



## 2023 CANDIDATE GUIDE

# CARE OF THE EXTREMELY LOW BIRTH WEIGHT NEONATE C-ELBW

*Congratulations on taking the next step in your career – earning your certification and C-ELBW certification!*

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### THIS EXAM’S PURPOSE

The purpose of the Care of the Extremely Low Birth Weight Neonate Subspecialty Certification is to provide a competency-based examination that tests specialty knowledge and the application of that knowledge for licensed health care professionals in the US and Canada, who provide care to acutely and critical ill extremely low birth weight neonates and their families within an intensive care environment to improve overall outcomes.

**IT IS IMPORTANT TO READ THE INFORMATION IN THIS GUIDE. IT EXPLAINS ALL POLICIES TO WHICH CANDIDATES WILL BE SUBJECT.**

### ABOUT THIS GUIDE

This guide lists fees and provides information that will help candidates prepare for the examination. It includes the exam content in outline form, competency statements and study guide. It also provides sample exam questions to familiarize the test taker with question format, study resources and lists some of NCC administrative policies & procedures. It is recommended that candidates familiarize themselves with the information in this guide.

NCC examinations are offered in several different test administrations options. The NCC publication **Guide to Testing Methods** will explain the different rules and policies based on how the candidate is taking the examination. Please download this publication from the NCC website and review the exam administration options. It will answer any questions about the NCC examination process.

If there are other questions, please feel free to contact NCC through the [“Contact Us”](#) page at [NCCwebsite.org](http://NCCwebsite.org).

### NCC’S PHILOSOPHY OF TESTING

Certification is an evaluative process that provides the opportunity for health care professionals in the obstetric, gynecologic and/or neonatal specialty to demonstrate publicly what they know and to be recognized for the special knowledge they possess. The NCC certification carries no licensing authority. The ability to practice as a health care professional is regulated by the state, and while certification may be required in some states for specific health care roles, NCC has no regulatory power to require states to recognize NCC certification for this purpose. Practice and educational standards are reflected in the certification process, but the responsibility for development of such standards rests with the professional specialty organizations and the educational community. NCC encourages individual to seek out information about how certification relates to licensure requirements, program accreditation of the educational institutions attended, the educational and practice standards of national specialty organizations, and employment expectations.

# FEES & GENERAL POLICIES

## EXAMINATION AND RELATED FEES

### EXAMINATION FEES\*

Test Center and Live Remote Proctoring (LRP) Computer Exam Fees are \$210 which includes the non-refundable \$50 application fee.

*\*Examination fees are subject to change.*

### CANCELLATION: 6 HOUR WINDOW

Candidates have six hours from the time they submit an exam application to cancel the exam. After the six hours they have to withdraw or pay for a change.

### CHANGE REQUEST

Candidates who cannot take their currently scheduled examination, have missed their testing date or need to take a different exam - can request a change for a fee of \$125. Details are on the NCC website.

### WITHDRAWAL FEE

A Testing Center or LRP testing candidate who withdraws from testing is subject to a \$165 withdrawal fee. The candidate will receive \$160 of their \$325 payment, minus any outstanding charges. Bulk Purchase Voucher candidates cannot withdraw.

### RETEST FEE

Retest candidates must pay full application and examination fees. There are no discounts and they must complete a 90-day wait period\* before resubmitting an application for testing. (\*see Retest Policy page 4). Certification exams of the same specialty can only be taken TWICE in a calendar year for the same candidate. Candidates must submit a new application and again demonstrate eligibility and licensure.

### SUBSTITUTION FEE

Candidate substitutions are not allowed for any reason.

### THIRD PARTY PAYMENTS

Applicant fees paid by third parties will be refunded to the third party in accordance with stated refund policies, in the event the applicant is determined ineligible or withdraws within the specified time. Vouchers are nonrefundable.

### NO REFUNDS WILL BE CONSIDERED FOR ANY CANDIDATE

- who has taken an examination
- who is not successful in achieving certification
- who failed to take the exam at a Test Center or via Live Remote Proctoring (LRP) within the 90-day testing window and did not submit a change request within stated time frames
- who failed to schedule an appointment to test within the first 30 days of their 90-day eligibility window and is unable to schedule their exam within their eligibility window.
- who failed to have proper ID or meet any required rules
- who failed to login to the test portal or appear at the test center (no-show) or who signed in late to the test portal or arrived late to the test center
- who failed to take a scheduled exam for any reason (illness, quarantine, accident, death, etc.)

### Test Date Change

Test Center and Live Remote Proctoring (LRP) exam candidates can change their scheduled testing date to another date within their window *once for free*.

Candidates must handle this directly with PSI/AMP.

**Refer to the NCC testing guide for details.**

# FEES & GENERAL POLICIES

## PAYMENT INFORMATION

- All applications are subject to a nonrefundable application fee.
- All fees are nonrefundable except where otherwise noted.
- Payments can be made by credit card (Visa, American Express and MasterCard only). NCC does not accept debit cards or split payments (part check and part credit card).
- Payments can be made by e-check: bank routing number and account number required.
- For payments made by third parties, any refund will be issued to the third party and not to the applicant. Vouchers are nonrefundable.
- All payments must be in US funds.
- Exam fees can only be submitted online at the NCC website. Applications will not be accepted by mail, phone or fax.
- NCC will accept group payments for certification exams from institutions. Details are on the NCC website under Bulk Purchases.

## OTHER NON-REFUNDABLE PAYMENT RELATED FEES

### INCOMPLETE APPLICATION FEE

All incomplete applications are subject to a non-refundable \$30 reprocessing fee upon the submission of proper documentation. Incomplete applications are those submitted with missing information, (e.g. required licensure information and corroborating uploaded documentation; containing incomplete or incorrect information; or do not include full fee payment).

### RETURNED CHECKS AND CREDIT CARD CHARGEBACK FEE

A \$30 fee will be assessed for any check or e-check returned or a credit card payment disputed for any reason. Remittance thereafter of all fees and applications must be in the form requested by NCC.

### LICENSE VERIFICATION

If licensure information is requested requiring an additional submission, the candidate will have two weeks to provide the license with all the correct information and pay the non-refundable \$30 reprocessing fee. If this is not provided within the two weeks, the application will be marked ineligible. Ineligible applicants will receive a refund minus the \$50.00 non-refundable application fee. There are no refunds or withdrawals for applications using a bulk code.

### VERIFICATION OF CERTIFICATION

Third party notification of status will NOT be released without authorization from the certified individual. A \$30 fee is required for any third-party notification or issuance of duplicates of test results reports. Verification requests can only be submitted after official results with score report have been uploaded to the candidate's NCC account.

Verification requests can only be made via the online verification system on the NCC website. NCC does not issue verifications via the mail or fax.

***Certification will be revoked or withheld if a returned check or a chargeback request on a credit card payment results in loss of income to NCC and the monies are not recovered in an alternate payment. Fees received at any time will first be applied to any unpaid prior certification/special fees.***

# FEES & GENERAL POLICIES

## GENERAL POLICIES

### UNSUCCESSFUL CANDIDATES

A candidate who sits for the examination and does not receive a passing score is not eligible for any refund nor for any credit on any later NCC exam.

### NONDISCRIMINATION

It is the policy of NCC that no individual will be excluded from the examinations as a result of age, sex, race, religion, national origin, ethnicity, disability, marital status, sexual orientation, military status or gender identity.

### AMERICANS WITH DISABILITIES ACT

Special testing accommodations will be provided pursuant to the Americans with Disabilities Act. Any requests for special testing accommodations must be made in writing and submitted with the application. The accommodation request form can be downloaded from the NCC website. Upon receipt of a request for special accommodations, NCC will contact the applicant. Such requests must be signed by a clinician, physician, or other qualified specialist with training and experience appropriate to diagnose and treat the specified disability.

### EXAM CATEGORY CHANGES

Candidates can only request an exam category change by completing a **Change Request Form** on the NCC website and submitting with non-refundable payment of \$125. **Candidates are only allowed one change request** (e.g. After a change request is submitted no other change request can be submitted). All change requests must be approved by NCC. **There will be no refund of original or Change Request fees.** Eligibility must be re-established for the new exam category, and additional documentation and fees may be required. The time to consider eligibility for the new category will count toward the original assigned 90-day testing window.

**Examination category cannot be changed from a subspecialty or RN Core application to a NNP or WHNP certification.** *Examinees must take the exam for which they have been determined eligible. No changes will be permitted on examination day.* If a candidate knowingly or unknowingly takes an examination other than the one they were found eligible to take, the examination will not be scored. No refunds will be allowed, and all fee policies will apply if the candidate reapplies for an examination. See website for complete details.

### RETEST POLICY

Candidates may retake the examination if they do not pass. They must reapply 90 days after the test was taken, submit all applicable fees and documentation, and re-establish eligibility according to the appropriate deadlines. There is no limit to the number of times a candidate may retake the examination. **However, the maximum number of times a candidate can take the same NCC test in a calendar year is two.**

**All retest candidates must wait 90 days from the date their exam was taken before they can submit a new application to retest.**

- this date is provided in the candidate's results notification
- this 90-day wait period affects all modes of testing

Any loss of power or internet during an exam in which there was more than 15 minutes of testing with exposure to more than 10% of the exam requires a retest at a Test Center. Candidates will have to wait 90-days before they can reschedule and they must follow NCC's retest policy. A decision on the timing of a second attempt will be made after NCC reviews the test exposure. There is no need to complete a new application, **but candidates MUST notify NCC of the internet disconnection issue as soon as computer access is available.**

If a retest application is submitted prior to the 90-day wait period, the application will be returned as ineligible. The applicant will be subject to the \$50 non-refundable application fee.

# FEES & GENERAL POLICIES

## REVIEW COURSES AND MATERIALS

NCC does not offer or sponsor review courses or review materials for its certification examinations. Examination candidates should view any course of study as being independent of NCC. Candidates should carefully examine the merits of any individual exam preparation offering before participating.

## TEST DISCLOSURE

NCC does not make test questions available for review. Because test questions may be used for more than one examination administration, distributing this information would compromise the security of the test questions and would increase the cost of certification if the questions had to be replaced each year.

## REVOCAION

Your certification may be revoked for falsifying any information submitted to determine eligibility to take the certification examination or for maintaining certification, for losing your license to practice, or for failing to pay designated certification or maintenance fees.

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**POLICIES ARE SUBJECT  
TO CHANGE  
WITHOUT NOTICE.**

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## GENERAL POLICIES (CONTINUED)

### INTERNET DISCONNECTIONS

If the candidate has started the exam and is disconnected, please use the PSI tech lines if testing with LRP or if at a Test Center discuss immediately with the proctor to attempt to get reconnected and continue testing.

If the candidate is unable to get reconnected after starting the exam, the timing for a second attempt to take the exam will be based on how much time and how many questions they were exposed to. If a candidate is disconnected and cannot be reconnected and has tested for under 15 minutes and were exposed to less than 10% of the exam they may be able to reschedule within their current eligibility window. **Candidates must work directly with PSI that day to reschedule and if they run into any issues they must notify NCC within 3 days of testing.** If a candidate tests for longer than 15 minutes and/or saw more than 10% of the questions on the exam they will have to wait 90 days before they can reschedule, and they must follow NCC's retest policy. A decision on the timing of a second attempt will be made after NCC reviews the test exposure. Please note, candidates will need to retest at a Test Center. Please notify NCC of the internet disconnection issue as soon as computer access is available.

### APPEALS PROCEDURE

Any request to waive any policy of the NCC Board of Directors relative to eligibility, administration, examination content issues, or certification maintenance must be received in writing within 60 days of the dispute. All requests should be sent to the attention of the NCC President at [nccpresident@nccnet.org](mailto:nccpresident@nccnet.org). The correspondence should contain a detailed account as to why the NCC policy should be waived or the candidate's status should be changed. Such requests are referred to the NCC Policy Review Committee of the Board of Directors. All decisions will be provided in writing. Cases not resolved by the Policy Review Committee will be referred to the full Board of Directors.

### DESIGNATION AUTHORIZATION

Certification is a non-transferable, revocable, limited, non-exclusive license to use the certification designation "C-ELBW", subject to compliance with the policies and procedures, as may be revised from time to time.

Any use or display of NCC certification marks and/or logos without the prior written permission of the NCC is prohibited. Any candidate or certificant who manufacturers, modifies, reproduces, distributes or uses a fraudulent or otherwise unauthorized NCC certificate, NCC designation or other credential may be subject to disciplinary action, including denial or revocation of eligibility or certification. Any individual who engages in such behavior also may be subject to legal action.

# ABOUT THE EXAM

## ABOUT THE EXAM

### TIMED EXAMINATION

Two (2) hours are allotted to complete the examination.

### EXAM FORMAT

The Care of the Extremely Low Birth Weight Neonate examination consists of up to 125 test questions. 100 are scored and the remainder are embedded in the exam as pretest items. The pretest items do not count toward the examinee's final results.

- There is one question format used for all NCC examinations.
- Each question has a premise (stem) and three alternative answers.
- The answer options are alphabetized by the first word in each answer option to randomize the answers.
- Tests are delivered in a different random order for each candidate.
- Questions will test both basic knowledge and application of knowledge.
- Questions that contain laboratory data will show results in conventional units of measure with international units in parentheses.
- Drugs are listed in both generic and trade names where appropriate.

## EXAMINATION CONTENT DEVELOPMENT

The development of NCC certification involves many individuals and involves a meticulous process of review. There are three major groups that contribute to the test development process:

### ITEM WRITERS:

MDs, RNCs, APRNs (NNP CNS), Neonatal Therapists (PT, OT, SLP), Neonatal Dietitians, Pharm-D, Respiratory Therapists and others identified with special expertise have the responsibility of drafting test items per designated assignment for review by the content team and expert reviewers. Item writers are solicited from the NCC certified population, by recommendations or through the volunteer portal.

### REVIEWERS:

Reviewers are MDs, RNCs, APRNs (NNP CNS), Neonatal Therapists (PT, OT, SLP), Neonatal Dietitians, Pharm-D, Respiratory Therapists or other designated experts who assist the content teams in review of test items developed by the item writers. Reviewers are responsible for reviewing items for content relevance and confirming that references cited for the questions support the items as written.

### CONTENT TEAMS:

Content team members are experienced practitioners and are appointed on an annual basis by the NCC President. Content teams are solicited from the NCC certified population, by recommendations or through the volunteer portal. To see the current membership composition of the Content Team responsible for the Care of the Extremely Low Birth Weight Neonate examination, please visit the NCC website under the section on NCC Leadership.

Content team members are MDs, RNCs, APRNs (NNP CNS), Neonatal Therapists (PT, OT, SLP), Neonatal Dietitians, Pharm-D, Respiratory Therapists or other identified experts who:

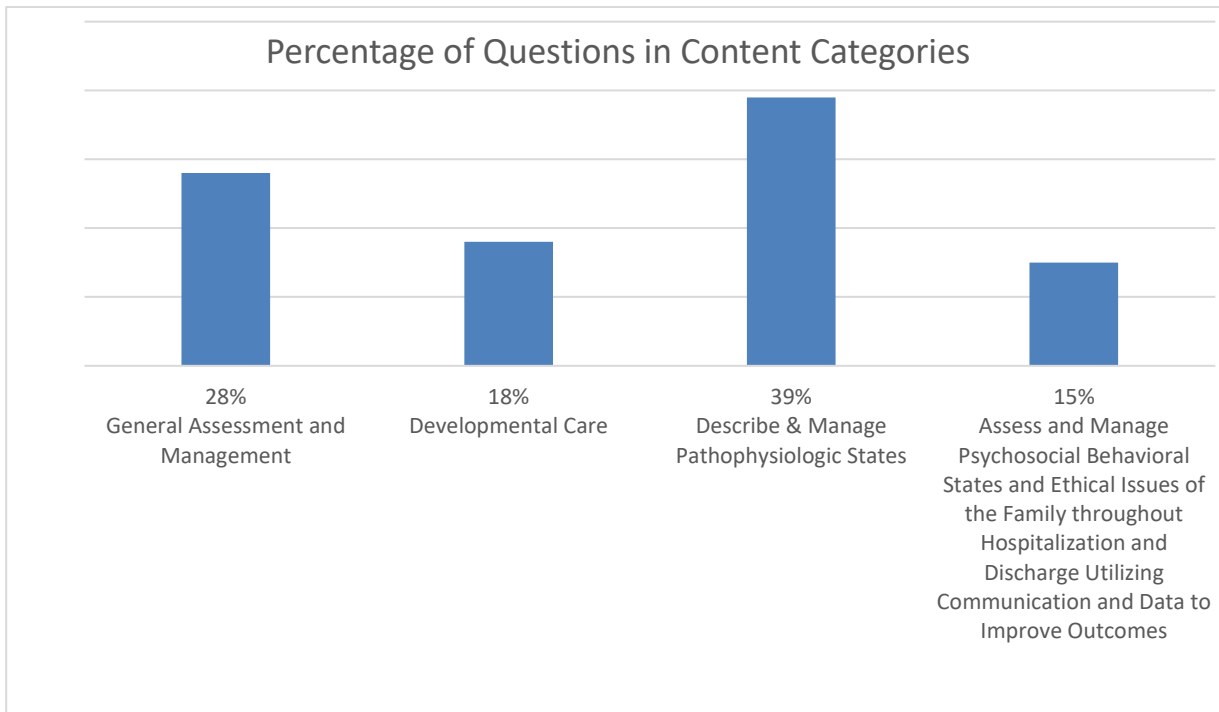
- develop and update the test outline and competency statements
- review test items developed by item writers
- review item statistics from exam administrations and pretest examinations
- approve the exam forms to be administered
- review item banks

In addition, NCC uses volunteers for standard setting and content validation studies/job analysis studies.

# EXAMINATION CONTENT



## Care of the Extremely Low Birth Weight Neonate



The chart shows the percentage distribution of questions on the Care of the Extremely Low Birth Weight Neonate exam across the major content categories covered on the examination.

# EXAMINATION CONTENT

## EXAM OUTLINE

Areas of knowledge to be tested on the Care of the Extremely Low Birth Weight Neonate examination are listed in the following outline. This list is not intended as an all-inclusive review. It is provided only to help candidates evaluate their own practice.

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

- 10.00 General Assessment and Management (28%)

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  - Physical, Gestational Age, Behavioral and Neurologic Assessment
  - Delivery Room Management, Stabilization and Transition
  - Transport/Transfer
  - Thermoregulation
  - Fluid and Electrolytes
  - Nutrition and Feeding
  - Respiratory Management/Oxygenation (e.g. Blood gases, Ventilation)
  - Skin Care
  - Infection Risks (immaturity, prevention, bundles)
  
- 11.00 Developmental Care (18%)

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  - Neurodevelopment (Structure, function, immaturity)
  - Impact of NICU Environment
  - Neuroprotective Intentional Caregiving and Promotion of Self-regulation
  - Neurobehavioral Alterations and Responses (habituation, state and motor organization)
  - Stress and Pain Assessment and Management
  - Neuroprotection and Injury Prevention
  
- 12.00 Describe & Manage Pathophysiologic States (39%)

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  - Perinatal Management, Maternal Risk Factors During Pregnancy and Obstetric Emergencies that Impact the ELBW neonate
  - Cardiac
  - Respiratory
  - GI/GU
  - Hematopoietic
  - Infectious Diseases
  - Metabolic/Endocrine/Genetic
  - Neurologic, Neuromuscular, Skin and Musculoskeletal
  - Renal
  - Head, Eyes, Ears, Nose and Throat
  - Pharmacology
  
- 13.00 Assess and Manage Psychosocial Behavioral States and Ethical Issues of the Family throughout Hospitalization and Discharge Utilizing Communication and Data to Improve Outcomes (15%)

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  - Family Integration
  - Trauma Informed Care/Parental Coping and Grieving Process
  - End of Life Care/Palliative Care, Viability and legal/ethical issues
  - Discharge Planning, Teaching and Follow up
  - Risks for motor, cognitive, language delays and expected milestones
  - Professional Practice and Team Communication along the continuum of care
  - EBP, QI, Research, Data Outcomes, Benchmarking



# EXAMINATION CONTENT

## ASSOCIATED COMPETENCIES

- Identify maternal risk factors during pregnancy and the potential implications for the ELBW neonate.
- Systematically assess all body systems of the ELBW neonate utilizing physical examination, gestational age assessment and neurobehavioral assessment.
- Apply knowledge of anatomy and physiology (fetal, transitional, neonatal), pathophysiology, pharmacology, and behavioral psychology to assess the ELBW neonate and differentiate abnormal from normal.
- Recognize normal values and deviations in clinical laboratory and diagnostic data and identify potential significance for the ELBW neonate.
- Identify life-threatening states in the ELBW neonate and initiate appropriate, early intervention.
- Develop an individualized plan of care for the restoration, maintenance and promotion of health for the ELBW neonate and family unit during hospitalization and following discharge.
- Implement diagnostic, therapeutic and educational plans in collaboration with other health care providers to provide care for the ELBW neonate and family.
- Identify the vulnerabilities of the ELBW neonate across the continuum and implement strategies to reduce risks and optimize outcomes.
- Apply knowledge of local, state and national outcome data to guide families and direct clinical practice and quality improvement processes to optimize outcomes.
- Recognize the psychosocial impact and stressors related to the birth of an ELBW neonate in collaboration with the family.
- Identify professional, legal and ethical issues which impact the role of the health care provider in the care of ELBW neonate.

# STUDY GUIDE

## GENERAL ASSESSMENT AND MANAGEMENT

### I. Physical, Gestational Age, Behavioral and Neurologic Assessment

- Normal/abnormal findings regarding:
  - general appearance
  - head, eyes, ears, neck (cartilage, recoil, fused eyes, eye prophylaxis, vitamin K)
  - respiratory/Chest
  - cardiovascular
  - skin (immaturity, fragility)
  - abdomen
  - genitalia
- Physical and neuromuscular characteristics
- Associated risks
- Posture/Tone
- Movement
- Reflexes

### II Delivery Room Management, Stabilization and Transition

- Resuscitation (NRP)
  - initial evaluation
  - indications for ventilation and cardiac compressions
  - use of medications and volume expanders
- Timing of umbilical cord clamping
- Transition
  - during umbilical cord clamping
  - initial resuscitation
- Thermoregulation
  - trans-epidural water loss
  - plastic wrap and hat
  - heat mattress
  - delivery room/OR temperature
- Ventilation strategies
  - CPAP
  - FiO<sub>2</sub>
  - target oxygen saturation
- Surfactant
- Access
  - UVC
  - UAC
  - PIV
  - cleansing agents

- Fluid and electrolytes requirements at birth
  - dextrose and amino acid solution
  - total fluid goals
  - insensible water loss
  - weight
- Transport/transfer
  - positioning and handling

### III. Transport

- Thermoregulation
- Transfer

### IV. Thermoregulation

- Mechanisms and management of heat loss/production
  - conduction
  - convection
  - evaporation
  - radiation
  - response to hypothermia and cold stress
  - response to hyperthermia
- Physiology of heat production
- Neutral thermal environment of the ELBW
  - humidification
  - environment
  - equipment

### V. Fluid and Electrolytes

- Fluid status
  - normal body water composition
  - physiologic transition
  - renal function of the ELBW
  - urine output
  - acid base homeostasis
  - fluid overload/dehydration
- Parenteral nutrition
  - indications
  - electrolyte needs in first week of life
  - intralipid
- Electrolyte monitoring
  - timing and frequency
- Effects of humidity, maturity, temperature

# STUDY GUIDE

## **VI. Nutrition and Feeding**

- GI development and immaturity
- Bone mineralization
- Nutritional requirements
  - calories
  - macro/micronutrients
- Pre-feeding foundations and strategies for positive oral feeds
  - Non-nutritive suckling
  - oral care
- Prevention of growth failure
  - monitoring anthropometric measurements
- Interpretation of lab values to evaluate nutritional status
- Enteral substrates
  - benefits of human milk
  - composition
  - fortifiers
  - supporting lactogenesis
  - education about value of breast milk and lactogenesis
  - breastfeeding
  - donor milk
- Formula composition and indications
- Nutritional supplements

## **VII. Respiratory Management/Oxygenation**

- Structural and functional immaturity of the ELBW lung
- Ventilation strategies
  - ventilation modes (volume targeted, high frequency)
  - non-invasive ventilation
- Blood gas interpretation and management
  - acid-base homeostasis
- Oxygen delivery and management
  - oxyhemoglobin saturation curve
  - pulse oximetry
  - oxygen saturations
- Prevention of neonatal morbidities
  - BPD (ventilation strategies, surfactant use, caffeine)
  - ROP (FiO<sub>2</sub>)
  - IVH (role of CO<sub>2</sub>)

## **VIII. Skin Care**

- Structural and functional immaturity
  - epidermal barrier function
  - permeability
  - role in thermoregulation
  - sensory
- Prevention of skin breakdown
  - use of adhesives
  - repositioning
  - medical devices
  - bedding
  - cleansing agents
  - hydrocolliods
  - hydrogels

## **IX. Infection Risks**

- Immaturity of the ELBW immune system and function
  - environment (lines, tubes)
- Prevention and management of infection
  - catheter-associated infection (best practice bundles)
  - ventilator associated pneumonia
  - oral immune therapy (maternal milk, colostrum)

# STUDY GUIDE

## DEVELOPMENTAL CARE

### I. Neurodevelopment

- Structural and functional immaturity  
stages of brain development at time of delivery  
organization  
myelination
- Brain and neurosensory development

### II. Impact of NICU environment

- Neurosensory
- Limbic  
sensory capabilities  
role of smell and taste  
impact of light, noise, sound, vestibular, touch

### III. Neuro-protective Intentional Caregiving and Promotion of Self-regulation

- Cue-based care
- Handling and positioning  
Containment
- Circadian rhythms
- Kangaroo Care

### IV. Neurobehavioral Alterations and Responses

- Habituation
- Motor organization
- State organization
- Sensory/interaction capabilities
- Neurodevelopmental risks and outcomes

### V. Stress and Pain Assessment and Management

- Self-regulation  
stability
- Stress response  
autonomic  
motoric  
state/sleep cycle
- Pharmacological and non- pharmacological  
management
- Effects on the developing brain

### VI. Neuroprotection and Injury Prevention

- IVH and white matter injury prevention  
strategies/bundles

# STUDY GUIDE

## DESCRIBE AND MANAGE PATHOPHYSIOLOGIC STATES

### **I. Maternal Risk Factors During Pregnancy that Impact the ELBW Neonate**

- Perinatal management  
maternal transport to high risk perinatal referral center  
consultation
- Maternal factors  
Gestational/ chronic hypertension  
HELLP  
antenatal corticosteroids  
magnesium sulfate  
maternal analgesia/anesthesia  
maternal medications  
PROM  
Diabetes  
Multiple gestation
- Mode of Delivery
- Obstetric emergencies

### **II. Cardiac**

*For specific problems: presentation/assessment, labs, diagnostic imaging, causes, management, complications, outcome*

- Patent ductus arteriosus
- Pulmonary hypertension  
Cor pulmonale
- Hypotension  
Shock

### **III. Respiratory**

*For specific problems: presentation/assessment, labs, diagnostic imaging, causes, management, complications, outcome*

- Apnea of prematurity
- Pulmonary hypoplasia
- Respiratory distress syndrome
- Pulmonary air leaks  
Pneumothorax  
PIE
- Pulmonary hemorrhage
- Respiratory distress
- Bronchopulmonary dysplasia/chronic lung disease

### **IV. GI/GU**

*For specific problems: presentation/assessment, labs, diagnostic imaging, causes, management, complications, outcome*

- Perforations/Peritonitis
- Disorders of motility related to immaturity
- Necrotizing enterocolitis
- Disorders of suck and swallow
- GE reflux
- Inguinal hernia
- Short gut syndrome

### **V. Hematopoietic**

*For specific problems: presentation/assessment, labs, diagnostic imaging, causes, management, complications, outcome*

- Anemia  
blood and blood products
- Neutropenia/Neutrophilia
- Thrombocytopenia
- Hyperbilirubinemia  
direct and indirect  
red blood cell turnover  
immature impaired conjugation and elimination  
enterohepatic circulation

### **VI. Infectious Disease**

*For specific problems: presentation/assessment, labs, diagnostic imaging, causes, management, complications, outcome*

- Sepsis evaluation
- Septic shock
- Viral and fungal infections  
candidiasis
- Late onset sepsis  
hospital acquired infection  
UTI  
osteomyelitis  
meningitis  
MRSA

# STUDY GUIDE

## **VII. Metabolic/Endocrine/Genetics**

*For specific problems: presentation/assessment, labs, diagnostic imaging, causes, management, complications, outcome*

- Thyroid disorders
- Adrenal insufficiency
- Glucose homeostasis
- Metabolic bone disease
  - osteopenia
  - rickets
  - fractures
- Metabolic screen interpretation

## **VIII. Neurologic, Neuromuscular, skin and Musculoskeletal**

*For specific problems: presentation/assessment, labs, causes, management, complications, outcome*

- Skin injuries
  - burns
  - pressure injuries
  - tears
- Periventricular/Intraventricular hemorrhage
- Post-hemorrhagic hydrocephalus
- Periventricular leukomalacia
- Seizures
- Hemangiomas
- Dislocation of the hip

## **IX. Renal**

*For specific problems: presentation/assessment, labs, causes, management, complications, outcome*

- Acute renal failure
  - SIADH
- High output renal failure
- Renal vein/artery thrombosis
- Renal insufficiency
  - Hypertension

## **X. Head, Eyes, Ears, Nose and Throat**

*For specific problems: presentation/assessment, labs, diagnostic imaging causes, management, complications, outcome*

- Retinopathy of prematurity
  - target O2 saturations
- Airway malacia/stenosis
- Vocal cord paralysis
- Hearing loss

## **XI. Pharmacology**

- Pharmacokinetics and pharmacotherapeutics
  - drug use and precautions
  - distribution
  - absorption
  - metabolism
  - excretion
  - drug levels
  - drug effects
- Common drugs
  - antibiotics/antifungals
  - anesthesia/analgesia concurrent use with non-pharmacological management
  - bronchodilators
  - cardiovascular agents
  - inotropes and vasopressors
  - PDA treatments
    - caffeine
    - diuretics
    - steroids
    - surfactant
    - ROP treatment
- Antibiotic Stewardship
  - risk with exposure and developing intestinal mucosa
  - risk for repeated courses secondary to multiple sepsis evaluations

# STUDY GUIDE

## ASSESS AND MANAGE PSYCHOSOCIAL BEHAVIORAL STATES

### I. Family Integration

- Prenatal consultation
- Family partnered care
- Parental role attainment
  - Barriers
  - bonding
- Special circumstances
  - adolescent parents
  - extended family
- Parent teaching
- Shared decision making
  - parent/staff disagreements
- Breastfeeding support
- Family support and education

### II. Discharge Planning, Teaching and Follow Up

- General discharge planning
- Newborn screening
  - car seats
  - metabolic
  - hearing
  - CCHD screening
  - ROP exam
- Parent education/training
  - Feeding/nutrition
  - safe sleep
  - immunizations
  - importance of follow up
  - special equipment
  - parent readiness
- Follow up
  - clinics
  - nursing care
  - community resources
  - equipment
  - early interventions/development follow up

### III. Trauma Informed Care/Parental Coping and Grieving Process

- Stages of grief and common behaviors and interventions
- Specific circumstances
  - chronic sorrow
  - death of twin
  - repeated obstetric loss or preterm deliveries
  - sibling responses

- Parent mental health
  - post-traumatic stress disorder
  - post-partum depression
  - incongruent grieving
- Support systems
- Parental stress responses

### IV. End of Life Care/Palliative Care/Viability and Legal/Ethic Issues

- Non-initiation
- Withdrawal
- Comfort care
- Parental desire for futile care
- Outcomes
- Cultural sensitivity
- Ethical principles
  - autonomy
  - beneficence
  - non-maleficence
  - justice

### V. Professional Practice

- Communication tools
- Inter-professional teamwork
- Continuity/Continuum of care
- Compassion fatigue

### VI. EBP, QI, Research, Data Outcomes, Benchmarking

- Small baby risks
  - Data outcomes
- Benchmarking
- QI
- Process Improvement

### VII. Communication of outcomes

- Motor
- Cognitive
- Language delays
- Expected milestones

# STUDY RESOURCES

- Bissinger, et al. Golden Hours, 2nd ed., NCC, 2019.
- Blackburn, Maternal, Fetal, & Neonatal Physiology, Elsevier, 2018.
- Fanaroff, et al., Klaus & Fanaroff's Care of the High-Risk Neonate, Elsevier-Saunders, 2019.
- Gardner, et al., Handbook of Neonatal Intensive Care: An Interprofessional Approach, Elsevier, 2021.
- Gleason, et al., Avery's Diseases of the Newborn, Elsevier, 2018.
- Goldsmith, et al., Assisted Ventilation of the Neonate: An Evidence-Based Approach to Newborn Respiratory Care, Elsevier, 2022.
- Gomella, et al., Gomella's Neonatology, Lange, 2020.
- Kimberlin, et al., Red Book 2021: Report of the Committee on Infectious Diseases, AAP, 2021.
- Martin, et al. Fanaroff and Martin's Neonatal-Perinatal Medicine: Diseases of the Fetus and Infant, Elsevier, 2020.
- Polit, et al., Essentials of Nursing Research: Appraising Evidence for Nursing Practice, LWW, 2021.
- Resnik, et al., Creasy & Resnik's Maternal Fetal Medicine Principles and Practice, Elsevier, 2019.
- Stark, et al., Cloherty and Stark's Manual of Neonatal Care 9th ed., Wolters Kluwer, 2021.
- Taketomo, Pediatric and Neonatal Dosage Handbook, 28<sup>th</sup> ed., Lexi-comp, 2021.
- Tappero, et al., Physical Assessment of the Newborn, Springer, 2019.
- Verklan, et al., Core Curriculum for Neonatal Intensive Care Nursing, Elsevier, 2021
- Volpe, et. al., Neurology of the Newborn, Elsevier, 2018.
- Walsh, et al., Neonatal and Pediatric Respiratory Care, Elsevier, 2019.



# SAMPLE QUESTIONS

## CARE OF THE EXTREMELY LOW BIRTH WEIGHT NEONATE

### SAMPLE QUESTIONS

Listed below are five sample questions to acquaint the candidate with the test question format. These questions do not reflect the scope or the difficulty level of the questions on the actual examination. The reference from which each question is derived is also cited. However, other references might substantiate a different answer, and the answer shown here might be substantiated by other references.

The rigorous review to which actual test questions are subject is not applied to these sample questions. The focus that should be attended to in reviewing these items is format, not content.

1. An extremely low birth weight neonate is at increased risk for germinal matrix hemorrhage due to

- A. decreased cerebral arterial blood flow
- B. fragility of the germinal matrix
- C. increased blood-brain barrier

Answer: B

Bissinger, et al. Golden Hours, 2<sup>nd</sup> ed., NCC, 2019, p. 318

2. The major source of heat loss in the extremely low birth weight neonate is

- A. convection
- B. evaporation
- C. radiation

Answer: B

Bissinger, et al. Golden Hours, 2<sup>nd</sup> ed., NCC, 2019, p. 170

3. An ELBW neonate requires chest physiotherapy and suctioning but becomes mottled and flaccid during the procedure. An appropriate intervention would be to

- A. contain in flexion
- B. play soft music
- C. stroke the neonate

Answer: A

Gardner, et al., Handbook of Neonatal Intensive Care: An Interprofessional Approach, Elsevier, 2021, p. 371

4. Administration of surfactant in ELBW with respiratory distress syndrome results in decreased

- A. oxygenation
- B. lung compliance
- C. surface tension

Answer: C

Martin, et al. Fanaroff and Martin's Neonatal-Perinatal Medicine: Diseases of the Fetus and Infant, Elsevier, 2020, p. 1165

5. A 10-day-old 26-week-gestational-age neonate has had repeated heel sticks for labs, and now demonstrates pain behavior when the heel is being touched gently by the mother. The explanation for this response is

- A. conditioning
- B. habituation
- C. hyperalgesia

Answer: C

Gardner, et al., Handbook of Neonatal Intensive Care: An Interprofessional Approach, Elsevier, 2021, p. 277

# SCORING & TEST REPORT

## HOW EXAMS ARE SCORED

NCC examinations are criterion-referenced. This means the passing score is based on a predetermined criterion. This criterion is a statistical ability level established by the Content Team based on evaluation of criticality of content and the test questions' past statistical performance. Questions used to determine pass/fail have proven statistical history that demonstrates the question is appropriate for use to measure an individual's ability level.

There is no set percentage passing level. **An ability level for each candidate is calculated based on the number of questions they answer correctly (there is no penalty for wrong answers).** Pass/fail is determined based on this ability level as compared to pass/fail standard which is a predetermined ability criterion. When different forms of the examination are used, a process called equating is initiated. This procedure converts all results to a common scale. So someone who takes a slightly more difficult form of the exam will need to answer fewer questions correctly than someone who takes a slightly easier form of the exam.

NCC utilizes the item response theory of psychometrics for the analysis of its examinations. Item response theory (Rasch analysis) is the study of test and item scores based on assumptions concerning the mathematical relationship between abilities and item responses. This is a commonly used system, and such examinations as the NCLEX and other health related certification examinations utilize this type of psychometric analysis.

Test reports identify pass/fail status, and they give feedback on the various content areas of the examination in the form of word descriptors: very weak, weak, average, strong and very strong. No percentages or standard scores are given. These descriptors are based on the items within a given subtest. The overall pass/fail decisions are based on the full test, and the verbal descriptors are intended to provide suggested feedback on strengths and weaknesses in various content areas. Since this feedback is based on relatively few items, general verbal descriptions are given instead of subtest scores. These word descriptors are for information only, and they should be interpreted cautiously due to the small number of items included in each content area.

### HAND SCORING YOUR EXAMINATION

If you believe there might be a discrepancy in your test results, you may request a hand score for a fee of \$55.

You must make this request via the NCC website within 60 days of receiving the pass/fail report by selecting that option from your NCC profile at [NCCwebsite.org](https://www.nccwebsite.org/certification-exams) or go to the certification tab <https://www.nccwebsite.org/certification-exams>, scroll down to "Other helpful information" and click "Exam hand score request" to submit your request.

# SCORING & TEST REPORT

## SAMPLE TEST REPORT

Candidates will receive an official test results report from NCC. It will be located in your NCC account. Shown below is a sample test result report for a candidate who has passed the examination.

### CARE OF THE EXTREMELY LOW BIRTH WEIGHT NEONATE EXAMINATION

#### Test Results

NAME

DATE:

ADDRESS

Pass/Fail:

PASS

Maintenance Due Date:

Your credential is designated as: C-ELBW (Certified - Care of the Extremely Low Birth Weight Neonate)

#### EXAM CONTENT REPORT

Overall pass/fail decisions are based on your overall exam performance. A candidate must obtain a score equal to or higher than the “passing score” to pass the exam. A candidate’s performance on the examination is not compared to the performance of others taking the examination.

In addition, the test report provides you with feedback on the various content areas of the examination in the form of word descriptors: Very Weak, Weak, Average, Strong and Very Strong. No percentages or standard scores are given. These descriptors are based on items within a given subtest and are intended to provide suggested feedback on strengths and weaknesses in various content areas. Since this feedback is based on relatively few items, general verbal descriptions are given instead of subtest scores. Word descriptors for scoring are set using these ability levels and utilize equal intervals of scale above and below the pass point to provide additional feedback. See the Important Facts and Information on Test Results and Scores page for more detail. These word descriptors are for information only, and they should be interpreted cautiously due to the small number of items included in each content area.

#### Content Area (Percentage of Questions on Exam)

#### Your Results

General Assessment and Management (28%)

VERY STRONG

Developmental Care (18%)

WEAK

Describe & Manage Pathophysiologic States (39%)

AVERAGE

Assess and Manage Psychosocial Behavioral States and Ethical Issues of the Family throughout Hospitalization and Discharge Utilizing Communication and Data to Improve Outcomes (15%)

AVERAGE

# TERMS OF CERTIFICATION AND CERTIFICATION MAINTENANCE

## AFTER PASSING THE EXAM

### CREDENTIAL

Successfully completing the Care of the Extremely Low Birth Weight Neonate exam entitles you to use the credential C-ELBW (Certified – Care of the Extremely Low Birth Weight Neonate).

### TERMS OF CERTIFICATION

NCC certification is awarded for a period of three years.

The effective date for certification is the date on the official NCC score report letter that shows a passed examination.

### MAINTENANCE AUDITS

Certificants must maintain the conference/CE description and/or objectives, along with the CE certificate which are required to be uploaded if chosen for random audit. Pre-approval of CE does not exempt a certificant from random audit.

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**NO CONTINUING  
EDUCATION IS ISSUED FOR  
TAKING THE  
CARE OF THE EXTREMELY  
LOW BIRTH WEIGHT  
NEONATE EXAM.**

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## MAINTAINING CERTIFICATION

- NCC certification must be maintained every three years.
- Certification that is not maintained will expire
- The NCC certification maintenance program allows you to continue your certification status by obtaining 15 hours of continuing education credit
- For continuing education credit to be used for certification maintenance it must be earned between the date of your notification of certification and the date your maintenance is due.
- The maintenance process includes submitting a maintenance application prior to the maintenance due date with appropriate fees and requested documentation. All CE must be in Care of the Extremely Low Birth Weight Neonate. Using NCC CE modules does NOT automatically maintain your certification. Individuals must submit a maintenance application and pay a maintenance fee in addition to any CE fees.
- Maintenance applications are subject to random audit. If an individual is chosen for audit, they will be required to upload CE certificates and course descriptions. These records should be maintained during each maintenance cycle, until the maintenance application has been approved. Individuals can upload these documents in their maintenance application throughout their maintenance cycle. *Documents from NCC modules are already on file with NCC and therefore are not requested or audited.*
- The maintenance due date is the last day the certification is active. ***NCC Certified professionals do not need to wait until their maintenance deadline to apply.*** As long as they have obtained the required contact hours of continuing education credit - maintenance applications can be submitted up to 12 months before this date to avoid a lapsed certification while the maintenance application is in review. Maintenance will be due in the quarter in which they were notified of their certification (*not the date on which they took the examination*). Maintenance due dates can be found by signing into the certified professional's NCC account. Sign into the account using the associated email and password.

### The NCC website has more detailed information

For more information about the certification maintenance program, click the purple "Maintain your Certification" box.