

## **Vancouver General Hospital, University of British Columbia Clinical Epilepsy Fellowship Program: Every year**

The purpose of this one-year fellowship is to provide a solid foundation in clinical epileptology as well as in technical aspects and interpretation skills of electroencephalography (EEG) and evoked potentials so that by the end of this training, the graduating fellow will be able to manage complex epilepsy cases, interpret scalp and intracranial EEG and perform epilepsy surgery work up.

Our fellowship program, which is fully funded, offers training to Canadian and International board-certified adult neurologists. All international applicants must meet the English proficiency requirement of the College of Physician and Surgeon's of BC as mentioned under "application" below.

The clinical fellowship program provides education via case-based learning to achieve its learning objectives. The knowledge foundation is consolidated through daily staff guided interpretation of inpatient and outpatient EEGs, guided interpretation of video-EEG monitoring in the epilepsy monitoring unit and intensive care unit monitoring as well as regular presentation of epilepsy surgical cases in our weekly multidisciplinary rounds. In addition, the fellows directly interacts with neurology residents and medical students, and presents at epilepsy journal club, providing opportunity to enhance their teaching experience.

After one year of fellowship training in our program, fellowship candidates will qualify to sit for the Canadian Society of Clinical Neurophysiologists (CSCN-EEG) Board Examination. Given the circumstances at the time, extension for a second-year fellowship could be possible for suitable candidates.

The Epilepsy Program at Vancouver General Hospital staffs are as follows: Drs. Yahya Agha Khani (Director), Chantelle Hrazdil, Jennifer Percy, Farzad Moien Afshari and Laura Gill. Our Neuropsychologist is Dr. Jing Tan.

Our services are as follows: 1) A comprehensive provincial outpatient epilepsy clinic, an EEG laboratory with 11 technologists and the capacity to record-20 plus daily outpatient and inpatient EEGs; 2) an inpatient epilepsy consultation service, an epilepsy monitoring unit with 4 active beds (two with the capacity for intracranial monitoring); 3) an ongoing 2-3 bedside long-term video-EEG monitoring in intensive care unit or neurology step down unit; 4) a surgical program (Dr. Mostafa Fatehi) providing resective and/or disconnective epilepsy surgeries (50 plus surgeries), stereo-EEG with depth electrode

placement using the ROSA robotic platform, subdural grids and strips, electrocorticography and cortical mapping, and Vagal Nerve Stimulator implantation. In addition, there are a variety of brain imaging modalities available for surgical work up of drug resistant epilepsy, including 3T MRI of brain, interictal PET scan and ictal SPECT scan.

## **Curriculum**

In the one year of fellowship, fellows are expected to spend half of their time in the epilepsy monitoring unit (EMU), which also includes coverage of 2-3 video-EEG long-term monitoring and inpatient epilepsy consultations. The other half of the fellow's time is spent in the comprehensive epilepsy clinic and the EEG/ electrophysiology laboratory learning the technical aspects and interpretation of routine outpatient and inpatient EEGs.

Depending on their future career goals, the adult epilepsy fellows in our program may be provided with the opportunity to do a 2-4 week rotation with the pediatrics epilepsy program and BC Children's Hospital.

For fellows interested in learning the interpretation of visual evoked potentials and somatosensory evoked potentials, there is the opportunity to dedicate adequate time and exposure to these studies with our expert staff.

An overview of the Vancouver Epilepsy Fellowship Program and our training objectives can be found in the attached document below.

## **Application**

Applicants should send a curriculum vitae, a letter of intent with description of their long-term goals and objectives as well as three letters of reference to Dr. Laura Gill (Laura.Gill@vch.ca). All international board-certified neurologist applicants must have an IELTS Academic English Proficiency Test Score of 7.0 or higher in each of the 4 components to qualify for application, unless both the primary language of medical education and the primary language of patient care was in English during their medical school training. The alternative acceptable English proficiency tests are available at: (<https://www.cpsbc.ca/files/pdf/REG-ELP.pdf>).

## **Application Deadlines**

The applicants may start sending their applications as of beginning of August of each year for fellowship starting on July 1<sup>st</sup> of two years later. The fellowship interview season begins on December 1<sup>st</sup> of the same year that the application is submitted, the applicants are ranked in April of the next year and the applicants are informed about the decision by May 1st [e.g. for fellowship start date of July 1, 2024 applicants may begin submitting their application by the beginning of August 2022, Fellowship interview season begins December 1, 2022, applicants are ranked in April, 2023 and the applicants are informed about the final decision by May 1, 2023].

## **Vancouver Epilepsy Program Fellowship in Epilepsy and EEG**

### **Overview and Training Objectives**

#### **Program overview**

This fellowship track consists of training in clinical neurophysiology focused on EEG and epilepsy. The main objective is to master skills necessary for recording and interpreting EEG and epilepsy monitoring studies and to develop competence in the clinical management of patients with epilepsy.

During the one-year fellowship, the trainee will become proficient in:

- Interpreting the outpatient and inpatients EEGs of patients with epilepsy, non-epileptic events, and other neurologic or psychiatric disorders.
- Interpreting scalp and intracranial prolonged video EEG recordings.
- Supervising intra-operative electrocorticography and cortical stimulation for functional brain mapping
- Diagnosing and managing patients in an epilepsy clinic.

The one year of fellowship aims to provide the candidate with knowledge on the basic principles in clinical epileptology and EEG. The fellowship year includes: 1) clinical rotations in the 4 bed Vancouver General Hospital Seizure Investigation Unit (EMU); 2) participation in outpatient epilepsy clinics; and 3) training in the acquisition and interpretation of EEGs in adults with or without epilepsy. The trainee will learn the mechanisms and classification of the epilepsies and seizure types, their etiologies, differential diagnosis, medical treatment and indications for surgical therapy, including neuromodulation. She/he will become familiar with the basic principles of the pharmacotherapy of epileptic seizures. It is also expected that she/he will become familiar with related basic underlying neurophysiology and neuroanatomy, in addition to an understanding of the basic mechanisms involved in seizures and epilepsy. The trainee will review EEG abnormalities in epileptic disorders. The trainee will be given exposure to: 1) EEG data acquired in patients with epilepsy who are monitored both with scalp EEG and invasive intracerebral EEG recordings; 2) EEG in the ICU or neuro-intensive care unit for critically-ill patients in status epilepticus; and 3) intraoperative EEG monitoring in the form of electrocorticography).

At the end of fellowship, it is expected that the trainee will be able to act as an independent epileptologist in an academic or community environment.

#### **Duties and Responsibilities:**

##### **Clinical Epilepsy Service**

The supervisors at VGH include:

- Adult epileptologists (in alphabetical order): Drs. Y. Agha Khani, C. Hrazdil, F. Moien, J Percy, and L Gill.
- Epilepsy surgeon: Dr. Fatehi
- Neuropsychologist: Dr. Tan
- Neuroradiologist: Drs. J. Shewchuk, T. Vertinsky, F. Sabiq, A. Rohr, J. Chew, F. Settecase

In the 2-4 weeks block in BC Children Hospital the supervisors will be:  
Drs. M. Connolly, C. Boelman, A. Datta, L. Huh.

The service includes an inpatient consultation service, an active outpatient epilepsy clinic, a seizure investigation unit, and an epilepsy surgery program. In addition to offering advice on the medical management of seizure disorders, there is evaluation for the surgical management of such problems.

The fellow's time will be divided between the Clinical Epilepsy Service (EMU, inpatient and outpatient epilepsy consultations) and the EEG Laboratory.

When on the Epilepsy Service, the fellow will be responsible for:

- Performing inpatient consultations on patients with epilepsy or related problems under the supervision of a staff epileptologist scheduled on their EMU rotation.
- EEG - Fellows will be responsible for pre-reading laboratory EEGs daily, for reviewing these EEGs with an EEG attending daily, and for creating final EEG reports when scheduled on EEG rotations. During EEG rotation, fellows will also have two days per week of seeing outpatient epilepsy patients under the supervision of staff.
- EMU- Fellows will be responsible for pre-reading EMU recordings daily, for reviewing these records with an Epilepsy attending, and for creating a final report. These recordings will include intracranial EEG from epilepsy surgery candidates, as well as routine scalp EEG monitoring. The fellow will also be responsible for supervising and summarizing the clinical and electrographic evaluation of inpatients admitted to the EMU in conjunction with the staff epileptologists and neurology residents.
- Fellows will be on first call with the attending epileptologist for consultations and EMU in-patients.
- EMU Fellows will also be on first call for emergency (including after hours) EEGs, and interpretation of continuous video EEG monitoring.
- Performing electrocorticography and cortical stimulation under the supervision of an epileptologist.
- Assisting in the didactic and interactive teaching of neurology house staff with regards to epilepsy and EEG.
- Conferences - Fellows will be responsible for preparing materials for the weekly epilepsy surgery conferences. Data to be organized and presented includes a review of the patient history and exam, EEG and video monitoring,

- radiographic and neuropsychological findings.
- There are ample opportunities for participation in clinical or basic research protocols involving patients on the Epilepsy Service. Engagement in at least one clinical research project related to the field of epilepsy for fellows engaged in one-year fellowship is encouraged.

### **CLINICAL NEUROPHYSIOLOGY LABORATORY**

- The Clinical Neurophysiology Laboratory performs over 4000 outpatient and inpatients adult EEGs/year. The EEG equipment is state-of-the-art digital Xltek which is networked to the EMU, EEG lab and ICU at VGH.

When on the EEG lab service, the fellow will be responsible for:

- Assisting the technologists with all problems arising in the EEG laboratory and intensive monitoring units relating to the acquisition of reliable data from patients.
- Providing preliminary interpretations of all routine EEGs done in the EEG laboratory and/or on the VGH hospital wards each day and reviewing these with the EEG reader of day before generating comprehensive EEG reports. This responsibility will be shared with the neurology residents on their epilepsy and EEG rotations.
- Giving occasional lectures to the technologists in monthly educational rounds.
- The fellow may choose to pursue a clinical neurophysiology research project that can be completed during the fellowship.

### **Teaching Faculty**

The Vancouver epileptologists, both adult and pediatric teaching faculty, have a broad range of experience in clinical epileptology, EEG and continuous EEG monitoring, intraoperative EEG monitoring, high-resolution MR imaging and functional imaging.

### **Academic Facilities**

The clinical epilepsy fellowship ties in with the EEG service and neurology training programs with regular availability of neurology rounds (weekly), neurosurgery rounds (weekly), epilepsy conferences (weekly), educational EEG rounds (monthly) and Epilepsy Journal Clubs (monthly). Library access and materials relevant to fellowship training are available 7-days/week.

### **Evaluation:**

Fellows are regularly given verbal feedback as he/she learns with various staff members.

Individual epilepsy fellow formal evaluations occur every 2 months by all staff who are involved in the fellow's training.

Fellows are given feedback on their performance by the staff epileptologist in charge of fellows' affairs (currently Dr. L. Gill).

Fellows are assigned to epileptologists for EEG teaching rounds on the first Monday of the month from 9-10 am. The fellows oversee these rounds, during which they select interesting EEGs for review. At these sessions, the teaching may consist of show and tell, quiz the epileptologists, and/or topic review.

Fellows are given immediate feedback.

The EMU rounds are the educational highlight of the program, consisting of refractory epilepsy case presentations for discussion of management. The rounds are well attended by allied health care professionals, epileptologists, epilepsy neurosurgeons, neuropsychologists, neuroradiologists, fellows, and neurology residents on their epilepsy rotations. Once every three months, we have common EMU rounds with colleagues in the pediatric epilepsy program. Fellows receive feedback on their case presentations.

Fellows are expected to take the national Canadian Society of Clinical Neurophysiology EEG examination held every June in conjunction with the annual Canadian Neurological Sciences Federation meeting.

In preparation for the CSCN EEG examination, fellows are provided with a syllabus of material on neurophysiology, technology and clinical EEG subjects covered in the examinations on the CSCN website. Fellows take the responsibility to review related topics with epileptologists who are on rotation in the seizure monitoring units one hour per week.

Formal and informal examinations are also held periodically to evaluate an applicant's technology skillset, short and long EEG cases.

## **Vancouver Epilepsy Program Fellowship in Epilepsy and EEG Training Objectives**

### **1. Medical Expert/Clinical Decision-Maker**

### *General Requirements*

- Demonstrate diagnostic and therapeutic skills for ethical and effective patient care.
- Access and apply relevant information to clinical practice.
- Demonstrate effective consultation services with respect to patient care, education and legal opinions.

### *Specific Requirements*

Provide scientifically based, comprehensive and effective diagnosis and management for patients with epileptic seizures and epilepsy.

### Clinical

For a patient with epilepsy or allied disorder, the fellow will be able to:

- Obtain a complete neurological history from adults and children obtaining a collateral history where necessary.
- Perform an appropriate physical examination.
- Determine whether a patient's symptoms and signs are the result of a disorder related to epilepsy.
- Formulate an appropriate classification, localization, differential and provisional diagnosis of epilepsy and epileptic seizures and their cause(s).
- Outline an appropriate plan of laboratory investigation.
- Outline an appropriate therapeutic plan.
- Exhibit appropriate clinical judgment in outlining a differential diagnosis and an investigative and therapeutic plan, considering matters such as the patient's age, general health, risk and cost of investigative procedures, risk and cost of therapeutic interventions, and epidemiology of the disease.

### Technical Skills

- To learn/review detailed, practical anatomy of epilepsy.
- Other technical skills related to fellowship in EEG including routine and sleep EEG recordings, and non-invasive and invasive continuous EEG recording methods (detailed in objectives of EEG fellowship).

### Knowledge

- Acquire and understand the neuroanatomic and pathological substrates of EEG, epileptic seizures and epilepsy.
- Become familiar with the neurophysiological principles and basic mechanisms related to epileptic seizures and epilepsy.
- Learn the major categories or classifications related to seizure types, epilepsy and epileptic syndromes.
- Advanced knowledge and skills in diagnosis and management of



refractory status epilepticus: to be able to recognize subtle subclinical EEG seizure patterns in critically ill patients (including patients with autoimmune encephalitis, traumatic brain injury, intracranial hemorrhage, stroke, anoxic encephalopathy, or relating to neurosurgical procedures).

- Learn clinical neuropharmacology related to epilepsy.
- Acquire expertise in the decision making related to epilepsy and to epilepsy surgery.

## 2. Communicator

### *General Requirements*

- Establish therapeutic relationships with patients/families.
- Obtain and synthesize relevant history from patients/families/communities.
- Listen effectively.
- Discuss appropriate information with patients/families and the health care team.

### *Specific Requirements*

- Communicate effectively with patients, their families and medical colleagues (particularly referring physicians), and other health care professionals in both the inpatient and outpatient settings. The resident will:
- Communicate effectively and regularly with patients and their families.
- Be considerate and compassionate in communicating with patients and families; willingly provide accurate information appropriate to the clinical situation, with a reasonable attempt at prognosis.
- Learn to write concise reports of the clinical findings with conclusions and recommendations comprehensible to the non-specialist.
- Communicate effectively and appropriately with the nurses and paramedical personnel.
- When ordering investigative procedures, ensure there has been adequate communication about the patient with the person who will actually be doing and/or reporting the diagnostic study.

## 3. Collaborator

### *General Requirements*

- Consult effectively with other physicians and health care professionals.
- Contribute effectively to other interdisciplinary team activities especially with neurology and ICU services.

### *Specific Requirements*

- Be an effective teacher of other physicians (including medical students and house officers), other health care personnel, and patients. The resident will:
- Provide instruction to medical students and more junior physicians at a level appropriate to their clinical education and professional

- competence.
- Willingly share knowledge with others with whom they are associated, thus ensuring the most effective delivery of health care to patients.

#### 4. Manager

##### *General Requirements*

- Utilize resources effectively to balance patient care, learning needs, and outside activities.
- To formulate a diagnostic and management plan for patients.
- Allocate finite health care resources wisely.
- Work effectively and efficiently in a health care organization.
- Utilize information technology to optimize patient care, life-long learning and other activities.

##### *Specific Requirements*

- Be proficient in professional skills related to the diagnosis and treatment of epilepsy.
- Demonstrate the following professional skills in time management:
- Recognize that effective use of time depends upon punctuality.
- Recognize that effective use of time requires planning.
- Develop speed as well as accuracy in clinical skills.
- Reserve time for reading and keeping current with the neurological literature.
- Establish routines for carrying out regular activities and adhere to them. Maintain complete and accurate medical records:
- Record and maintain a complete and accurate medical record for every patient seen; this record will include the patient's history and the findings on physical examination (including the neurological examination), a differential diagnosis, a provisional diagnosis, Effectively coordinate the work of the health care team: .
- Indicate, by the treatment plan, that for the optimal treatment of many patients with neurological disorder, a team approach is necessary -- members of the team may include nurses, rehabilitation personnel (physiotherapists, occupational therapists, speech therapists, etc.), psychologists, social workers, etc.
- Identify where an important role(s) can be played by disease focused lay groups with regard to helping the patient and/or family and to facilitate its happening.

#### 5. Health Advocate

##### *General Requirements*

- Identify the important determinants of health affecting patients. Contribute effectively to improved health of patients and communities. Recognize and respond to those issues where advocacy is appropriate.

### *Specific Requirements*

- Learn about community resources and related patient support groups; aid access programs (e.g. home care, occupational and physiotherapy, drug plans, application for nursing homes etc) and participate in their activities.
- Educate, be able to generate and access information (e.g. printed material, video tapes web sites) and be available as a resource person to counsel patients effectively on neurological disorders.
- Counsel patients on the importance of taking responsibility for their own well-being and recognize the important determinants predisposing to worsening of neurological status
- Understand the role of national and international bodies (e.g. CLAE, CCNS, CSCN, ILAE, AES, AAN, etc.) in the promotion of neurological health and in the prevention, detection, and treatment of nervous system disorders.

## 6. Scholar

### *General Requirements*

- Develop, implement and monitor a personal continuing education strategy. Critically appraise sources of medical information.
- Facilitate learning of patients, house staff/students and other health professionals. Contribute to development of new knowledge.

### *Specific Requirements*

- Be able to critically assess the neurological literature as it relates to patient diagnosis, investigation and treatment:
- Develop criteria for evaluating neurological literature.
- Critically assess the neurological literature using these criteria.
- Be familiar with the design of experimental and observational studies, especially randomized controlled trials.
- Be able to calculate absolute risk reductions, relative risk reductions and numbers needed to treat or harm.
- Be able to participate in clinical or basic science studies as a member of a research team:
- Be able to describe principles of good research.
- Use the above principles and be able to judge whether a research project is properly designed.
- Be prepared to present research findings to peers at local, national or international conferences.

## 7. Professional

### *General Requirements*

- Deliver highest quality care with integrity, honesty and compassion.
- Exhibit appropriate personal and interpersonal professional behaviours with patients/families, peer residents and other health care professionals.
- Practice medicine ethically consistent with obligations of a physician.

### *Specific Requirements*

- Demonstrate personal and professional attitudes consistent with a consulting physician role:
- Periodically review his/her personal and professional performance against national standards set for the specialty.
- Be willing to include the patient in discussions concerning appropriate diagnostic and management procedures.
- Show appropriate respect for the opinions of fellow consultants and referring physicians in the management of patient problems and be willing to provide means whereby differences of opinion can be discussed and resolved.
- Be willing and able to appraise accurately his/her professional performances and show that he/she recognizes his/her limitations with regard to skill and knowledge by appropriately consulting other physicians and paramedical personnel when caring for the patient.
- Be willing and able to keep his/her practice current through reading and other modes of continuing medical education and develop a habit of maintaining current his/her clinical skill and knowledge base through continuing medical education.