

Clinical Goals and Objectives
Neonatal-Perinatal Residency Program
Children's Hospital at University Hospital and Clinics

INTRODUCTION

The fellows in Neonatal-Perinatal Medicine (PL-4, 5 and 6) will have exposure to and a breadth of experience in all disorders encountered in Neonatal-Perinatal Medicine. The intent of our Neonatal-Perinatal Medicine Residency Program is to train pediatricians in the diagnosis and management of disorders in premature and full-term newborns and to provide up-to-date, comprehensive, compassionate care in the training of the next generation of neonatologists. This training program will provide the foundation necessary to become competent clinicians, researchers, teachers and leaders within the field of Neonatal-Perinatal Medicine.

The overall goals for the fellows in Neonatal-Perinatal Medicine are:

- 1 To develop and maintain a standard of excellence in the clinical practice of neonatal-perinatal medicine.
- 2 To develop a broad knowledge base in neonatal-perinatal medicine.
- 3 To develop a personal program of self study and professional growth with guidance from the teaching faculty.
- 4 To base clinical decisions upon scientific evidence-based medicine.
- 5 To develop teaching skills.
- 6 To develop administrative skills.
- 7 To develop basic skills in research.
- 8 To initiate and complete at least one research project. This includes development of a hypotheses, research protocol, abstract, and presentation.
- 9 Please note that it is a requirement for the Neonatal-Perinatal Medicine boards to publish a peer-reviewed manuscript -- a product of the research performed during the 3-years fellowship.

Below, is the general fellowship core curriculum. It is a requirement for fellows and must be completed by their final year. The curriculum includes:

- Biostatistics
- Clinical and laboratory research methodology
- Study design
- Preparation of applications for funding and/or approval of clinical research protocols,
- Critical literature review
- Principles of evidence-based medicine
- Ethical principles involving clinical research
- Achievement of proficiency in teaching for all subspecialty fellows
- Principles of adult learning
- Curriculum development
- Delivery of information
- Provision of feedback to learners
- Assessment of educational outcomes
- Conferences dealing with complications and death
- Scientific, ethical, and legal implications of confidentiality and of informed consent
- Bioethics including attention to physician-patient, physician-family, physician-

- physician/allied health professional, and physician-society relationships
- Economics of health care and current health care management issues, such as cost-effective patient care, practice management, preventive care, quality improvement, resource allocation, and clinical outcomes
 - Prevention of medical errors

OVERALL GENERAL COMPETENCY GOALS AND OBJECTIVES

1ST YEAR

Clinical Diagnosis and Management

The first year fellow in Neonatal-Perinatal Medicine is expected to obtain knowledge for clinical practice, to understand the physiology and altered structure and function of the fetus and neonate, and to diagnose and manage problems of the neonate. The fellows in Neonatal-Perinatal Medicine must learn the fundamentals of clinical diagnosis and management of problems seen in the continuum of development from prenatal through intrapartum and neonatal periods, including assessment of outcomes (for specific objectives, please see Medical Knowledge section).

The first year fellow is expected to:

- 1 Perform prenatal consults under supervision of the neonatal attending faculty
- 2 Resuscitate premature and full-term neonates under supervision of the faculty
- 3 Serve as a team leader for the residents and nurse practitioners in our 36 bed Neonatal Intensive Care Unit (NICU) under the supervision of the faculty

Teaching

The first year fellow is expected to help teach residents and medical students on service in the NICU various aspects of care including but not limited to ventilator management, nutrition management, thermal support, antibiotic therapy, etc. In addition, they are to help teach the residents and medical students various procedures (intubation, umbilical line placement, thoracentesis, etc.).

Research

The first year fellow is expected to select a research mentor in an area of research relevant to neonatal-perinatal medicine, to develop a hypothesis and research protocol, and to begin the process of data collection.

Each fellow chooses a Research Mentor with the help of the Associate Chief of Research for Pediatrics and the Program Director. The Fellowship Director and mentor assist the fellow in selecting a project. The Scholarship Oversight Committee (SOC) meets at least once a year in years 1, 2 and 3 of the fellowship to review the progress of the project.

In the first year, the fellow presents his/her research area, gives a review of the literature, and his/her overall plan for the research project. The SOC members discuss the research plan and make recommendations for his/her review of the literature; where appropriate, revisions to the protocol; and suggestions for future directions.

In year two or three, the fellow presents data that he/she has collected. It is reviewed by the SOC and suggestions for new directions are made.

In year three, the fellow presents the most current data collected and reports on presentations he/she has made and reports on his/her progress in writing their manuscript(s). Suggestions for his/her manuscripts are made by the Scholarship Oversight Committee.

2nd YEAR

Clinical Diagnosis and Management

The second year fellow in neonatal-perinatal medicine is expected to continue on the clinical service as outlined for the first year fellow. However, the second year fellow assumes a greater role of responsibility for prenatal consults, neonatal resuscitation, and managing the team in the NICU. Hence, in the second year, the fellow in neonatal/perinatal medicine still receives supervision, but begins to act more independently than in the first year. Although the fellow performs the prenatal consults independently, the attending in neonatal-perinatal medicine is available on beeper for consultation.

Teaching

The second year fellow will continue to work with residents and students in the NICU. The fellow will start planning/organizing various division conferences. They help choose journal review articles and are expected to lead the discussion on these articles. They also become NRP instructors and help with the NRP classes over the next two years. The fellow will have more independence than in the first year, but will still be evaluated by attendings.

Research

The second year fellow is expected to continue on his/her research endeavors begun in the first year.

3rd YEAR

Clinical Diagnosis and Management

The third year fellow in neonatal-perinatal medicine is expected to be self sufficient. The fellow is expected to do prenatal consults independently, teach the residents and nurse practitioners appropriate techniques in neonatal resuscitation, and to supervise and manage their team in the NICU with appropriate consultation from the attending in neonatology.

Teaching

The third year fellow is expected to be competent in presenting lectures on his/her own and can confidently teach the residents in pediatrics and students. The fellow is expected to be competent enough to independently review literature at Journal Club, but will be evaluated by the faculty member acting as their second reviewer.

Research

The third year fellow is expected to have enough data to submit abstracts to regional and national meetings. The third year fellow is encouraged to attend a national conference and present their research. The third year fellow is expected to submit a completed manuscript to a peer reviewed journal.

SPECIFIC COMPETENCY GOALS AND OBJECTIVES FOR FELLOWSHIP

EXPERIENCE (Patient Care, Interpersonal and Communication Skills, Medical Knowledge, Practice-Based Learning and Improvement, Professionalism, and Systems-Based Practice.)

PATIENT CARE:

Fellows are expected to provide patient care that is compassionate, appropriate and effective for the promotion of health and prevention of illness. Thus, fellows must, *at the level of a subspecialist*:

- Gather essential, accurate and concise information (including a family history), perform a complete H&P, and order appropriate tests.
- Make informed diagnostic and treatment decisions, analyze and synthesize information, know one's limits of knowledge and expertise, and recognize when to obtain appropriate consultation.
- Develop and carry out patient care management plans, prescribe and perform procedures, and effectively counsel parents.
- Recognize and appropriately intervene in urgent and emergent situations.
- Understand the role of the family in the care and management of the patient.
- Learn to supervise the management of premature and full-term neonates with a variety of disorders in a multidisciplinary NICU.
- The fellows should be able to perform the following techniques at the level appropriate for each year.

1ST YEAR

The first year fellow should be able to perform the techniques under supervision.

2ND YEAR

The second year fellow should be able to perform these techniques with minimal supervision.

3RD YEAR

The third year fellow should be proficient in these techniques and able to teach them to other personnel.

- 1 Neonatal resuscitation
- 2 Venous and arterial access
- 3 Evacuation of air leaks
- 4 Endotracheal intubation
- 5 Preparation for transport
- 6 Ventilatory support
- 7 Continuous monitoring
- 8 Temperature control
- 9 Nutritional support, etc.

INTERPERSONAL & COMMUNICATION SKILLS:

Fellows are expected to be at the subspecialty level in maintaining interpersonal and communication skills that result in effective information exchange. Fellows are to maintain professional relationships with parents, families, and other members of the health-care team at the level of a subspecialist in neonatal-perinatal medicine. Fellows should be able to maintain interpersonal and communication skills at the level appropriate for each year.

More specifically, fellows must, at the level of a subspecialist:

- Be proficient in communicating diagnoses, daily management of a neonate, potential outcomes, and discharge plans to his/her parents and family.
- Encourage communication with primary care physicians and the involvement with their patients in the NICU.
- Invariably be proficient in communicating both good and bad news regarding neonates in the NICU to parents and family.
- Be proficient in communicating to parents and family information about a newborn that is dying.
- Coordinate the care and management of all neonates on his/her team in the NICU including discharge planning, laboratory, occupational therapy, social services, family, and community pediatricians.
- Develop effective communication with nursing staff, nurse practitioners, other fellows, and medical students.
- Learn preparation for discharge.

1ST YEAR

The first year fellow should maintain interpersonal and communication skills under close supervision of their attending.

2ND YEAR

The second year fellow should be able to maintain interpersonal communication skills with minimal supervision from the attending.

3RD YEAR

The third year fellow should be proficient in maintaining interpersonal and communication skills as outlined above on his/her own and be able to teach these interpersonal and communication skills to other personnel.

MEDICAL KNOWLEDGE:

1ST YEAR

The first year fellow in neonatal-perinatal medicine is expected to begin to develop a broad base of knowledge on the topics and areas outlined below:

2nd YEAR

The second year fellow in neonatal-perinatal medicine should become proficient and be exposed to all of the areas of neonatal medicine outlined below:

3rd YEAR

The third year fellow in neonatal-perinatal medicine must have developed a comprehensive fund of knowledge in all of the areas outlined below:

All fellows, starting with year one and continuing to year three, are expected to show proficiency in obtaining knowledge of established and evolving biomedical, clinical, and social science protocols, and the application of their knowledge to patient care applicable to their level of fellowship training. They will apply an open-minded, analytical approach to acquiring new knowledge, access, and critically evaluate current medical information and scientific evidence, and apply this knowledge to clinical problem-solving, clinical decision-making, and critical thinking. They will extract relevant knowledge and apply it to each patient's individual situation.

All fellows, starting with year one and continuing to year three, will learn from a didactic curriculum on complications of neonatal disease and therapy, and managing the complicated critically ill neonates. The fellow will also learn the scientific, ethical, and legal implications of confidentiality and of informed consent applicable to their level of fellowship training.

All fellows, starting with year one and continuing to year three, are expected to develop an adequate knowledge of physiology and pathophysiology of the neonate, maternal antepartum, and intrapartum conditions, which affect the health of the fetus and newborn. They are expected to appropriately manage normal neonatal physiologic processes and have the ability to prevent pathologic conditions. They are expected to evaluate the literature in neonatal-perinatal medicine to acquire sufficient knowledge of study, design management, statistical analysis, and critical thinking applicable to their level of fellowship training.

All fellows, starting with year one and continuing to year three, must become proficient in obtaining knowledge of the following topics through didactic lectures, learning from and emulating the attendings in neonatal-perinatal medicine, discussion on rounds, specific readings including online and reference literature and attending local and national meetings applicable to their level of fellowship training. Specific areas of expertise that are required in neonatal-perinatal medicine are outlined below:

Gain experience with high-risk pregnancies and complicated labor and deliveries.

- A) Vital statistics and perinatal health care outcomes.
- B) Antenatal diagnosis and antenatal counseling.
- C) Fetal assessment and treatment during pregnancy.
- D) Tests commonly used to measure fetal developmental status and well-being.
- E) Fetal/neonatal effects of common obstetrical problems including:
 - Infections
 - Endocrine abnormalities
 - Intrauterine growth retardation
 - Maternal addiction
 - Immunologic abnormalities
 - Multiple gestations
 - Amniotic fluid production abnormalities

- Placental/membrane abnormalities
 - Pre-eclampsia
 - Prematurity
 - Complications of labor and delivery and effects of anesthesia
- F) Labor: normal and abnormal
- G) Delivery: normal and complicated

Develop expertise in newborn resuscitation and stabilization.

A) Physiology of the transition from the fetal to neonatal state and acute and chronic asphyxial syndromes.

B) Principles and mechanics of neonatal resuscitation

- Anticipation, environment, and equipment
- Bag and mask techniques
- Endotracheal intubations
- Management of meconium aspiration
- Chest compressions
- Medications

C) Identification and management of unsuspected anomalies in the delivery room (e.g. meningomyelocele, gastroschisis, cleft palate, etc.)

D) Neonatal transport

- Principles of stabilization
- Elements of transport
- Environmental control
- Mechanical ventilation
- Means of maintaining fluid and metabolic stability
- Monitoring during transport
- Indications for transport to a higher level of care

Develop expertise with procedures and techniques for neonatal diagnosis and management.

A) Indications, necessary precautions, and support systems.

B) Specific procedures

- Arterial puncture
- Lumbar puncture
- Bladder catheterization
- Suprapubic aspiration
- Gastric suction/lavage
- Airway suction
- Oro-gastric tube placement
- Intravenous line placement
- Percutaneous central venous line placement
- Umbilical Artery Catheterization
- Umbilical Venous Catheterization
- Thermal control
- Chest tube insertion
- Conscious sedation

- Cardioversion/defibrillation
- Exchange transfusion
- Inguinal hernia reduction
- Enteral/parenteral medication administration
- Nasal CPAP
- Oxygen delivery
- Surfactant administration
- Mechanical ventilation initiation, maintenance and weaning
- High frequency oscillatory ventilation/jet ventilation
- Observation of ventricular fluid removal via tap
- Subcutaneous/intradermal treatment of intravenous infiltration
- Indications/decision for alternative methods of support

Learn diagnostic and monitoring techniques, their clinical usefulness, limitations, and interpretation.

- A) Indications, necessary precautions, and support systems with the following monitoring techniques:
- Gestational age assessment
 - Apgar scoring
 - Physiologic monitoring (cardiac, respiratory, blood pressures)
 - Oxygen saturation
 - X-rays
 - Cranial ultrasound
 - Abdominal ultrasound
 - Echocardiography
 - Doppler velocity
 - Pulmonary function tests
 - Hyperoxia test
 - Electrocardiogram
 - Abstinence scoring
 - Newborn hearing assessment

Develop expertise with laboratory procedures, specimen collection, handling, and interpretation of laboratory results.

- A) Blood culture
- B) Conjunctival specimen
- C) Nasopharyngeal secretions
- D) Rectal swab/stool
- E) Cerebral spinal fluid
- F) Skin lesions
- G) Abscess fluid
- H) Tracheal Aspirate
- I) Urine culture and analysis
- J) CBC
- K) Blood gases
- L) Metabolic screening
- M) TORCH titers
- N) RBC antigen/antibody testing
- O) Neonatal drug screening

P) Pharmaco-kinetic assays

Develop the capacity to independently manage common neonatal problems associated with mild and moderate illness.

- A) Moderate perinatal asphyxia
- B) Prematurity greater than 34 weeks' gestation
- C) Prolonged rupture of membranes or other risk of sepsis
- D) Multiple gestations, greater than 34 weeks' gestation
- E) Non-hemolytic and mild hemolytic jaundice
- F) Polycythemia
- G) Respiratory distress requiring less than 40% FiO₂
- H) Infant of Diabetic Mother
- I) Uncomplicated Trisomy 21
- J) Genetic Syndromes/Anomalies
- K) Infant with non-acute isolated anomalies
- L) Gastroesophageal reflux

Develop expertise in nutritional management of newborns.

A) Abnormal conditions

- Prematurity
- Intrauterine Growth Retardation
- Bronchopulmonary dysplasia
- Short bowel syndrome
- Renal disease
- Congestive heart failure
- Unusual metabolic disorders
- Post-surgical cases

B) Feeding techniques

- Breastfeeding
- Gavage tube feeding
- Parenteral nutrition
- Adaptive feeding devices, including gastrostomy
- Nutrition and growth of the fetus
- Nutrition and growth of normal term infant
- Minerals, vitamins and trace elements
- Parenteral nutrition

Develop expertise with common therapeutic agents in neonatal care.

- A) Adenosine
- B) Albuterol
- C) Anti-epileptics
- D) Anti-reflux medicines
- E) Antibiotics
- F) Antifungal agents
- G) Antiviral agents
- H) Diuretics
- I) Inotropes/Vasopressors
- J) Muscle relaxants
- K) Narcotic analgesia

- L) Neoprofen
- M) Prostaglandin E₂
- N) Sodium Bicarbonate
- O) Surfactant
- P) Vitamins
- Q) Volume expanders
- R) Caffeine
- S) Other, including nitric oxide, erythropoietin, etc.

Develop expertise with the primary care components of neonatology.

- A) Immunizations for premature and high risk infants
- B) Surveillance of somatic growth
- C) Surveillance of nutritional status
- D) Surveillance of sensorineural residua of high risk birth
- E) Metabolic screening
- F) Surveillance of developmental status

Supervise the management of complex neonatal disorders in the NICU.

- A) Respiratory disorders
 - Morphologic abnormal development of the lung
 - Fetal Respiration
 - Control of breathing - normal and abnormal
 - Pulmonary surfactant - physiology, pathophysiology and treatment
 - Pulmonary function - normal and abnormal ventilation/perfusion
 - Respiratory mechanics - normal and abnormal
 - Oxygen transport and delivery
 - Pulmonary function testing in the neonate
 - Apnea of prematurity
 - Respiratory distress syndrome
 - Neonatal pneumonias
 - Meconium aspiration syndrome
 - Persistent pulmonary hypertension
 - Transient tachypnea of the neonate
 - Extrapulmonary causes of respiratory distress
 - Airway obstruction
 - Other causes of respiratory distress
 - Conventional/"unconventional" mechanical ventilation
 - Pulmonary barotrauma
 - Pleural disorders, e.g., effusion and chylothorax
 - Bronchopulmonary dysplasia
 - Indications for extracorporeal membrane oxygenation
 - Nitric oxide

- B) Cardiovascular system
 - Normal and abnormal cardiac embryology and development
 - Cardiovascular physiology
 - Congenital heart disease
 - Cardiopulmonary distress in the absence of congenital heart disease
 - Electrophysiology and dysrhythmias

- Pharmacologic therapy of heart disease

C) Genetic/chromosomal disorders

- Complicated trisomy 21
- Trisomy 13, 21, 18
- Other trisomies
- VACTERL association
- Other syndromes
- Basic understanding of molecular genetics
- Specific patterns of inherited congenital disorders
- Patterns of noninherited congenital defects
- Diagnostic approach to congenital defects
- Prenatal and neonatal genetic counseling

D) Gastrointestinal disorders

- Necrotizing Enterocolitis
- Meconium Ileus or plug
- Peritonitis
- Esophageal atresia
- Intestinal obstruction
- Gastroesophageal reflux
- Congenital hyperbilirubinemia
- Surgical abnormalities such as malrotation, volvulus, omphalocele, gastroschisis, Hirschsprung's disease

E) Metabolic/endocrine disorders

- Fluid and electrolyte imbalance/balance
- Hypocalcemia
- Hypoglycemia
- Hypo/hyponatremia
- Hyperkalemia
- Hyperglycemia
- Metabolic acidosis
- Metabolic bone disease of prematurity
- Other (e.g., congenital hyperthyroidism, congenital adrenal hypoplasia)
- Hyperbilirubinemia

F) Renal physiology/salt and water metabolism

- Renal functions in the fetus and neonate
- Water and electrolyte metabolism during development
- Water and electrolyte metabolism in the neonate
- Renal diseases in the fetus and neonate
- Dialysis, hemofiltration, and other adjunctive renal treatments

G) Hematologic

- Anemia
- Hemolytic anemia
- Anemia of prematurity
- Anemia in general

- Twin-to-twin transfusion and/or fetomaternal hemorrhage
- Thrombocytopenia
- Neutropenia
- Disseminated Intravascular Coagulation
- Oncology: tumors in newborn

H) Neurologic/sensory

- Hypoxic ischemic encephalopathy
- Intraventricular hemorrhage
- Periventricular leukomalacia
- Neural tube defects
- Hydrocephalus
- Neonatal seizures
- Neonatal narcotic withdrawal
- Retinopathy of prematurity
- Hearing deficit
- Subarachnoid hemorrhage
- Other, e.g. encephalocele, myelomeningocele
- Neurologic examination: physical examination, neurodiagnostic tests
- Brain vascular abnormalities
- Cranial and neurologic trauma
- Neuromuscular disorders
- Neurocutaneous disorders

I) Infectious diseases

- Infections of organ systems
- Etiologic agents
- Treatment of specific infections
- Prevention of infections
- Infection control in the Neonatal Intensive Care Unit
- Congenital viral infections
- Hepatitis
- Bacterial and fungal sepsis
- Bacterial meningitis
- Pyelonephritis

J) Bilirubin

- Biochemistry and metabolism
- Bilirubin toxicity
- Measurement
- Physiologic jaundice
- Breastfeeding and jaundice
- Pathologic hyperbilirubinemia and physiologic or breastfeeding

K) Immunology

- Developmental biology of the immune system
- Specific components of the immune system
- Abnormal function of the immune system
- Immunization

L) Miscellaneous

- Hydrops fetalis of: immune and non-immune origins

PRACTICE-BASED LEARNING AND IMPROVEMENT:

Fellows are expected to identify deficiencies in patient care practices, and to appraise and assimilate scientific evidence to improve patient management. The fellows must, at the level of a subspecialist:

- Respond to feedback; demonstrate a willingness to learn from errors.
- Provide constructive feedback to learners.
- Become an active educator of patients, families, students, and other health professionals.
- Become proficient at administrative responsibilities by organizing his/her own conference series, journal clubs, lectures, call schedule, and participating in hospital committees.
- Demonstrate knowledge of investigation and evaluation of best practices in the NICU.
- Utilize resources such as web-based information, published peer-reviewed journal articles, and textbooks to improve patient care practices.
- Consistently utilize evidence-based medicine versus anecdotal therapy.
- Invariably recognize and initiate alternative care plans when appropriate.
- Respond and adapt to systems and individual errors.
- Respond to criticism and advice when warranted.
- Acquire the skills needed to identify areas of deficiency and analyze and improve the quality of neonatal intensive care practices.
- Participate in and become aware of the newest studies in neonatal intensive care targeted to improve outcome.

1st YEAR

The first year fellow in neonatal-perinatal medicine is expected to identify deficiencies in patient-care practices and to appraise and assimilate scientific evidence to improve patient management as outlined below above the direct supervision of the attending in neonatal-perinatal medicine.

2nd YEAR

The second year fellow in neonatal-perinatal medicine is expected to identify deficiencies in patient-care practices and to appraise and assimilate scientific evidence to improve patient management as outlined above with minimal supervision from the attending in neonatal-perinatal medicine.

3rd YEAR

The third year fellow in neonatal-perinatal medicine is expected to identify deficiencies in patient-care practices and to appraise and assimilate scientific evidence to improve patient management as outlined above independently and to be able to teach these principles to other personnel with minimal supervision from the attending in neonatal-perinatal medicine.

PROFESSIONALISM:

Fellows shall demonstrate a commitment to carry out professional responsibilities, adhere to ethical principles, and be sensitive to diversity. Fellows will have a responsible attitude toward their patients, their profession, society and themselves. The fellows must, at the level of a subspecialist:

- Demonstrate caring and respectful behaviors when interacting with patients, families, staff, and colleagues.
- Maintain patient/family confidentiality.
- Follow hospital procedures for reporting errors.
- Be punctual, reliable, and accountable for actions and responsibilities.
- Acquire and apply knowledge of basic principles of bioethics in clinical management of neonates in the NICU.
- Place interests of patients and families ahead of self-interest.
- Form therapeutic and ethically sound relationships with patients and families.
- Demonstrate awareness of and sensitivity to differences in culture, religion, age, gender, disability, and sexual preference, and their relevance to clinical care of neonates in the NICU.
- Learn to become a team leader to manage a multidisciplinary NICU.
- Learn to coordinate all interdisciplinary subspecialties in the NICU.
- Understand the areas of expertise of the various interdisciplinary team members in the NICU and maximize the expertise of each team member.
- Develop the expertise to delegate appropriate medical management to residents, medical students, nurse practitioners, nursing staff, respiratory therapists, etc.
- Develop administrative and leadership skills that will enable the trainee to become a leader in academic neonatology.

1st YEAR

The first year fellow in neonatal-perinatal medicine is expected to demonstrate a commitment to carryout professional responsibilities, adhere to ethical principles, and be sensitive to diversity as outlined below under the supervision of an attending in neonatal-perinatal medicine.

2nd YEAR

The second year fellow in neonatal-perinatal medicine is expected to demonstrate a commitment to carryout professional responsibilities, adhere to ethical principles, and be sensitive to diversity as outlined above with minimal supervision from the attending in neonatal-perinatal medicine.

3rd YEAR

The third year fellow in neonatal-perinatal medicine is expected to demonstrate a commitment to carryout professional responsibilities, adhere to ethical principles, and be sensitive to diversity as outlined above independently and to be able to teach these principles to other personnel.

SYSTEMS-BASED PRACTICE:

Fellows are expected to show proficiency in using contexts and systems, in which health care is provided, and apply this knowledge to improve and optimize care. The fellows must, *at the level of a subspecialist:*

- Develop the ability to simultaneously manage a large number of neonates requiring intensive care

and coordinate patient related services including nursing staff, laboratory, diagnostic radiology, respiratory therapy, neonatal nutrition, occupational therapy, social services, discharge planning, consultative services, and billing related services to ultimately benefit the patients and families in the NICU.

- Advocate for neonates and help parents and families as they navigate system complexities
- Invariably demonstrate knowledge of billing and coding in the NICU, and invariably demonstrate competence in the documentation to support such billing and coding
- Coordinate with all pediatric subspecialty consultants to ensure that appropriate questions are being asked and ensure that there is effective flow of communications amongst specialists, parents, and the health care team.
- Develop knowledge of the cost of care of high-risk neonates, available funding mechanisms for needy families, and understand the role of the neonatologist in limiting the cost of care.
- Follow hospital procedures for preventing and reporting errors/adverse events.
- Develop knowledge of community health resources.
- Understand the role of private pediatricians in the long-term management of infants after discharge from the NICU.
- Coordinate with discharge planning, Neonatal Follow-up Clinic, Early Intervention, occupational therapy, and insurance agencies to ensure that appropriate questions are being asked, and to ensure that there is effective flow of communication
- Acquire knowledge and skills of discharge planning and care of high-risk neonates after discharge including the following:
 - A) Common care issues following neonatal intensive care.
 - B) The role of primary physicians.
 - C) Resources available and programs for follow-up care.
 - D) To participate in neonatal follow up and become aware of its role in the community.
- Acquire the knowledge for administration of a large NICU including the following:
 - A) Multi-disciplinary approach to neonatal intensive care.
 - B) Quality assurance programs.
 - C) Principles of risk management.
 - D) Cooperation/collaboration with other physicians and services.
 - E) Discharge planning and coordination.
- Develop the expertise in documentation of neonatal clinical course
 - A) Appropriate medical record documentation.
 - B) Appropriate documentation for consults, diagnostic imaging, and clinical charts.

1st YEAR

The first year fellow in neonatal-perinatal medicine is expected to show proficiency in using context and systems in which health care is provided and apply this knowledge to improve and optimize care as outlined above under the supervision of the attending in neonatal-perinatal medicine.

2nd YEAR

The second year fellow in neonatal-perinatal medicine is expected to show proficiency in using context and systems in which health care is provided and apply this knowledge to improve and optimize care as outlined above with minimal supervision from the attending in neonatal-perinatal medicine.

3rd YEAR

The third year fellow in neonatal-perinatal medicine is expected to show proficiency in using context and systems in which health care is provided and apply this knowledge to improve and optimize care as outlined above independently and to be able to teach these principles to other personnel.