

NEONATOLOGY - Pediatric Residents

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PREAMBLE

1. Neonatology is a core rotation with teaching and clinical experience provided at the Edmonton-zone neonatal intensive care units (NICUs): the Misericordia Hospital NICU (MIS), Philip C. Etches NICU at the Royal Alexandra Hospital (RAH), the Grey Nuns Hospital NICU (GNH), and if desired, the David Schiff NICU at the University of Alberta Hospital (UAH).
2. General Pediatrics Residents are assigned to the NICU for 1 block in each of the first three years of training. Residents spend one month at the MIS in year 1, one month at the RAH in year 2, one month at the GNH in year 3. Residents have the option to do additional rotations in various NICUs in year 4.
3. The NICU is under the direct supervision of the staff Neonatologists. The Neonatal Subspecialty Trainees, Neonatal Nurse Practitioners, and Associate Physicians assist in the supervision of the residents in the NICU and during night call. The NICU is multidisciplinary and consists of bedside Nurses, Neonatal Nurse Practitioners, Respiratory Therapists, Social Workers, Dieticians, Pharmacists as well as the Medical Staff. There is a fully operational Neonatal Transport Team (consisting of specially-trained Transport Nurses and Respiratory Therapists) for neonatal transports.
4. Through their NICU experience, Residents can expect to become familiar with the diagnosis and management of common neonatal problems of the premature and term newborn, and be competent in basic neonatal resuscitation and technical procedures. As Residents gain experience, they are afforded increased responsibilities and independence.

ROTATION SPECIFIC OBJECTIVES

During the first year rotation at the MIS NICU, the Resident should endeavor to know all the level 2 patients admitted to their team, should attend as many deliveries and resuscitations as possible with support of the appropriate staff, and participate in morning Rounds with the team. The Resident should maintain up to date documentation and write problem-oriented progress notes. The Resident will be on-call at nights and on weekends and will be required to attend to any emergent problems in the nursery, neonatal resuscitations and any new admissions with the support of on-call in-house Neonatologist, Neonatal Nurse Practitioner, or Associate Physician. The Resident will become familiar with discharge planning of a premature neonate and other neonates requiring close follow-up.

The second year rotation at the RAH NICU will increase Resident exposure to newborns who are critically ill with multiorgan involvement, who require greater ventilatory support and who are preterm with very low or extremely low birth weight. The Resident should know and manage all the patients assigned to them; participate in morning Rounds, case conferences, perinatal consultations, and attend high-risk deliveries and resuscitations. The Resident will be first on call at nights/weekends with the support of on-call in-house Neonatal Subspecialty Trainee or Neonatal Nurse Practitioner.

The third year rotation at the GNH Level 2 NICU will focus on caring for healthy newborns and common problems of newborns in a Community Hospital/Level II Nursery. As a senior trainee, the Resident should be actively involved in managing the nursery including admissions, patient care, rounds and family conferences with the support of the attending Neonatologist. The Resident should be able to perform a complete newborn examination and give anticipatory guidance to parents regarding normal growth, nutrition, and behavior of newborns. The Resident should be actively involved in teaching junior learners. The Resident will take an increasingly independent role with the Caseroom Resuscitation team and may perform prenatal consults with Neonatologist support.

Residents have the option of selecting additional NICU rotations in their fourth year of training. Depending on learning objectives and career goals, rotation options include:

Fourth Year rotation at David Schiff (UAH) NICU: this rotation will focus on newborns that require surgical intervention including cardiac, gastrointestinal, ENT or neurosurgery. The Resident will become familiar with infants with congenital or acquired anomalies and multisystem involvement requiring a multidisciplinary approach. The Resident should know and manage all the patients assigned to them, participate in morning Rounds, and family case conferences. The Resident will be first on call at nights/weekends with the support of on-call in-house Neonatal Subspecialty Trainee or Neonatal Nurse Practitioner.

Fourth year Junior Staff rotation at the GNH or MIS Level 2 NICU: this rotation will focus on management of a community/Level 2 NICU. The Resident should be actively involved in managing the nursery including admission, patient care, rounds, family conferences, and discharges, acting as a junior consultant. The Resident should be actively involved in teaching junior learners and managing a multidisciplinary team. The Resident will lead the Caseroom resuscitation team and perform prenatal consults with Neonatologist support. The resident will manage the unit on overnight call shifts with support from an attending neonatologist at home.

Other rotation options may be available; requests should be made to Melissa Meaver (pedsneo@ualberta.ca)

KNOWLEDGE

The Resident will be able to demonstrate knowledge concerning:

- fetal growth, development and physiology, including the role of the placenta
- aspects of pregnancy, labour and delivery which affect the neonate
- effect of maternal systemic disease on the fetus and newborn
- demographic, medical and psychosocial factors which influence perinatal mortality and morbidity (the high risk pregnancy)
- antenatal assessment including prenatal diagnostic techniques
- recognition of potential problems for the newborn during labour and delivery
- process of neonatal adaptation to extrauterine life
- initial neonatal assessment including Apgar score, gestational age (Ballard assessment), growth parameters (weight, length, head circumference, small/large for gestational age, intrauterine growth restriction)
- general principles of care of the normal term and preterm newborn including thermoregulation, physiologic jaundice, newborn metabolic screen
- neonatal growth, nutrition, feeding
- recognition of common congenital malformations/anomalies and associated problems
- pharmacology in the newborn, neonatal pain management
- stabilization and transport of the neonate
- follow-up of the high risk neonate

SKILLS

The Resident will be able to demonstrate the following skills:

Clinical:

- maternal and neonatal history, maternal obstetric and medical history, social background
- complete physical examination and initial assessment of the newborn, including Apgar score and estimation of gestational age
- recognition of the seriously ill newborn
- initial stabilization and management of the ill newborn
- problem formulation and problem solving
- appropriate investigation and interpretation of laboratory and radiologic tests
- management of conventional mechanical ventilation and its complications
- discharge planning and follow-up arrangements
- communication with parents
- working as part of a multidisciplinary team

Technical:

- intravenous access and blood drawing
- umbilical venous and arterial catheterization
- nasogastric tube placement
- lumbar puncture, cerebrospinal fluid reservoir tap
- suprapubic bladder aspiration
- neonatal resuscitation, including endotracheal intubation, and CPR (NRP)
- knowledge of technique of emergency percutaneous drainage of pneumothoraces and chest tube placement
- knowledge of technique of percutaneous catheter insertion

PROBLEMS

The Resident, using the relevant knowledge, skills and attitudes, will be able to recognize, diagnose and initiate management of the following problems:

- Prematurity, postmaturity, intrauterine growth restriction
- Asphyxia
- Birth trauma
- Congenital anomalies, dysmorphic infant, chromosomal disorders

CNS:

- hypoxic ischemic encephalopathy/neonatal encephalopathy
- intraventricular hemorrhage
- intracranial infarction
- periventricular leukomalacia
- hypotonia/hypertonia
- drug withdrawal
- meningitis/encephalitis
- apnea
- seizures
- hydrocephalus - congenital or acquired
- hearing screening in NICU
- screening and treatment of retinopathy of prematurity
- long term neurodevelopmental outcomes of disorders/disease in the neonatal period

Respiratory:

- respiratory distress
- transient tachypnea of the newborn
- hyaline membrane disease
- pneumonia
- meconium aspiration syndrome
- pneumothorax and air leaks
- hypoplastic lungs
- bronchopulmonary dysplasia/chronic lung disease
- apnea
- respiratory depression
- blood gas interpretation
- techniques of ventilation and assisted respiratory support, surfactant administration

Cardiovascular:

- cyanosis, murmurs, arrhythmias
- hypovolemia/hypotension
- persistent pulmonary hypertension of the newborn
- congenital heart disease

Hematology:

- anemia, polycythemia
- hemorrhage, DIC, thrombocytopenia
- Rh/ABO incompatibility
- blood transfusion

Gastrointestinal:

- feeding problems
- vomiting
- bowel obstruction
- abdominal masses in the newborn
- congenital malformations: omphalocele, gastroschisis, malrotation, intestinal atresia, imperforate anus
- necrotizing enterocolitis
- enteral and parenteral nutrition

Infections:

- sepsis, congenital infections, nosocomial infections

Metabolic/endocrine:

- jaundice
- hypoglycemia; infant of a diabetic mother
- inborn errors of metabolism
- hypo/hypercalcemia
- ambiguous genitalia

Renal:

- fluid and electrolyte imbalance
- oligo/anuria
- urinary tract infection

- congenital anomalies: polycystic/multicystic kidney, hydronephrosis
- hypertension

Ethics:

- decision making in the areas of treatment initiation and limitation
- goals of care and compassionate care
- quality of life

CanMEDS Objectives for Pediatric Residents in Neonatology

Role	Key Competencies
Medical Expert / Clinical Decision Maker	<ol style="list-style-type: none"> 1. Identify high risk pregnancies and newborns at risk of mortality and morbidity 2. Differentiate normal from abnormal findings in neonates 3. Have a good understanding of common neonatal problems, how they are diagnosed and managed 4. Obtain an accurate, focused perinatal-neonatal history and a complete physical exam 5. Formulate an appropriate differential diagnosis or prioritized problem list 6. Elaborate a management plan 7. Demonstrate and assist with newborn resuscitation
Communicator	<ol style="list-style-type: none"> 1. Obtain and synthesize relevant history from patient-families and other health care providers 2. Establish therapeutic relationships with families of sick newborns 3. Appropriately discuss concerns with neonatologist or pediatrician 4. Communicate effectively with consultants 5. Communicate effectively with all members of the Interdisciplinary Neonatal Team 6. Maintain complete and accurate medical records
Collaborator	<ol style="list-style-type: none"> 1. Manage emergency situations as well as ongoing care of newborns as part of an interdisciplinary team 2. Involve primary care physicians in the community in continued care
Leader	<ol style="list-style-type: none"> 1. Order and interpret common ancillary investigations when appropriate, understanding the value and limitations of these investigations 2. Prioritize care plans for each patient on a continuous basis 3. Recognize skills of other health care providers, and delegate tasks accordingly
Health Advocate	<ol style="list-style-type: none"> 1. Recognize concerns and issues which families have when newborns are admitted to the NICU 2. Aware of social circumstances which impact on the newborn infant's outcome 3. Understand the principles of family-centered care and the importance of the family's involvement in the decision-making and provision of care 4. Refer newborns at risk of adverse outcome for appropriate long-term services 5. Understand the importance of anticipatory guidance, appropriate discharge planning and follow-up arrangements
Scholar	<ol style="list-style-type: none"> 1. Identify areas of weakness and establish a comprehensive continuing education strategy 2. Direct and teach other learners within the team
Professional	<ol style="list-style-type: none"> 1. Act in an honest, compassionate, and ethical fashion 2. Recognize limitations and act upon them to optimize patient care