Related Specialty Experiences:
*Descriptions, Goals and Objectives*

**Overview**

In addition to clinical rotations within the NICU and ongoing participation in the high-risk follow up clinic, each fellow will have additional exposure to clinical areas related to the practice of neonatology. In most cases these will include block rotations but in some instances a longitudinal experience has been developed, similar to the high-risk clinic experience. These clinical areas include Maternal-Fetal Medicine, Genetics, Pediatric Cardiology, Pediatric Cardiovascular Surgery, Pediatric Infectious Diseases, and Pediatric Radiology. In addition, with the arrival of a Pediatric Surgeon, it is anticipated that a clinical experience in that area will be developed and incorporated into the fellowship curriculum within the coming year or two.

Recognizing that most fellows will already have had experience in some or all of these areas, depending on residency training and post-graduate clinical experience, it is imperative that each fellow establish individualized goals and objectives for each of these subspecialty experiences. To that end, each fellow should plan to meet with the subspecialty faculty member who has been identified as the fellowship coordinator for that experience, at least 1-2 weeks before the scheduled experience begins, to develop an individualized learning plan (ILP) for that fellow. This could also be documented in a written ILP that the fellow can review with his/her neonatology faculty advisor, and/or the NPM Program Director.

Each of these experiences is further described below, along with specialty-specific, competency-based goals and objectives that will serve as the minimum expectations of competency following the experience. Since each fellow will develop an ILP for these experiences, building on their prior competency and experience, actual goals and objectives will vary.

A. Maternal-Fetal Medicine (4 week block)
   a. Goal: To understand the role of the neonatologist in the prenatal management of high risk pregnancies
   b. Approach: To assess, diagnose, make recommendations for management, and provide prognosis for antenatally diagnosed maternal or fetal conditions of concern.
   c. Learning Environment: The fellow will work directly with board-certified maternal-fetal specialists, an obstetrical sonologist, a board-certified pediatric cardiologist who specializes in fetal echocardiography, an HIV social worker, a geneticist, and genetics counselors to provide diagnostic evaluation, fetal intervention (as indicated), and management recommendations. This will take place in both an inpatient (hospital) and outpatient (high risk antenatal clinic) setting.
   d. Specialty-Based Objectives
      i. Identify what constitutes a high-risk pregnancy.
      ii. Explain the neonatologist’s role in assessment and management to minimize the risk to the fetus and/or newborn, recognize potential adverse outcomes for the fetus/neonate, and list the complications for each of the following prenatal and perinatal
complications: maternal infections/exposures to infection during pregnancy; fetal exposure to harmful substances (alcohol, tobacco, street drugs, medications, environmental toxins); maternal insulin-dependent diabetes and pregnancy-induced glucose intolerance; multiple gestation; placental abnormalities (placenta previa, abruption, abnormal size, function); pre-eclampsia, eclampsia; chorioamnionitis; polyhydramnios; oligohydramnios; premature labor; premature rupture of membranes; complications of anesthesia and common delivery practices (Caesarean, vacuum, forceps, epidural, induction of labor); fetal distress during delivery; postpartum maternal fever/infection

iii. Describe maternal physiological, biochemical, and pharmacological influences on the fetus; fetal physiology; fetal development; placental function (placental circulation, gas exchange, growth); physiological and biochemical adaptation to birth; cellular, molecular, and developmental biology and pathology relevant to diseases of the neonate

iv. Detail key limitations of the technique, normal and frequently encountered abnormal findings with the procedure, and common complications for the fetus/infant for each of the following obstetric and pediatric techniques and procedures: fetal ultrasound for size and anatomy; fetal heart rate monitors; scalp and cord blood sampling; amniocentesis; cordocentesis; intrauterine transfusion; chorionic villus sampling.

v. Explain the methods used to evaluate fetal well being and maturation.

vi. Describe factors that may compromise the fetus during the intrapartum period, and recognize the signs of fetal distress.

vii. Explain the psychology of pregnancy and maternal-infant interaction.

viii. Promote breast-feeding by discussions well before delivery.

ix. Summarize both the short- and long-term consequences of specific antenatal diagnoses, including survival expectations, quality of life issues, and secondary complications.

B. Genetics (4 week block)

a. Goal: To assess, diagnose, make recommendations for management, counsel families, and help coordinate both short- and long-term care for newborns with common and not-so-common genetic or suspected genetic disorders.

b. Approach: The fellow will work directly with a geneticist, a genetic counselor, and the genetic laboratory to provide diagnostic evaluation, patient care and management recommendations, family counseling, and coordination of care. This will take place in both a patient (hospital and clinic) and non-patient (genetics laboratory) setting. [Some genetics experience is also obtained during a rotation in Maternal-Fetal Medicine, where the fellow will work alongside these same genetics faculty and personnel. (See A, above.)]

c. Specialty-Based Objectives
i. Describe common clinical findings for some of the more common genetic or suspected genetic disorders typically diagnosed during the neonatal period, including, but not limited to: trisomy 21, trisomy 13, trisomy 18, XO, DiGeorge Syndrome, and VATER Association.

ii. List common risk factors, including teratogenic factors, for genetic aberrations.

iii. Demonstrate the ability to discuss recurrence with families and care providers.

iv. List which laboratory investigations are appropriate for the diagnosis of genetic and/or metabolic disorders.

v. Summarize both short- and long-term consequences of specific genetic/metabolic diagnoses, including survival expectations, quality of life issues, related medical conditions, and secondary diseases.

C. Pediatric Cardiology (4 week block)
   a. Goal: To assess, diagnose, make recommendations for management, counsel families, and help coordinate both short- and long-term care for newborns with common and not-so-common congenital heart lesions or rhythm disturbances.
   b. Approach: The fellow will work directly with board-certified pediatric cardiologists (including a cardiac electrophysiologist) and an echocardiograph technician to provide diagnostic evaluation, patient care and management recommendations. This experience will take place in a variety of patient settings, including the patient wards (NICU, PICU, pediatric ward), the cardiac catheterization laboratory, and the outpatient clinic.
   c. Specialty-Based Objectives
      i. Develop a general understanding of cardiovascular development and how that improves our understanding of common cardiac defects in the newborn.
      ii. Describe common cardiac (structural and/or functional) occurring in neonates, including cyanotic defects, acyanotic defects, cardiomyopathies, and abnormal cardiac rhythms.
      iii. Explain the basic approach to the diagnosis and management of the neonate with suspected cardiac disease.
      iv. Describe the role of the cardiac specialist in the management of the neonate with a suspected cardiac condition, particularly when they need to be involved.
      v. Demonstrate the initial assessment and stabilization of a neonate with a suspected cardiac condition.
      vi. List which laboratory/technical investigations are appropriate for the diagnosis of a suspected cardiac condition.
      vii. Describe how to interpret a neonatal EKG and how certain parameters are normally affected by postnatal age.
      viii. Describe the role of surgery for a variety of congenital heart defects, particularly when corrective versus palliative surgery is indicated.
      ix. Summarize both the short- and long-term consequences of
specific types of congenital heart defects, including survival expectations, quality of life issues, related problems in other organ systems, and secondary complications.

D. Pediatric Cardiovascular Surgery (longitudinal experience)
   a. Goal: To understand the role of the neonatologist in clinical management, family counseling, and coordination of short- and long-term care of the neonate with a known cardiac defect.
   b. Approach: The fellow will work directly with board-certified pediatric cardiologists (including a cardiac electrophysiologist), board-certified pediatric cardiovascular surgeons, and pediatric cardiovascular nurse practitioners to provide pre- and post-operative management of the neonate undergoing cardiac surgery. This experience will take place in several inpatient settings, including the NICU, PICU, and pediatric ward. [The fellow will also see such patients in the outpatient setting, although this would be as part of a structured Pediatric Cardiology rotation (see C, above).]
   c. Specialty-Based Objectives
      i. Demonstrate the preoperative management of the neonate with a known cardiac defect.
      ii. Participate in the postoperative management of the neonate/infant who has undergone cardiac surgery.
      iii. Describe both intraoperative and postoperative complications that may occur in infants undergoing cardiac surgery.
      iv. Describe the short- and long-term outcomes of infants undergoing cardiac surgery during the neonatal period.
      v. Summarize both the short- and long-term consequences of specific types of congenital heart defects postoperatively, including survival expectations, quality of life issues, related problems in other organ systems, and secondary complications.

E. Pediatric Infectious Diseases (4 week block)
   a. Goal: To assess, diagnose, make recommendations for management, and provide prognosis for neonates with common and not-so-common infectious diseases.
   b. Approach: The fellow will work directly with board-certified pediatric infectious disease specialists, an HIV social worker, and microbiologists to provide diagnostic evaluation, patient care, and management recommendations. This will take place in both a patient (hospital and clinic) and non-patient (microbiology laboratory) setting.
   c. Specialty-Based Objectives
      i. Describe common infections occurring in neonates, both maternal-related as well as nosocomial, including but not limited to: intrauterine viral/protozoal infections, Group B streptococcal infection (both early and late-onset), herpes simplex, gram-negative sepsis, and meningitis.
      ii. Explain the basic approach to the diagnosis and management of the neonate with suspected sepsis.
      iii. Describe basic isolation procedures for potentially contagious
diseases, and when they would be appropriate.

iv. Explain the initial evaluation and management for a newborn infant exposed to an HIV-positive mother.

v. Describe when to consider evaluation for an immune deficiency condition.

vi. List common risk factors for either early-onset (perinatal) or late-onset (nosocomial) infections.

vii. List which laboratory investigations are appropriate for the diagnosis of infection or suspected infection.

viii. Assess initial culture results and antibiotic inhibition profiles.

ix. Summarize both the short- and long-term consequences of specific types of neonatal infections, including survival expectations, quality of life issues, and secondary complications.

F. Pediatric Radiology (2 week block)

a. Goal: To understand the indications and limitations of commonly used radiological assessments and interventions to assist diagnosis and management of a variety of disorders that may present during the neonatal period.

b. Approach: The fellow will work directly with board-certified pediatric radiologists and neuroradiologists to provide diagnostic evaluation, patient care and management recommendations. This experience will take place in the inpatient setting (NICU, PICU, pediatric ward, and radiology suites).

c. Specialty-Based Objectives
   i. Describe the variety of imaging modalities (radiography, computed tomography, ultrasonography, nuclear medicine, and magnetic resonance) and how each might be used to assist in the diagnosis and/or management of common neonatal conditions.

   ii. List of which imaging modalities are appropriate for specific conditions and clinical questions.

   iii. Explain how imaging techniques may be used for direct patient management (interventional radiology).

   iv. Evaluate the pros and cons of different modalities in certain clinical conditions (cost, ease of use, patient access, information obtained, etc.).