Vision

- Create an Academic Cardiac Health Care System which will improve the health of our community through cost effective health care, strengthening the health care services to both regional and supra-regional centers, nurturing the next generation of Cardiac health care professionals, encouraging world class research and empowering people to take ownership of their health

Mission

- To advance health by synergizing care, education and research, in partnership with patients and the community

3.5.2. Action Plan to fulfill the essential infrastructures for cardiovascular center of excellence, Cardiovascular Medicine Department, Mandalay General Hospital, University of Medicine, Mandalay

Requirements	Existing and future plan
Supra-regional Cardiovascular Disease Center must be a part of university hospital with strong leadership in teaching and research.	Department of Cardiology, Mandalay General Hospital, affiliated with University of Medicine, Mandalay. Local Cardiology Training program has been established. To expend the area of Cardiology Research engaged with University of Medicine, Mandalay and Department of Medical Research.
There should be a national guideline on management of acute and chronic CVD conditions.	Existing guidelines must be revised. (within 6 months from 2019)
It is the responsibility to provide integrated care pathways, standard operation procedures (SOPs) and quality assurance for the care provided in the regions under the support.	Integrated care pathways will be formed with respective regional centers in accordance with regional plan. SOPs will be documented. (within 6 months from 2019)
National Cardiology Outcomes Database/ Registry must be developed. The data return from every CVD center must be mandatory.	Departmental database will be reformed in 2019.

3.5.3. Action Plan for Strategy 1

Strategy	Action Plan
To train fully competent cardiologists by acquirement of knowledge, skills, attitude and behavior of a cardiologist who will be able to work as a consultant specialist. The institution needs to produce more and more of ethically minded, committed, technically competent cardiologist to lead a future Center of Excellence Cardiac Center in Myanmar.	According to Dr.Med.Sc (Cardiology) Curriculum with WPBA, commencing in 2019 (Curriculum has been established, refer to Annex) Existing training - local structured training 3 years plus oversea training 1 year (currently)

3.5.3.1. Professional Training for Cardiology

Training system in cardiology is important to harmonize the standard of specialists. It must be initiated and endorsed by government body (MOHS) in association with medical professional body (MMC, MAMS) to set up the framework for training.

3.5.3. 2. Existing Training Period

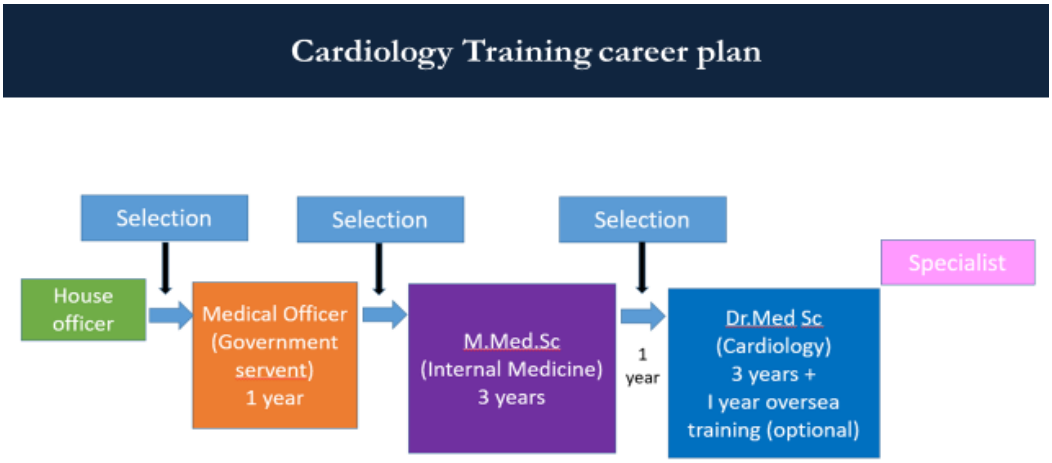

Fig. Outline of carrier development of a Cardiology Specialist

Fig. Outline of carrier development of a Cardiology Specialist Nursing

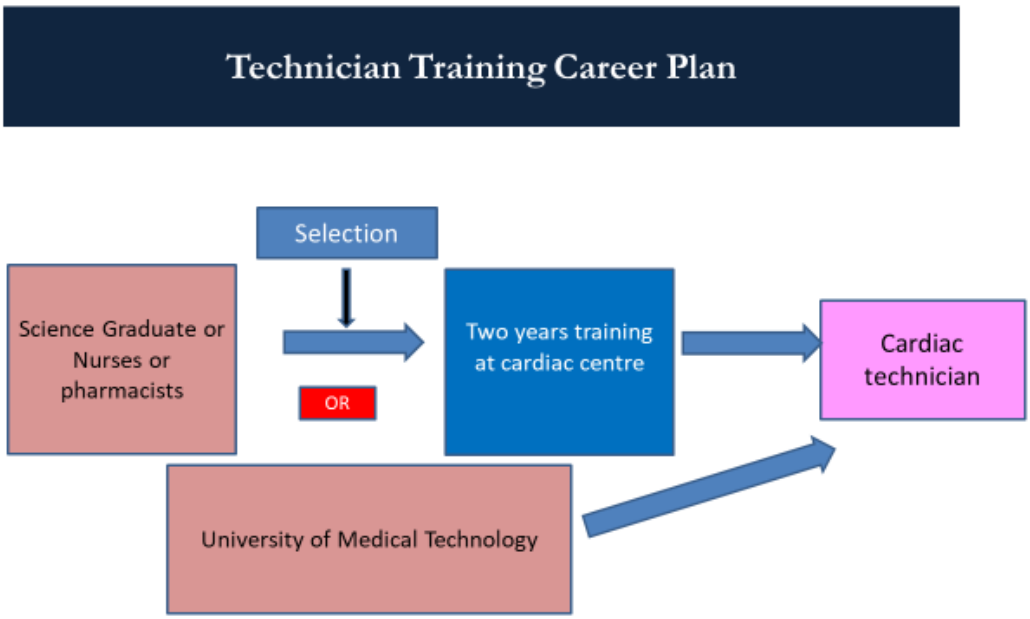

Fig. Outline of carrier development of a Cardiac Technician

3.5.3.3. Components of Sub-specialization in a Cardiac Centre in MGH

A Cardiac center should have facilities for

- Coronary intervention
- Heart rhythm disorders
- Adult congenital heart disease
- ECHO
- Cardiac imaging (CT and MRI)
- Cardiac Rehabilitation
- Heart failure clinic
- Cardiovascular Surgery
- Cardiac Research and own data Registry

In the future

- HR Department
- International Relationship Department (for International-National Collaboration with world renowned oversea cardiac centers)
- Finance Department

3.5.4. Action for Strategy 2 – To set up the cardiology department with sub-specialties such as Echocardiography, Interventional Cardiology, Electrophysiology and Pacing, Structural Heart Disease Intervention, Cardiac Rehabilitation and Heart Failure, Nuclear Cardiology, Cardiac imaging and Research Cardiology

3.5.4.1. Man Power

Department	Man Power (Existing)	Man Power (Minimum Target)
Echocardiography and Non-invasive Cardiology	One person already trained	Incharge1, Consultant 2
Interventional Cardiology	Incharge1, Consultant 3	Incharge1, Consultant 7
Electrophysiology and Pacing	Consultant 2	Incharge1, Consultant 5
Structural Heart Disease Intervention	Partially started with existing manpower	Incharge1, Consultant 3
Heart Failure & Cardiac Rehabilitation	Running with existing manpower	Incharge1, Consultant 2
Nuclear Cardiology	One person already trained	Incharge1, Consultant 1
Cardiac imaging (CT, MRI)	One person already trained	Incharge1, Consultant 1
Research Cardiology	One sending for training	Belongs to all sub-specialties

3.5.4.2. Logistics

Department	Logistics (Existing)	Logistics (Minimum Target)
Echocardiography and Non-invasive	ETT 2, Holter 3, Echo 4, 24 hr BP monitor 1	ETT 3, Holter 6, Echo 6, 24 hr BP monitor 4, tilt table test 1May need to be replaced (wear and tear)
Interventional Cardiology	Cath Lab 2 (share with EP)	Cath Lab 3 (1 for EP) Cath Lab 1 for hybrid lab to share with surgeons
Electrophysiology and Pacing	One setting for conventional EP and one for 3D	Transferring from existing and new additional 3D May need to be replaced (wear and tear)
Structural Heart Disease Intervention	Same as interventional cardiology	
Heart Failure & Cardiac Rehabilitation	Already Exist	already exist (to strengthen for full set up)
Nuclear Cardiology	Belongs to nuclear medicine department , MGH	Separate machine for Cardiology
Cardiac imaging (CT, MRI)	Belongs to radiology department , MGH	Need 1 multi-slice CT and 1 Cardiac MRI

3.5.4.3. Consumables Supply

Consumables Supply (Existing)	Consumables Supply (Future Plan)
Consumables supplied by MOHS cover one-third of the existing workload (shared with patients' own expense)	Sustainable consumables supply should be considered. Need to develop a system

3.5.5. Action for Strategy 3 - Collaboration with renowned oversea cardiac centers for achieving technical skill training in sub-specialties

Specialties	Oversea cardiac centers (Existing)	Plan
Echocardiography and Non-invasive	National Heart Center, Singapore	Expanding
Interventional Cardiology	National University Heart Centre, Singapore Nation Heart Center, Singapore Nation Heart Center (IJN), Malaysia Tan Tock Seng Hospital, Singapore Open heart International, Australia Hanoi Medical University Hospital, Vietnam Central Chest Institute of Thailand	Expanding
Electrophysiology and Pacing	National University Heart Centre, Singapore National Heart Center, Singapore Open heart International, Australia	Expanding
Structural Heart Disease Intervention	Hanoi Medical University Hospital, Vietnam National University Heart Centre, Singapore	Expanding
Heart Failure and Cardiac Rehabilitation	National Heart Center Singapore Central Chest Institute of Thailand	Expanding
Nuclear Cardiology	National Heart Center Singapore	Expanding

Cardiac imaging (CT, MRI)	National Heart Center Singapore	Expanding
Research Cardiology	National University Heart Centre, Singapore Need to collaborate with international centers for aiming to have publications Local research : M.Med.Sc (Internal Medicine) M.Med.Sc (Emergency Medicine), M.Med.Sc (Cardiac Surgery) Dr.Med.Sc (Cardiology & Cardiovascular Surgery) and implementation research	Expanding

3.5.6. Action for Strategy 4 - To train the Allied Professionals to facilitate the set-up of sub-specialties

	Existing	**Future Plan**
Training for Allied Professionals (Nursing)	Allied professional diploma course has been started in 2017 intake in Nursing Institute, Mandalay.	Curriculum approved and established.
Training for Allied Professionals (technician)	Nil	Need to set up the curriculum at University of Medical Technology (2020/2021???)

3.5.7. Action for Strategy 5 - To fulfill the demand of operational round-the-clock service for cardiac patients in full range of diagnostic, therapeutic, preventive and rehabilitative cardiac service

Services	**Existing**	**Future Plan**
	24/7 round-the-clock	**24/7 round-the-clock**
Cardiac Intervention Service (Primary + Elective PCI)	24/7 round-the-clock for Primary PCI except high risk cases	High risk cases will be performed with 24/7 cardiac surgical team back up (2022/2023 onwards)
Electrophysiological study & Radio frequency Ablation Service	Elective	Elective
Cardiac Implantation Devices	Elective	Elective
Heart Failure and Cardiac Rehabilitation service	Elective	Elective
Nuclear and CT, MRI Imaging service	Elective (MRI – not available)	CT, MRI - 24/7 round-the-clock (2022 onwards)

3.5.8. Organizational Design

Position	Existing	Future Plan
Professor and Head	1	1
Professor	1	1
Senior Consultant	4	4
Consultant	8	(20 to fulfil sub-specialties)
Specialist Registrar Medical Officer	5 7	12 10
Research Fellow	0	2?
Sister	3	3
Senior Staff Nurse	12	20
Staff Nurse	24	35
Nurse Aid	2	6
Technical Officer	Nil	2
Radiographer	4	8
Worker	8	16
Biomedical Engineer Cardiac Technician	Nil Nil	2 6

3.5.9. Check-lists for Features of Center of Excellence

	Existing	**Future Plan**
Organization Design	√	√
Servicescape Design		
Personnel	√	√
Medical Care	√	√
Marketing		
Finance	MOHS	MOHS

3.5.10. Training of Physicians / medical doctors and nursing staffs from regional areas

Training course	**Existing**	**Future Plan**
CCU training for doctors	Two-month training	According to regional plan
CCU training for nurses	Two-month training	According to regional plan
Refresher course	Twice a year	According to regional plan
Referral Network	Depends on individual preference	Need to set up a systematic referral network with regional centers

***** Engaged with regional proposal/plan

3.5.11. Partnership

- Collaboration with NCD Control and Prevention Department for Primary Prevention of Cardiovascular diseases
- Collaboration with Medical Research Department
- Collaboration with Private Cardiac Center
- Collaboration with Social Organizations
- Collaboration with related ministries and organizations

3.5.13. Monitoring and Evaluation

- Monitoring and evaluation will be based on assessing the achievement every 2 years
- If target is not achieved, to revise and reset the timeline.

3.5.14. Targets

No	**Activity (Training)**	**Base year**	**5 year plan period**					**Total**
		2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	2023-2024	
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5	**Refresher courses ***	2	+2	+2	+2	+2	+2	12

4. Objective 2: To strengthen the health care services for cardiovascular diseases at regional centers

4.1. Strategies

- Expansion of Cardiology Departments in State and Divisional Hospitals, then District Hospitals
- Management of acute and chronic cardiac diseases according to standard operating procedure at regional cardiac center
- Primary and secondary prevention of common cardiac diseases

4.2. Strategy for action

4.2.1. Phase I; Physician-Led CCU at State and Divisional Hospital

- 5 bedded CCU at all State & Division within 3 years, will be supervised by General Physicians
- These cardiac centers should provide **EMERGENCY CARDIAC CARE** for patients referred by District, Township and Station Hospital as well as from general practitioners and facilities for **PREVENTIVE AND REHABILITATIVE CARDIOLOGY.**

4.2.2. Phase II; Cardiologist-Led Non-invasive Cardiology

- Non-invasive Cardiology department in 500 bedded state & Divisional Hospital within next 3 years and Diagnostic tests like Echocardiogram, Treadmill, 24-hour Holter will be provided
- Trained cardiologists will be appointed at state and division hospitals
- **DIAGNOSTIC TESTS- like ECHO, TREADMILL, 24-HOUR HOLTER will be available at those hospitals** start from 2021**.**

4.2.3. Phase III; Cardiologist-Led Invasive Cardiology

- Cath Lab and Interventional cardiology centers will be established in the next 6 years at the appropriate state and divisional hospitals after sufficient numbers of cardiologists and cardiology specialty nurses have been trained, so as to give services to the cardiac patients referred from nearby hospitals.
- The centers should provide tertiary care for emergency and urgent cases from their traditional catchment area.
- The centers will also provide routine cardiology services for their local district, facilities for cardiac catheterization, and training for doctors, nurses, technicians, and radiographers.

4.2.4. Phase IV; Physician-Led CCU at District Hospital

- 5 bedded CCU at all District Hospital in next 6 years, will be supervised by General Physicians
- These cardiac centers should provide **EMERGENCY CARE** for patients referred by Township and Station Hospital as well as from general practitioners and facilities for **PREVENTIVE AND REHABILITATIVE CARDIOLOGY.**

University and Supercenter cardiology Centre need to set up for

- Structured training program for cardiologist, cardiac specialist nurses, technicians
- Organized curriculum
- Teaching facilities
    - Skill courses
    - Simulation center
- Research and innovation
- Management guideline and standard operating procedure

4.3. Action Plan

4.3.1. Action plan for Phase I; Physician-Led CCU at State and Divisional Hospitals

Phase I	Year	CCU at state and division
Physician-Led CCU at State and Divisional Hospitals	2019 -2020 onwards	◦ Taunggyi, ◦ Magway ◦ Mawlamyaing ◦ Pathein ◦ Monywa
	2019 -2020 onwards	◦ Lashio ◦ Sittwe ◦ Bago ◦ Dawei ◦ Myitkyina
	2019 -2020 onwards	◦ Hakha ◦ Hpa An ◦ Loikaw ◦ Pyay ◦ Kyaington

Requirement	Human Resource and Logistics	Action
1 Senior Physician 1 Junior Physician 6 Staff Nurses/Technicians	MOHS University of Medicine University of Nursing University of Paramedical Science	Setting up CCU Planning Cardiac services Training of physician and staff
CCU bed, Patient Monitor, Central Monitor with work station Defibrillator, Infusion pump, Syringe pump, Suction machine Oxygen cylinder with flowmeter, Oxygen concentrator CPAP/BiPAP machine	MOHS CMSD	Setting up CCU Planning cardiac services Training staff Maintenance
Total cost for CCU 78,468,000 MMK	MOHS Donor	
Cardiovascular Services Management for cardiac emergency/HF Thrombolysis for AMI Antiarrhythmic / cardioversion for arrthymia Anti-coagulation Clinic	Physician	Standard operational procedure Guideline

4.3.2. Action Plan for Phase II; Cardiologist-Led Non-invasive Cardiology at State and Divisional Hospitals

Phase II	Year	Non Invasive cardiology at state and division
Cardiologist-Led Non-invasive Cardiology	2022-2023 onwards	◦ Taunggyi ◦ Magway ◦ Mawlamyaing ◦ Pathein
	2022-2023 onwards	◦ Monywa ◦ Sittwe ◦ Myitkyina ◦ Dawei
	2022-2023 onwards	◦ Hakha ◦ Loikaw ◦ Pyay ◦ Hpa-an

Requirement	**Human Resource and Logistics**	**Action plan**
1 Senior Cardiologist 1 Junior cardiologist 6 Staff Nurses/Technicians	MOHS University of Medicine Cardiology department University of Nursing University of Paramedical Science	Setting up Noninvasive Cardiology Planning Training of Cardiologist and staff / technician
2D Echo, 3D echo, Stress test / Treadmill, 24-hour-Holter monitoring	MOHS CMSD	Setting up Planning Training Maintenance
Total cost with 3D Echo 211,000,000 MMK	MOHS Donor	
Cardiovascular Services Management for cardiac emergency/HF Thrombolysis for AMI Antiarrhythmic / cardioversion for arrhythmia Chest pain /Heart Failure Clinic/ Arrhythmia clinic Cardiac Rehab/Secondary Prevention Clinic/ Device follow up Anti-coagulation Clinic	Cardiology department / Cardiologist	Standard operational procedure Guideline

4.3.3. Action plan for Phase III; Cardiologist-Led Invasive Cardiology at State and Divisional Hospitals

Phase III	Year	Invasive cardiology at state and division
Cardiologist-Led Invasive Cardiology	*2025-2026 onward	◦ Taunggyi ◦ Magway
	*2025-2026 onward	◦ Mawlamyaing ◦ Pathein

*Depends on availability of Budget

Requirement	Human Resource and Logistics	Action
2 Senior Cardiologist 2 Junior Cardiologist 12 Nurse Technician / Staff Nurse	MOHS Universities of medicine Cardiology Department	Setting up Cath Lab Planning Training for cardiologist and Staff / Technician
Cath Lab, EO machine, Temporary and permanent pacemaker, catheter, wire, balloons, stents etc.	MOHS CMSD	Setting up Planning Training Maintenance
Total cost 1,077,600,000MMK	MOHS	
Cardiovascular Services Thrombolysis/PPCI Angio + PCI, PTMC EP & Ablation, Temporary Pacing	State and Divisional Health Department Cardiology Department	Standard operating procedure guideline

Pericardiocentesis Device Implantation Peripheral arterial disease Congenital Heart disease Chest pain /Heart Failure Clinic, Arrhythmia clinic Cardiac Rehab/Secondary Prevention Clinic/ Device follow up		
Structured training program for cardiologist, cardiac specialist nurses, technician Organized curriculum Teaching facilities Skill courses Simulation center Research and innovation Management guideline and standard operating procedure	University and Supra-regional center / cardiology Centre	Training and research

4.3.4. Action plan for Phase IV; Physician-Led CCU at District Hospitals

Phase IV	Year	CCU at District Hospital
Physician-Led CCU At District Hospitals	2027	◦ Meikhtila ◦ Taungoo ◦ Mogok • Hanthada
	2028	◦ Shwebo ◦ Bamaw ◦ Myaungmya ◦ Thantwe
	2029	◦ Kalay ◦ Myingyan ◦ Gantgaw ◦ Kyaukphyu

Requirement	**Human Resource and Logistics**	**Action plan**
1 Senior Physician 1 Junior Physician 6 Nurse Technicians / Staff Nurses	MOHS University of Medicine University of Nursing University of Paramedical Science	Setting up CCU Planning Cardiac services Training of physician and staff
CCU bed, Patient Monitor, Central Monitor with work station Defibrillator, Infusion pump, Syringe pump, Suction machine Oxygen cylinder with flowmeter, Oxygen concentrator CPAP/BiPAP machine	MOHS CMSD	Setting up CCU Planning cardiac services Training staff Maintenance
Total cost 78,468,000 MMK	MOHS Donor	
Cardiovascular Services Management for cardiac emergency/HF Thrombolysis for AMI Antiarrhythmic / cardioversion for arrhythmia Anti-coagulation Clinic		Standard operating procedure guideline

5. Objective 3: To strengthen the health care delivery for people with high cardiovascular risk by developing the guideline for cost effective measures for primary prevention

5.1. Magnitude of Non-communicable diseases (NCD) in Myanmar

National universal health coverage (UHC) consultation meeting, 2012, highlighted that Myanmar faces three disease burdens: burden from communicable diseases, the unfinished MDG agenda for women's and children's health and burden from the rise in the prevalence of non-communicable diseases (NCD), including injuries and chronic diseases condition. World Health Organization (WHO) had stated that in 2016 NCDs are 68% of total 430,000 deaths in Myanmar. Of which, cardiovascular disease (CVD) accounted 25% of all NCD deaths. This shows that NCDs of Myanmar is major health problem with high risk for the people.

5.2. Current NCD service delivery in Myanmar

Ministry of Health and Sports (MoHS) cohesively with its national and international partners has been working for prevention and control of NCDs with the objective to reduce incidence and prevalence of NCDs in Myanmar.

One nation-wide service availability and readiness assessment study, which was conducted during 2014 in Myanmar showed that among 166 public health facilities (from tertiary hospitals to rural health centers - RHC / sub-RHCs) and 35 private hospitals, services for diagnosis and/or management of diabetes, CVD and CRD were offered at most facilities, particularly at hospitals.

Another baseline study conducted during 2015 and 2016 focusing on maternal and child health services, NCDs and water, sanitation and hygiene (WASH) at public health facilities in Hlegu Township also observed similar conditions relating to NCD service readiness at the health facilities. Both studies highlighted the need of further improvement of service delivery for the NCDs, especially at peripheral level.

To narrow this gap, MoHS had stated in National Health Plan - NHP 2017-2021 to extend access to a Basic Essential Package of Health Services (EPHS) to the entire population by 2020 as its main goal. The EPHS emphasizes the critical role of primary health care (PHC) and delivery of essential services and interventions

including NCDs at Township level and below including RHCs and sub-RHCs, starting within the community.

WHO had supported enhancing the nursing and midwifery capacity as professionals and a part of multi-disciplinary team to help prevent, screen and detect NCDs, treat and rehabilitate those suffering such diseases, and to reduce the associated risk factors as a primary-care approach.

Since treating NCDs in tertiary hospitals are expensive and 70% of the population being residing in Rural area, accessibility to screening and treatment of uncomplicated cases of NCD including screening of hypertension, risk assessment of the patients for CVD must be conducted at PHC level. Along these services, health literacy promotion to community to reduce risk such as smoking, promoting physical activity, avoidance on consumption of unhealthy diet and reduce intake of alcohol will be provided.

5.3. Strategy for Cardiovascular Disease Services at Primary Health Care Level

(1) Early detection of cardiovascular risks and cardiovascular diseases by Screening at community level clinics
(2) Secondary prevention of cardiovascular diseases by treatment of uncomplicated cases
(3) Identifying high CVD risk patients by CVD risk assessment
(4) Reducing CVD by appropriate treatment

The following activities are to be conducted by Health Care Providers at Urban Health Centers, Rural Health Centers and Sub-Rural Health Centers.

(1) Identifying high risk patients demarcated by more than 40 years old, obesity, smokers, and family history of hypertension.
(2) Screening of cardiovascular risks and diseases at community clinics (UHC, RHC, SRHC)
(3) Calculating BMI and CVD risk at community clinics (UHC, RHC, SRHC)
(4) Treatment of CVD risk patients

5.4. Capacity Building to implement the activities

Department of Public Health has rolled out NCD service to the community by Package of Essential NCD (PEN) approach. The above mentioned activities have been built in into the mentioned package of NCD services.

The training will be conducted mainly to two categories of health staffs.

(1) Township medical officers
(2) Basic Health Staffs implementing PEN Clinics

5.5. Reporting and Recording

The screened patients and treated patients will be reported by level of health administration.

5.6. Monitoring and supervision

The performance will be monitored by reviewing monthly reports, supervision visit to selected health centers.

6. Annex

1. Curriculum for Dr.Med.Sc (Cardiology), Department of Cardiology, University of Medicine (1), Yangon
2. Curriculum for Diploma in Specialty Nursing (Cardiovascular Nursing), University of Nursing, Yangon
3. Curriculum for Dr.Med.Sc (Cardiology), Department of Cardiology, University of Medicine Mandalay, Mandalay
4. Curriculum for Diploma in Specialty Nursing (Cardiovascular Nursing), University of Nursing, Mandalay
5. Curriculum for Dr.Med.Sc (Cardiology), Department of Cardiology, University of Medicine (2), Yangon
6. Proposal for cardiac rehabilitation, Physical Medicine and Rehabilitation department

Annex 6.

Functional plan for cardiac rehabilitation
Physical Medicine and Rehabilitation department &
Department of Cardiology
(Yangon General Hospital)

Goal

To give effective cardiac rehabilitation service to the patients with cardiac diseases

Objective

1. To organize a cardiac rehabilitation team
2. To implement the capacity building of the team to be an effective and efficient team
3. To establish a referral system for both inpatient and outpatient with cardiac diseases

Action plan

Objective no (1) Cardiac rehabilitation team organization

Members

- Cardiologist
- Physiatrists
- Physiotherapists
- Cardiac nurses
- Occupational therapist
- Social workers

Physiatrists & Physiotherapists

- To discuss with Professor and Head (Physical Medicine and Rehabilitation Department) for allocations of physiatrists and physiotherapists
- To discuss with Chief physiotherapist for selection of physiotherapists to involve in the cardiac rehabilitation team (2-4 in number)

Occupational therapist & social worker

- To set up occupational therapist service for community cardiac rehabilitation (Phase three cardiac rehabilitation)
- To set up social worker's service for social counselling for cardiac patients

Cardiologist & cardiac nurses

- To discuss with Professor and Head (Cardiovascular medicine Department) for possible involvement

Objective no (2) Implementation of the capacity building of the team to be an effective and efficient team

To be effective and efficient

The team members must have adequate knowledge and experience of the following subjects

- Exercise physiology
- Pathophysiology, management, complications of cardiovascular diseases
- Rehabilitation principle of cardiovascular diseases
- Designing exercise program, application of various exercise types and exercise tests
- Evaluation of the patient and effectiveness treatment program

<u>To build theoretical framework</u>

- Formal lectures concerning the above subjects have to be prepared and given.

<u>To gain practical experience</u>

- Exercise principle, techniques and exercise tests will be practiced within the cardiac rehabilitation team groups.
- This include teaching proper exercise technique, handling of exercise machine & carrying out exercise tests with and without machine (Hands on training included).

<u>To gain international orientation and experience</u>

To promote the quality of cardiac rehabilitation, international exposure of the involved team members is essential to get inspiration, motivation and improve quality.

- To send one physiatrist and two physiotherapists for six months
- To send two physiatrists and four physiotherapists for three months each

Objective no (3) To establish a referral system for both inpatient and outpatient with cardiac diseases

To discuss with Professor and Head (Cardiovascular medicine Department) for the establishment of referral pathway

Action plan for establishment of cardiac rehabilitation program

	Proposed Time Line			
	January 2019	February 2019	March-June 2019	June-December 2019
To organize cardiac rehabilitation team				
To implement of the capacity building of the team to be an effective and efficient team				
To build theoretical framework				
To gain practical experience				
To gain international orientation and experience				
To establish a referral system for both inpatient and outpatient with cardiac diseases				