The above chart shows the percentage distribution of questions on the Neonatal Nurse Practitioner exam across the major content categories covered on the examination. The major focus of the examination is on Embryology, Physiology, Pathophysiology and Systems Management. Less emphasis is on General Management, General Assessment and Pharmacology while the Professional Issues category has the lowest percentage of content covered on the exam.
EXAM OUTLINE

Areas of knowledge to be tested on the Neonatal Nurse Practitioner examination are listed in the following outline. This list is not intended as an all-inclusive review of the role and scope of knowledge of the neonatal nurse practitioner. It is provided only to help certification candidates evaluate their own nursing practice.

Percentages identified for the topic areas represent the number of test questions assigned to each content area. These areas do not necessarily reflect the content of future examinations.

11.00 General Assessment (15%)
   - Maternal History Affecting the Newborn
     - Antepartum
     - Intrapartum
     - Intrauterine Drug Exposure
   - Neonatal
     - Physical Examination & Gestational Age/Behavioral Assessment
     - Clinical Laboratory Tests
     - Diagnostic Procedures, Techniques and Equipment
   - Family Integration
     - Family Integration and Communication
     - Grieving Process
   - Discharge Preparation and Follow Up Care

12.00 General Management (19%)
   - Thermoregulation
   - Resuscitation and Stabilization
   - Growth and Nutrition
   - Fluids and Electrolytes

15.00 Pharmacology (9%)
   - Pharmacokinetics and Pharmacodynamics
   - Common Drug Therapies

13.00 Embryology, Physiology, Pathophysiology and Systems Management (54%)
   - Cardiac
   - Respiratory
   - Gastrointestinal
   - Renal/Genitourinary
   - Metabolic/Endocrine
   - Hematopoietic
   - Infectious Diseases
   - Musculoskeletal
   - Integumentary
   - Genetics
   - Neurological
   - Ears, Eyes, Nose & Mouth/Throat

14.00 Professional Issues (3%)
   - Including: Evidence Based Practice, Legal/Ethical Principles, Quality Improvement, Patient Safety
EXAMINATION CONTENT

ASSOCIATED COMPETENCIES

• Demonstrate the knowledge inherent in the role and scope of NNP practice
• Apply knowledge of basic sciences to the provision of neonatal health care
• Obtain and interpret a comprehensive perinatal history and a systematic assessment of all body systems
• Obtain clinical laboratory information and interpret the resultant data
• Institute diagnostic procedures and techniques and interpret the resultant data
• Apply critical thinking to diagnose reasoning and clinical decision make with the care giver and family
• Evaluate the benefits and risks of diagnostic and therapeutic intervention
• Use adult learning principles when teaching about the care, growth and development of the high-risk infant up to 2 years of age
• Formulate a diagnosis and a plan of care in collaboration with physicians, other health care professionals and family.
• Initiate appropriate therapeutic and educational interventions including consultations and referral
• Evaluate and document responses to interventions and modify the plan of care as indicated
• Maintain current knowledge regarding advances in neonatal health care
• Apply knowledge of basic research principles to practice
• Integrate legal and ethical principles into neonatal health care
GENERAL ASSESSMENT

I. Maternal History Affecting the Newborn

Antepartum
• Neonatal complications: maternal risk factors & complications
  - gestational hypertension
  - cardiac/pulmonary disease
  - diabetes
  - common infectious diseases
  - common hematologic diseases
  - placental insufficiency
  - substance abuse
  - medication effects
    common prescription or non-prescription drugs
• Fetal assessment
  - fetal fibronectin
  - nonstress test
  - biophysical profile
  - ultrasound/doppler flow
  - amniocentesis
  - antenatal screening/quad screen
• Fetal procedures

Intrapartum
• Fetal Heart Rate (FHR) Patterns
• Effects on the Fetus/Neonate
  - tocolysis/induction
  - analgesia
  - anesthesia
  - neuroprotective agents
• Intrapartum Complications
  - amniotic fluid volume
  - oligohydramnios
  - polyhydramnios
• Rupture of Membranes
  - premature
  - prolonged

II. Neonatal

Physical Examination & Gestational Age/Behavioral Assessment Identify Normal, Normal Variants and Abnormal Findings
• General appearance
• Head, eyes, nose, ears and mouth
• Neck and throat
• Chest
• Abdomen
• Spine/back
• Extremities
• Genitalia
• Musculoskeletal
• Skin
• Vital signs
• Gestational age assessment physical characteristics of
  - preterm
  - term
  - post-term
  - AGA
  - SGA
  - LGA
• Associated risks/Complications of variations in gestational age
• Abnormalities of intrauterine parameters
• Behavioral assessment
  - state
• Muscle movement/tone/reflexes
• Autonomic control/responses
• Neurosensory capabilities
• Neurological assessment

Intrauterine Drug Exposure
• Nicotine
• Alcohol
• Prescription/nonprescription
• Illicit Drug
Clinical Laboratory Tests
- Microbiological
- Biochemical
- Hematological
- Endocrine
- Immunologic
- Genetic

Diagnostic Studies, Techniques and Equipment

*Diagnostic studies*
- Ultrasound/Doppler
- CT scan
- MRI
- X-ray/fluoroscopy
- EKG
- EEG
- Echocardiogram
- Voiding Cystourethrogram

*Techniques & Equipment*
- Procedures
  - bag and mask ventilation and T-piece
  - LMA’s
  - endotracheal intubation
  - umbilical vessel and peripheral catheterization
  - chest tube insertion/removal
  - needle aspiration
  - spinal/lumbar tap
  - intraosseous access
  - intravenous line placement (central/peripheral)
  - blood sampling
  - circumcisions - complications/contraindications
- Equipment
  - cardiopulmonary monitors
  - oxygenation equipment/end tidal CO2 monitoring
  - invasive/non-invasive blood gas monitoring
  - indwelling catheters
  - incubators/radiant warmers
  - ventilators
  - phototherapy

III. Family Integration

*Communication*
- Family centered care
- Barriers to parent/infant interaction

*Grieving Process*
- Stages of grieving and common behaviors
- Factors influencing enhancement or impediment of grief process
- Palliative care/End of life
- Parental depression

IV. Discharge Planning and Follow Up

- Anticipatory guidance
- Follow up screening
- Hearing
- Vision - ROP
- Developmental
- Health risks
- Discharge preparation
- Follow-up care
STUDY GUIDE

GENERAL MANAGEMENT

I. Thermoregulation
- Mechanisms and management of heat transfer
  - evaporation
  - conduction
  - convection
  - radiation
- Rewarming techniques
- Mechanisms of heat production
- Temperature assessment
- Neutral thermal environment

II. Resuscitation and Stabilization
- Transition to extrauterine life
- Delivery room assessment
- Techniques of resuscitation
- Indications for interventions
- Cord blood gas interpretation
- Neonatal transport

III. Growth and Nutrition
- Physiology of Digestion and Absorption
- Nutritional Requirements
- Enteral Feeding
- Parenteral Nutrition
- Composition of Breast Milk/Formulas/Donor milk
- Dietary Supplementation

IV. Fluids and Electrolytes
- Common problems and conditions
- Fluid & Electrolyte requirements
- Insensible water loss/gain
- Central & peripheral infusion
- Acid base balance
- Fish oil emulsion (Omegaven) SMOF
PHARMACOLOGY

I. Pharmacokinetics & Pharmacodynamics
   • Pharmacokinetics
     - distribution
     - excretion
     - absorption
     - metabolism
     - withdrawal
   • Principles of administration
     - dosage/interval
     - route
     - tolerance/weaning

II. Common Drug Therapies
   • Analgesia/narcotics
   • Anticoagulants
   • Anticonvulsants
   • Antihypertensive drugs
   • Antimicrobials
     - biologics/immunities
     - vaccinations
   • Cardiovascular drugs
     - vasodilators/vasopressors
     - antidysrhythmia drugs
   • Diuretics
   • GI drugs
     - antacids
     - prokinetic
     - proton pump inhibitors
   • Inhalants
     - iNO
   • Neurologic agents
     - anesthetics agents
     - sedatives
     - hypnotics
   • Respiratory drugs
     - bronchodilators
     - respiratory stimulants
     - surfactant therapy
   • Steroids
   • Drugs and breastfeeding
     - Drug transfer
     - Drug safety
STUDY GUIDE

EMBRYOLOGY, PHYSIOLOGY, PATHOPHYSIOLOGY & SYSTEMS MANAGEMENT

I. Cardiac
- Congenital Cardiac Defects
  - cyanotic
    - Ebstein’s Anomaly
    - Tetralogy of Fallot
    - truncus arteriosus
    - transposition of great vessels
    - total anomalous pulmonary venous return
    - tricuspid atresia
  - acyanotic
    - ventricular septal defect
    - coarctation of aorta (interrupted arch)
    - atrial septal defect septal defect
    - hypoplastic left heart syndrome
    - endocardial cushion defect (AV canal)
    - aortic stenosis
- Patent ductus arteriosus
- Congestive heart failure
- Hypertension/Hypotension
- Shock
- Dysrhythmias
- PGE’s

II. Respiratory
- Respiratory distress syndrome
- Transient tachypnea
- Pneumothorax and air leaks/chylothorax
- Congenital pulmonary airway malformation (CPAM)
- Cystic pulmonary
- Apnea of prematurity
- Meconium aspiration
- Diaphragmatic eventrations
- Persistent pulmonary hypertension
- Pneumonia
- Pulmonary hemorrhage
- Pulmonary hypoplasia
- Diaphragmatic hernia
- Chronic lung disease
- Laryngeal, tracheomalacia/stenosis
- Respiratory support
  - principles and methods of oxygen
  - administration/ventilation
  - risk factors affecting oxygenation/ventilation
  - oxyhemoglobin dissociation curve
  - high frequency ventilation (HFV)
  - extracorporeal membrane oxygenation (ECMO)
  - nitric oxide
  - neurally adjusted ventilatory assist (NAVA)
  - nasal intermittent positive pressure ventilation (NIPPV)
  - noninvasive ventilation (NIV)

III. Gastrointestinal
- Development of the GI tract
- Digestive and absorptive disorders
  - diarrhea/short gut
- Disorders of suck/swallow/motility
  - GERD
  - cleft lip palate
  - Duodenal atresia
  - tracheoesophageal fistula
  - esophageal atresia
  - small left colon syndrome
  - Hirschsprung disease
  - volvulus
  - imperforate anus
  - pyloric stenosis
- Malabsorption/maldigestion
- Diarrhea/short gut
- Anomalies/obstruction of upper and lower GI tract
  - small left colon syndrome
  - Hirschsprung’s disease
- Abdominal wall defects
  - gastroschisis
  - omphalocele
- Obstructions
- Perforations
- Meconium ileus
- Tracheoesophageal fistula
- Necrotizing enterocolitis
- Inguinal hernia
IV. Renal/Genitourinary
• Renal vein/artery thrombosis
• Acute renal failure/insufficiency
• Polycystic/multicystic dysplastic kidneys
• Urinary outflow tract obstruction
• Testicular torsion
• Exstrophy of the bladder
• Hypospadias/epispadias
• Hydronephrosis grading system/hydroureter

V. Endocrine/Metabolic
• Adrenal disorders
• Ambiguous genitalia
• Calcium disorders
• Glucose disorders
• Magnesium disorders
• Phosphorus disorders
• Pituitary disorders
• Thyroid disorders
• Infants of diabetic mothers
• Osteopenia of prematurity

VI. Hematopoietic
• Hematological disorders
  - anemia
  - polycythemia
  - platelet disorders
  - coagulopathies
    - vitamin K deficiency
    - disseminated intravascular coagulation
  - factor deficiencies
  - neutropenia/neutrophilia
  - Rh disease and ABO incompatibility
• Blood component therapy
• Jaundice and liver disease
• Hyperbilirubinemia (direct and indirect)
  - Breastmilk jaundice
• Kernicterus
• Phototherapy
• Exchange transfusion
• Biliary atresia

VII. Infectious Diseases
• Normal immunologic function
• Common neonatal infections
  - group B streptococcal
  - e-coli
  - staphylococcal
  - klebsiella
  - enterococcus
  - candidiasis
  - pseudomonas
  - enterovirus
  - respiratory syncytial virus (RSV)
  - CMV
  - hepatitis B
  - toxoplasmosis
  - herpes
  - HIV/AIDS
  - chlamydia
  - gonorrhea
  - syphilis
  - varicella
• Neonatal sepsis
• SIRS
• Meningitis
• Septic shock
• Infection control and universal precautions
• MRSA/VRSE
• Osteomyelitis

VIII. Musculoskeletal
• Abnormalities of the skeleton
  - metatarsus adductus
  - achondroplasia
• Clubfoot
• Developmental dysplasia of the hip
• Spinal abnormalities
• Musculoskeletal birth injuries
  - fractures
  - nerve damage
  - torticollis
• Aperts, crouzon, etc.
IX. Integumentary
- General skin development and care
- Disorders
  - ecchymosis
  - epidermolysis bullosa
  - hemangiomas
  - ichthyosis
  - subcutaneous fat necrosis
- Milia/miliara
- Hyperpigmented macule
- Erythema toxicum
- Neonatal pustular melanosis
- Auricular tags
- Petechiae
- Port wine stain
- Hyper/hypopigmentation

X. Genetics
- Genetic processes
  - multifactorial inheritance
  - nondisjunction
  - translocation
  - deletion/duplication
  - sex linked inheritance
- Inborn errors of metabolism
- Hyperammonemia
- Newborn Screening
  - galactosemia
  - cystic fibrosis
- Chromosomal abnormalities/syndromes
  - Trisomy 21
  - Trisomy 13
  - Trisomy 18
  - Turner syndrome
  - Beckwith-Wiedemann syndrome
  - DiGeorge syndrome
- Osteogenesis imperfecta
- Potter sequence
- VATER/VACTERL
- CHARGE

XI. Neurological
- Perinatal – depression/asphyxia
- Hypoxic ischemic encephalopathy
  - therapeutic hypothermia
- Cranial hemorrhages
- Hydrocephalus
- Neural tube defects
- Seizures
- Jitteriness
- Periventricular leukomalacia
- Auto regulation
- Cerebral palsy
- aEEG
- Near-infrared spectroscopy (NIRS)
- Congenital neuromuscular disorders
- Craniosynostosis

XII. Ears, Eyes, Nose and Throat
- Eyes
  - eye prophylaxis
  - cataracts
  - coloboma
  - glaucoma
  - retinopathy of prematurity
  - strabismus
  - conjunctivitis
- Nose
  - nasolacrimal duct obstruction
  - choanal atresia
  - deviated septum
- Ears
  - malformations
- Mouth/throat
  - cleft lip and palate
  - micrognathia/retrognathia
  - macroglossia
- airway obstruction
PROFESSIONAL PRACTICE ISSUES

Ethical Principles
• Autonomy
• Beneficence
• Non-maleficence
• Justice

Professional/Legal Issues
• Professional
  - Regulation
  - Practice
  - HIPPA
• Staffing issues
• Legal liability
  - Consent
  - Documentation/medical records
  - Negligence/malpractice

Evidence based practice
• Terminology
  - Reliability
  - Validity
  - Significance
  - Levels of Evidence
• Quality Improvement
• Research utilization

Patient Safety
• Communication
• Interprofessional practice
STUDY RESOURCES

- Snell, et al., Care of the Well Newborn, Jones & Bartlett, 2017.