



الهيئة السعودية للتخصصات الصحية
Saudi Commission for Health Specialties

Vascular Neurology (Stroke) Fellowship



سُبْحَانَكَ اللَّهُمَّ عَمَّا يُشْرِكُونَ

PREFACE

- The primary goal of this document is to enrich the training experience of postgraduate trainees by outlining the learning objectives for them to become independent and competent future practitioners.
- This curriculum may contain sections outlining some regulations of training; however, such regulations need to be sought from the “General Bylaws of Training in Postgraduate Programs” and “Executive Policies” published by the Saudi Commission for Health Specialties (SCFHS) SCFHS, which can be accessed online through the official SCFHS website. In case of discrepancy in regulation statements, the statement in the most up-to-date bylaws and executive policies will be the reference to apply.
- As this curriculum is subjected to periodic refinements, please refer to the electronic version posted online for the most up-to-date edition at: www.scfhs.org.sa

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We also acknowledge that the CanMEDS framework is a copyright of the Royal College of Physicians and Surgeons of Canada, and many of the descriptions of competencies have been acquired from their resources.

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IV. INTRODUCTION

Context of Practice

Stroke is the second leading cause of death and a leading cause of adult disability worldwide, with 15 million strokes and 5.8 million stroke-related deaths per year [World Stroke Organization 2012]. Stroke is preventable, yet its incidence is increasing globally. In older studies from the 1990s, the standardized incidence of stroke was calculated as 125.8 per 100,000 population [Epidemiology of stroke in the last decade], with a prevalence of stroke survivors at 186/100,000 of the Saudi population [Stroke register: experience from the eastern province of Saudi Arabia, Al Rajeh 2002]. However, this data probably underestimates the actual incidence of stroke in the country. The 2010 Global Burden of Diseases Study estimated the incidence of stroke in our region to be around 250 per 100,000 people. This translates to more than 40,000 annual strokes. It is now well established that patients treated in stroke units have better outcomes and lower morbidity and mortality rates than those treated in regular medical units. An average stroke unit admits at least 300–400 patients annually [Ontario Stroke System 2015]. From 1990 to 2019, stroke cases increased substantially (70.0% increase in incident strokes and 43.0% deaths from stroke worldwide) [Global Stroke Fact Sheet 2022]. This suggests that Saudi Arabia will require stroke units in each general hospital. Each stroke unit is served by two to four stroke-trained neurologists. Currently, there are fewer than 60 stroke specialists in the country, whereas there is a need for at least 120 to 160 stroke specialists in the next 10 years. We must start working on establishing stroke units and stroke systems of care, and training stroke specialists as early as possible.



2.2. Goals and Responsibilities of Curriculum Implementation

Ultimately, this Vascular Neurology curriculum seeks to guide trainees to become *competent* in their specialty. This goal requires significant effort and coordination from all the stakeholders involved in postgraduate training. As “*adult learners*,” trainees must be proactive, fully engaged, and exhibit the following: a careful understanding of learning objectives, self-directed learning, problem-solving, an eagerness to apply learning by means of reflective practice from feedback and formative assessment, and self-awareness and willingness to ask for support when needed. The Program Director plays a vital role in ensuring the successful implementation of this curriculum. Moreover, training committee members—particularly the program administrator and chief resident—significantly impact program implementation. Trainees should be called upon to share responsibility in curriculum implementation.

The strategic direction of the Saudi Commission for Health Specialties (SCFHS) applies a recognized competency model of training governance to achieve the highest quality of training. The Vascular Neurology training program is also required to cover research activities and evidence-based practice in their curriculum. Additionally, academic affairs in training centers and the regional supervisory training committee play major roles in training supervision and implementation. The Specialty Scientific Committee will guarantee that the content of this curriculum is constantly updated to adhere to the highest standards in postgraduate education for each trainee’s specialty.

What is new in this edition?

- Modification in the fellowship rotations
- Mandating a protected time for academic activity (half-day)

- The annual leave is a full block (28 days in total) after approval of the fellowship director.
- Maximum on-call numbers for fellows: every third day for home on-call (one in three) and every fourth day in the hospital (one in four) on-call per block.



V. ABBREVIATIONS USED IN THIS DOCUMENT

Try to limit the use of abbreviations to the recognized ones, for examples:

Abbreviation	Description
SCFHS	Saudi Commission for Health Specialties
F(1)	(First) year of Fellowship
F(2)	(Second) year of Fellowship
PT	Progress Test
OSCE	Objective Structured Clinical Examination
OSPE	Objective Structured Practical Examination
Mini-CEX	Mini-Clinical Experience Report
DOPS	Direct Observation of Procedural Skills Report
CBD	Case-Based Discussion
CBE	Competency-Based Education
ITER	In-Training Evaluation Report
FITER	Final In-Training Evaluation Report
M&M	Morbidity and Mortality
CPD	Continuous Professional Development
PBL	Practice-Based Learning

VI. PROGRAM ENTRY REQUIREMENTS

- Full-time commitment
- Candidates who have completed accredited neurology training in Saudi Arabia or Gulf countries or have equivalent training elsewhere (board certification or at least passing final written exam in neurology).
- Academic and research activities during the residency training will be considered positively.
- The final selection of the candidate(s) will be made by the interview panel at the training centers, and the results will be announced through the SCFHS website.
- For more details, please refer to the executive policy of the SCFHS on admission and registration, and ensure that there is a statement advising candidates to refer to the SCFHS website.



VII. LEARNING AND COMPETENCIES

1. Introduction to Learning Outcomes and Competency-Based Education

Training should be guided by well-defined “*learning objectives*” driven by the targeted “*learning outcomes*” of a particular program to serve specific specialty needs. Learning outcomes are supposed to reflect the professional “*competencies*” and tasks aimed to be “*entrusted*” to trainees upon graduation. This will ensure that graduates meet the expected demands of the healthcare system and patient care in relation to their specialty. *Competency-based education* (CBE) is an approach to “*adult learning*” based on achieving *pre-defined, fine-grained, and well-paced* learning objectives driven by complex professional competencies.

Professional competencies related to healthcare are usually complex and contain a mixture of multiple learning domains (knowledge, skills, and attitude). CBE is expected to change the traditional method of postgraduate education. For instance, the time of training, though a precious resource, should not be considered a proxy for *competence* (e.g., time of rotation in certain hospital areas is not the primary marker of competence achievement). Furthermore, CBE emphasizes the critical role of informed judgment in learners’ competency progress, based on a staged and formative assessment driven by multiple workplace-based observations. The CBE model—developed for postgraduate education in healthcare (CanMEDS) by the Royal College of Physicians and Surgeons of Canada (RCPSC)—has been adopted by the Vascular Neurology program.

The following concepts enhance the implementation of CBE in this curriculum:

- **Competency:** Competency is a cognitive construct that assesses the potential to perform efficiently in a given situation based on the profession's standards. Professional roles (e.g., medical expert, health advocate, communicator, leader, scholar, collaborator, and professional) are used to define competency roles to make them suitable for learning and assessment.
- **Milestones:** Milestones are the stages of the developmental journey throughout the competency continuum. Trainees throughout their learning journey, from junior to senior levels, will be assisted in transforming from (novice/supervised) to (master/unsupervised) practitioners. This should not undermine the role of supervisory/regulatory bodies regarding the malpractice of independent practitioners. Milestones are expected to enhance the learning process by pacing training/assessment to match the developmental level of the trainees (junior vs. senior).
- **Learning Domains:** Whenever possible, efforts should be directed to annotate the learning outcomes with the corresponding domain (K = Knowledge, S = Skills, and A = Attitude). There might be more than one annotation for a given learning outcome.
- **Content-Area Categorization:** It is advisable to categorize learning outcomes in broad content areas concerning the practice of the profession. For example, diagnostic versus therapeutic, simple versus complex, and urgent versus chronic.
- **Trainees** are expected to progress from the novice to mastery level in certain professional competencies. The SCFHS has endorsed CanMEDS to articulate professional competencies. This curriculum applies the principles of competency-based medical education. CanMEDS is a globally accepted framework that outlines competency



roles. The CanMEDS 2015/ACGME 2018 framework has been adopted in this section.

2. Program Duration

2 years

3. Program Rotations

The following will be the distribution of rotations during the 2 years of training:

First Year (F1)		Second Year (F2)	
Inpatient stroke service	7 blocks	Inpatient stroke service	4 blocks
Outpatient stroke clinic	2 blocks	Outpatient stroke clinic	3 blocks
Neuroradiology	1 block	Outpatient stroke clinic / community outreach	1 block
Research	1 block	Neuroradiology	1 block
**Elective	1 block	Research	1 block
*Annual leave	1 block	Neurorehabilitation	1 block
		**Elective	1 block
		*Annual leave	1 block
Total	13	Total	13

***Elective rotation: Set of rotations related to the specialty, as determined by the scientific committee, of which the trainee is required to do some.*

**Annual leave is a separate block that must not affect the total block count of the other rotations. Eid Holidays (either Eid-al-Adha or Eid-al-Fitr) shall be as per local hospital policy and after mutual agreement of fellows and program director.*

Each block consists of four weeks.

- Inpatient stroke services include stroke units, consultations, and code services, as determined by the training center according to the implemented stroke service structure.

Rotation-Specific Goals:

Inpatient stroke service rotation:

A stroke specialist on service will provide supervision. At the end of rotation through inpatient stroke service (spread over two years), the fellow will be able to:

1. Assess and diagnose acute stroke
2. Interpret diagnostic data and decide on the need and feasibility of thrombolytic treatment in emergency settings
3. If a patient is eligible for intravenous thrombolytic treatment, he/she can calculate the dose of the medication and administer the appropriate dose after fulfilling the inclusion/exclusion requirements.
4. If the patient is a candidate for intraarterial thrombolysis, initiate the appropriate consultations and coordinate the (IA) treatment.
5. Assess the patient's clinical status to decide on an appropriate point/place of care for each patient and, if needed, consult intensive care services and coordinate care with them.
6. Manage day-to-day clinical affairs of stroke patients admitted by the stroke team and, when necessary, initiate appropriate consultations



7. Provide consultation services to patients who suffered a stroke and are admitted under other services in the hospital.
8. Interpret the pathophysiology and risk factors of stroke in individual patients and communicate those to team members, patients and their families, and other healthcare providers
9. Recognize the prognostic factors of stroke and communicate with stroke team members, patients and their families, and other healthcare providers
10. Supervise neurology residents and other rotating residents/interns in the care of stroke patients
11. Recognize the basic requirements of clinical research and participate in ongoing clinical research on the stroke team.

Outpatient stroke and community out-reach rotation:

Supervision will be provided by stroke specialists/neurologists/social workers.

At the end of rotation through an outpatient stroke and community outreach services, the fellow will be able to:

1. Assess and manage the clinical issues of stroke patients in the outpatient setting
2. Assess the need for appropriate referrals of stroke patients to primary care physicians, rehabilitation specialists, community resources, and other relevant specialists
3. Participate in community outreach activities about stroke awareness and stroke prevention.

Neuroimaging/endovascular neurology rotation:

Supervision will be provided by a neuroradiologist/interventional neuroradiologist on service.

At the end of rotation through neuroimaging/endovascular neurology (spread over two years), the fellow will be able to:

1. Interpret and clinically correlate stroke-related neuroimaging, including computed tomography scans (including CT perfusion studies), magnetic resonance imaging scans (including diffusion and perfusion studies), CT angiography, magnetic resonance angiography, and conventional angiography.
2. Describe the role of investigational neuroimaging in stroke, including acetazolamide perfusion imaging, positron emission tomography, and single-photon emission computerized tomography scans
3. List the principles and importance of endovascular procedures related to stroke care.
4. Observe endovascular procedures performed on stroke patients, including IA thrombolysis, extracranial and intracranial stenting, aneurysm coiling, and arteriovenous malformation embolization.
5. When possible and allowed, assist in endovascular procedures.

Neurorehabilitation rotation:

Supervision will be provided by physiatrists/neurorehabilitation specialists.

At the end of rotation through neurorehabilitation, the fellow will be able to:

1. Summarize the basic principles of rehabilitation in stroke patients
2. Describe the brain mechanisms involved in rehabilitation after a stroke
3. Summarize the role of various components of rehabilitation services, including speech therapy, swallowing therapy, physical therapy, occupational therapy, cognitive therapy, and vocational therapy



4. Participate in the assessment of the stroke patient from a rehabilitation standpoint and decide on the suitability for rehabilitation
5. Assess the need and role of various assistive devices for stroke patients
6. Assess the need and role of various home and environment modifications for stroke patients.
7. Manage post-stroke complications such as spasticity, central pain syndrome, post-stroke epilepsy, depression, and vascular dementia
8. Outline the principle of spasticity management, like Botox injection.

Research rotation:

Supervision will be provided by stroke specialists/neurologists/epidemiologists/biostatisticians.

At the end of two months rotation in research (spread over two years), the fellow will be able to:

1. Write at least one research proposal, get it approved by the Institutional Review Board (IRB), and complete the clinical research, including data collection, data interpretation, and manuscript writing.
2. Summarize the role of clinical and basic sciences research in stroke.
3. Understand the critical appraisal of literature related to stroke.
4. Efficiently use the educational resources available in the training center.

Elective rotation:

The fellow will be allowed one block of elective rotation each year.

Elective rotation must be performed in an area relevant to fellowship training. The goals will be decided based on a specific selection.

The following are the options the fellow can choose from with approval from the program director:

- In-patient stroke service
- Interventional neuroradiology
- Neurosonology (Transcranial Doppler, Carotid Doppler, Echocardiography)
- Neurorehabilitation
- Neurocritical care
- Outpatient stroke clinic



4. MAPPING OF LEARNING OBJECTIVES AND COMPETENCY ROLES TO PROGRAM ROTATIONS

1. Medical Expert
2. Communicator
3. Collaborator
4. Manager
5. Health Advocate
6. Scholar:
 - Lifelong learning
 - Critical appraisal
 - Teaching
 - Research
7. Professional
8. Patient safety and quality improvement
9. E-Health

1. Medical Expert:

Key Competencies Enabling Stroke fellow is able to:

Key competencies	Enabling competencies
<p>1. Practice stroke medicine within the defined clinical scope of practice and expertise</p>	<p>1.1. Demonstrate a commitment to high-quality care of stroke patients</p> <p>1.2. Integrate the CanMEDS Intrinsic Roles into the practice of medicine</p> <p>1.3. Apply knowledge of the clinical and biomedical sciences relevant to stroke</p> <p>1.4. Perform an appropriately timed consultation, presenting well-documented assessments and recommendations in written and/or oral form</p> <p>1.5. Carry out professional duties in the face of multiple competing demands</p> <p>1.6. Recognize and respond to the complexity, uncertainty, and ambiguity inherent in stroke practice</p>
<p>2. Perform a patient-centered clinical assessment and establish management plans</p>	<p>2.1. Identify and prioritize issues to be addressed in a patient encounter</p> <p>2.2. Elicit a history, perform a physical exam, select investigations, and interpret the results for diagnosis and management, disease prevention, and health promotion</p> <p>2.3. Establish goals of care with the patient and his or her family, * which may include slowing disease progression, achieving a cure, improving function, treating symptoms, and palliation</p> <p>2.4. Establish a patient-centered management plan</p>
<p>3. Plan and perform interventions for the assessment and/or management</p>	<p>3.1. Determine and choose the indicated interventions for the assessment and/or management</p> <p>3.2. Obtain and document informed consent, explaining the risks and benefits of, and the rationale for, the options discussed</p>



Key competencies	Enabling competencies
	<p>3.3. Triage interventions, taking into account clinical urgency, the potential for deterioration, and available resources</p> <p>3.4. Develop and implement a plan incorporating the degree of clinical uncertainty and the expertise of team members individually and as a whole</p> <p>3.5. Perform the intervention skillfully and safely, adapting to findings or changing clinical circumstances</p> <p>3.6. Establish and implement a plan for both pre-and post-procedure care</p>
<p>4. Establish plans for timely follow-up and appropriate consultation</p>	<p>4.1. Establish the roles of the patient and all team members for follow-up on investigations, response to treatment, and consultations, and ensure that the agreed follow-up occurs</p> <p>4.2. Recognize when care should be transferred to another physician or healthcare provider</p>
<p>5. Actively participate, as an individual and as a member of a team, in the continuous improvement of healthcare quality and patient safety</p>	<p>5.1 Recognize and respond to adverse events and near misses</p> <p>5.2 Seek opportunities to provide high-quality care</p> <p>5.3 Contribute to a culture that promotes the continuous improvement of healthcare quality and patient safety</p> <p>5.4 Describe how human and system factors influence decision-making and the provision of patient care</p> <p>5.5 Engage patients and their families in the continuous improvement of healthcare quality and patient safety</p>

Specialty core topics:

The fellow should master the following topics:

I. Mechanisms of stroke

A. General mechanisms of stroke

1. Atherosclerosis:

- a. common anatomical sites
- b. pathophysiology: cellular response, cytokines, lipids, plaque development, and progression
- c. prevention strategies

2. Thrombosis:

- a. coagulation cascade
- b. platelet and coagulation system interactions
- c. endogenous fibrinolytic system

3. Biochemical changes in brain ischemia.

Current concepts of:

- a. excitotoxicity and mediator/inhibitory mechanisms
- b. calcium homeostasis and calcium-related ischemic damage
- c. reperfusion injury
- d. the ischemic penumbra
- e. endothelial cell activity

4. Hemorrhage

- a. Pathophysiology of brain ischemia and hemorrhage
- b. Pathology of stroke
- c. Mechanisms of brain ischemia:
 1. Cardiogenic brain embolism:
 - a. atrial fibrillation
 - b. heart valvular abnormalities



- c. cardiomyopathies
 - d. wall septal abnormalities
 - e. endocarditis
- 2. Large vessel atherosclerosis:
 - a. Anterior circulation
 - b. Posterior circulation
- 3. Aortic arch embolism
- 4. Small vessel disease:
 - a. small deep infarcts
 - b. white matter disease
- 5. Hemodynamic brain ischemia
- 6. Migraine
- 7. Pregnancy and hormonal contraception
- 8. Hereditary and acquired hypercoagulable states
- 9. Disseminated intravascular coagulation, Thrombotic thrombocytopenic purpura, and other hematological disorders.
- 10. Antiphospholipid antibody syndromes
- 11. Sickle cell disease
- 12. Substance abuse and drug toxicities
- 13. Hypertensive encephalopathy
- 14. Arterial dissection
- 15. Fibromuscular dysplasia
- 16. Vasculopathies including inflammatory, infectious moyamoya.
- 17. Cerebral venous thrombosis
- 18. Genetic causes, e.g., Cerebral autosomal dominant arteriopathy and leukoencephalopathy

19. Metabolic disorders (Mitochondrial dencephalopathy,
lactic acidosis and stroke-like episodes syndrome)

B. Mechanisms of hemorrhagic stroke:

1. Intracerebral hemorrhage (ICH):
 - a. hypertensive
 - b. amyloid angiopathy
 - c. vascular malformations
 - d. drug- or vasculitis-related
 - e. hematological disorders
2. Aneurysmal subarachnoid hemorrhage (SAH)
3. Hemorrhagic infarction
4. Sinus/venous occlusion
5. Subdural hematomas
6. Thrombolytic related

II. Clinical syndromes

A. Clinical manifestations of the more common clinical syndromes of ischemic stroke:

1. Carotid artery occlusion
2. Middle cerebral artery, complete territory
3. MCA, superior division
4. MCA, inferior division
5. Striatocapsular infarction
6. "Watershed" infarctions, anterior and posterior
7. Basilar artery thrombotic and embolic syndromes.
8. Basilar branch occlusion
9. Vertebral occlusive disease
10. Thalamic syndromes



11. Classic lacunar syndromes
12. Major neurobehavioral syndromes of the right and left hemispheres
13. Major neurobehavioral syndromes of the posterior cerebral artery territory
14. Spinal arteries stroke syndromes

B. Transient ischemic attack

III. Diagnosis

A. Evaluation of stroke patients

1. Brain imaging
2. Other diagnostic tests: electroencephalogram (EEG), cerebrospinal fluid (CSF)
3. Arterial imaging
4. Cardiac imaging
5. Hematologic tests
6. Autoimmune tests

B. Neuroradiology

1. Radiographic signs of acute and chronic ischemic and hemorrhagic stroke
2. Indications, contraindications, and cost considerations for the use of specific neuroradiographic studies

C. Neurosonology

1. Principles and interpretation of vascular ultrasound: Doppler principle, spectral analysis, B-mode imaging, color flow imaging
2. Carotid duplex
 - a. techniques to identify vessels
 - b. artifacts

- c. principles of interpretation
 - d. indications and limitations
 - e. importance and method of establishing criteria for individual labs
3. Transcranial Doppler
- a. interpretation, indications, and limitations
 - b. bubble/echo contrast studies
 - c. diagnosis of vasospasm
 - d. diagnosis of intracranial occlusive disease

IV. Patient management

A. Medical management of acute stroke

1. Management of blood pressure
2. Fluids and nutrition
3. Differential diagnosis in Emergency department
4. Acute stroke scales
5. Thrombolytic treatment: evaluation, delivery, management, and complications
6. Mechanical thrombectomy indications, limitations, and complications
7. Antithrombotic therapies
8. Experimental therapies: blood flow and parenchymal agents
9. Management of Intracerebral hemorrhage and indications for evacuation
10. Subarachnoidal hemorrhage
 - a. recognition and management of SAH and vasospasm
 - b. indications and timing of aneurysmal treatment
 - c. interventional therapy
 - d. management of complications of SAH (e.g., hydrocephalus)



11. Management of delayed complications, including cerebral edema and increased Intracerebral pressure
 12. Prevention of medical complications (e.g., Deep venous thrombosis, infection, arrhythmias)
- B. Surgical treatment for stroke and stroke prevention (basic understanding of possible indications and techniques)**
1. Carotid endarterectomy
 2. Large arterial bypass surgeries
 3. Hemicraniectomy
 4. Surgical management for increased ICP
 5. Evacuation of ICH
- C. Medical therapies for stroke prevention**
1. Antiplatelet agents: classes and clinical trial data
 2. Anticoagulation: indication, controversies, administration, complications, and clinical trial data.
 3. Management of risk factors
 - a. hypertension
 - b. lipid disorders
 4. Emerging risk factors
 5. Stroke risk screening
 6. Economics of stroke prevention therapies
- D. Interventional neuroradiology:**
1. Endovascular therapy, basic understanding of indications, techniques, and costs:
 - a. percutaneous transluminal angioplasty
 - b. carotid stenting
 - c. IA thrombolysis

d. embolization of arteriovenous malformations and coiling of aneurysms

2. Radiosurgery for arteriovenous malformations

E. Rehabilitation of stroke patients

1. Matching patients' needs with appropriate rehabilitation services

2. Outcome measurements

a. Familiarity with scales (e.g., The National Institutes of Health Stroke Scale (NIHSS), Barthel Index, Rankin Scale, Glasgow Outcome Scale, Functional Independence Measure)

3. General principles of acute and longer-term stroke rehabilitation

4. Rehabilitation issues of depression, spasticity, and pain

5. Neurobehavioral issues, including aphasias and "nondominant hemisphere" syndromes
Vascular dementia: basic understanding of pathogenesis, assessment, diagnostic criteria, risk factors, prevention, and treatment

6. Transition to the community and continuity of care

V. Epidemiology

A. Economics of stroke

- International Statistical Classification of Diseases and Related Health Problems (ICD) codes

B. Genetics of stroke



2. Communicator:

Key competencies	Enabling competencies
<p>1. Establish professional therapeutic relationships with patients and their families</p>	<p>1.1 Communicate using a patient-centered approach that encourages patient trust and autonomy and is characterized by empathy and respect</p> <p>1.2 Optimize the physical environment for patient comfort, dignity, privacy, engagement, and safety</p> <p>1.3 Recognize when the values, biases, or perspectives of patients, physicians, or other healthcare providers may affect the quality of care, and modify the approach to the patient appropriately</p> <p>1.4 Respond appropriately to patients' non-verbal communication and utilize appropriate non-verbal behaviors to enhance communication with patients</p> <p>1.5 Manage emotionally charged conversations and conflicts</p> <p>1.6 Adapt to the unique needs and preferences of each patient and his or her clinical condition and circumstances</p>
<p>2. Elicit and synthesize accurate and relevant information along with the perspectives of patients and their families</p>	<p>2.1 Use patient-centered interviewing skills to identify and gather relevant biomedical information effectively</p> <p>2.2 Manage the flow of a physician–patient encounter</p> <p>2.3 Inquire about and explore the patient's beliefs, values, preferences, context, expectations, and healthcare goals</p>

Key competencies	Enabling competencies
	<p>2.4 Seek out and synthesize relevant information from other sources, including the patient's family, with the patient's consent</p>
<p>3. Engage patients and others in developing plans that reflect the patient's health care needs and goals</p>	<p>3.1 Provide explanations that are clear, accurate, and adapted to the patient's level of understanding and need</p> <p>3.2 Share information that is timely, accurate, and transparent regarding the patient's health status, care, and outcome</p> <p>3.3 Engage patients in a way that is respectful, non-judgmental, and ensures cultural safety</p> <p>3.4 Assist patients and others in identifying and making use of information and communication technologies to support their care and manage their health</p> <p>3.5 Use counseling skills and decision aids to help patients make informed choices regarding their healthcare</p> <p>3.6 Disclose adverse events to patients and/or their families accurately and appropriately</p>
<p>4. Document and share written and electronic information about the medical encounter to optimize clinical decision-making, patient safety, confidentiality, and privacy</p>	<p>4.1 Document clinical encounters in an accurate, complete, timely, and accessible manner, in compliance with legal and regulatory requirements</p> <p>4.2 Communicate effectively using an electronic health record or other digital technology</p> <p>4.3 Share information with patients and appropriate others in a manner that respects patient privacy and confidentiality</p>



3. Collaborator:

Key competencies	Enabling competencies
1. Work effectively with other physicians and other healthcare professionals	1.1 Establish and maintain healthy inter- and intra-professional working relationships for collaborative care 1.2 Negotiate overlapping and shared responsibilities with inter- and intra-professional health care providers for the episodic or ongoing care of patients 1.3 Engage in effective and respectful shared decision-making with other care providers
2. Work with inter- and intra-professional colleagues to prevent misunderstandings, manage differences, and resolve conflict	2.1 Demonstrate a respectful attitude toward other colleagues and members of an inter- and intra-professional team 2.2 Work with others to prevent conflicts 2.3 Employ collaborative negotiation to resolve conflicts 2.4 Respect differences, misunderstandings, and limitations of others 2.5 Recognize one's differences, misunderstandings, and limitations that may contribute to inter- and intra-professional tension 2.6 Reflect on inter- and intra-professional team function
3. Effectively and safely hand over care to an appropriate healthcare professional	3.1 Demonstrate effective and safe handover during a patient transition to a different setting or stage of care 3.2 Demonstrate effective and safe handover during a transition of responsibility for care

4. Manager/leader:

Key competencies	Enabling competencies
1. Contribute to the improvement of healthcare delivery in healthcare teams, organizations, and systems	1.1. Demonstrate personal responsibility for improving patient care 1.2. Contribute to quality improvement and patient safety using the best available knowledge and practices 1.3. Engage others to work collaboratively to improve systems of patient care 1.4. Use and adapt systems to learn from adverse events and near misses 1.5. Use health informatics to improve the quality of patient care and optimize patient safety
2. Engage in the stewardship of healthcare resources	2.1 Allocate health care resources for optimal patient care 2.2 Apply evidence and management processes to achieve cost-appropriate care 2.3 Contribute to strategies that improve the value of healthcare delivery
3. Demonstrate leadership in professional practice	3.1 Develop their leadership skills 3.2 Facilitate change in health care to enhance services or outcomes 3.3 Design and organize elements of healthcare delivery
4. Manage their practice and career	4.1 Set priorities and manage time to balance practice and personal life 4.2 Manage career planning, finances, and health human resources in a practice 4.3 Implement processes to ensure personal practice improvement



5. Health Advocate:

Key competencies	Enabling competencies
<p>1. Respond to individual patients' complex health needs by advocating with them in the clinical or extra-clinical environment</p>	<p>1.1 Work with patients to address determinants of health that affect them</p> <p>1.2 Work with patients and their families to increase their opportunities to adopt healthy behaviors</p> <p>1.3 Consider disease prevention, health promotion, or health surveillance when working with individual patients</p>
<p>2. Respond to the needs of a community or population they serve by advocating with them for system-level change</p>	<p>2.1 Use a process of continuous quality improvement in their practice that incorporates disease prevention, health promotion, and health surveillance activities</p> <p>2.2 Work with a community or population to identify the determinants of health that affect them</p> <p>2.3 Participate in a process to improve health in the community or population they serve.</p>

6. Scholar:

This includes:

- Lifelong learning
- Critical appraisal
- Teaching
- Research

Key competencies	Enabling competencies
1. Engage in the continuous improvement and enhancement of their professional activities through ongoing learning	1.1 Develop, monitor, and revise a personal learning plan to enhance professional practice 1.2 Regularly analyze their performance, using various data and other sources to identify opportunities for learning and improvement 1.3 Engage in collaborative learning to continuously improve personal practice and contribute to collective improvements in practice
2. Facilitate the learning of students, residents, other health care professionals, the public, and other stakeholders	2.1 Recognize the power of role modeling and the impact of the hidden curriculum on learners 2.2 Promote a safe learning environment 2.3 Ensure that patient safety is maintained when learners are involved 2.4 Collaboratively identify the learning needs of others and prioritize learning outcomes 2.5 Demonstrate effective teaching to facilitate learning 2.6 Seek and provide meaningful feedback 2.7 Use assessment tools and practices that are appropriate to a given learning context



Key competencies	Enabling competencies
<p>3. Integrate the best available evidence, contextualized to specific situations, and integrate it into real-time decision-making</p>	<p>3.1 Recognize uncertainty and knowledge gaps in clinical to a given learning context and other professional encounters and generate focused questions that can address them</p> <p>3.2 Demonstrate proficiency in identifying, selecting, and navigating pre-appraised resources</p> <p>3.3 Integrate evidence into decision-making</p>
<p>4. Critically evaluate the integrity, reliability, and applicability of health-related research and literature</p>	<p>4.1 For a given professional scenario, formulate scholarly questions using a structure that encompasses the patient or population, intervention, comparison, and outcome (PICO)</p> <p>4.2 Identify one or more studies or scholarly sources that shed light on a given professional question</p> <p>4.3 Interpret study findings, including a discussion and critique of their relevance to professional practice</p> <p>4.4 Determine the validity and risk of bias in a wide range of scholarly sources</p> <p>4.5 Describe study results in both quantitative and qualitative terms</p> <p>4.6 Evaluate the applicability (external validity or generalizability) of evidence from a wide range of biomedical research products</p> <p>4.7 Translate and apply the findings of studies into professional practice, and discuss the barriers and facilitators to achieving this</p> <p>4.8 Identify and use automatic information-delivery services that highlight new evidence appropriate to their scope of professional practice</p>
<p>5. Contribute to the dissemination and/or creation of knowledge and practices applicable to health</p>	<p>5.1 Describe the principles of research and scholarly inquiry and their role in contemporary healthcare</p>

Key competencies	Enabling competencies
	<p>5.2 Discuss and interpret the ethical principles applicable to health-related research</p> <p>5.3 Discuss the roles and responsibilities of researchers, both principal investigators and research collaborators, and how they differ from clinical and other practice roles and responsibilities</p> <p>5.4 Pose medically and scientifically relevant, appropriately constructed questions that are amenable to scholarly investigation</p> <p>5.5 Discuss and critique the possible methods of addressing a given scholarly question</p> <p>5.6 Summarize and communicate to professional and lay audiences, including patients and their families,* the findings of applicable studies and reports</p>

In addition, the fellow is expected to be academically inclined and to show motivation for self-learning. The consultants/faculty will provide the necessary supervision and guidance.

A brief outline of academic responsibilities includes:

- i. Participating in all academic conferences related to stroke when doing any rotation inside the training center
- ii. Attending and sometimes presenting in stroke journal clubs, case conferences, neuroradiology conferences, and city-wide stroke academic activities
- iii. The fellow is expected to complete at least one, preferably more, research projects during the fellowship
- iv. The fellow is encouraged to write case reports, reviews, and original articles during the fellowship. Necessary supervision and help will be provided by the consultants

- v. The fellow is expected to supervise and teach the residents/interns rotating on stroke service
- vi. The fellow is expected to actively participate in teaching nursing staff, rehabilitation staff (physical therapists, occupational therapists, speech and language pathologists, swallowing therapy experts, social workers, and other members of the stroke team about various aspects of stroke
- vii. The fellow was also asked to participate in teaching other relevant specialties. (e.g., emergency room (ER) nursing staff, intensive care unit (ICU) nursing staff, unit managers) about stroke
- viii. The fellow will be expected to participate in at least one national or international meeting of relevance during the training period

7. Professional:

- Professionalism
- Physician health

Key competencies	Enabling competencies
1. Demonstrate a commitment to patients by applying best practices and adhering to high ethical standards	1.1 Exhibit appropriate professional behaviors and relationships in all aspects of practice, reflecting honesty, integrity, commitment, compassion, respect, altruism, respect for diversity, and maintenance of confidentiality 1.2 Demonstrate a commitment to excellence in all aspects of practice and active participation in collaborative care 1.3 Recognize and respond to ethical issues encountered in practice 1.4 Recognize and manage conflicts of interest 1.5 Exhibit professional behaviors in the use of technology-enabled communication

Key competencies	Enabling competencies
2. Demonstrate a commitment to society by recognizing and responding to the social contract in health care	<p>2.1 Demonstrate a commitment to the promotion of the public good in health care, including stewardship of resources</p> <p>2.2 Demonstrate a commitment to maintaining and enhancing competence</p> <p>2.3 Demonstrate a commitment to quality improvement and patient safety</p> <p>2.4 Demonstrate accountability to patients, society, and the profession by recognizing and responding to societal expectations of the profession</p>
3. Demonstrate a commitment to the profession by adhering to standards and participating in physician-led regulation	<p>3.1 Fulfill the professional and ethical codes, standards of practice, and laws governing practice</p> <p>3.2 Recognize and respond to unprofessional and unethical behaviors in others</p> <p>3.3 Commit to participation in peer assessment and standard-setting</p> <p>3.4 Maintain and promote a culture of collegiality, respect, and professional relationships</p>
4. Demonstrate a commitment to physician health and well-being to foster optimal patient care	<p>4.1 Exhibit self-awareness and effectively manage the influences on personal well-being and professional performance</p> <p>4.2 Manage personal and professional demands for a sustainable practice through the physician life cycle</p> <p>4.3 Promote a culture that recognizes, supports, and responds effectively to colleagues in need</p>

8. Patient Safety and Quality Improvement

Patient safety—defined as the reduction and mitigation of unsafe acts within the healthcare system and the use of best practices shown to lead to optimal patient outcomes—is a critical aspect of quality healthcare. A



stroke fellow should be familiar with the basic concepts of the core domains of patient safety.

Domain 1: Contribute to a Culture of Patient Safety – A commitment to applying core patient safety knowledge, skills, and attitudes to everyday work

Domain 2: Work in Teams for Patient Safety – Working within inter-professional teams to optimize patient safety and quality of care

Domain 3: Communicate Effectively for Patient Safety – Promoting patient safety through effective healthcare communication

Domain 4: Manage Safety Risks – Anticipating, recognizing, and managing situations that place patients at risk

Domain 5: Optimize Human and Environmental Factors – Managing the relationship between individual and environmental characteristics to optimize patient safety

Domain 6: Recognize, Respond, and Disclose Adverse Events – Recognizing an adverse event or close call and responding effectively to mitigate harm to the patient, ensure disclosure, and prevent a recurrence

9. E-health:

- Describe the advances in electronic health records
- Explain the trends and impact of new technologies in managing stroke
- Describe the concept of telestroke
- Describe the concepts of teleradiology and mobile stroke units
- Outline the concept and impact of e-learning.

VIII. CONTINUUM OF LEARNING

This includes learning that should take place at each key stage of progression within the specialty. Trainees are reminded of lifelong Continuous Professional Development (CPD) and should keep in mind the necessity of CPD for every healthcare provider to meet the demands of their vital profession. The following table shows how this role is progressively expected to develop throughout the junior, senior, and consultant levels of practice.

Specialty General Practice	F1 (Junior Level)	F2 (Senior Level)	Consultant sub-specialist
Sub- specialty non-practicing	Dependent/supervised practice	Dependent/supervised practice	Independent practice/provide supervision
Obtain basic health science and foundational level to core discipline knowledge	Obtain fundamental knowledge related to core clinical problems of the specialty	Apply knowledge to provide appropriate clinical care related to core clinical problems of the specialty	Acquire advanced and up-to-date knowledge related to core clinical problems of the specialty
Internship to the practice of discipline	Apply clinical skills such as physical examination and practical procedures related to the core presenting problems and procedures of the specialty	Analyze and interpret the findings from clinical skills to develop appropriate differential diagnoses and management plans for the patient	Compare and evaluate challenging, contradictory findings and develop expanded differential diagnoses and management plan



IX. TEACHING METHODS:

The teaching process in postgraduate fellowship training programs is mainly based on the principles of adult learning theory. Trainees are expected to be aware of the importance of learning and playing active roles in the content and process of their own learning. The training programs implement the adult learning concept in each feature of the activities, where the fellows are responsible for their own learning requirements. The formal training time includes the following four teaching activities:

- Program-Specific Learning Activities
- Universal Topics
- General Learning Opportunities
- Simulation

Program-Specific Learning Activities:

Program-specific activities are educational activities specifically designed and intended to teach trainees during their training time. Trainees are required to attend these activities, and non-compliance can subject trainees to disciplinary actions. It is advisable to link attendance and participation in these activities with formative assessment tools (see the formative assessment section below). Program administration should support these activities by providing protected time for trainees to attend these activities and allow them to participate in them.

A) Program Academic Half-Day:

Every week at least 2–4 hours of formal training time (commonly referred to as an *academic half-day*) should be reserved. A formal teaching time is

an activity that is scheduled with the assigned tutor(s), time slots, and venue, or even virtual lectures. Formal teaching time excludes bedside teaching and clinic postings. The academic half-day covers the core specialty topics determined and approved by the specialty's scientific council aligned with specialty-defined competencies and teaching methods. The core specialty topics ensure that important clinical problems of the specialty are well taught. It is recommended that lectures be conducted in an interactive, case-based discussion format. The learning objectives of each core topic must be clearly defined, and it is preferable to use pre-learning materials. Whenever applicable, core specialty topics should include workshops, team-based learning (TBL), and simulation to develop skills in core procedures. Regional supervisory committees, in coordination with academic and training affairs, program directors, and chief residents, should work together to ensure the planning and implementation of academic activities as indicated in the curriculum. The trainee should be actively involved in the development and delivery of the topics under faculty supervision; the involvement might be in the form of delivery, content development, or research, among other activities. The trainee's supervisor should ensure that the discussion of each topic is stratified into the three categories of learning domains—knowledge, skill, and attitude—whenever applicable.

The recommended number of half-days that should be conducted annually is 40 sessions per academic training year, with time reserved for teaching methods such as journal clubs and clinical/practical teaching. The Fellowship Training Committee, program directors, and chief fellows, in coordination with academic and training affairs and regional supervisory committees, should work together to ensure the planning and implementation of academic activities as indicated in the curriculum. This should be done efficiently by utilizing the available resources with an optimal exchange of expertise.



Example of an academic half-day schedule

<i>Academic week</i>	<i>Section</i>	<i>Date</i>	<i>Time</i>	<i>Sessions</i>	<i>Presenters</i>
1	Stroke Primary prevention	Jan 3	13:00–14:00	Welcome to the program	Vascular Neurology Consultant or related Specialty Consultant or Training Fellow
			14:00–15:00	Case base study**	
			15:00–16:00	Main topic	
2	Transient Ischemic Attack	Jan 10	13:00–14:00	Pathophysiology	
			14:00–15:00	Case base study	
			15:00–16:00	Management	
3	Cardio-embolic Stroke	Jan 17	13:00–14:00	Diagnosis	
			14:00–15:00	Case base study	
			15:00–16:00	Treatment	
4	Endovascular acute management	Jan 24	13:00–14:00	Journal club*	
			14:00–15:00	Case base study	
			15:00–16:00	Guidelines	

* Journal club could be done in the evening or during the half-day

** Case-based study could be done in the evening or during the half-day

B) Practice-based Learning:

On the one hand, training exposures during bedside radiology labs and other work-related activities, including courses and workshops (e.g., simulations, standardized patients, and bedside teaching), represent excellent learning opportunities. Trainees are expected to build their capacity through self-directed learning.

On the other hand, practice-based learning allows the educator to supervise trainees to become competent in the required program

practical skills that ensure fulfilling the knowledge, psychomotor, and/or attitude learning domains.

C) Morning report:

The morning report is a case-based teaching session, and it is common to many fellowship programs with varying purposes and focuses. The goals of morning reports are to teach efficient handover strategies and case presentation skills, to allow discussion of the management of interesting cases, and to enhance problem-solving and multidisciplinary team skills.

1.1. Universal Topics

Universal topics are educational activities developed by the SCFHS and intended for all specialties. Priority is given to topics with these qualities.

- High value
- Interdisciplinary and integrated
- Require expertise that might be beyond the availability of the local clinical training sites

Universal topics have been developed by the SCFHS and are available through e-learning via personalized access for each trainee (to access the online modules). Each universal topic will have a self-assessment at the end of the module. As indicated in the “executive policies of formative assessment and annual promotion,” universal topics are a mandatory component of the criteria for the annual promotion of trainees from their current level of training to the subsequent level, particularly at the residency level. Universal topics will be distributed throughout the entire training period.



See (Appendix A) for Universal Topics

Selected Universal Topics distributed over training years

Training Year	Modules		Topics name	
	Number	Name	Number	Name
F1	Module 1	Introduction	Topic 5	Safe Drug Prescribing
	Module 3	Diabetes and Metabolic Disorders	Topic 13	Cardiovascular Risk
	Module 4	Medical and Surgical Emergencies	Topic 16	Altered Sensorium
F1	Module 4	Medical and Surgical Emergencies	Topic 18	Hypertension
F2	Module 5	Acute Care	Topic 25	Fluid Management in the Hospitalized Patient
F2	Module 7	Ethics and Healthcare	Topic 33	Patient Advocacy
F2	Module 7	Ethics and Healthcare	Topic 35	Autonomy and Treatment Refusal
F2	Module 7	Ethics and Healthcare	Topic 36	Death and Dying

1.2. General Learning Opportunities

Formal training time should be supplemented by other PBL, such as (can be customized).

- Journal club**
- Grand rounds**
- Involvement in quality improvement committees and meetings
- CPD activities relevant to the specialty (conferences and workshops)
- M&M**

The M&M conference offers trainees an opportunity to discuss patient cases in which adverse effects have occurred through errors or complications. The goal of this resource is to refocus the content of morbidity and mortality and transform it into a platform for teaching patient safety principles and emphasizing error-reduction strategies.

1.3. Simulation:

The SCFHS, as the national supervising body, initiated a move toward integrating simulations into fellowship training programs.

Medical simulation involves creating an artificial clinical scenario from which trainees can learn. This process has educational advantages, such as learning and practicing how to deal with rare and/or high-risk clinical scenarios and rare procedures while practicing in a controlled, standardized environment with immediate effective feedback, with a major impact on knowledge, skills, and attitude (1,2,3,4).

The scenarios for simulation need to be as close to real clinical situations as possible, including team members, equipment, and the environment, followed by timely and effective feedback. According to McGaghie *et al.*, effective feedback has three key components: planning, pre-briefing, and feedback provision (5).

The use of simulation in postgraduate training programs is currently a necessity, especially in competency-based curricula. Current programs are looking to graduate skilled, competent, and independent physicians while focusing on quality and patient safety. Practically speaking, there can be a high variability in using simulation to implement competency-based curricula, and the nature of the specialty is likely to play another role in increasing this variability. Establishing standardized needs assessment methods for simulation may pose a challenge to any national organizational body dealing with various ongoing postgraduate training programs.



X. ASSESSMENT AND EVALUATION

10.1. Purpose of Assessment

Assessment plays a vital role in the success of post-graduate training. Assessment guides trainees and trainers to achieve defined standards, learning outcomes, and competencies. Conversely, the assessment also provides feedback to learners and faculty regarding curriculum development and implementation, teaching methods, and the quality of the learning environment. A reliable and valid assessment is essential to assess curriculum alignment with respect to objectives, learning methods, and assessment tools. Finally, assessment ensures patients and the public that health professionals are safe and competent to practice.

Assessment can serve the following purposes:

- a. **Assessment for learning:** Trainers will use information from trainees' performance to inform their learning for improvement. This enables educators to use information about trainees' knowledge, understanding, and skills to provide them feedback about their learning and how to improve.
- b. **Assessment as learning:** This involves trainees in the learning process while enabling them to monitor their progress. Trainees use self-assessment and educators' feedback to reflect on their progress. It develops and supports the trainees' metacognitive skills. Assessment of learning is crucial in helping residents/fellows become lifelong learners.

- c. **Assessment of learning:** This is used to demonstrate the achievement of trainees' learning. This graded assessment usually counts toward the trainees' end-of-training degree.
- d. **Feedback and evaluation:** Assessment outcomes will represent quality metrics that can improve the learning experience (through the One45 program).

10.2. Formative Assessment

2.1 General Principles

Trainees, as adult learners, should strive to seek and develop their performance based on feedback throughout their competency journey from “novice” to “mastery” levels. Formative assessment (also called formative assessment) is a component of assessment distributed throughout the academic year, aiming primarily to provide trainees with effective feedback.

Every four weeks, at least one hour should be assigned for trainees to meet with their mentors to review performance reports (e.g., ITER, e-portfolio and mini-CEX, among others). Input from the overall formative assessment tools will be utilized at the end of the year to determine whether individual trainees will be promoted from the current to the subsequent training level. Formative assessment will be defined based on scientific committee recommendations, usually updated and announced for each program at the start of the academic year.

According to the executive policy on formative assessment (available online: www.scfhs.org), formative assessment has the following features:

- a. **Multisource:** minimum four tools.
- b. **Comprehensive:** covering all learning domains (knowledge, skills, and attitude).



- c. Relevant: focusing on workplace-based observations.
- d. Competency milestone-oriented: reflects the trainee's expected competencies that match the trainee's developmental level.

Trainees should actively seek feedback during their training, and trainers should provide timely and formative assessments. The SCFHS provides an e-portfolio system to enhance the communication and analysis of data from formative assessments.

2.2 Formative Assessment Tools

Learning Domain	Formative Assessment Tools	Important details (e.g., frequency, specifications related to the tool)
Knowledge	<ul style="list-style-type: none"> - Structured academic activities - Promotion exam - Rotation evaluation 	<p>Trainees should participate in academic activities and be evaluated by the program director (e.g., lecture presentation, participation in a multidisciplinary meeting) every three months with a minimum 60% passing score as a total evaluation.</p> <p>The promotion exam is mandatory and is usually held once in the last quarter of the first academic year (F1). It is designed to give feedback to the trainee on the gained knowledge.</p> <p>The trainee should score at least 80% of the total assessment evaluation on the One45 form.</p>
Skills	<ul style="list-style-type: none"> - Mini-CEX - Research Activities 	<ul style="list-style-type: none"> - Mini-CEX: Trainees will be evaluated every three months to measure his/her clinical skills progress. - Research Activities: Each trainee is expected to participate in clinical research at least once in his full training period.
Attitude	ITER	Trainees should have a clear pass in 80% of evaluations regarding attitude (through the One45 program at the end of each block).

The evaluation of each component will be based on the following equation:

Percentage	< 50%	50–59.4%	60–69.4%	> 70%
Description	Clear fail	Borderline fail	Borderline pass	Clear pass

To achieve unconditioned promotion, the candidate must score a minimum of a “borderline pass” on all formative assessment tools.

- The program director can still recommend the promotion of candidates if the above is not met, and the opposite is true in some situations.
- If the candidate scored “borderline failure” in one or two components at maximum, these scores do not belong to the same assessment area for example, both borderline failures should not belong to skills).
- The candidate must have passed all other components and scored a minimum of a clear pass in at least two components.

10.3. Summative Assessment

3.1. General Principles

Summative assessment is a component of assessment that aims primarily to make informed decisions about trainees’ competency. Compared to formative assessment, the *summative assessment* does not aim to provide constructive feedback. For further details on this section, please refer to the General Bylaws of Training in Postgraduate Programs and General Assessment Bylaws (available online: www.scfhs.org). To be eligible to sit for the final exams, trainees will be granted the “Certification of Training Completion” upon successfully completing all training rotations.

3.3. Final In-Training Evaluation Report (FITER)

In addition to approval of the completion of clinical requirements, a FITER is prepared by program directors for each fellow at the end of his or her



final year of training. This report will be the basis for obtaining the Certificate of Training Program Completion and the qualification to sit for the Final Specialty Exam.

3.4 Certification of Training Completion

To be eligible to sit for final specialty examinations, each trainee is required to obtain the “*Certification of Training Completion.*” Based on the General Bylaws of Training in Postgraduate Programs and executive policy (please refer to www.scfhs.org), trainees will be granted the “Certification of Training-Completion” once the following criteria are fulfilled:

- a. Successful completion of all training rotations
- b. Completion of the training requirements (e.g., research, others) outlined in FITER, as approved by the Scientific Committee of Vascular Neurology
- c. Clearance from SCFHS training affairs ensuring compliance with tuition payments and completion of universal topics

The “Certification of Training Completion” will be issued and approved by the supervisory committee or its equivalent, according to the SCFHS policies.

3.5. Final Sub-Specialty Examinations

The final specialty examination is the summative assessment component that grants trainees specialty certifications. It has two elements:

- a) **Final written exam:** To be eligible for this exam trainees are required to have obtained the “Certification of Training Completion.”
- b) **Final clinical/practical exam:** Trainees are required to pass the final written exam with a score of at least 70% to be eligible to sit for the final clinical/practical exam.

- Passing the final clinical examination is mandatory to enter the fellowship's final written exam.

Blueprint Outlines: The content of the following table is for demonstration only (please refer to the most up-to-date version published on the SCFHS website).

The blueprints of the final written and clinical/practical examinations are shown in the following table:

Example of Written Exam Blueprint

Contents						
Categories	Sections	Proportions	Medical science	Diagnosis	Management	Investigations
Stroke Etiology (25%)	Monogenic	15%	4	4	3	4
	Dissection	18%	5	4	5	4
	Cardio-embolic	5%	2	1	1	1
	Large vessel disease	3%	0	1	1	1
	Small vessel disease	4%	1	1	1	1
Stroke Secondary Prevention 40%	Anti-platelet therapy	15%	3	3	5	4
	Anti-coagulation therapy	18%	4	4	6	4
	Rehabilitation	7%	3	1	2	1
Anatomy 5%	Variants	5%	1	1	2	1



Contents						
Categories	Sections	Proportions	Medical science	Diagnosis	Management	Investigations
Scholarly Activities and Others 10%	Research, ethics, professionalism, and patient safety	10%	5	0	5	0
	Total	100%	28	20	31	21

For further details on the final exams, please refer to the General Bylaws of Training in Postgraduate Programs and General Assessment Bylaws (available online: www.scfhs.org)

Learning Domain	Summative Assessment Tools	Passing Score
Knowledge	- Final Written Examination	Held once at the end of the two years of training; at least a borderline pass is required (70%).
Skills	- Objective Structured Clinical Examinations (OSCE) - Structured Oral Examinations (SOE)	Passing the final written examination is required for OSCE and SOE entrance; a borderline pass as a cumulative for all stations (the number of stations will be determined by the exam committee) is required to pass.
Attitude	FITER	Each trainee should obtain a clear pass on FITER from Program Director at the end of the training period.

XI. PROGRAM AND COURSE EVALUATION

The SCFHS applies various measures to evaluate the implementation of this curriculum. The training outcomes of this program will follow the quality assurance framework endorsed by the Central Training Committee at the SCFHS. Trainee assessment (both formative and summative) results will be analyzed and mapped to the curriculum content. Other indicators that will be incorporated are as follows:

- Report on the annual trainees' satisfaction survey.
- Reports from trainees' evaluation of training center members (through One45 program).
- Reports from trainees' evaluation of rotations (through One45 program).
- Reports from the annual survey of program directors.
- Data available from program accreditations.
- Reports from direct field communications with trainees and trainers.

Goal-based Evaluation: The achievement of intended milestones will be evaluated at the end of each rotation (four weeks) to assess the progress of the curriculum delivery. Any deficiencies will be addressed in the following stage utilizing the time devoted to trainee-selected topics and professional sessions.

In addition to subject-matter opinions and best practices from benchmarked international programs, the SCFHS will apply a robust method to ensure that this curriculum will utilize all the data available during the revision of this curriculum in the future.



XII. POLICIES AND PROCEDURES

This curriculum represents the means and materials, and outlines the learning objectives with which trainees and trainers will interact to achieve the identified educational outcomes. The SCFHS has a full set of “General Bylaws of Training in Postgraduate Programs” and “Executive Policies” (published on the official SCFHS website) that regulate all training-related processes. The general bylaws of training, assessment, and accreditation, as well as executive policies on admission, registration, formative assessment and promotion, examination, trainees’ representation and support, duty hours, and leaves, are examples of regulations that need to be implemented. Under this curriculum, trainees, trainers, and supervisors must comply with the most up-to-date bylaws and policies, which can be accessed online (via the official SCFHS website).

XIII. APPENDICES

- A. Universal Topics Modules
- B. Example of Research Rotation Objective
- C. References

11. Appendix-A

12. Universal Topics

Intent:

These are high-value interdisciplinary topics of utmost importance to the trainee. The reason for delivering the topics centrally is to ensure that every trainee receives high-quality teaching and develops essential core knowledge. These topics are common to all specialties.

Topics included here meet one or more of the following criteria:

- Impactful: topics that are common or life-threatening
- Interdisciplinary: topics that are difficult to teach under a single discipline
- Orphan: topics that are poorly represented in the undergraduate curriculum
- Practical: topics that trainees will encounter in hospital practice

Development and Delivery:

Core topics for the PG curriculum will be centrally developed and delivered by the Commission through an e-learning platform. A set of preliminary learning outcomes will be developed for each topic. In collaboration with the central team, content experts may modify the learning outcomes.



These topics will be didactic in nature, focusing on the practical aspects of care. These topics will be more content-intensive than workshops and other planned face-to-face interactive sessions.

The suggested duration of each topic is 1:30 hours.

Assessment:

The topics will be delivered in a modular fashion. At the end of each Learning Unit, there will be an online formative assessment. After completing all topics, there will be a combined summative assessment in the form of a context-rich MCQ. All trainees must attain minimum competency in the summative assessment. Alternatively, these topics can be assessed in a summative manner along with a specialty examination.

Some ideas may include case studies, high-quality images, worked examples of prescribing drugs in disease states, and Internet resources.

Module 1: Medical Fundamentals (Introduction)

1. Blood transfusion
2. Hospital-acquired infections
3. Antibiotic stewardship
4. Sepsis
5. Safe drug prescribing

Module 2: Cancer

6. Colon cancer
7. Breast cancer
8. Lung cancer
9. Prostate cancer

Module 3: Diabetes and Metabolic Disorders

10. Diabetic emergencies
11. Management of diabetic complications

- 12. Obesity
- 13. Cardiovascular risk

Module 4: Medical and Surgical Emergencies

- 14. Acute chest pain
- 15. Acute breathlessness
- 16. Altered sensorium
- 17. Hypotension
- 18. Hypertension
- 19. Upper GI bleeding
- 20. Lower GI bleeding
- 21. Abnormal ECG

Module 5: Acute Care

- 22. Pre-operative assessment
- 23. Post-operative care
- 24. Acute and chronic pain management
- 25. Fluid management in the hospitalized patient
- 26. Management of electrolyte imbalances

Module 6: Frail Elderly

- 27. Second consultation
- 28. Third consultation
- 29. Hospital consultation
- 30. Final consultation

Module 7: Ethics and Healthcare

- 31. Occupational hazards of healthcare workers
- 32. Evidence-based approach to smoking cessation
- 33. Patient advocacy
- 34. Organ transplantation



35. Autonomy and treatment refusal

36. Death and dying

13. Appendix E

The following is a table with example topics that illustrate the half-day activities over of one year (or cycle of teaching if more than one year is required to cover all topics).

Repeating sessions/topics every training year is discouraged. Each half-day is ideally dedicated to one theme.

<i>Academic week</i>	<i>Section</i>	<i>Date</i>	<i>Time</i>	<i>Sessions</i>	<i>Presenters</i>
1	Stroke Primary prevention	Jan-3	13:00–14:00	Welcome to the program	Vascular Neurology Consultant or related Specialty Consultant or Training fellow
			14:00–15:00	Case base study**	
			15:00–16:00	Main topic	
2	Transient Ischemic Attach	Jan-10	13:00–14:00	pathophysiology	
			14:00–15:00	Case base study	
			15:00–16:00	Management	
3	Cardio-embolic Stroke	Jan- 17	13:00–14:00	Diagnosis	
			14:00–15:00	Case base study	
			15:00–16:00	Treatment	
4	Endovascular acute management	Jan- 24	13:00–14:00	Journal club*	
			14:00–15:00	Case base study	
			15:00–16:00	Guidelines	

<i>Academic week</i>	<i>Section</i>	<i>Date</i>	<i>Time</i>	<i>Sessions</i>	<i>Presenters</i>
1	Stroke Primary prevention	Jan-3	13:00–14:00	Welcome to the program	Vascular Neurology Consultant or related Specialty Consultant or Training fellow
			14:00–15:00	Case base study**	
			15:00–16:00	Main topic	
2	Transient Ischemic Attach	Jan-10	13:00–14:00	pathophysiology	
			14:00–15:00	Case base study	
			15:00–16:00	Management	
3	Cardio-embolic Stroke	Jan- 17	13:00–14:00	Diagnosis	
			14:00–15:00	Case base study	
			15:00–16:00	Treatment	
4	Endovascular acute management	Jan- 24	13:00–14:00	Journal club*	
			14:00–15:00	Case base study	
			15:00–16:00	Guidelines	

* Journal club could be done in the evening or during the half-day

** Case-based study could be done in the evening or during the half-day



14. Appendix F

2.2.6 RESEARCH ROTATION

Number of rotation months	First year	Second year	Total
	1	1	2

MEDICAL EXPERT

Goals:

- To demonstrate an understanding of the basic principles of research design, methodology, data analysis, and clinical epidemiology. In addition, they have both advantages and disadvantages from the radiology perspective.
- To familiarize themselves with the ethical requirements of research and demonstrate an understanding of the responsible use of informed consent.
- To practice appropriate methods for writing research proposals, manuscripts, data collection, and result in analysis and discussion.
- To demonstrate the awareness of current research topics in radiology using available medical informatics systems.
- To skillfully present scientific presentations and participate in public discussions.

Training Methods

- Specify the period as appropriate dedicated to research or full-time rotation in the research to be conducted.
- The program may require attendance at dedicated courses or workshops that enhance research skills.
- The project is expected to span more than a month. Therefore, the completion of the work should be parallel with other subsequent rotations.
- The trainee must choose a supervisor to help access the essential resources that will allow the appropriate utilization of research skills and periodically discuss progress.

- The trainee must finish the research proposal by the end of the first six months, and it should be accepted by the IRB.
- The oral abstract of the study results should be presented at a specified time point (e.g., end of the final year before entering the final exam) on Specialty Research Day.
- The research paper should be sent at least two weeks before Specialty Research Day.
- It is highly desirable for trainees to present research results at national and/or international meetings and aim to publish their work in indexed journals.

Evaluation

- Attendance at designated courses/lectures/workshops will be monitored and incorporated into the annual evaluation score.
- Panel scoring of the research abstract presentation will be conducted at the end of the pre-specified point year on Specialty Research Day. This will count as the rotation score for that month.

COMMUNICATOR

- Demonstrate skills in conveying and discussing scientific research to scientific communities through posters, abstracts, teaching slides, manuscripts, or other scientific communication modalities.
- Communicate and collaborate effectively with the research supervisor to conduct the research.

COLLABORATOR

- Identify, consult, and collaborate with appropriate experts, research institutions, and/or organizational bodies to facilitate research.

LEADER

- Identify an area of research interest and research supervisor to engage in scientific inquiry and dissemination scholarship.



- Utilize available resources and regularly meet with an identified research mentor.
- Set realistic priorities and use time effectively to optimize professional performance.
- Utilize health care resources cost-effectively.

HEALTH ADVOCATE

- Recognize the contributions of scientific research in improving the health of patients and communities.

SCHOLAR

- Pose appropriate research questions, recognize and identify gaps in knowledge and expertise around this question, and formulate an appropriate study design to answer it.
- Carry out the research as outlined in the proposal.
- Collect and analyze data utilizing appropriate methods.
- Prepare abstracts and manuscripts suitable for publication in peer-reviewed journals and/or international scientific meetings.
- Identify research limitations and areas for further research.

PROFESSIONAL

- Uphold ethical and professional research expectations consistent with the IRB guidelines, including maintaining meticulous data and conducting of ethical research.
- Demonstrate personal responsibility for setting research goals and work with supervisors to set and achieve research timeline objectives.
- Appropriately attribute authorship and contributions when publishing research
- Disclose potential financial conflicts of interest (including speaker fees and consultative relationships) as appropriate when engaging in and disseminating research results.

- *This amendment overrides any conflicting previous resolutions and shall be effective from January 1st, 2022.*

15. APPENDIX-H

References:

In APA

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- 6- So, H. Y., Chen, P. P., Wong, G. K. C., & Chan, T. T. N. (2019). Simulation in medical education. *Journal of the Royal College of Physicians of Edinburgh, 49*(1), 52–57.

