I. General Overview:
   a. The Neonatal-Perinatal Medicine (NPM) fellowship program, accredited by the Review Committee for Pediatrics is sponsored by the Section of Neonatology of the Brody School of Medicine in the Department of Pediatrics.
   b. Clinical activities for fellows are jointly sponsored at two institutions:
      i. Pitt County Memorial Hospital (PCMH). Clinical sites include the Neonatal Intensive Care Unit (NICU), the Convalescent Nursery (CN), the Newborn Nursery (NBN), Labor and Delivery (L&D), and the NICU follow-up clinic. Each year, nearly 4000 women deliver at PCMH and > 75% are considered at increased risk for adverse perinatal outcome. In addition, PCMH serves as the regional perinatal center for the 29 counties of eastern Carolina, which encompasses approximately 20,000 deliveries yearly. The NICU at PCMH admits more than 1000 infants yearly, 90% of whom are inborn.
      ii. The Brody School of Medicine. Clinical sites include the High Risk Antenatal Clinic, and various outpatient clinics (e.g., Cardiology, Genetics, Infectious Diseases, etc.).
      iii. The two clinical institutions are contiguous and connected by an enclosed hallway.
   c. All clinical sites include resident staff and medical students who receive experience in neonatology in the form of critical care clerkships, electives and sub internships.
   d. The Section of Neonatology is actively involved in a variety of collaborative research projects, and our research staff include a full-time clinical research nurse and clerical support.
   e. Current faculty in the Section of Neonatology include:
      i. James Cummings, MD, Professor, Program Director
      ii. Stephen Engelke, MD, Professor
      iii. William Meetze, MD, Associate Professor
      iv. Sharon Buckwald, MD, Clinical Professor
      v. Scott MacGilvray, MD, Clinical Associate Professor
      vi. Raghu Turebylu, MD, Clinical Assistant Professor
      vii. Martha Naylor, MD, Clinical Assistant Professor
      viii. Laura Raynor, MD, Clinical Assistant Professor
   f. The fellowship educational program includes an even balance of clinical and non-clinical academic experiences, and is generally completed during a 36-month period, that is divided into 42 blocks of 3 or 4 weeks each.
II. Curriculum

a. The NPM fellowship program consists of the following components as outlined by the Program Requirements for Education developed by the American Board of Pediatrics (ABP) and Accreditation Council for Graduate Medical Education (ACGME) Resident Review Committee (RRC) for Neonatal-Perinatal Medicine. Fellows are assigned to these components in an educationally appropriate sequence over 36 months of training. The first year consists of predominately clinical activities and the second two years are primarily for scholarly activity.

b. The Clinical Curriculum is based on providing PGY-4 fellows (1st year) with a high degree of direct patient contact and responsibility in the NICU, and graduated supervised responsibility for 2nd and 3rd year fellows. All fellows in addition have gradual and increasing supervisory responsibilities for PGY-1/2/3 residents and medical students. The fellowship requires 15-16 months of clinical rotations, and fellows will spend five or six months of the first year rotating in the NICU as a clinical fellow. The clinical fellow functions as a junior staff person in the supervision of residents and medical students in the hour-to-hour care of critically ill newborn infants. In addition, fellows generally have four or five months of clinical experience during the second and third years. During the first year, fellows are supervised directly by faculty. During the second year of clinical service, fellows take on increasing responsibilities for patient care with less direct supervision. During the third year of clinical service, the fellow is expected to function fully as an attending Neonatologist. Formal training in the Neonatal Resuscitation Program (NRP) is provided, with the expectation that all fellows become certified NRP instructors. Participation in the NICU Follow-up Clinic is required during all three years of the fellowship. Administrative education is also part of this curriculum including experience in clinical and conference scheduling and the administrative working of the clinical NICU.

c. The Scholarly Curriculum: The remainder of the Neonatal-Perinatal Medicine Fellowship consists of 17-18 months of scholarly activity. As per the ABP, “all fellows will be expected to engage in projects in which they develop hypotheses or in projects of substantive scholarly exploration and analysis that require critical thinking. Areas in which scholarly activity may be pursued include, but are not limited to: basic, clinical or translational biomedicine; health services; quality improvement; bioethics; education; and public policy.” Traditional clinical or basic research or other scholarly activities, within neonatology, Perinatology and other University departments are facilitated by mentors in the ECU faculty. Neonatologists and subspecialists in other pediatric divisions supervise these studies and are instrumental in developing individual projects with appropriate specific curriculum (e.g., laboratory meetings, journal clubs, and coursework). The Division has been involved in many collaborative research projects over the past 10 years, but each fellow is encouraged to develop their own academic/research endeavors with the guidance of a Scholarship Oversight Committee that meets regularly with the fellow, and with increasing frequency during the fellowship. Fellows also have the opportunity to participate in graduate-level coursework offered by East Carolina University to obtain a Masters of Public Health.
d. Formal educational experiences include a variety of conferences, some conducted by the fellow (monthly Journal Club, Morbidity & Mortality Review, and Neonatal Physiology Lectures), some conducted by the faculty (monthly Fetal Case presentations, Perinatology conference, and NPM Board preparation), and some conducted together (e.g., daily Clinical Conferences). In addition, there is a formal faculty development workshop series that all fellows are enrolled in throughout their 36-month education; these include comprehensive workshops in several areas, including Teaching, Research, Professionalism, and Ethics. All fellows are enrolled for two semesters of Biostatistics, and one semester each of Epidemiology and Manuscript Preparation at the University, at no cost to them. There are also numerous faculty development workshops offered to fellows and junior faculty throughout the year, covering a wide range of topics including: literature searching, grant writing, manuscript preparation, bedside teaching, budgeting, contract negotiation, and stress management.
III. Competency-Based Goals and Objectives:

a. Patient Care

i. General Goals - develop expertise required to:

1. Gather essential and accurate information about patients.
2. Make informed decisions about diagnostic and therapeutic interventions based on patient information and preferences, up-to-date scientific evidence, and clinical judgment.
3. Develop and carry out patient management.
4. Counsel and educate patients and their families.
5. Use information technology to support patient care decisions and patient education.
6. Perform competently all medical and invasive procedures considered essential for the area of practice.
7. Provide health care services aimed at preventing health problems or maintaining health.
8. Communicate effectively and demonstrate caring and respectful behaviors when interacting with patients and their families.
9. Work with health care professionals, including those from other disciplines, to provide patient-focused care.

ii. Goals specific to the field of neonatal-perinatal medicine – develop expertise and experience in the:

1. Immediate management, resuscitation, and stabilization of the newborn.
2. Transport of a critically ill neonate.
3. Diagnosis and assessment, care and treatment of a variety of neonatal illnesses, including chronic illnesses, congenital heart disease, and other cardiovascular diseases.
4. Pre-operative and post-operative care and treatment of neonates requiring surgery.
5. Performance of neonatal procedures including endotracheal intubation, thoracentesis, paracentesis, umbilical venous and arterial catheterization, percutaneous central vein catheterization, percutaneous arterial line catheterization, and exchange transfusion.
6. Monitoring a high-risk labor, including understanding fetal biophysical assessments and heart rate monitoring.
7. Care of the well newborn, including breast-feeding and family counseling.
8. Safe and effective application of mechanical ventilation, high frequency ventilation, and inhaled nitric oxide.
9. Discharge planning and routine pediatric care in high-risk neonates including specific preventive (e.g., influenza and respiratory syncytial virus [RSV] prophylaxis) and diagnostic procedures (e.g., screening for retinopathy of prematurity) pertinent to those infants.
10. Longitudinal follow up of infants at risk for developmental abnormalities.
11. Counseling of women in labor concerning decision making for themselves and their fetus.
12. Counseling families in the care of the well newborn, including breastfeeding.
13. Use of the internet database (i.e. Ovid, Medline) to access information needed for patient care and family education.

iii. Educational Year Specific Objectives

1. Year One (PGY-4). With full supervision, the fellow will:
   a. Treat most common diseases (RDS, shock, meconium aspiration syndrome, PPHN, TTN, sepsis, TORCH, hyperbilirubinemia, NEC, feeding intolerance, congenital heart disease, congenital malformation[s] or syndrome), using a comprehensive and multidisciplinary approach.
   b. Provide CPR to a neonate in the delivery room and in the NICU, and assess perinatal information including fetal monitoring.
   c. Correctly place, localize, and adequately reposition if necessary, endotracheal tube, peripheral and percutaneous central catheter, umbilical arterial and venous lines.
   d. Select and adjust ventilatory management, including oxygen, CPAP, conventional ventilator, high-frequency ventilator, nitric oxide.
   e. Transport an intubated infant to and from another hospital or to and from the operating room, and appropriately stabilize the infant before and after the transport.
   f. Evaluate neurodevelopmental stage and problems in a NICU graduate.
   g. Assess, prevent and manage pain in the critically ill neonate or young infant.
   h. Counsel women and families prenatally, in the delivery room and after birth.
   i. Plan discharge using age-specific preventive diagnostic (screening for ROP and hearing loss) and therapeutic procedures (vaccinations, RSV prophylaxis).
   j. Determine need for consultation services and ask for attending supervision when needed.
   k. Use internet databases (i.e., Ovid, Medline) to access information needed for patient care and family education.

2. Year Two (PGY-5). With intermittent supervision, and demonstrating increased proficiency, the fellow will:
   a. Treat most common diseases (RDS, shock, meconium aspiration syndrome, PPHN, TTN, sepsis, TORCH, hyperbilirubinemia, NEC, feeding intolerance, congenital heart disease, congenital malformation[s] or syndrome), using a comprehensive and multidisciplinary approach.
   b. Treat surgical emergencies, assume postoperative care.
c. Provide CPR to a neonate in the delivery room and in the NICU, and assess perinatal information including fetal monitoring.

d. Correctly place, localize, and adequately reposition if necessary, endotracheal tube, peripheral and percutaneous central catheter, umbilical arterial and venous lines.

e. Select and adjust ventilatory management, including oxygen, CPAP, conventional ventilator, high-frequency ventilator, nitric oxide.

f. Transport an intubated infant to and from another hospital or to and from the operating room, and appropriately stabilize the infant before and after the transport.

g. Provide consultative care to neonates as needed in the well baby nursery.

h. Follow serial neurodevelopmental exams and adequately address problems in a NICU graduate.

i. Develop expertise in (perform at least once/year during fellowship): chest tube placement, thoracentesis.

j. Provide counseling about care of well neonate, including breastfeeding.

3. Year Three (PGY-6). Independently and demonstrating competency by faculty evaluation, the fellow will:

   a. Treat most common diseases of newborn infants.

   b. Organize and direct rounds and patient care in the NICU.

   c. Prepare, handle and supervise discharge planning.

   d. Interpret need for home apnea monitoring.

   e. Meet with families to discuss routine care, complex care, and withdrawal of support.

b. Medical Knowledge

   i. General Goals - develop expertise required to:

      1. Demonstrate an investigatory and analytic thinking approach to clinical situations.

      2. Know and apply the basic and clinically supportive sciences which are appropriate to the discipline.

   ii. Goals specific to the field of neonatal-perinatal medicine – develop expertise and understanding in the:

      1. Physiology of the normal neonate and the pathophysiology of the sick newborn infant.

      2. Fetal developmental anatomic, genetic, hematologic, and metabolic abnormalities.

      3. Basic aspects of molecular biology and genetics.

      4. Prevalence, incidence and prognosis of various perinatal and neonatal disorders.

   iii. Educational Year Specific Objectives

      1. Year One (PGY-4)
a. Pass neonatal resuscitation program (NRP) course.
b. Understand the physiology of lung disease, neonatal transition, feeding, age-specific developmental stages.
c. Understand the use of a cardiac monitor, adjustment of FIO2, ventilator including HFO/ HFJV, NO.
d. Understand use and adjustment of most current medications.
e. Understand basic aspects of molecular biology and genetics and ethics.

2. Year Two (PGY-5)
a. Understand the physiology of the normal neonate and the pathophysiology, incidence and prognosis of many perinatal and neonatal disorders.
b. Understand fetal developmental anatomic, genetic, hematologic, and metabolic abnormalities.
c. Become a certified NRP instructor.

3. Year Three (PGY-6)
a. Understand the pathophysiology, prevalence, treatment and prognosis of most perinatal and neonatal disorders.

c. Practice-Based Learning and Improvement
i. General Goals - develop expertise required to:
   1. Analyze practice experience and perform practice-based improvement activities using a systematic methodology.
   2. Locate, appraise, and assimilate evidence from scientific studies related to their own patients’ health problems.
   3. Obtain and use information about our own population of patients and the larger population from which our patients are drawn.
   4. Apply knowledge of study designs and statistical methods to the appraisal of clinical studies and other information on diagnostic and therapeutic effectiveness.
   5. Use information technology to manage information, access on-line medical information, and support their own education.
   6. Facilitate the learning of students and other health care professionals.

ii. Goals specific to the field of neonatal-perinatal medicine – develop expertise and understanding in the:
   1. Develop experience in practice-based improvement in delivery room, NICU and well baby care.
   2. Develop an understanding of the methods and principles of evidence-based medicine, including the Neonatal Cochrane Database.
   3. Develop expertise in entry and retrieval of clinical data in the computer database and Vermont oxford network database.
   4. Develop expertise in assessing the literature, by analyzing hypotheses, methods including study designs and statistical analyses, results and conclusions.
   5. Develop expertise in computer use, including literature searches, use of neonatal internet sites, word processing, and experience in using
spreadsheets, computerized presentations, graphics and statistical software.

6. Develop the ability to teach students, residents and other professionals at the bedside, in the classroom and at local/regional/national meetings, including computerized preparation of slides.

7. Develop expertise in teaching the pediatric residents the role of primary care providers in neonatal care and the specific needs of high-risk infants including preterm infants and those with chronic diseases or disorders after discharge from the NICU.

iii. Educational Year Specific Objectives

1. Year One (PGY-4)
   a. Get exposure to and participate in practice-based improvement in delivery room, NICU and well baby care.
   b. Understand the methods and principles of evidence-based medicine, including the Neonatal Cochrane database.
   c. Enter NICU data in the Vermont Oxford and computer data base and compare these data with those of other nationally recognized Networks.
   d. Critically appraise the literature, by analyzing rationale, hypothesis, methods (patient selection, study design and statistical analysis), results, discussion and abstract.
   e. Use literature search, neonatal internet sites, word processing.
   f. Give bedside teaching to medical students, residents and other professionals: resuscitation, intubation, ventilator and fluid therapy initiation and management.
   g. Present comprehensive discussion of case reports, journal club, and one state of the art lecture.
   h. Initiate teaching portfolio and update curriculum vitae.

2. Year Two (PGY-5)
   a. Prepare and present at least two (2) state-of-the-art lectures with slides.
   b. Develop experience in using spreadsheets, graphics, statistical software.
   c. Develop experience in oral presentations.
   d. Teach neonatal resuscitation course.
   e. Continue to add to CV and teaching portfolio.

3. Year Three (PGY-6)
   a. Develop at least four (4) lectures with slides.
   b. Teach housestaff the role of primary care providers in neonatal care and the specific needs of high-risk infants including preterm infants and those with chronic diseases or disorders after discharge from the NICU.
   c. Attend and present at regional and national conferences.
   d. Complete teaching portfolio and CV

   d. Interpersonal & Communication Skills
      i. General Goals - develop expertise required to:
1. Create and sustain a therapeutic and ethically sound relationship with patients.
2. Use effective listening skills and elicit and provide information using effective nonverbal, explanatory, questioning, and writing skills.
3. Work effectively with others as a member or leader of a health care team or other professional group.

ii. Goals specific to the field of neonatal-perinatal medicine:
1. Develop the ability to interact with nursing, respiratory therapy, social work and other professionals who care for neonates and assist in the formulation of policies of these disciplines concerning neonates.
2. Develop expertise in communicating with the primary care provider and with other members of the team before and after discharge of NICU graduates and of well newborn infants.

iii. Educational Year Specific Objectives
1. Year One (PGY-4)
   a. Interact with nursing, respiratory therapy, social work and other professionals who care for neonates, as well as with parents.
   b. Communicate with the primary care provider and with other members of the team before and after discharge of NICU graduates and of well newborn infants.
   c. Conduct work rounds in the NICU with supervision.
   d. Prepare effective talks and slides including PowerPoint presentations.
   e. Interact effectively with house officers at shift change and resident report rounds.
   f. Work effectively in the Follow-up program with supervision.
2. Year Two (PGY-5)
   a. Conduct work rounds in NICU with intermittent supervision.
   b. Generate PowerPoint presentations and oral presentations independently.
   c. Supervise and interact effectively at morning rounds with supervision.
   d. Work effectively in the Follow-up program with intermittent supervision.
3. Year Three (PGY-6)
   a. Independently conduct rounds in NICU, relying on back-up faculty appropriately.
   b. Assist in the formulation of policies concerning neonates and neonatal intensive care.
   c. Function effectively and independently in the Follow-up program with minimal supervision.
   d. Give Attending round lectures in the NICU
   e. Teach house officers and junior fellows how to prepare computer-assisted (e.g. Power Point) presentations.
f. Supervise and interact effectively at resident sign out with minimal supervision.

e. **Professionalism**

   i. **General Goals – develop expertise required to:**

   1. Demonstrate respect, compassion, and integrity; a responsiveness to the needs of patients and society that supercedes self-interest; accountability to patients, society, and the profession; and a commitment to excellence and on-going professional development.

   2. Demonstrate a commitment to ethical principles pertaining to provision or withholding of clinical care, confidentiality of patient information, informed consent, and business practices.

   3. Demonstrate sensitivity and responsiveness to patients’ culture, age, gender, and disabilities.

   ii. **Goals specific to the field of neonatal-perinatal medicine:**

   1. Develop expertise and experience in counseling families concerning their ill neonate, including death, dying and the grieving process, taking in consideration specific characteristics of the family.

   2. Develop an understanding of the ethical and legal issues involved in the care of critically ill and abnormal infants and their families.

   3. Develop expertise and experience in counseling families concerning fetal abnormalities, including an understanding of the legal and ethical implications and intra-uterine therapy and prognosis.

   iii. **Educational Year Specific Objectives**

   1. **Year One (PGY-4)**

   a. Participate in counseling families concerning their ill neonate, including death, dying and the grieving process, taking in consideration specific characteristics of the family.

   b. Know ethical and legal issues involved in the care of critically ill and abnormal infants and their families.

   c. Participate in counseling families concerning fetal abnormalities, including an understanding of the legal and ethical implications and intra-uterine therapy and prognosis.

   d. Attend the school of medicine workshops in professionalism.

   2. **Year Two (PGY-5)**

   a. Same, with intermittent but guided supervision.

   b. Same, with intermittent but guided supervision.

   c. Same, with intermittent but guided supervision.

   3. **Year Three (PGY-6)**

   a. Same, with minimal but guided supervision.

   b. Same, with intermittent but guided supervision.

   c. Same, with intermittent but guided supervision.

   d. Attend at least one hospital bioethics committee deliberation.
f. Systems-Based Practice
   i. General Goals – develop the expertise required to:
      1. Understand how patient care and other professional practices affect other health care professionals, the health care organization, and the larger society, and how these elements of the system affect his/her own practice.
      2. Know how types of medical practice and delivery systems differ from one another, including methods of controlling health care costs and allocating resources.
      3. Practice cost-effective health care and resource allocation that does not compromise quality of care.
      4. Advocate for quality patient care and assist patients in dealing with system complexities.
      5. Know how to partner with health care managers and health care providers to assess, coordinate, and improve health care and know how these activities can affect system performance.

   ii. Goals specific to the field of neonatal-perinatal medicine:
      1. Develop the expertise and ability to administrate a newborn service and an NICU, including understanding data collection, infection control, policy development and hospital administration.
      2. Develop expertise in organization of perinatal care in the context of managed care and cost effectiveness.
      3. Develop expertise in deciding the appropriate time for discharge from the hospital and deciding appropriate referral.
      4. Develop expertise in preparing the family for discharge planning including need for hearing screening, vaccinations, eye exams and followup appointments and in obtaining and organizing home care delivery as needed.

   iii. Educational Year Specific Objectives
      1. Year One (PGY-4)
         a. Participate in perinatal care in the context of managed care and cost effectiveness.
         b. Participate in deciding appropriate time for discharge from the hospital and deciding appropriate referral.
         c. Participate in preparing the family for discharge planning and in obtaining and organizing home care delivery as needed.
         d. Regular attendance and participation at monthly multidisciplinary Morbidity & Mortality conferences.
      2. Year Two (PGY-5)
         a. Ibid, but with only intermittent supervision.
         b. Ibid, but with only intermittent supervision.
         c. Ibid, but with only intermittent supervision.
         d. Ibid.
      3. Year Three (PGY-6)
         a. Ibid, with minimal but guided supervision.
b. Ibid, with minimal but guided supervision.
c. Ibid, with minimal but guided supervision.
d. Ibid.
e. As a junior attending, administer a newborn service, including understanding data collection, infection control, policy development and hospital administration.

IV. Goals of the Research Program
a. General Goals
i. Develop expertise in scientific inquiry and research design.
ii. Develop expertise in biostatistics and data.
iii. Develop an understanding of research ethics, including respect for animal welfare and an understanding of the role of Institutional Review Boards for Human Subjects.
iv. Develop, design and submit a research project to the Institutional Review Board (IRB) for Human Subjects.
v. Analyze the data from the research project and prepare a manuscript for publication.
vi. Develop expertise in presenting data as abstract, poster, poster symposium, and oral presentation at various stages of the research.
vii. Develop an understanding of the process of grant application.

b. Educational Year Specific Objectives
i. Year One (PGY-4)
   1. Complete, at minimum, the full protocol of a research project (background, hypothesis, methods, references).
   2. Present that protocol to a divisional meeting.
   3. Attend the school of medicine workshops in research and study design, and ethics.
   4. Attend university courses in biostatistics, epidemiology, and manuscript preparation.
   5. Learn how to prepare a poster, poster symposium and oral presentation.
   6. Understand research ethics, including respect for animal welfare and role of Institutional Review Boards for Human Subjects.
   7. Understand the process of grant application, mentoring and academic career progression.

ii. Year Two (PGY-5)
   1. Submit an application to the IRB/Animal Care Facility (as appropriate) if not done yet.
   2. Present to the division research in progress.
   3. Present research to Graduate Medical Education Research Day (at least once during the fellowship).
   4. Submit research (i) to a professional society as an abstract and/or (ii) to a journal as manuscript and/or (iii) at least a written comprehensive report (background, hypothesis, methods, results, discussion, conclusion, references).
iii. Year Three (PGY-6)
   1. Present research progress to the division.
   2. Present research to at a regional meeting (at least once during the fellowship).
   3. Submit research (i) to a professional society as an abstract and/or (ii) to a journal as manuscript and/or (iii) at least a written comprehensive report (background, hypothesis, methods, results, discussion, conclusion, references).
   4. Finalize initial research for journal submission for publication.