The above chart shows the percentage distribution of questions on the Neonatal Intensive Care Nursing exam across the major content categories covered on the examination. The major focus of the examination is on General Assessment and Management and Pathophysiologic States having the most emphasis. Lesser emphasis is on Psychosocial Behavioral States and Professional Issues having the least number of questions assigned to this content category.
### CONDENSED EXAM OUTLINE

This is an outline of topics and areas which may be included in the Neonatal Intensive Care Nursing examination.

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<thead>
<tr>
<th>Section</th>
<th>Topic</th>
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<tr>
<td>11.00</td>
<td>General Assessment and Management (45-55%)</td>
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<tr>
<td>11.01</td>
<td>Maternal History and Risk Factor</td>
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<td>11.02</td>
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<td>Resuscitation and Stabilization</td>
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<td>Fluids and Electrolytes</td>
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<td>11.06</td>
<td>Nutrition and Feeding</td>
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<td>Pharmacology</td>
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<td>Developmental Care</td>
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<td>11.11</td>
<td>Assess &amp; Manage Pathophysiologic States (45-55%)</td>
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<td>Cardiac</td>
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<td>12.02</td>
<td>Respiratory</td>
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<td>12.03</td>
<td>Gastrointestinal</td>
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<td>Hematopoietic</td>
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<td>12.06</td>
<td>Neurological/Neuromuscular</td>
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<td>Infectious Diseases</td>
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<td>12.08</td>
<td>Metabolic/Endocrine</td>
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<tr>
<td>12.09</td>
<td>Genetic Disorders</td>
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<td>12.10</td>
<td>Head, Eye, Ear, Nose Throat</td>
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<tr>
<td>13.00</td>
<td>Assess and Manage Psychosocial/ Behavioral Adjustments (5-10%)</td>
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<tr>
<td>13.01</td>
<td>Discharge Planning and Follow up</td>
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<tr>
<td>13.02</td>
<td>Grieving Process</td>
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<tr>
<td>13.03</td>
<td>Family Integration</td>
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<tr>
<td>14.00</td>
<td>Professional Issues (Less than 5%)</td>
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EXAMINATION CONTENT
COMPETENCY STATEMENTS, TEST CONTENT OUTLINE & STUDY RESOURCES

MATERNAL HISTORY AND RISK FACTORS

ASSOCIATED COMPETENCIES

- Identify antepartal and intrapartal indicators of neonatal risk and their potential significance
- Systematically assess all body systems utilizing physical examination, gestational age assessment and neurobehavioral assessment
- Apply knowledge of anatomy and physiology (maternal, fetal, transitional, newborn), pathophysiology, pharmacology, nutrition, and behavioral psychology to assess the neonate and differentiate abnormal from normal
- Recognize normal values and deviations in clinical laboratory and diagnostic data and identify potential significance
- Assess the neonate’s family, community and environment to identify areas of risk

MATERNAL HISTORY AND RISK FACTORS

**Effects of maternal medical complications**
- hematologic (anemia, thrombocytopenia)
- hypertension (chronic, PIH, HELLP Syndrome)
- infections (CMV, Toxoplasmosis, syphilis, herpes, hepatitis, AIDS, gonorrhea, chlamydia)
- renal disease

**Problems associated with amniotic fluid and membranes:**
- amniotic bands
- oligohydramnios
- polyhydramnios
- PROM and chorioamnionitis

**Significance of findings:**
- alpha-fetoprotein/triple screen
- biophysical profile
- diagnostic ultrasound
- lung maturation studies (L:S ratio, lung profile, PG)

**Recognize neonatal significance of fetal heart rate patterns**
- altered variability
- decelerations (early, late, variable)
- tachycardia, bradycardia

**Effects of maternal medications on the neonate**
- tocolytics
- analgesia, anesthesia

**Problems in labor - impact on the neonate**
- breech and other malpresentation
- maternal hemorrhage
- meconium

Obstetric emergencies (impact on the neonate)
- abruptio placenta
- cord prolapse
- placenta previa

Impact of methods of delivery on the neonate (forceps, vacuum, cesarean)

GESTATIONAL AGE (AT BIRTH)

Interpretation of growth curves (weight, length and head circumference)

**Physical and neuromuscular characteristics**
- preterm
- term
- post-term
- AGA
- SGA
- LGA

**Associated risks with**
- preterm
- post-term
- SGA/IUGR
- LGA

**Physical Assessment**

Normal/abnormal findings regarding:
- general appearance
- head
- eyes, ears, nose & throat
- neck
- chest
- cardiovascular
- respiratory
- abdomen
- genitalia
- extremities
- spine/back
- skin
- maintaining skin integrity
- neuromuscular and reflexes
## RESUSCITATION AND STABILIZATION

### Neonatal Cardiopulmonary Resuscitation
*Per the American Heart Association & the American Academy of Pediatrics*

- Initial evaluation (ABC)
- Indications for ventilation
- Indications for intubation
- Indications for cardiac massage

### Use of drugs

- Epinephrine
- Narcan
- Sodium bicarbonate
- Volume expanders

### Resuscitation and stabilization of the neonate with

- Diaphragmatic hernia
- Hydrops fetalis
- Perinatal asphyxia
- Upper airway obstruction

## FLUIDS AND ELECTROLYTES

### Normal fluid and electrolyte requirements

- Monitoring fluid and electrolyte status
- Electrolytes
- Urine output

### Effects of

- Humidity
- Maturity
- Temperature

### Specific problems

- Dehydration and overhydration
- Gastrointestinal abnormalities
- Insensible water loss
- Patent ductus arteriosus
- Post-asphyxia
- Third spacing

### Parenteral fluid therapy

### NUTRITION AND FEEDING

#### Nutritional requirements and effects of excess and deficiency

- Calories
- Carbohydrates
- Fat
- Minerals
- Protein
- Vitamins

#### Enteral feeding

- Minimal enteral feedings (gut priming)
- Gavage feeding
- Bolus vs continuous feedings
- Bottle feeding

#### Feeding techniques

- Formula composition
- Breast feeding
- Stimulating production
- Composition of breast milk

#### Parenteral nutrition

- Indications
- Composition
- Complications

#### Dietary supplements

- Breast milk fortifiers
- Glucose polymers
- Iron
- MCT
- Vitamins

#### Nutritional management for

- Bronchopulmonary dysplasia
- Prematurity
- Short gut syndrome

## OXYGENATION/VENTILATION AND ACID BASE HOMEOSTASIS

### Oxygenation: interpretation and management

- Hypoxia/hypoxemia
- Oxygen saturation
- Principles re: increasing/decreasing FiO₂ levels
- Pulse oximeter

### Methods of oxygenation/ventilation (indications, complications)

- CPAP
- Extracorporeal membrane oxygenation (ECMO)

### Mechanical ventilation

- Conventional high frequency
- Other methods of oxygen delivery (hood, nasal cannula, face mask)

### Blood gases: interpretation and management

- Metabolic acidosis (compensated & uncompensated)
- Metabolic alkalosis (compensated & uncompensated)
- Respiratory acidosis (compensated & uncompensated)
- Respiratory alkalosis (compensated & uncompensated)
- Mixed

## THERMOREGULATION

### Mechanisms of heat loss and production

- Assessment of thermal state
- Responses to hypothermia and cold stress
- Responses to hyperthermia

### Maintaining a neutral thermal environment

### Management of thermoregulation problems

- Evaporation
- Conduction
- Convection
- Radiation
- Hypothermia and cold stress
- Hyperthermia

### Equipment

- Incubators
- Radiant warmers
- Servo-controlled incubator
PHARMACOLOGY

Principles of neonatal pharmacology
administration methods/issues
absorption from GI tract, skin and muscle
blood drug levels (toxic vs therapeutic)
drug distribution in the body
drug excretion
drug incompatibilities
drug withdrawal (therapeutic drugs)

Dosage calculations

Common drugs
anesthetics and analgesia (sedatives)
antibiotics
anticonvulsants
antiviral drugs
bronchodilators
cardiovascular agents
CNS stimulants (caffeine, etc)
diuretics
muscle relaxants

Management of the drug exposed neonate
Fetal alcohol syndrome
Neonatal abstinence syndrome
Cocaine

Laboratory Testing
urine
meconium

Equipment
Infusion pumps

DEVELOPMENTAL CARE

Neurobehavioral development
habitation
motor organization
state organization
sensory/interaction capabilities

Self regulatory (stability) and stress responses
autonomic
motoric
state
attentional

Impact of the NICU environment
physical
light
sound
social
caregiver-infants interactions
patterns of caregiving

Intervention strategies
reducing noise levels
reducing light levels/diurnal patterns
altering care patterns
handling
positioning
musculoskeletal integrity
kangaroo care
nonnutritive sucking
provision of sensory experiences
auditory
tactile
visual
vestibular and proprioceptive

Pain
assessment
non-pharmacologic interventions

STUDY RESOURCES

ASSOCIATED COMPETENCIES

- Recognize normal values and deviations in clinical laboratory and diagnostic data and identify potential significance

- Utilize biophysical monitoring techniques to identify body system alterations

- Assess the neonate’s family, community and environment to identify areas of risk

- Develop an individualized plan of care for the restoration, maintenance and promotion of health for the high risk neonate and family unit during hospitalization and following discharge

- Implement diagnostic, therapeutic and educational plans in collaboration with other health care providers to provide direct care for the high risk neonate and family

- Identify life-threatening states and initiate appropriate interventions

- Evaluate the plan of care in collaboration with other health care providers and the family and modify the plan of care as indicated

CARDIAC

Transition to Extraterine Life

Cyanosis
central vs peripheral
cardiac vs pulmonary

Specific Problems
For all problems: presentation/assessment causes, management, complications, outcome

arrhythmias
cardiac tamponade
congestive heart failure
congenital heart defects
AV canal
coarctation of the aorta
hypoplastic left heart
pulmonary stenosis and atresia
tetralogy of Fallot
transposition of the great vessels
total anomalous pulmonary venous return
ventricular septal defect
cyanotic vs acyanotic disease
hypertension
patent ductus arteriosus shock

Cardiovascular assessment
blood pressure
central venous pressure
EKG
blood pressure monitors
cardiopulmonary monitors
indwelling lines

RESPIRATORY

Normal pulmonary function, surfactant

Specific respiratory problems
For all problems: presentation/assessment causes, management, complications, outcome

apnea of prematurity
bronchopulmonary dysplasia
diaphragmatic hernia/paralysis
hypoplastic lungs
meconium aspiration
persistent pulmonary hypertension
pneumothorax/air leaks
pulmonary hemorrhage
respiratory distress syndrome
transient tachypnea of the newborn

Specific therapies
For all problems: presentation/assessment causes, management, complications, outcome
endotracheal intubation
suctioning
surfactant replacement therapy
chest tubes and drainage systems
GASTROINTESTINAL

Normal gastrointestinal function

Maturation of GI tract

Specific GI problems
For all problems: presentation/assessment, causes, management, complications, outcome
esophageal atresia/
    tracheoesophageal atresia
GE reflux
GI bleeds perforation/peritonitis
Hirschsprung’s disease
intestinal obstructions (duodenal, jejunal, ileal, imperforate anus)
meconium ileus/plug
malrotation/volvulus
necrotizing enterocolitis
omphalocele/gastrochisis
short gut syndrome
ostomy care

GENITOURINARY

Renal function/urinary output

Specific genitourinary problems
For all problems: presentation/assessment causes, management, complications, outcome

Genital
ambiguous genitalia
adrenogenital syndrome
inguinal hernia
hydrocele

Urinary tract
asphyxial renal damage
renal abnormalities
renal failure
renal vein thrombosis

HEMATOPOIETIC

Interpret laboratory values
CBC
hematocrit, hemoglobin
platelets
total and direct serum bilirubin
direct and indirect Coomb’s test
Kleihauer Betke test

Developmental differences
fetal vs adult hemoglobin
RBC differences

Administration of blood and blood products

Hyperbilirubinemia
physiologic jaundice
causes of direct
    hyperbilirubinemia
causes of indirect
    hyperbilirubinemia
phototherapy

Specific hematologic problems
anemia
coagulopathies/DIC
polycythemia and hyperviscosity
Rh and ABO incompatibility/
    hydrops fetalis
thrombocytopenia

NEUROLOGICAL/NEUROMUSCULAR

For all problems: presentation/assessment causes, management, complications, outcome

Birth injuries (neuromuscular)
Hydrocephalus/V-P shunts
Hypoxic ischemic encephalopathy
Neural tube defects
Periventricular/intraventricular hemorrhage
    periventricular
    leukomalacia
Seizures
Subdural hemorrhage

INFECTIONOUS DISEASES

For all infections: presentation/assessment causes, management, complications, outcome

Interpret laboratory values
WBC and differential cerebrospinal fluid

Immature host defenses
Neonatal sepsis/meningitis

Viral and fungal infections
candidiasis
cytomegalovirus
hepatitis B
herpes
HIV/AIDS
toxoplasmosis
varicella

Specific bacterial infections
chlamydia
E coli infection
Group B Streptococcal infection
early onset
late onset
staphylococcal infection
syphilis

Infection control procedures
nosocomial infection
infection control procedures

METABOLIC/ENDOCRINE

Interpret laboratory values
calcium, phosphorus magnesium glucose

Newborn screening
PKU
T assay
Glucose homeostasis
EXAMINATION CONTENT
COMPETENCY STATEMENTS, TEST CONTENT OUTLINE & STUDY RESOURCES

Specific metabolic/endocrine problems
For all problems: presentation/assessment, causes, management, complications, outcome
hypocalcemia and hypercalcemia
rickets
hypoglycemia and hyperglycemia
infant of diabetic mother
hyperthyroidism and hypothyroidism

GENETIC DISORDERS
Mendelian inheritance patterns
autosomal recessive
autosomal dominant
sex-linked
Chromosomal anomalies and diseases
Trisomy
Trisomy 1
Trisomy 21
Multifactorial diseases

HEAD, EYES, EARS, NOSE AND THROAT
Eye prophylaxis
Specific problems
For all problems: presentation/assessment, causes, management, complications, outcome
cerebral palsy
choanal atresia
cleft palate/lip
retinopathy of prematurity
tracheal stenosis/atresia
tracheomalacia
tracheostomy

STUDY RESOURCES
EXAMINATION CONTENT
COMPETENCY STATEMENTS, TEST CONTENT OUTLINE & STUDY RESOURCES

ASSESS AND MANAGE PSYCHOSOCIAL/BEHAVIORAL ADJUSTMENT

ASSOCIATED COMPETENCIES
- Recognize normal values and deviations in clinical laboratory and diagnostic data and identify potential significance
- Implement diagnostic, therapeutic and educational plans in collaboration with other health care providers to provide direct care for the high risk neonate and family
- Evaluate the plan of care in collaboration with other health care providers and the family and modify the plan of care as indicated

DISCHARGE PLANNING AND FOLLOW-UP
General discharge planning and parent teaching
- car seats
- CPR
- feeding
- immunizations
- SIDS
- visitors
Discharge planning and parent teaching for infants with special needs
- nutrition
- medications
- special equipment needs
- special care needs
- developmental follow up
- visual screening
- hearing screening
- motor delay (including cerebral palsy)
- cognitive/language delay

GRIEVING PROCESS
Anticipatory grief
Stages of grieving and common behaviors and interventions
Factors which impede\enhance grief process
Pathologic responses
Maternal/paternal differences (incongruent grieving)
Specific circumstances
- chronic sorrow
- death of a twin (triplets, etc)
- repeated obstetric loss (recurrent abortion, stillbirth, preterm delivery)
- sibling responses

Support systems and referrals
- bereavement groups
- parent support groups

FAMILY INTEGRATION
Parent-infant attachment behaviors
Parental stress responses
- high risk birth
- changes in status transfer

Barriers to parent infant interaction
Specific circumstances
- adolescent parents
- grandparents and other extended family
- long distance nurturing of parent/ infant attachment
- sibling responses and interventions

Specific interventions with parents and extended family
- counseling techniques
- parent teaching

Shared decision making
- parent-staff disagreements regarding treatment

Principles of culturally sensitive care

STUDY RESOURCES
EXAMINATION CONTENT
COMPETENCY STATEMENTS, TEST CONTENT OUTLINE & STUDY RESOURCES

PROFESSIONAL ISSUES

ASSOCIATED COMPETENCIES

- Identify professional nursing issues which impact on the role of the neonatal nurse

Quality assessment/improvement

Ethical issues and dilemmas
process of bioethical decision making
role of nurse in ethical decision making situations in regard to colleagues, patients, parents

Legal issues
documentation
informed consent
standard of care
Security/Abduction Precautions

Research
Understanding/using research findings in clinical practice
randomization
significance of research findings
generalization

Patient Safety

STUDY RESOURCES