



Neonatal Neurocritical Care Certification Examination Content Outline

The UCNS Neonatal Neurocritical Care (NNCC) examination was established to determine the level of competence for Neonatal Neurocritical Care specialists.

The following content outline is provided to examination candidates interested in the certification examination. The content outline consists of four primary categories followed by subcategories. The written examination consists of 200 multiple choice questions.

<u>Content Area</u>	<u>Percentage of questions</u>
I. Neonatal Neurology	50%
II. Fetal Neurology	20%
III. Follow-up of the High-Risk Neonate	20%
IV. General Neonatal Critical Care	10%
I. Neonatal Neurology	
A. Neurodiagnosis	
1. Neurologic examination	
2. EEG -vEEG	
3. Neuroimaging	
a. Cranial ultrasound and Doppler	
b. CT scan	
c. MRI/MRA/MRV/MRS	
4. NIRS	
5. Genetics evaluation	
6. Neuropathology	
B. Neonatal seizures	
1. Classification	
2. Etiology	
3. Evaluation of etiology (history, imaging, genetics)	
4. Therapy	
5. Early onset epileptic encephalopathies	

- 6. Risk of postnatal epilepsy
- C. Neonatal brain injury
 - 1. Trauma including epidural, subdural and subgaleal hemorrhages; fractures
 - 2. Preterm brain injury
 - a. Intraventricular hemorrhage and post hemorrhagic ventricular dilatation
 - b. White matter injury and periventricular leukomalacia
 - c. Cerebellar hemorrhage
 - d. Stroke
 - 3. Term brain injury
 - a. Hypoxic ischemic encephalopathy
 - b. Intracranial hemorrhage
 - c. Extracranial hemorrhage
 - d. Stroke
- D. Neurogenetics
 - 1. Structural abnormalities
 - 2. Neurocutaneous disorders
 - 3. Inborn errors of metabolism
 - 4. Genetic epilepsies presenting in the newborn period
 - 4. Mitochondrial disorders
 - 5. Neuromuscular disorders
 - 6. Neurodegenerative disease
 - 7. Testing modalities: who, how, when and by whom
 - 8. Pre- and post-genetic counseling
- E. Neuromuscular
 - 1. Neonatal hypotonia
 - 2. Arthrogryposis
 - 3. Spinal muscular atrophy
 - 4. Congenital neuropathies, myopathies, dystrophies
 - 5. Myasthenia gravis - neonatal, passive transfer
 - 6. Critical illness myopathy
- F. Neuroprotection
 - 1. Neuromonitoring
 - a. NIRS
 - b. EEG
 - 2. Therapeutic hypothermia
 - 3. Pharmacologic agents
 - 4. Genetic therapies

G. Infections

1. Congenital
2. Bacterial
3. Viral

H. Sleep

1. Sleep wake cycling
2. Sleep disorders as a risk for abnormal neurodevelopment
3. Monitoring

I. Communication

1. Parental counseling
2. Skills in all aspects of communication

J. End of Life Care

1. Brain death
2. Palliative care
3. Communication/bereavement

K. Other

1. Neonatal abstinence syndrome
2. Antenatal exposures including neuropsychiatric medications Pain management and analgesia
3. Neonatal hyperbilirubinemia
5. Hydrops fetalis
6. Brachial plexus injury

II. Fetal Neurology

A. General considerations

1. Pre-pregnancy maternal health
2. Maternal/placental/fetal triad as the patient
3. Psychosocial health
4. Low- vs high-risk pregnancy
5. Fetal surveillance

B. Prenatal screening for genetic and structural disorders

1. Maternal screening
2. CVS, amniocentesis
3. Fetal ultrasound & Doppler
4. Fetal MRI

- C. Abnormalities of the placenta
 - 1. Anatomy, function
 - 2. Normal and abnormal pathology

- D. CNS development
 - 1. Genetic maldevelopment vs destructive processes
 - 2. Impact of maternal disorders on maternal-placental-fetal triad
 - a. Systemic disorders
 - b. Infections
 - c. Medications
 - d. Substance abuse
 - e. Health care disparities
 - 3. Fetal brain development in relation to other organ systems
 - 4. Typical development
 - 5. Major malformations
 - 6. Abnormalities of migration
 - 7. Spine malformations -neural tube defects
 - 8. Ventriculomegaly

- E. Fetal growth disorders
 - 1. Genetic vs maternal disease/medication/lifestyle exposures

- F. Neurogenetic disorders with fetal presentations
 - 1. Structural abnormalities
 - 2. Metabolic disorders
 - 3. Neurodegenerative disorders
 - 4. Genetic fetal seizures
 - 5. Genetic neuromuscular disorders

- G. Fetal Neuromuscular disorders
 - 1. Fetal dyskinesia
 - 2. Arthrogryposis
 - 3. Spinal muscular atrophy
 - 4. Congenital neuropathies, myopathies, dystrophies
 - 5. Myasthenia gravis -fetal passive transfer

- H. Congenital brain tumors

- I. End of life counseling

- J. Fetal therapies
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- III. Follow-up of High-Risk Neonate
 - A. Hearing
 - 1. OAE
 - 2. Audiology
 - 3. ABR methodologies
 - B. Vision
 - 1. Acuity
 - 2. Retinopathy of prematurity
 - 3. Visual fields
 - 4. Typical visual development
 - C. Standardized developmental assessments
 - 1. Neonatal
 - 2. Neurobehavioral
 - 3. Gross motor; fine motor
 - 4. Speech/language
 - 5. Intelligence/cognition
 - 6. Autism screening instruments
 - 7. Autism diagnostic instruments
 - 8. Developmental screeners
 - D. Outcomes & disabilities
 - 1. Vision impaired
 - 2. Hearing impaired
 - 3. Global developmental delay
 - 4. Epilepsy
 - 5. Neurobehavioral/cognitive disorders
 - 6. Neuromuscular disorders including cerebral palsy
 - 7. Assistance with daily living
 - E. Therapies and rehabilitation
 - 1. Physical therapy
 - 2. Occupational therapy including constraint therapy
 - 3. Speech therapy
 - 4. Vision therapy
 - 5. Ancillary therapies
 - 6. Computer assisted augmentative communication devices
 - 7. Treatments for tone abnormality – oral medications, Botox injections, surgery
 - 8. Autism related therapies

9. Feeding therapy
10. Equipment needs – ambulation, activities of daily living
11. Respiratory support needs

IV. General Neonatal Critical Care

- A. Disorders of the cardiovascular system
 1. Congenital heart disease
 2. Patent ductus arteriosus
 3. Cardiomyopathies

- B. Disorders of the respiratory system
 1. Respiratory distress syndrome
 2. Persistent pulmonary hypertension
 3. Pulmonary hemorrhage
 4. Congenital diaphragmatic hernia/ and other congenital thoracic disorders (e.g., CCAM)
 5. Bronchopulmonary dysplasia

- C. Disorders of the renal system
 1. Renal failure

- D. Gastrointestinal disorders
 1. Necrotizing enterocolitis
 2. Spontaneous ileal perforation

- E. Sepsis and infectious diseases
 1. Early onset sepsis
 2. Late onset sepsis
 3. NICU-acquired infections

- F. Hematological disorders
 1. DIC
 2. Congenital thrombophilias

- G. NNCC – Resuscitation
 1. Term neonate
 - a. HIE
 - b. Infant with congenital heart disease
 2. Preterm infant
 - a. ELGAN resuscitation

H. Complications of critical care interventions

1. ECMO
2. Cardiopulmonary bypass
3. ELBW critical care
4. Pharmacologic intervention

I. Neurologic complications of systemic illness

1. Pulmonary hypertension
2. Complex congenital heart disease
3. Necrotizing enterocolitis