

**NEUROINTERVENTIONAL RADIOLOGY FELLOWSHIP
ATTACHMENT PROGRAMME IN SGH**

Components	Information
1. Division/ Department	Radiological Sciences/ Department of Diagnostic Radiology
2. Title of Programme	Fellowship Training in Neurointerventional Radiology
3. Relevant Registrations	<ul style="list-style-type: none"> • Temporary Registration with Singapore Medical Council (SMC) • Training employment pass application with Ministry of Manpower, Singapore (MOM) (upon successful Temporary Registration with Singapore Medical Council)
4. Overview	To provide training in neurointerventional procedures for the endovascular treatment of neuro/vascular disorders (eg. Ischemic stroke, vascular malformations, aneurysm) in the head, neck and spine as well as management of complications. Fellows will receive hands on training under supervision. They will also be trained in the clinical, diagnostic, imaging (CT/MR/US), pre/post procedural aspects of patient care.
4.1 Background information	
4.2 Goal/ aim(s)	To provide training in neurointerventional radiology and provide fellow with the knowledge, procedural skills and professional judgement to be able to practice neurointerventional radiology independently and safely
4.3 Duration	6 to 12 months
4.4 Hyperlinks/URL Sites	https://www.sgh.com.sg/Diagnostic-Radiology/Pages/Education-DDR.aspx
5. Target Audience	Local (Home country) Board qualified radiologists holding recognised post graduate degrees in their specialties
5.1 Pre-requisite /eligibility requirement(s)	<p>General requirements for Temporary Registration for training (required by SMC):</p> <ul style="list-style-type: none"> • A basic medical degree from an accredited medical university or medical school • Passed the relevant national licensing examination in the country of conferment of basic degree, where applicable • Evidence of at least 12 months houseman-ship / internship with a certificate of satisfactory completion of houseman-ship or equivalent • Been registered as a medical practitioner in the country where he is currently practising • Been certified to be of good standing by the Medical Council or the relevant national authority <p>Note: The doctor should be in active clinical practice (and been registered as a medical practitioner in the countries of practice) for the 3 years preceding the application for medical registration in Singapore.</p> <p>In addition to the above criteria, Clinical Fellows must:</p> <ol style="list-style-type: none"> a) Have a minimum of 3 years working experience as a medical officer (or equivalent) b) Fulfil English Language requirements of SMC if the medium of instruction for the basic medical qualification is <u>not</u> in English

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	<p>c) Preferably have obtained a postgraduate diploma or medical degree in his country or overseas</p> <p>d) Be sponsored by (i) the government, or (ii) regional health authority or (iii) an appropriate institution in the home country. For (d)(iii), the doctor must be on current full-time employment (40 hours or more per week) with the sponsoring institution.</p> <p>As a Clinical Fellow, the doctor will be allowed to be involved in patient care and make entries in patients' case note, communicate care plans to patients and fellow healthcare professionals, and perform procedures under <u>direct</u> supervision or Level 1 supervision under SMC's Supervisory Framework.</p> <p>Department's requirement, if any (only for Clinical Fellow in this subspecialty):</p> <ul style="list-style-type: none"> • Skillset required on arrival is pegged at the level of a Senior Resident • Accepted postgraduate medical qualifications include FRCR, FRANZCR, American Board of Radiology (ABR) or equivalent • At least 1-year clinical (working) experience after attainment of accepted postgraduate qualification above
6. Learning Objectives	<p>This fellowship would allow the Fellow to acquire:</p> <ul style="list-style-type: none"> • Neuroanatomy, etiology, pathophysiology and natural history of neurovascular conditions involving the head, neck and spine • Clinical history, examination, diagnosis, communication and management of patients with neurovascular conditions • CT/MRI/angiographic imaging selection and interpretation for the various neurovascular conditions • Pre and post procedural management (Clinic consultations, ward review, multidisciplinary rounds) • Technical expertise in performing cerebral angiograms, neurointerventional procedures (aneurysm, stroke, AVMs, DAVFs, intra/extracranial angioplasty and stenting, ECA embolisation) and management of complications
7. Course/Training Syllabus	<ol style="list-style-type: none"> 1. Clinical evaluation, imaging diagnosis and endovascular/percutaneous treatment of acute and elective neurovascular conditions involving the head, neck and spine (eg. aneurysms, vascular malformations and ischemic stroke) 2. Present at multidisciplinary neurovascular meetings, stroke and QI audits 3. Active member of the acute stroke service participating in the rapid evaluation, imaging workup and treatment with neurovascular thrombectomy 4. Reporting competency in MRI/CT and angiography of neurovascular cases 5. Protected academic time for research. Fellows are expected to do at least 2 journal readings within the 6 months fellowship and encouraged to present abstracts/ posters at local/ regional conferences and submit manuscripts for publications 6. Take part in routine patient care/evaluation of neurovascular patients including outpatient clinics, pre/post procedure review and ward rounds.

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8. Training Method	Method of Supervision: Direct observation and feedback. Clinical Fellow will be supervised by an assigned supervisor at all times.		
	TRAINING ACTIVITIES & METHODOLOGY		
	Name of activity	Frequency / No. of sessions / Length of session	Teaching methodology
	Stroke, Urgent Intervention office/after hour coverage	2 sessions per week	Direct supervision
	Cerebral angiograms	2 sessions per week	Direct supervision
	Elective interventions	2 sessions per week	Direct supervision
	Neurovascular Reporting session	2 sessions per week	Direct supervision of all studies reported with Consultant sign off of reports.
	Research, Audit and QI	2 sessions per week	
	Participate in weekly Neuro Team education	1 hr 3 sessions per month	Case sharing, Journal reading, Didactic tutorials
	Attendance / presentations at Multidisciplinary meetings	Several meetings per week	Case based discussion with one or multiple clinical disciplines
8.1 Night Duties Requirement	No stay in night duties. Afterhour call backs (night/weekend/Public holidays) for stroke endovascular thrombectomy, urgent neurointerventional procedures and offsite phone consultations may be required		
8.2 Running of Clinics Requirement	Fellows will be rostered together with a neurointervention expert to assist with running the clinic and review patients under direct supervision.		

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9. Assessment and Evaluation	<p>Clinical Fellow will need to demonstrate their proficiency level based on the following competencies:</p> <ol style="list-style-type: none"> 1) Patient Care <ul style="list-style-type: none"> • Skills to perform percutaneous arterial and venous access (including transradial access) as well as postprocedure management and appropriate use of closure devices. • Skills to perform and analyse cerebral angiograms • Skills to perform endovascular thrombectomy and neurovascular interventions • Skills to perform percutaneous CT or fluoroguided interventions • Skills to interpret CT/MR and angiograms related to neurovascular conditions • Skills to carry out preprocedural informed consent, postprocedural evaluation and outpatient clinic follow up 2) Medical Knowledge <ul style="list-style-type: none"> • Know the basic neurovascular anatomy, pathophysiology and natural history of the neurovascular conditions involving the head, neck and spine • Know the indications for endovascular thrombectomy (EVT), appropriate use of imaging and guidelines used for patient selection for EVT. • Know the equipment, techniques and devices used to perform EVT and neurointerventional procedures • Know the management of major procedural complications (rupture, distal thromboembolic event, dissection, perforation, pseudoaneurysm) • Know the neuropharmacology of antiplatelet, anticoagulation agents and drugs typically used in neurointerventional procedures 3) Practice-Based Learning and Improvement <ul style="list-style-type: none"> • Participate and present in department teaching, journal clubs, morbidity and mortality rounds • Participate in stroke audits and quality improvement programs 4) Interpersonal and Communication Skills <ul style="list-style-type: none"> • Communicate effectively and professionally with referring clinicians, colleagues and members of the neurointerventional team. • Communicate effectively and demonstrate sensitivity with all patients 5) Professionalism <ul style="list-style-type: none"> • Display attitude, behavior and manner becoming of a Doctor and Radiologist in Outram Campus. • Maintains professionalism when communicating with staff, patients and family • Respects patient confidentiality • Practice evidence based, guideline directed and patient centered care 6) Systems-Based Practice <ul style="list-style-type: none"> • Participate in multidisciplinary conferences/rounds • Incorporate cost awareness, risk/benefit factors in clinical decisions and management of patients

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	<ul style="list-style-type: none">Understanding the practice of medicine; specific organisational structure of healthcare; possible implications of decisions and appropriate use of resources in a Singapore government restructured hospital.															
9.1 Assessment approaches	<p>Formative assessment:</p> <ul style="list-style-type: none">Regular evaluation between Clinical Fellow and Supervisor / Head of DepartmentReflective journal- logbook recordings of training activities <p>Summative assessment:</p> <p>Periodical assessment reports as required by Singapore Medical Council</p> <p>Feedback:</p> <ul style="list-style-type: none">End-of-training feedback form as required by Singapore Medical CouncilEnd-of-training feedback session with SGH-PGMI															
9.2 Evaluation Process 9.2.1 General overall grading system	<p>The general overall grading system evaluates the Clinical Fellow’s performance upon completion of the fellowship programme. All Clinical Fellow will be given a general overall grading status at the end of the fellowship programme based on the grading criteria requirements incorporating the six competencies based knowledge, skills and performance that Clinical Fellow must demonstrate throughout the programme.</p> <table><tr><th>Grading Status</th><th>Description</th><th>Grading Criteria Requirements</th></tr><tr><td>CMP</td><td>Completes the programme</td><td><ul style="list-style-type: none">Satisfies all core competencies</td></tr><tr><td>USP</td><td>Unsatisfactory performance</td><td><ul style="list-style-type: none">Lacking in one or more core competencies and attends less than 50% of training and education activities</td></tr><tr><td>DCP</td><td>Did not complete the programme</td><td><ul style="list-style-type: none">Ends fellowship before 80% of the stipulated duration is completed</td></tr><tr><td>WDN</td><td>Withdrawn from the programme</td><td><ul style="list-style-type: none">Ends fellowship within 1 month of start</td></tr></table>	Grading Status	Description	Grading Criteria Requirements	CMP	Completes the programme	<ul style="list-style-type: none">Satisfies all core competencies	USP	Unsatisfactory performance	<ul style="list-style-type: none">Lacking in one or more core competencies and attends less than 50% of training and education activities	DCP	Did not complete the programme	<ul style="list-style-type: none">Ends fellowship before 80% of the stipulated duration is completed	WDN	Withdrawn from the programme	<ul style="list-style-type: none">Ends fellowship within 1 month of start
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9.3 Criteria for Early Termination	<p>The attachment programme will be terminated early on the ground of the Clinical Fellow’s poor performance, misdemeanour, misconduct, negligence or breach of any terms stipulated or referred to in the Fellowship Letter of Offer and Institution Terms and Conditions.</p> <p>The Clinical Fellow may also request to terminate the attachment programme for reasons such as serious illness or other personal obligations. The institution will review all requests for early termination with the Clinical Fellow and the Supervisor / Head of Department.</p>															

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10. Course Administration	Type of Certification: Certificate of Training Training Fee: S\$3,240 per month Programme Funding source: Self-funded
11. Number of Clinical Fellow to be accepted at any one time	2