

Neonatal Neurocritical Care (NNCC) Clinical Research Fellowship

Administrative Information:

Name of Institution: McGill University

Duration: 1 year

Number of Positions: Maximum of 1 position per year (subject to funding availability)

Type: Clinical Research Fellowship

Training Sites:

- McGill University Health Center – Montreal Children’s Hospital (MUHC or MCH)
- Jewish General Hospital (JGH)

Host Residency Program: Neonatal-Perinatal Medicine

Fellowship Entry Route: Eligible trainees must have completed a residency in neonatal-perinatal medicine with Royal College certification or equivalent for foreign fellows

Fellowship Director: Jarred Garfinkle

Fellowship Co-Director, Research: Pia Wintermark

Fellowship Coordinator: Amber Gumbley

Fellowship Training Committee Members: This fellowship will be overseen by the Neonatal-Perinatal Medicine Residency Training Committee.

Rationale and Mission:

Rationale: The neonatal brain is uniquely susceptible to injury due to its developmental stage and the physiological challenges of the prenatal, perinatal, and early postnatal periods. These injuries can have profound and lifelong consequences, not only for the neonate but also for their families and communities. Advances in neonatal neurocritical care have demonstrated that timely and evidence-based interventions can significantly reduce the burden of brain injury, improve neurodevelopmental outcomes, and enhance quality of life for affected infants. However, specialized expertise is essential to implement these interventions effectively. The NNCC Clinical Research Fellowship is designed to meet this need by equipping neonatologists with the advanced clinical and research skills necessary to prevent, diagnose, treat, and prognosticate neonatal brain injuries. Through this fellowship, trainees will gain exposure to fetuses and newborn with critical neurological conditions via varied clinical experiences, neuroimaging, and neurophysiology, as well as interdisciplinary approaches to care of the newborn and family.

Mission: The mission of the NNCC Clinical Research Fellowship is to cultivate leaders in neonatal neurocritical care, who will advance the field through innovative research, exceptional clinical practice, and the implementation of neuroprotective/neurorestorative strategies. The program aims to foster a deep understanding of neonatal brain health, equip trainees with the skills to address neurocritical conditions, and empower them to contribute meaningfully to the development of multidisciplinary neonatal neurocritical care models. This fellowship pairs hands-on clinical experience with longitudinal research, ensuring that graduates are well-prepared to improve outcomes for fetuses and neonates at risk of neurological injury.

Fellowship Objectives:

At the end of this fellowship, the trainee is expected to be competent in the following areas.

A. Medical Expert

1. Fellows will develop advanced expertise in evaluating and managing neonatal neurocritical conditions, mastering the neonatal neurological exam, neuroimaging tools such as cranial ultrasonography and neonatal MRI, and electrophysiological tools such as amplitude-integrated EEG to diagnose and monitor brain injuries.
 - Attain proficiency in neonatal neuroimaging:
 - Perform and interpret neonatal cranial ultrasonography.
 - Gain expertise in neonatal MRI interpretation through multidisciplinary rounds and personalized learning.
 - Develop skills in applying and interpreting neonatal amplitude-integrated EEG.
2. Fellows will refine their skills in conducting comprehensive neurological examinations, using direct patient care and simulation exercises to enhance their assessment capabilities.
3. Fellows will acquire an in-depth understanding of the pathophysiology and management of various neonatal brain injuries, including hypoxic-ischemic encephalopathy (HIE), prematurity associated brain injury, neonatal seizures, stroke, congenital heart disease associated brain injury, post-hemorrhagic ventricular dilation, and congenital CNS malformations.
 - Acquire knowledge of neonatal brain injury pathophysiology and therapeutic interventions.
 - Focused interpretation and integration of testing
 - Manage critical neurological conditions, such as neonatal seizures, HIE, and neonatal stroke.
4. Fellows will develop expertise in long-term neurodevelopmental follow-up, ensuring a holistic approach to patient care.
 - Participate in long-term neurodevelopmental follow-up via the neonatal follow-up clinic and neonatal neurology clinic.
 - Perform screening for neurodevelopmental disorders post-discharge
 - Participate in referral to early intervention programs
5. Fellows will develop expertise in antenatal consultations of fetuses with anticipated or suspected neurological conditions
 - Acquire knowledge of fetal brain development and injury
 - Focused interpretation and integration of testing
 - Formulation of a clear management plan

B. Scholar

1. The fellowship prepares trainees to become researchers by providing a robust framework for developing and executing research projects that address key clinical questions in neonatal neurocritical care. Fellows will learn to apply rigorous methodologies.
 - Formulate a research question and conduct a clinical research project related to neonatal neurocritical care.
2. Fellows will participate in a quality improvement initiative that enhances patient care and safety.
3. Trainees will be equipped to critically appraise scientific literature, integrate evidence-based findings into their practice
 - Participate in weekly journal club
 - Participate in weekly neonatal rounds
 - Lead bimonthly NICU-Neuro rounds
4. Participation in conferences, guideline development initiatives, and mentorship from experienced faculty will support their growth as scholars.

- Present findings at national or international conferences.
- Contribute to guideline development and knowledge translation.

C. Communicator

1. Fellows will cultivate the skills necessary for building trust and rapport with families, providing empathetic and clear updates on the infant's condition and care plan.
 - Establish and maintain effective therapeutic relationships with patients and families.
 - Communicate results of investigations, diagnosis, prognosis and management plan
 - Engage the family in a shared-decision-making process
 - Family education on neuroprotective interventions/strategies and neurorehabilitation/
2. They will gain experience in delivering complex prognostic information, addressing uncertainty with sensitivity, and ensuring families are fully informed and supported.
 - Counseling with families regarding fetal and neonatal neurological conditions
 - Develop skills in providing prognostic information and navigating uncertainty.
3. Through interdisciplinary team meetings, trainees will develop the ability to effectively convey critical information to other healthcare professionals.

D. Collaborator

1. The fellowship emphasizes collaboration within multidisciplinary teams, fostering strong partnerships with neonatologists, pediatric neurologists, neurosurgeons, neuroradiologists, and other specialists to ensure comprehensive management of neurocritical cases.
 - Collaborate with inter-disciplinary care teams in the care of patients with fetal and neonatal neurological conditions
 - Coordinate neurological management and communication among specialties and services involved in the care of the patient
 - Maintain professional relationships with other consultants and healthcare providers
2. Trainees will actively participate in team rounds and consultations, learning to navigate complex care scenarios and integrate diverse inputs into cohesive care plans.
 - Engage in multidisciplinary team-based care.
3. They will gain skills in fostering a collaborative approach to problem-solving and maintaining respectful and effective communication within team settings.

E. Leader

1. Fellows will take on leadership roles in managing neurocritical care consultations, guiding the management of complex cases and coordinating multidisciplinary input.
 - Triage neurocritical care consultations
 - Lead multidisciplinary neurocritical care consultations.
 - Manage the neurocritical care consult load
2. Opportunities to mentor junior trainees, contribute to teaching programs, and lead the development of clinical protocols and guidelines will prepare fellows for leadership positions in academic and clinical settings.
 - Mentor junior trainees

- Lead bimonthly NICU-Neuro rounds
- Lead new protocol development

F. Health Advocate

1. Fellows will learn to identify and address social determinants of health that impact neonates with neurological conditions, advocating for equitable access to neuroprotective/neurorestorative interventions and resources.
 - Identify and address health determinants in infants with neurological conditions.
 - Advocate for equitable access to neuroprotective interventions.
2. The program emphasizes public health initiatives and policy advocacy, enabling trainees to promote health and well-being at both individual and systemic levels.
3. By addressing barriers to care, fellows will help ensure all families receive the support they need to achieve the best possible outcomes for their infants.

G. Professional

1. Trainees will learn to demonstrate integrity, compassion, and adherence to ethical standards in all interactions.
2. Fellows will learn to respect diversity, maintain patient confidentiality, and model professional behaviors in their relationships with families, colleagues, and the broader healthcare team.
3. The program instills a commitment to excellence and accountability, ensuring that fellows contribute positively to the culture of their clinical and research environments.

Structure and Content:

The Neonatal Neurocritical Care program consists of 1 years of training.

Orientation: Fellows undergo an intensive orientation to the neonatal intensive care units, clinical practices, neuroimaging techniques, neurophysiological monitoring, research ethics, and the fundamentals of protocol development. This orientation establishes the foundation for effective clinical and research practices.

Clinical Rotations: Fellows will complete rotations that provide both depth and breadth in neonatal neurocritical care. The year includes 13 blocks of 4 weeks each. The clinical rotations will be tailored to each fellow, based on their previous training experiences and educational needs. Each fellow will complete a minimum of 4 clinical blocks.

- NICU service: 0-2 blocks/year at MCH and/or JGH. The NICU rotations at MCH and JGH focus on managing critically ill neonates. Fellows who are already familiar with the MUHC and JGH NICUs will likely not require NICU blocks. Fellows unfamiliar with the MUHC and JGH NICUs will require NICU rotations in anticipation of their in-house calls.
- Acute care pediatric neurology consult service: 1-2 blocks/year of rotations on the acute care neurology consult service at the MCH. This inpatient service would expose the trainee to neuroanatomic localization, neurodevelopmental disorders across childhood and adolescence, and a variety of neurological pathologies. In addition, fellows would participate in select clinics relevant to neonatal neurocritical care (e.g., Neonatal Neurology and epilepsy).

- Neonatal Follow-Up clinic: 1-2 blocks/year of rotations in the neonatal follow-up clinic at the MCH. Fellows will be exposed to typical and atypical neurodevelopment of young children discharged from the NICU, up until the age of 5 years.
- Neonatal Neurocritical Care and Antenatal Care consultations at the MCH (to coincide with Research blocks): 6-9 blocks/year advancing their research project, while managing the neonatal neurocritical care consult service and participating in neurological antenatal consultations. We anticipate 1-2 consults per week which will be completed under the supervision of the Neonatal Neurocritical Care or Antenatal Consult attending physician.
- Electives: Options include pediatric neurophysiology, neuroradiology, neuropathology, and palliative care, among others. Electives may also be available at Hopital Sainte-Justine (maximum 1 period per year). These rotations are designed to expose fellows to varied clinical environments and interdisciplinary practices, fostering adaptability and comprehensive expertise.

Teaching Requirements: Fellows will actively contribute to educational initiatives, enhancing their ability to convey complex concepts effectively. This includes:

- Leading NICU-Neuro rounds: These bimonthly rounds are designed to expose NICU and neurology practitioners to a variety of neonatal neurological (5/year)
- Leading journal clubs (minimum 2/year)
- Delivering presentations at neonatal rounds (minimum 1/year)
- Organizing and delivering NNCC-specific teaching sessions for residents and nurses (minimum 2/year).
- Participating in local and national NNCC educational initiatives (e.g., Newborn Brain Society) (optional)

By engaging in these activities, trainees will not only solidify their knowledge but also develop as educators capable of training the next generation of neonatal neurocritical care specialists.

Longitudinal Research Experience: The research component of the fellowship emphasizes the development of independent research skills. A research supervisor will be matched to the fellow and a project identified prior to their start. Fellows will design and execute a research project focused on addressing pivotal questions in neonatal neurocritical care. This involves formulating a hypothesis, applying the right methodological approaches, and generating data that contribute to the field's evidence base. Fellows will receive close mentorship from a supervisor from early on in the fellowship to ensure they reach their research goals and at a minimum present their project at an academic conference.

Fellow Evaluation:

1. ITERS
 - a. Senior Research ITER to be completed after every research block by the primary research supervisor
 - b. Junior Attending ITER to be completed after every NICU rotation (2 per year) by the supervising Neonatologist
 - c. Specific rotation ITER to be completed by the staff physician supervising the neurology, neonatal follow-up, or elective rotation
2. The Neonatal Perinatal Medicine competence committee will review and complete summative evaluations every 6 months.

3. The fellow will keep a log-book of cases they were involved in to ensure an adequate case mix; the log-book will be reviewed by the fellowship director every 3 months.
4. Fellows will receive regular, immediate, specific, and actionable verbal feedback, particularly during their initial months of training.

Fellow Duties, responsibilities and resources:

- A. Call: 5-7 in-house calls (overnight and/or week end) per block (alternating between MUHC-MCH and JGH sites), as decided by the fellowship director based on source of funding.
- B. Resident Supervision: The fellow will supervise residents and students during clinical duties and will provide mid-rotation and end of rotation feedback.
- C. National or International conference presentation: Fellow should present his/her work at a national or international conference.
 - a. Financial support to present at 1 conference per year up to a maximum dollar amount is offered to each fellow
- D. Vacation: Fellows are entitled to 4 weeks' vacation during a 1-year fellowship
- E. Support staff: Administrative tasks will be managed by the program coordinator.
- F. Reading Material: Recommended reading materials include Volpe's Neurology of the Newborn, Neonatal Brain Injury: An Illustrated Guide, Neurology: Neonatology Questions and Controversies, and other textbooks based on the fellow's individual goals.

Eligibility:

Eligible trainees must have completed a residency in neonatal-perinatal medicine with Royal College certification or equivalent for foreign fellows. Trainees must meet the licensing requirements for neonatal-perinatal medicine training in Québec via the Collège des Médecins du Québec. Candidates must demonstrate strong clinical performance, an interest in academic neonatology, and specific enthusiasm for neonatal neurocritical care. Canadian citizenship or visa eligibility is required.

Application Process:

Interested candidates should submit:

1. A letter of intent.
2. A CV highlighting relevant clinical and research experience.
3. Two letters of reference.

For further details, please contact the Fellowship Director at jarred.garfinkle@mcgill.ca and the program administrator at programadmin-neonat.med@mcgill.ca.