Neonatal Therapy Certification Examination
Study Guide
January 1, 2022

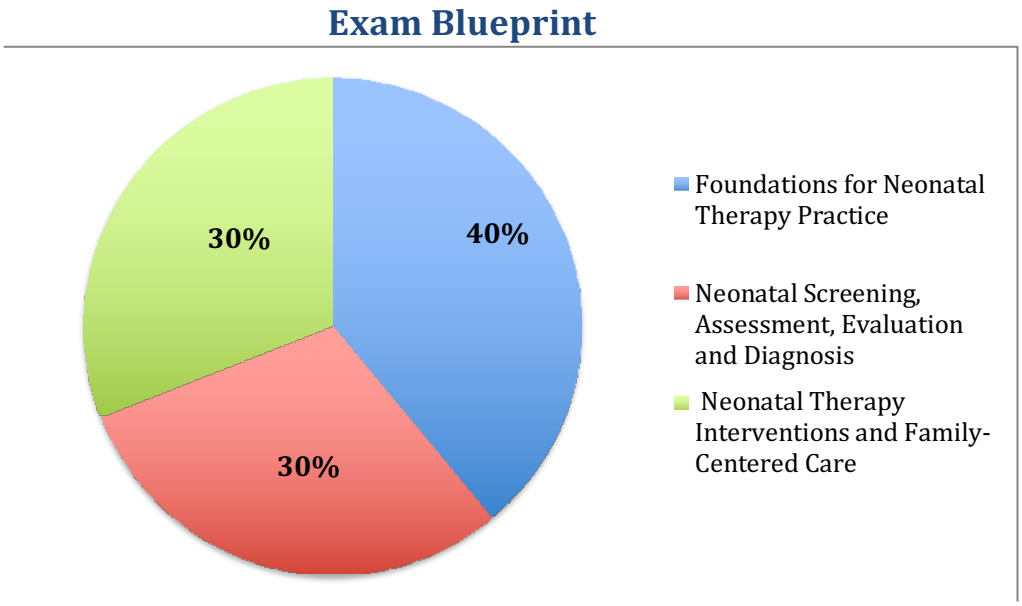
I. Definition of Neonatal Therapy

Neonatal therapy is the art and science of integrating typical development of the infant and family into the environment of the NICU. Neonatal therapy practice incorporates theories and scopes of practice from the respective disciplines of occupational therapy, physical therapy, and speech-language pathology. Neonatal therapy promotes optimal long-term developmental outcomes and nurtures infant-parent relationships by addressing the following synergistic neurodevelopmental systems: neurobehavioral, neuromotor, neuroendocrine, musculoskeletal, sensory, and psychosocial. These systems provide the foundation for the development of functional skills.

NB: *This definition was created by the National Association of Neonatal Therapists Professional Collaborative (NPC)*

II. Content of Examination

The Neonatal Therapy National Examination assesses the basic skill and knowledge required for safe, efficacious, evidence-based, and independent practice in the NICU setting. The examination covers a broad range of knowledge and is broken down as follows:



Descriptions of each area are provided below, along with a self-assessment to aid each applicant in determining areas he/she may need to focus on.

*Content areas have been validated through surveys of Certified Neonatal Therapists, who aided in defining critical knowledge for professionals practicing in the NICU and how often such core knowledge is used in practice.

III. Domain-Specific Content

Domain 1: Foundations for Neonatal Therapy Practice

This domain outlines the foundational knowledge required by neonatal therapists to underpin their practice in the NICU. An understanding of neonatal care principles, infant development and theories of neonatal practice, are important in supporting the advanced clinical reasoning necessary for the provision of neonatal therapy for high-risk infants and their families in the NICU.

Knowledge required:

- Scientific knowledge - Degree/depth of knowledge required varies by component. Some topics require only conceptual understanding while others require full integration of the component – i.e. able to teach, analyze, and reflect upon.
- Atypical and typical preterm and term infant development including neurobehavioral, sensory, feeding and swallowing development
- Basic anatomy & physiology of the neonate
- Embryology
- Environment (including equipment)
- Fetal/Neonatal brain development/Theory of neuronal group selection
- Medical equipment/Commercial infant products (hospital and retail)
- Medical procedures
- Medical terminology and diagnoses
- Models of care and theory in the NICU: attachment theory, dynamic systems theory, synactive theory
- Neurodevelopment (motor, sensory, autonomic)
- Neurobehavior
- Neurodevelopmental outcomes of preterm and high-risk infants
- NICU environment and culture

Domain 2: Neonatal Screening, Assessment, Evaluation and Diagnosis

This domain outlines the core knowledge required for the development of appropriate approaches for the screening, assessment and evaluation of infants in the NICU setting. It considers the clinical reasoning interplay of individualized evaluation of the infant with the development of appropriate intervention strategies.

Knowledge Required:

- Acute and chronic pain
- Assessment/Evaluation – standardized, observational, non-standardized, continuous /ongoing
- Interpreting results
- Maternal risk factors, exposures & complications (medical, psychosocial)
- Medications – potential impact on infant
- Musculoskeletal assessment
- Neurobehavioral assessment
- Neuromotor assessment
- Oral feeding and swallowing (non-instrumental assessment)
- Pain assessment and management
- Pre-feeding skills
- Sensory
- States of arousal
- Synthesize information
- Treatment planning
    - Determine frequency and duration of treatment
    - Set discipline-specific goals
- Utilizing critical thinking skills

Domain 3: Neonatal Therapy Interventions and Family-Centered Care

This domain outlines the core knowledge required to deliver evidence-based interventions with infants and their families in the NICU setting; both in terms of providing neuro-protective support and intervention for the infant, as well as promoting the delivery of family-centered care.

Knowledge Required:

- Evidence-based interventions with neonate and family
- Impact of the NICU stay on the family unit
- Family-centered care
    - Educate/Guide/Promote parental participation and independence in early parenting skills through transition to home.
    - Provide psychological support.
    - Facilitate bonding and attachment.
    - Parent engagement
- ADLs
    - Feeding
    - Facilitate/Support
        - Oral-sensory-motor development
        - Pre-feeding skills
        - Transition to oral feeding (not including instrumental assessment)
        - Breastfeeding support
    - Sleep
        - Protecting sleep
        - Facilitate/support
            - Transition to sleep
            - Safe sleep practices
    - Bathing
        - Facilitate
            - State regulation
            - Self-regulation
            - Neuromotor stability

- Play/Interaction
  - Assist with attainment of age appropriate developmental skills through guided exploration of and interaction with the environment
  - Infant communication
  - Parent-infant interaction

- Environment
  - Modify and adapt the environment
- Neurobehavioral
  - Facilitate/Support
    - Autonomic regulation
    - Motor regulation
    - State transition/regulation
    - Attention/interaction
    - Self-regulation
- Neuromotor
  - Facilitate/Support
    - Neurodevelopmental positioning
    - Neurodevelopmental handling/positive touch
    - Development of normal movement patterns
    - Normal reflex development
    - Normal tone development and tonal changes

IV. Self-Assessment of Domain-Specific Content

Rate your current knowledge and experience of neonatal therapy topics below using the following scale.

Rating Scale:

0 = **No knowledge or skills** - Unfamiliar with concept or practice of the skill

1 = **General knowledge through observation and academic learning** - Familiar with general knowledge related to the skill through academic learning and observation but have not had an opportunity to apply this in the NICU

2 = **General clinical skills with mentorship** - Familiar with general clinical application of the skill and occasionally applied this with mentorship in the NICU

3 = **Neonatal Therapy practice competence** – Implemented the skill in the NICU setting and can begin to guide others in this practice

- Areas that are assessed as a 0 or 1 may require additional education
- Those scored a 2 may require review
- Those scored a 3 indicate good knowledge in that particular area.

Refer to the reference guide for study materials related to domain-specific content that were scored 0, 1, or 2 for additional readings.

1: Foundations of Neonatal Therapy Practice

Knowledge of fetal physical, sensory, feeding and neurologic development

○ 0 ○ 1 ○ 2 ○ 3

Knowledge of co-morbidities & sequelae of preterm birth

○ 0 ○ 1 ○ 2 ○ 3

Knowledge of medical diagnoses that may require NICU admission

○ 0 ○ 1 ○ 2 ○ 3

Knowledge of cardio-pulmonary monitoring thresholds

○ 0 ○ 1 ○ 2 ○ 3

Knowledge of and ability to interpret monitors used in the NICU

○ 0 ○ 1 ○ 2 ○ 3

Knowledge of equipment & medical/nursing care in the NICU

○ 0 ○ 1 ○ 2 ○ 3

Knowledge of synactive theory and other theories used in the NICU

○ 0 ○ 1 ○ 2 ○ 3

Knowledge of common medications used in the NICU, impact on the premature/medically complex infant

○ 0 ○ 1 ○ 2 ○ 3

Knowledge of common medical interventions used in the NICU and potential impact on the premature/medically complex infant such as phototherapy, head/body cooling, intubation, CPAP

○ 0 ○ 1 ○ 2 ○ 3

Knowledge of medical/surgical procedures and the potential impact on the premature/medically complex infant such as PDA ligation, TEF/EA repair, chest tubes, gastroschisis/omphalocele closure, gastrostomy tube placement, Nissen fundoplication

○ 0 ○ 1 ○ 2 ○ 3

Knowledge of NICU “culture”

○ 0 ○ 1 ○ 2 ○ 3

Knowledge of common NICU terminology

○ 0 ○ 1 ○ 2 ○ 3

2: Neonatal Screening, Assessment, Evaluation and Diagnosis

Knowledge of pain assessment and management

0 1 2 3

Knowledge of standardized and non-standardized assessments used in the NICU

0 1 2 3

Knowledge of feeding/swallowing skills in typically developing term infant

0 1 2 3

Knowledge of co-morbidities & sequelae of preterm birth on feeding/swallowing development, including difference between "healthy" premature/immature infant and extremely premature/low birth weight and/or medically complex infant

0 1 2 3

Knowledge of common comorbidities, diagnoses and potential impact on outcome

0 1 2 3

Knowledge of feeding interventions for extremely premature/medically fragile infants

0 1 2 3

Knowledge of models of care used in the NICU

0 1 2 3

Knowledge of the impact of NICU hospitalization on the family

0 1 2 3

Knowledge of the states of arousal, behavioral development in the context of postmenstrual age

○ 0 ○ 1 ○ 2 ○ 3

Knowledge of neonatal reflexes

○ 0 ○ 1 ○ 2 ○ 3

3: Neonatal Therapy Interventions and Family-Centered Care

Knowledge of strategies to support oral feeding skill acquisition

○ 0 ○ 1 ○ 2 ○ 3

Knowledge of family experience of preterm birth

○ 0 ○ 1 ○ 2 ○ 3

Knowledge of evidenced based interventions in the NICU

○ 0 ○ 1 ○ 2 ○ 3

Knowledge of patterns of sleep and methods to protect sleep

○ 0 ○ 1 ○ 2 ○ 3

Knowledge of appropriate positioning for high risk infants

○ 0 ○ 1 ○ 2 ○ 3

Knowledge of methods and tools available to position high-risk infants in the NICU

○ 0 ○ 1 ○ 2 ○ 3

Knowledge of strategies to decrease or increase tone, facilitate feeding, improve state regulation, empower parents, foster reflex development, and ultimately improve outcomes

○ 0 ○ 1 ○ 2 ○ 3

Knowledge about methods to modify the environment

○ 0 ○ 1 ○ 2 ○ 3

V. Sample Examination Questions

Examination questions are multiple choice with 4 options. Read the question carefully and choose the option that best answers the question. Below are some sample examination questions, in addition to the ones provided in the examination manual, to assist you in becoming familiar with the format and style. Explanations for correct answers are provided for your reference after the sample questions.

1. At which gestational age does a fetus first demonstrate an emerging tactile system?
    a. 12-15 weeks.
    b. 16-19 weeks.
    c. 20-23 weeks.
    d. 24-27 weeks

2. What is the Moro response?
    a. When you stroke the side of the infant's mouth, and the infant turns toward the stimulus.
    b. When you extend the knee, and determine the angle of knee flexion at the point of resistance.
    c. When you tap or stroke on the side of the infant's spine, and the infant's trunk flexes toward that side.
    d. When an infant is tilted backwards from upright, and his/her arms abduct and extend, followed by return.

3. Which of the following diagnoses is a risk factor for possible structural anomalies that may impact swallow function?
    a. Fetal alcohol syndrome.
    b. Hypoxic ischemic encephalopathy.
    c. Polyhydramnios.
    d. Intraventricular hemorrhage.

4. What are possible side effects of patent ductus arteriosus ligation that a neonatal therapist should consider?
    a. This procedure can lead to pulmonary hypertension, which can result in limited endurance for feeding and other activities.
    b. This procedure can exacerbate lung disease by decreasing pulmonary compliance, resulting in bronchopulmonary dysplasia.
    c. This procedure can cause increased risk of desaturation episodes, which should be carefully monitored during therapy activities.
    d. This procedure can lead to vocal cord paralysis, resulting in respiratory issues, increased risk of aspiration, dysphagia, and reflux.

5. Which is a common characteristic of a preterm baby, compared to a full-term infant?
    a. Hyperactive reflexes.
    b. More extended positioning.
    c. More fat stores.
    d. Lack of hair.

6. For infants born extremely preterm, what are some patterns related to feeding that are often observed during later infancy and toddlerhood?
    a. Parental report that NICU graduates show improved tolerance of introduction of new, solid foods at early ages.
    b. Altered parent-infant interaction during feeding, with praise for eating more and minimal response to infant cues.
    c. Reduced parental emphasis on weight gain and amount of food intake, with a preference for ad lib feeding schedules.
    d. Heightened parent sensitivity to infant feeding behavior, paying close attention to infant feeding cues.

7. Which of the following sources of nutrition will be most likely utilized for an infant who is 24-weeks postmenstrual age?
    a. Total parenteral nutrition.
    b. 22-calorie formula.
    c. Mother's breastmilk.
    d. No nutrition would be needed.

8. Which of the following NICU assessments can be described as "observations of behaviors repeated at 2-minute intervals before, during, and after caregiving events to assess the interplay of the infant behavioral subsystems to the environment or caregiving environment?"
    a. Naturalistic Observation of the Newborn.
    b. Prechtl's General Movement Assessment.
    c. Test of Infant Motor Performance.
    d. Brazelton Neonatal Behavioral Assessment Scale.

9. In taking an infant out of their bed for therapy at 32 weeks postmenstrual age, which of the following issues should be considered to ensure safety during therapy?
    a. The infant's ability to regulate his/her temperature.
    b. Whether the infant can maintain the head in midline.
    c. Whether the infant can maintain flexion of extremities.
    d. Whether the infant has been off a ventilator for 48 hours.

10. With developmental care provision for an infant who needs a new intravenous (IV) line, the neonatal therapist should recommend the following sequence:
    a. Complete routine cares and then proceed to insert the IV.
    b. Insert the IV, and then follow with a diaper change and routine care.
    c. Have parent hold the baby, insert the IV, and start therapy session.
    d. Insert the IV, and follow with sucrose to decrease pain.

The following case scenario is used in the next 3 questions: Susie was born at 33 weeks estation with tracheal-esophageal fistula and esophageal atresia. She had surgical repair on day of life 3. She was extubated from conventional ventilation at day of life 5. She is supported by high flow nasal cannula at 4 liters of flow and 30% FiO2. She has an oral jejunal tube for small drip feedings. She is one week old today.

11. What is Susie's postmenstrual age?
    a. 1 week
    b. 33 weeks
    c. 34 weeks
    d. 35 weeks

12. What are the indications for neonatal therapy for Susie?
    a. Oral motor dysfunction, motor dysfunction, potential swallowing dysfunction, breathing difficulties, and history of intubation.
    b. Prematurity, limited positioning post-surgery, ongoing noxious sensory input, and potential swallowing dysfunction.
    c. Neonatal therapy is not indicated for Susie because it can complicate post-operative recovery.
    d. Prematurity only, as infant's oral and breathing issues were addressed and corrected by surgery.

13. What therapy services will most likely be needed for follow up post-discharge for this infant?
    a. NICU follow-up clinic, early intervention services to include speech and motor therapy, and feeding clinic.
    b. Speech therapy in surgery follow up clinic only.
    c. No therapy follow up is indicated, as long as the infant is able to complete all feedings by mouth at discharge.
    d. Outpatient occupational therapy services only.

Correct answers and rationale:

Question 1:
Correct answer is A. The tactile system is the first sensory system to develop embryologically, and 12-15 weeks is the only option that reflects the correct timeline.

Question 2:
Correct answer is D. The Moro response is elicited by tipping the child backwards, and involves abduction and extension of the upper extremities followed by return to the initial position. Answer A describes the rooting reflex. Answer B describes measurement of the popliteal angle. Answer C describes the Galant reflex.

Question 3:
Correct answer is C. The fetus swallows amniotic fluid and "primes" the intestines for feeding. One cause of polyhydramnios (excess amniotic fluid) is when the fetus is not swallowing amniotic fluid, such as in the case of esophageal atresia, clefts or structural problems impacting swallowing. Fetal Alcohol Syndrome presents with microcephaly and some facial differences, but swallowing structures are intact. Both hypoxic ischemic encephalopathy and intraventricular hemorrhage are injuries to the brain which do not influence swallowing structures.

Question 4:
Correct answer is D. One risk factor of surgical closure of patent ductus arteriosus (PDA) is left vocal fold paralysis, which can lead to vocal cord paralysis and other factors listed in answer "D." Answer "A" describes pulmonary hypertension. When infants experience pulmonary hypertension, there is a pressure gradient that makes it difficult to move blood to the lungs for oxygenation and the neonate may shunt blood from the right side of the heart to the left, keeping the PDA open. In answer "B", an open PDA can contribute to increased rate of BPD; therefore if the PDA is closed, lung function should be improved. In answer "C," there are multiple reasons for oxygen desaturation, not just PDA. After PDA closure, the infant should oxygenate better, as normal cardiac circulation can occur rather than shunting blood through the PDA.

Question 5:
Correct answer is B. Premature infants have lower muscle tone and less ability to fight gravity, resulting in more likelihood for extended positioning patterns. Answer A is incorrect because premature infants tend to have hypoactive, not hyperactive, reflexes. Answer C is incorrect because premature infants have less fat than full-term infants. Answer D is incorrect because term infants typically have shed their lanugo, or it has thinned considerably.

Question 6:
Correct answer is B. Several authors have described altered parent-infant interaction around feeding when infants are born prematurely. Parents of these infants demonstrate more focus on volume intake, and are concerned about weight gain. Therefore, parents have difficulty following infant cues during feeding, and this persists into toddlerhood and preschool ages. Option B correctly describes these issues. Options C and D are incorrect because they imply that parents give less importance to intake and weight, and more importance to infant cues. Option A is incorrect because these infants also demonstrate difficulties with introduction of solid foods, particularly if they have lumpy textures.

Question 7:
Correct answer is A. For a child at 24-weeks postmenstrual age, total parenteral nutrition can provide the child with the necessary nutrients (option A). A 24-week infant cannot take feedings by mouth (incorrect options B and C) because the rooting, swallowing, and sucking reflexes emerge around 28 weeks (and even then, they are still be slow or imperfect). Option D is evidently incorrect, as a source of nutrition needs to be provided.

Question 8:
Correct answer is A. The Naturalistic Observation of the Newborn (NONB) was developed as part of the Neonatal Individualized Developmental Care and Assessment Plan (NIDCAP), based on Dr. Heidelise Als' synactive theory. This assessment is observational with behaviors recorded over 2 minute intervals. The clinician summarizes results and writes a treatment plan for the baby based on infant responses to handling and the environment. While the General Movement Assessment (GMA) uses critical skills of observation for assessment, it is not time incremental over 2 minute periods and focuses more specifically on motor quality. The last two assessments - the Test of Infant Motor Performance (TIMP) and the Brazelton Neonatal Behavioral Assessment Scale (NBAS) - require that the clinician handle the infant and assess responses to handling and interaction.

Question 9:
Correct answer: A is the correct answer as ability to regulate temperature would be a key consideration for infant safety when taking them out of their bed. B and C are incorrect because the infant may not be able to perform these two tasks, but this does not affect the safety of therapy. D is incorrect because time off the ventilator is not a guideline to determine therapeutic safety.

Question 10:
Correct answer: A is the correct answer because in order to decrease infant stress, the least noxious stimuli in the caregiving cluster should be introduced first, and the most

noxious stimuli should be introduced last. B, C and D are incorrect because the most noxious stimulus is not introduced last. Also, in B and C, IV insertion can affect infant response to subsequent tactile handling. Finally, D is also incorrect because sucrose should be administered prior to the procedure to optimize pain control, not after the procedure.

Question 11:
Correct answer: C. Postmenstrual age is defined as the gestational age plus the chronological age. Answer A is the chronological age, answer B is the gestational age, and answer D is not relevant to the scenario.

Question 12:
Correct answer: B. The infant has all of the listed reasons identified by the American Academy of Pediatrics and the National Association of Neonatal Nurses to indicate therapy involvement to improve outcomes. A is incorrect because it is not noted that the infant has oral motor dysfunction or motor dysfunction, and this list does not include significant items such as prematurity. C is incorrect because prematurity, pain associated with current and past medical interventions, swallowing disorder, and ongoing noxious sensory input all indicate the need for therapy intervention. D is incorrect because documented outcomes of tracheal-esophageal fistula and esophageal atresia repair are noted to have ongoing swallowing and postural difficulties that can affect long term development.

Question 13:
Correct answer: A. Infants with tracheal-esophageal fistula (TEF) and esophageal atresia (EA) typically demonstrate ongoing swallowing difficulties and medical interventions for esophageal motility requiring feeding therapy. This infant's prematurity plus potentially long NICU hospitalization, as well as postural limitations sometimes associated with EA/TEF repair, warrant NICU follow-up and early intervention evaluation. B is incorrect because most infants who have TEF and EA benefit from speech therapy services, however, their ongoing sensory/feeding needs and postural needs cannot be addressed by speech therapy alone. C is incorrect because most infants who have TEF and EA benefit from speech therapy services addressing transitioning to solid foods, even when they swallow liquids with ease. D is incorrect because most infants who have TEF and EA benefit from speech therapy services addressing transitioning to solid foods, even when they swallow liquids with ease, and most likely will also need OT to address any ongoing sensory needs associated with prematurity

VI. Exam Preparation Tips

1. Review the reference list provided to you at the time you completed your application. Take NICU-related continuing education courses and/or review material related to neonatal therapy.
2. Use the self-assessment tools in this study guide, and the sample questions in the examination manual and the study guide, to help direct your study.
3. Plan ahead and pace yourself – make a schedule that helps you organize your study sessions and stick to it.
4. Don't feel like you have to block large chunks of time for each study session. Studying for shorter periods but more frequently may work better in terms of sticking to a schedule, and it can help you better retain information.
5. Select an environment without distractions so you can focus on your studying.
6. Allow yourself breaks as needed, but if you feel like you are taking too many breaks, it may not be a good day for studying. It is ok to modify your schedule as long as you keep making progress.
7. Start with one or two topics that you feel most comfortable with, to reinforce what you know and to start on a positive note. Then move to a topic that is a bit more challenging.
8. Use the resource list to help you expand your knowledge in areas where you feel less comfortable.
9. Focus on relevant clinical knowledge – things every neonatal therapist who has several years of experience should know – rather than random facts.
10. As you study, think of possible questions related to the material. What are the nuggets of information that are critical in the material that you are reading? If you had to check if someone knows this topic, what would you ask them?
11. Make flashcards with important topics, or write questions related to the material – then come back after a few weeks and see if you can answer them.
12. Get support from others who are preparing for the exam! Group studying can help reinforce information when you quiz one another or you share what you know on a topic. You can also help keep each other on track.
13. Arrive early at the testing center so you don't feel rushed. Get a full night's sleep the night before so you are rested and focused.
14. Eat something before you come. No food or drinks are allowed at the testing center.

Feedback from CNTs on completing the examination process

Certified neonatal therapists who have successfully completed the examination process have provided feedback on their experience of preparing for and undertaking the examination, which you may find useful.

- *"The type of knowledge provided was more general than expected"*
  Remember that the examination is designed to ascertain ***core knowledge*** required for safe, efficacious, evidence-based, and independent practice. The examination is not designed to test knowledge of infrequent or rare clinical presentations in the NICU. The examination also does not contain questions with content that does not have supporting evidence. You should have a comfortable level of knowledge across the core domains, built from your years/hours of experience in the NICU, personal reading/study and the NICU specific education and mentoring processes you have undertaken to date.

- *"Take the time to read through the recommended articles…focus on content over details"* Previous applicants have found the reference list in the following section helpful, although it can feel like a large amount of reading to review. In planning their study approach, CNTs noted that it was important to understand the main knowledge constructs discussed in the papers, but not necessarily to focus on specific study details.

- *"Review areas with which you have less clinical experience"*
  CNTs recognized that depending on their domain of practice and the different team members working within their NICU setting, they may have more practice experience in some core domains than others. This appears to particularly apply to areas such as feeding and neurodevelopmental assessment. The examination is designed to assess your understanding of ***core*** knowledge in these domains, so you will be familiar with many of them, even it if doesn't constitute part of your daily neonatal therapy practice on a regular basis. CNTs suggested that it is helpful to approach the review of the reference list by ensuring greater focus on those areas where they had less clinical experience, and therefore may be less familiar with some of the evidence supporting neonatal therapy practice in those domains. The applicant can do the self-assessment to better isolate core areas to focus their study on.

Reference Guide for Domain-Specific Study for the Neonatal Therapy Certification Examination

The NTCB hopes you will find this list useful as you prepare for the Neonatal Therapy Certification Exam. This list is extensive, but not all inclusive. The references in bold text contain core knowledge, significant amounts of information, and key concepts that are critical to neonatal therapy practice.

Below are domain-specific references that may be important in your review of current evidence related to the NICU as you prepare for the Neonatal Therapy Certification Examination. Use the self-assessment to identify content areas to focus your review.

Purple= Available via book
Bold= Core content
Black= Hyperlink to article access (For Windows based computers, control + click to follow the link;
For Mac based computers, click on the link/ this will take you to where you can obtain the article if your hospital or institution has access to that journal)

Foundational Materials

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