

Fetal-Neonatal Neurosciences Programme

Overview:

Babies who have experienced an *in utero* brain injury or have a congenital neurological condition benefit from specialized care. The Fetal-Neonatal Neurosciences Programme has been developed because of increased consultation requests from clinicians working in maternal-fetal-medicine. The Programme is part of the Paediatric Neurology service and the Paediatric Neurocritical Care Programme at Alberta Children's Hospital. It provides comprehensive evaluation for expectant mothers with follow-up evaluation and treatment of newborns as needed. Because newborn brains are in a crucial window of rapid development, we aim to identify problems as early as possible, starting prenatally, and plan interventions accordingly.

As a consultative service, we meet with expectant mothers during pregnancy if the obstetrician suspects that the fetus has a brain or spinal cord abnormality based on ultrasound or fetal MRI. Prenatal consultations are performed in person at the Alberta Children's Hospital or via virtual health. We provide comprehensive assessments, prognosis on developmental outcomes, and input into expectant management around delivery.

Once the baby is born, we contribute to the neurological management and care during the NICU or Intermediate Nursery stay, if required. After the baby has been discharged home, we continue to follow neurological progress and help develop therapies that support long-term neurodevelopment. The goal is to provide a continuum of neurological clinical care between pre-natal and post-natal life.

Weekly multidisciplinary case rounds are led by Maternal Fetal Medicine at EFW where discussions help guide a comprehensive approach to investigation, treatment and other aspects of management pre- and postnatally. Members of the Programme attend these rounds and contribute to discussions when there are concerns for fetal brain or spinal cord abnormalities.

Teaching residents and fellows is an integral and important part of our Programme. Teaching encompasses neuro-embryology, fetal neuroanatomy, developmental neuropathology, pathophysiology of fetal brain injury and stroke, fetal imaging, as well as general child development. Our neurology, neonatology and neurosurgery faculty members have expertise in the treatment of perinatal stroke, hydrocephalus, spinal cord abnormalities, and neuropathology.

Research also is essential in our Programme's development and growth. The physicians in the group are involved in ongoing projects to help advance the care of children with neurological impairment. We also work closely with other specialty services, such as those listed below.

Clinical Neuroscience Physicians

Dr. H.B. Sarnat (Co-Director) is a Paediatric Neurologist, Neuropathologist and co-founder of Fetal Neurology in Calgary. Dr. Sarnat has a long-standing interest and expertise in neurodevelopment and has been providing prenatal neurology consultation for over 10 years.

Dr. A. Mineyko (Co-Director) is a Paediatric Neurologist with clinical expertise in stroke and neurocritical care and interest in post-graduate medical education.

Dr. M. Esser is a Paediatric Neurologist, Director of the Neurocritical Care, and the Section Head of Pediatric Neurology at the Alberta Children's Hospital. Dr. Esser's interests include acquired brain injury.

Dr. L. Flores Sarnat is a Paediatric Neurologist and co-founder of Fetal Neurology in Calgary.

Dr. C. Gallagher

Dr. A. Kirton is a Paediatric Neurologist with clinical and research interests in fetal and neonatal cerebrovascular disease, neurocritical care, and understanding outcomes from perinatal brain injury. He directs the Calgary Pediatric Stroke Program and holds the Dr. Robert Haslam Chair in Pediatric Neurology.

Dr. J. Riva Cambrin is a Pediatric Neurosurgeon and Clinical Epidemiologist who has both clinical and research expertise in infants and children with hydrocephalus. He is also a Principal Investigator for several clinical trials involving this patient population including a randomized control trial, funded by the NIH, comparing shunts to the ETV+CPC procedure for infant hydrocephalus.

Dr. W. Hader

Dr. X. Wei is a Paediatric Neuroradiologist with expertise in fetal MRI. He founded the fetal MRI service at the Alberta Children's Hospital in 2007.

Collaborators

Maternal-Fetal Medicine (MFM)

Genetics

Neonatology

Conditions for which we frequently are consulted:

Brain and spinal cord malformations

Ventriculomegaly and hydrocephalus

Myelomeningocele

Perinatal stroke and CNS vascular injuries

Neurological complications of high risk pregnancy

Pre-natal exposure to teratogens and other neurotoxins, including alcohol

Suspected or confirmed genetic neurological conditions

Suspected or confirmed *in utero* infections