

**Department of Neurology and Neurosurgery Clinical and Clinical Research  
Fellowship Application Form**

**Type of Fellowship:** Neurocritical Care

**Name of the Fellowship Supervisor:** Jeanne Teitelbaum MD FRCP

**Fellowship Information:**

- Number of fellowship positions requested: 2
- Name of hospitals involved in training
  - Montreal Neurological Institute
  
- **Description of Fellowship:**

**Introduction**

Many critically ill patients suffer primary or secondary neurologic dysfunction. Through residency training, critical care and emergency neurology fellowships and continuing medical education, the neurological community will need to master a body of knowledge concerning the Special care of the critically ill patients with neurological disorders and incorporate this information into clinical practice, education and research. To this end, the members of the Critical Care and Emergency Neurology Section of the American Academy of Neurology have developed a core curriculum for critical care and emergency neurology. This curriculum is intended to serve principally as a tool for programs developing fellowships in critical care and Emergency Neurology. It also can serve as a guideline for the integration of the critical care and emergency neurology knowledge base and related skills in to the education of medical students, residents, fellows, and other medical and allied health care providers desiring education in this area.

**Definition**

Critical care and emergency neurology is a special area of neurology that focuses on the neurological disorders that affect critically ill patients. These can be primary neurologic disorders or secondary to other systemic diseases and can affect the central nervous system, the peripheral nervous system or both. It includes understanding the effects of critical illness on the nervous system and the special vulnerabilities of the nervous system of patients in Intensive care units and other emergency settings. It requires knowledge of the disorders that frequently occur in these settings, and the methods of diagnosis, assessment, treatment, management and prevention of further injury. Critical care and emergency neurology also involves bridges into many medical and allied health specialties, including critical care medicine, emergency medicine, neurosurgery, nursing and social work. Development of the

specialty of critical care and emergency neurology recognizes the special health needs of the population of critically ill patients with neurologic dysfunction, the characteristics of the nervous system in critically ill patients and the need for interdisciplinary collaboration in this field.

### **Goals and Objectives**

The *goal* of the core curricula in critical care and emergency neurology is to guide a training program that will prepare neurologists to competently care for critically ill patients with neurologic disorders. This training must be based on supervised clinical work with increasing responsibility for inpatients. It should include not only the specific diseases of the nervous system of different age groups but also the neurological complications of medical and surgical conditions. Critical care and emergency neurology is particularly a procedure-oriented specialty and basic training in procedures used in neurocritical care must be included. Finally, training must have an option of organized instruction in basic and/or clinical neuroscience' research.

The overall *objective* for specialty training in critical care and emergency neurology is to provide the skills and knowledge necessary to:

1. Provide high quality clinical care and assessments of critically ill patients with neurological disorders, including diagnostic evaluation, treatment, management, counseling and social intervention;
2. Work effectively with multidisciplinary teams oriented to the care of these patients; and
3. Develop the capacity to pursue an academic/research career focusing on neurological dysfunction in critically ill patients.
4. Develop the capacity to teach others in the methods and concepts used in the care of critically ill patients with neurological disorders.

### **Topics in Critical Care and Emergency Neurology**

The topics listed below provide an outline of a core curriculum, in Critical Care and Emergency Neurology, for fellowship training. Many of the topics included can be used for educational programs in Critical Care and Emergency Neurology for medical students, neurology residents, Academic neurologists and neurologists in practice. All educational components of a fellowship program should relate to the program goals listed above.

Brain Death

Coma

Encephalopathies and Delirium

Herniation Syndromes

Hydrocephalus

Intracranial hemorrhages:

Epidural

Subdural

Subarachnoid  
Parenchymal (supratentorial, cerebellar, brainstem)  
Intraventricular  
Cerebral Venous Thrombosis  
Acute Anterior Cerebral Artery Occlusion  
Acute Carotid Artery Occlusion  
Acute Middle Cerebral Artery Occlusion  
Acute Basilar Artery Occlusion  
Brainstem Infarction  
Cerebellar Infarction  
Hemispheric Infarction  
*Critical Care & Emergency Neurology Section*  
*Core Curriculum Page 3*  
Acute Spinal Cord Syndromes  
Cerebral Blood Flow and Hypoperfusion  
Cerebral Metabolism and Oxygen Demand  
Cerebral Edema  
Syncope  
Brain Abscess  
Encephalitis: Bacterial and Viral  
Meningitis: Bacterial and Viral  
Traumatic Brain Injury  
Traumatic Spinal Cord Injury  
Status Epilepticus  
Guillain-Barre' Syndrome  
Myasthenia Gravis  
Equipment and Technologies: Knowledge of the basic physiology and underlying technical principles.  
Cardiovascular and Pulmonary Monitoring Devices  
Intracranial Pressure Monitors: Fiberoptic, Intraventricular, and Epidural  
Noninvasive Intracranial and Extracranial Vascular Study, Including Transcranial Doppler  
General Principles of Management of Critically Ill Neurologic Patients  
General Perspectives of Care in Critically Ill Neurologic Patients  
Management of Agitation and Pain  
Management of Airway and Mechanical Ventilation  
Management of Nutrition  
Management of Intravascular Volume Status and Blood Pressure  
Management of Anticoagulation and Thrombolytic Therapy  
Management of Intracranial Pressure  
Management of Neurologic Complications in Critically Ill Patients  
Management of Post-operative Neurosurgical Patients  
Management of Systemic Complications in Critically Ill Neurologic Patients  
Management of Pulmonary Complications  
Management of Cardiac Complications  
Management of Acid-Base Disorders and Hypertonic and Hypotonic States  
Management of Gastrointestinal Complications

Management of Nosocomial Infections  
Intensive Care Unit Organization and Management  
Psychosocial Issues in the Intensive Care Unit  
End of Life Decision Making  
Transplant and Organ Donation Management

**Description of activities and responsibilities:**

- **Research activity and publications related to fellowship**  
Please refer to the supervisor's CV, appended to this submission  
There are many projects that will begin in 2009. The supervisor (J Teitelbaum) in conjunction with Dr Jean-Paul Soucy of the Neuro-imaging center, have obtained a \$100,000.00 grant that will allow the funding of a quantitative SPECT scan. Several research protocols using the SPECT have been elaborated, notably for research in sub-arachnoid and intracerebral hemorrhage. As well, we hope to do some work on prognosis in coma post cardiac arrest using PET and functional MRI.

- **Mission statement for fellowship**

**The mission is to promote:**

- **Quality Patient Care** by identifying and implementing best medical practices for acute neurological disorders that are consistent with current scientific knowledge, and that promote compassionate care and respect for patient-centered values.
  - **Professional Collaboration** by providing a forum for communication, collaboration, and exchange of ideas between physicians and allied health-care professionals within different specialties who care for critically-ill neurological patients.
  - **Research** by fostering clinical, experimental and outcomes research focused on developing innovative and cost-effective medical and surgical interventions for acute neurological disorders.
  - **Training and Education** by developing standards for advanced fellowship training, program accreditation, and physician certification in the subspecialty of neurological intensive care.
  - **Advocacy** by making the case to patients, the public, policy makers and other healthcare professionals that complex, life-threatening neurological diseases are best cared for by a multidisciplinary team with special expertise in neurocritical care.
- **Source of funding for fellowship:**
    - Dominique Lafrance: already a fellow in Critical Care Medicine, fellowship funding will come from grants obtained at Hôpital Notre-Dame

- Omar Ayoub: funding would be coming from the University of British Columbia (for 2009)

### Names of the Teaching Faculty

- Jeanne Teitelbaum MD FRCP
  - Director of the program
  - Direct supervision in the NICU
  - Co-director of a research project
  - Summary of clinical practice: full-time accredited Neurologist Neuro-intensivist with 18 years of neurocritical care practice as well as previous intensive care, internal medicine and family medicine practice.
- Mark Angle MD FRCP
  - Roles: chief of Neuroanesthesia as well as chief of the Neuro ICU
  - Direct teaching and supervision in the NICU
  - Direct teaching and supervision in the operating room
  - Co-directorship of research projects
  - Summary of clinical practice: full-time accredited intensivist in medical, surgical and neurological critical care as well as an accredited neuro-anesthetist. Full time clinical practice
  - Major Strengths: superb clinician in neuro-anaesthesia and critical care
- Marcello Lannes MD FRCP
  - Roles: Full time in Neuroanesthesia as well as Neuro ICU
  - Direct teaching and supervision in the NICU
  - Direct teaching and supervision in the operating room
  - Co-directorship of research projects
  - Summary of clinical practice: full-time accredited intensivist in medical, surgical and neurological critical care as well as an accredited neuro-anesthetist. Full time clinical practice
  - Major Strengths: Masters in education as well as superb clinical skills in neuro-anaesthesia and critical care

### Academic Facilities

- The fellow will be using the facilities of the Neurological Intensive Care for his clinical and academic pursuits. The unit has a conference room and access to internet as well as Up-to-date on it's 3 computers. The fellow will be able to share an office and have his own desk on the 3<sup>rd</sup> floor.
- Library access is available at both the MNI and the Royal Victoria Hospital. Materials relevant to fellowship training are kept in the conference room and the office of the assistant head nurse in the NICU.
- Multimedia learning materials available on CD and internet. These allow learning in Neuroanatomy, neurophysiology, stroke, multiple sclerosis and neurocritical care. There is also access to *Up To Date*.

### Fellow Duties and Responsibilities

- Call responsibilities to cover service: the fellow is on call one in 4 week days as well as one week-end per month. He is on first call from home and replaces the NICU attending. He or she does not replace the neurology or neurosurgery resident whose job it is to assess and admit the patient. The resident goes over admissions with the fellow. The attending is on as second call to supervise the fellow.
- The fellow is expected to supervise residents rotating through the ICU with the help and instruction of the attending.
- The fellow with a background in Critical Care will rotate only at the Montreal Neurological Institute and hospital. The fellow with a background in Neurology will rotate at the Royal Victoria, in the medical/surgical intensive care. Rotations are not fixed in advance and will vary according to the needs of the candidate.
- What are the outpatient clinic responsibilities: there are no outpatient clinic responsibilities.
- What are the teaching responsibilities towards residents: the fellow is expected to present one subject a week at 2PM teaching rounds.
- Outline participation in academic activities involving the residents: the resident will participate in service rounds. The fellow will either present or assist the 2PM teaching rounds.
- Describe any support staff available to the fellow: the fellow will have access to the stroke nurse clinician and the secretary.
- Proposed meetings to be attended by the fellow: the fellow will be expected to attend the American Neurocritical Care conference, this year in Miami, as well as the Toronto Critical Care conference.
- What is the research productivity/publications expected by the Fellow: one project, hopefully with a subsequent publication.

## Curriculum

- *In order to create an environment conducive to academic activity, the intensivist may involve residents whose time is dedicated to the unit, in the active care of patients. This will be complimentary to the responsibilities of the referring services who will maintain their primary role.*

The resident in training will actively involve himself / herself in the monitoring of all admitted patients. The resident should be present in the ICU from 8AM to 5PM. Chart notes on a daily basis are required.

Bedside rounds occur each morning and the resident is expected to attend, along with the nurse responsible for the patient and the NICU attending.

The resident will actively participate in teaching rounds within and outside the ICU context.

Call in the NICU is taken from home. Frequency is never more than 1 in four, with one weekend per month, and can vary according to individual requirements.

- Intended case load for the Fellow: there are a total of 14 beds in the NICU. The Fellow is responsible for the care of these patients under the supervision of the attending. He will also coordinate the activities of the residents rotating through the NICU.
- Intended percentages of the varieties of cases: there is a large variety of cases, 60% surgical pathology, 40% neurological pathology as the primary problem. All the pathologies listed in the section called topics are more than likely to be encountered.
- What regular reading materials are to be provided (if any):
  - There is a small library in the NICU that contains the latest textbooks in Neurocritical Care. These are available to the resident on a consultative basis. There are also textbooks on coma, Neurology, and the Neurological exam. Unlike the US, most of our fellows are likely to be internal medicine and critical care residents rather than Neurology residents. In these cases, teaching of basic Neurology becomes one of the goals of the fellowship and the textbooks reflect this.
- Outline the weekly / monthly conference schedule
  - Afternoon course from 2 to 3 PM 3 days per week, 3 out of 4 weeks
  - Neurology service rounds: once per week
  - Grand Rounds in Neurology: once per week
  - Grand rounds in Neurosurgery: once per week
  - Stroke rounds: once per month
- What role will the Fellow play in attending, organizing, and presenting rounds/conferences
  - The fellow will present one afternoon course per week

#### Evaluation:

The fellow will be evaluated every month using CANMEDS criteria. They will also be able to write a practice exam based on the American Neurocritical Care sub-specialty exam.



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## Department of Neurology and Neurosurgery Neurocritical Care Fellowship (General and Specific 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:

Brain Death

Coma

Encephalopathies and Delirium

Herniation Syndromes

Hydrocephalus

Intracranial hemorrhages:

Epidural

Subdural

Subarachnoid

Parenchymal (supratentorial, cerebellar, brainstem)

Intraventricular

Cerebral Venous Thrombosis

Acute Anterior Cerebral Artery Occlusion

Acute Carotid Artery Occlusion

Acute Middle Cerebral Artery Occlusion

Acute Basilar Artery Occlusion

Brainstem Infarction

Cerebellar Infarction

Hemispheric Infarction

Acute Spinal Cord Syndromes

Cerebral Blood Flow and Hypoperfusion

Cerebral Metabolism and Oxygen Demand

Cerebral Edema

Syncope  
Brain Abscess  
Encephalitis: Bacterial and Viral  
Meningitis: Bacterial and Viral  
Traumatic Brain Injury  
Traumatic Spinal Cord Injury  
Status Epilepticus  
Guillain-Barre' Syndrome  
Myasthenia Gravis

**Clinical:**

For a patient with an acute life-threatening neurological illness, the neurological complications of severe medical illness or allied disorder (see previous list), the resident 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 the field of neurocritical care
- Formulate an appropriate localization, differential and provisional diagnosis of the life-threatening illness in question.
- 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, taking into account 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.

General Principles of Management of Critically Ill Neurologic Patients  
General Perspectives of Care in Critically Ill Neurologic Patients  
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Management of Anticoagulation and Thrombolytic Therapy  
Management of Intracranial Pressure  
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Management of Systemic Complications in Critically Ill Neurologic Patients  
Management of Pulmonary Complications  
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Management of Acid-Base Disorders and Hypertonic and Hypotonic States  
Management of Gastrointestinal Complications  
Management of Nosocomial Infections  
Intensive Care Unit Organization and Management  
Psychosocial Issues in the Intensive Care Unit  
End of Life Decision Making  
Transplant and Organ Donation Management

### **Technical Skills**

- To learn/review detailed, practical anatomy of the central nervous system, the ventricular system and the spinal cord.
- Other technical skills related to fellowship: Knowledge of the basic physiology and underlying technical principles of equipment and technologies such as
  - Cardiovascular and Pulmonary Monitoring Devices
  - Intracranial Pressure Monitors: Fiberoptic, Intraventricular, and Epidural
  - Noninvasive intracranial and extracranial vascular study, including Transcranial Doppler and other future methods

### **Knowledge**

- Acquire and understand the neuroanatomic principles and pathological substrates of the diseases listed above
- Become familiar with the neurophysiological principles, the basic mechanisms related to the diseases listed above.
- Learn the major categories or classifications related to acute severe neurologic illness.
- Learn clinical neuropharmacology related to neurocritical care
- Acquire expertise in the decision making related to the diseases listed above

## **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.

### ***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.

- 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 acute severe neurologic illness and the neurologic complications of severe medical illness.

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; provide assistance to 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. Canadian Neurocritical Care Group, the Neurocritical Care Society) in the promotion of neurological health, and the prevention, detection, and treatment of acute severe neurological 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 own 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 own professional performances and show that he/she recognizes his/her own 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.