Specialty Training Requirements (STR)

Name of Specialty:	Cardiology
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Scope of Cardiology

Cardiology is the branch of medicine that deals with diseases and abnormalities of the heart.

Purpose of the Residency Programme

The purpose of the Cardiology Residency Program is to groom cardiologists who are dedicated to compassionate and high-quality patient-centered care. Residents will be trained in independent and collaborative care of patients with a broad range of cardiovascular diseases.

Admission Requirements

At the point of application for this residency programme,

a) Applicants must be employed by employers endorsed by Ministry of Health (MOH), and
b) Residents who wish to switch to this residency programme must have waited at least one year between resignation from his / her previous residency programme and application for this residency programme.

At the point of entry to this residency programme, residents must have fulfilled the following requirements:

a) Have completed local Internal Medicine Residency programme and attained the MRCP (UK) and / or Master of Medicine (Internal Medicine) (NUS) qualifications or equivalent. Potential residents without these qualifications will need to seek ratification from Joint Committee on Specialist Training (JCST) before they can be considered for the programme; and
b) Have a valid Conditional or Full Registration with Singapore Medical Council (SMC).

Selection Procedures

Applicants must apply for the programme through the annual residency intake matching exercise conducted by MOH Holdings (MOHH).

Continuity plan: Selection should be conducted via a virtual platform in the event of a protracted outbreak whereby face-to-face on-site meeting is disallowed and cross institution movement is restricted.

Less Than Full Time Training

Less than full time training is not allowed. Exceptions may be granted by Specialist Accreditation Board (SAB) on a case-by-case basis.

Non-traditional Training Route

The programme should only consider the application for mid-stream entry to residency training by an International Medical Graduates (IMG) if he / she meets the following criteria:

a) He / she is an existing resident or specialist trainee in the United States, Australia, New Zealand, Canada, United Kingdom and Hong Kong, or in other centres / countries where training may be recognised by the SAB; and

b) His / her years of training are assessed to be equivalent to the local training by JCST and / or SAB.

Applicants may enter residency training at the appropriate year of training as determined by the Programme Director (PD) and RAC. The latest point of entry into residency for these applicants is Year 1 of the senior residency phase.

Note: Entering at Year 1 of the senior residency phase by IMG in any of the IM-related programmes is regarded as 'mid-stream entry' because it requires the recognition of the overseas Junior Residency training.

Separation

The PD must verify residency training for all residents within 30 days from the point of notification for residents' separation/exit, including residents who did not complete the programme.

Duration of Specialty Training

The training duration must be 42 months.

Maximum candidature: All residents must complete the training requirements, requisite examinations and obtain their exit certification from JCST not more than 36 months beyond the usual length (IM residency + Cardiology) of their training programme. The total candidature for Cardiology is 36 months Internal Medicine residency + 42 months Cardiology residency + 36 months candidature.

Nomenclature: Cardiology residents will be denoted by SR1, SR2 and SR3 according to their residency year of training.

"Make-up" Training

"Make-up" training must be arranged when residents:

- Exceed days of allowable leave of absence / duration away from training or
- Fail to make satisfactory progress in training.

The duration of make-up training should be decided by CCC and should depend on the duration away from training and / or the time deemed necessary for remediation in areas of deficiency. The CCC should review residents' progress at the end of the "make-up" training period and decide if further training is needed.

Any shortfall in core training requirements must be made up by the stipulated training year and/or before completion of residency training.

Learning Outcomes: Entrustable Professional Activities (EPAs)

Residents must achieve level 4 of the following EPAs by the end of residency training:

	Title
EPA 1	Managing Cardiology Patients in the Emergency Room (ER) Setting
EPA 2	Managing Cardiology Patients in the Critical Care (CCU) Setting
EPA 3	Managing the General Cardiology Patient

Residents must achieve level 3 of the following EPAs by the end of residency training:

	Title
EPA 4	Managing Cardiology Patients using Invasive Cardiology
EPA 5	Managing Cardiology Patients using Echocardiography
EPA 6	Managing Cardiology Patients using Nuclear Imaging
EPA 7	Managing Cardiology Patients with Arrhythmias and Rhythm Management Devices

Information on each EPA is provided in *Annex C.R3*.

Learning Outcomes: Core Competencies, Sub-competencies and Milestones

The programme must integrate the following competencies into the curriculum, and structure the curriculum to support resident attainment of these competencies in the local context.

Residents must demonstrate the following core competencies:

1) Patient Care and Procedural Skills

Residents must demonstrate the ability to:

- Gather essential and accurate information about the patient
- Counsel patients and family members
- Make informed diagnostic and therapeutic decisions
- Prescribe and perform essential medical procedures
- Provide effective, compassionate and appropriate health management, maintenance, and prevention guidance

Residents must demonstrate the ability to prescribe and perform the following procedures:

a. Femoral and radial intra-arterial line
b. Central line insertion
c. Cardiac / left heart catheterisation, including coronary arteriography
d. DC cardioversion
e. Pericardiocentesis
f. Placement of temporary pacemakers
g. Intra-arterial sheath removal
h. Intra-arterial balloon pump insertion
i. Right heart catheterisation
j. Transthoracic echocardiogram

Residents must demonstrate ability to interpret diagnostic testing pertaining to cardiovascular conditions using various modalities:

a. Electrocardiogram, including stress ECGs and ambulatory ECG recordings
b. Echocardiogram, including trans-esophageal echo and stress echo
c. Nuclear imaging
d. Left and right heart catheterisation, including coronary arteriography
e. Cardiac CT / MRI scan
f. Cardiac implantable Electronic Device recordings

2) Medical Knowledge

Residents must demonstrate knowledge of established and evolving biomedical, clinical, epidemiological and social-behavioural sciences, as well as the application of this knowledge to patient care.

Residents must demonstrate knowledge of the prevention, evaluation and management of the following cardiovascular conditions:

a. Arrhythmias;
b. Acute myocardial infarction and other acute ischemic syndromes;
c. Cardiomyopathy;
d. Cardiovascular evaluation of patients undergoing non-cardiac surgery;
e. Congestive heart failure;
f. Coronary heart disease, including:
    i. Acute coronary syndromes; and,
    ii. Chronic coronary heart disease.
g. Diseases of the aorta;
h. Heart disease in pregnancy;
i. Hypertension;
j. Infectious and inflammatory heart disease;
k. Lipid disorders and metabolic syndrome;
l. Need for end-of-life (palliative) care;
m. Valvular heart disease;
n. Pericardial disease;
o. Pulmonary hypertension;
p. Thromboembolic disorders;

3) Systems-based Practice

Residents must demonstrate the ability to:

- Work effectively in various health care delivery settings and systems relevant to their clinical specialty
- Coordinate patient care within the health care system relevant to their clinical specialty
- Incorporate considerations of cost awareness and risk / benefit analysis in patient care
- Advocate for quality patient care and optimal patient care systems

- Work in inter-professional teams to enhance patient safety and improve patient care quality. This includes effective transitions of patient care and structured patient hand-off processes.
- Participate in identifying systems errors and in implementing potential systems solutions

4) Practice-based Learning and Improvement

Residents must demonstrate a commitment to lifelong learning.

Resident must demonstrate the ability to:
- Investigate and evaluate patient care practices
- Appraise and assimilate scientific evidence
- Improve the practice of medicine
- Identify and perform appropriate learning activities based on learning needs

5) Professionalism

Residents must demonstrate a commitment to professionalism and adherence to ethical principles including the SMC's Ethical Code and Ethical Guidelines (ECEG).

Residents must:
- Demonstrate professional conduct and accountability
- Demonstrate humanism and cultural proficiency
- Maintain emotional, physical and mental health, and pursue continual personal and professional growth
- Demonstrate an understanding of medical ethics and law

6) Interpersonal and Communication Skills

Residents must demonstrate ability to:
- Effectively exchange information with patients, their families and professional associates.
- Create and sustain a therapeutic relationship with patients and families
- Work effectively as a member or leader of a health care team
- Maintain accurate medical records

Other Competency: Teaching and Supervisory skills.

Residents must demonstrate ability to:
- Teach others
- Supervise others

Learning Outcomes: Others

Residents must attend Medical Ethics, Professionalism and Health Law course conducted by Singapore Medical Association (SMA)**.**

Curriculum

The curriculum and detailed syllabus relevant for local practice must be made available in the Residency Programme Handbook and given to the residents at the start of residency.

The PD must provide clear goals and objectives for each component of clinical experience.

Learning Methods and Approaches: Scheduled Didactic and Classroom Sessions

Programme must organise, and residents must attend the following didactic sessions:

Didactic Session	Frequency	Minimum Attendance Required
Multidisciplinary conferences / Grand rounds	4 per month	70%
Morbidity and mortality conferences	1 per month	70%
Journal or evidence-based reviews	1 per month	70%
Didactic lectures	4 per month	70%

In the event of a protracted outbreak whereby face-to-face on-site meeting is disallowed and cross institution movement is restricted, teachings should be done via virtual platforms.

Learning Methods and Approaches: Clinical Experiences

Residents must have a minimum of:

- Three months in the cardiac catheterisation laboratory;
- Three months of echocardiography;
- Two months of nuclear cardiology;
- Two months devoted to electrophysiology; and,
- Nine months of non-laboratory clinical practice activities, such as general ward, coronary care units and ambulatory clinics.
- Experience in cardiac tomography (CT) and cardiac magnetic resonance imaging (CMRI). These rotations may be done concurrently with other rotations.
- Experience in other non-invasive cardiac evaluations, to include exercise stress testing, electrocardiography (ECG) interpretation, and ambulatory ECG monitoring (continuous and event recording). These rotations may be done concurrently with other rotations.

In the event of a protracted outbreak whereby cross institution movement is restricted that leads to difficulty in residents completing all compulsory rotations, the PD should examine MOH guidance on cross-campus movements at the time, and examine individual residents' progress, so as to best adjust each resident's rotations for their completion of necessary training.

Learning Methods and Approaches: Scholarly/Teaching Activities

Residents must complete the following teaching / scholarly activities.

S/N	Name of activity	Brief description: nature of activity, minimum number to be achieved, when it is attempted
1.	Teaching presentations	Minimum 1 per year
2.	Poster / Oral conference abstract or Publication	Minimum 1 before graduation
3.	Participation in QI Workshop or QI Project	Minimum 1 before graduation

In the event of a protracted outbreak whereby face-to-face on-site meeting is disallowed and cross institution movement is restricted, teachings could be done virtual platforms.

Learning Methods and Approaches: Documentation of Learning

Residents must perform / interpret and log the following minimum number of procedures:

S/N	Procedure	Required No.
1	Perform direct cardioversions or defibrillations	5
2	Perform echocardiography studies	75
3	Interpret echocardiography studies	150
4	Perform exercise stress ECGs	50
5	Perform right and left heart catheterisations	100
6	Interpret radionuclide studies	100

In addition to the requirements above, Residents must attain procedural competency through Faculty-certified evaluation forms for the procedures decided by the programme. This must be accomplished before graduation from the programme.

Summative Assessments

For AY2024 intake onwards	Summative assessments	
	Clinical, patient-facing, psychomotor skills etc.	Cognitive, written etc.
SR3.5	Procedural logs, QI project completion	Cardiology Exit Examination (Data interpretation, 100 Mins) Research abstract / publication
SR3	NA	NA
SR2	NA	Cardiology Exit Examination (European Examination in Core Cardiology (EECC), 3 hrs, 120 MCQs
SR1	NA	NA
R3	NA	NA
R2	NA	NA
R1	NA	NA

For AY2023 intake and before	Summative assessments	
	Clinical, patient-facing, psychomotor skills etc.	Cognitive, written etc.
SR3.5	Procedural logs, QI project completion	Cardiology Exit Examination (Paper 1, 2 hrs, 100 MCQs and Paper 2, Data interpretation, 100 Mins) Research abstract / publication
SR3	NA	NA
SR2	NA	NA
SR1	NA	NA
R3	NA	NA
R2	NA	NA
R1	NA	NA

S/N	**Learning outcomes**	**Summative assessment components**			
		Component a: MCQ & Data Interpretation	Component b: Procedural logs	Component c: QI project	Component d: Research publication
1	EPA1: Managing Cardiology Patients in the Emergency Room (ER) Setting	✓	✓	✓	
2	EPA2: Managing Cardiology Patients in the Critical Care (CCU) Setting	✓	✓	✓	✓
3	EPA3: Managing the General Cardiology Patient	✓	✓	✓	✓
4	EPA4: Managing Cardiology Patients using Invasive Cardiology	✓	✓	✓	✓
5	EPA5: Managing Cardiology Patients using Echocardiography	✓	✓	✓	✓
6	EPA6: Managing Cardiology Patients using Nuclear Imaging	✓	✓	✓	✓
7	EPA7: Managing Cardiology Patients with Arrhythmias and Rhythm Management Devices	✓	✓	✓	