

Neonatal-Perinatal Medicine

Content Outline

In-Training, Certification, and
Maintenance of Certification Exams

Effective for examinations administered March 1, 2022, and after

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Overview

This content outline was developed primarily to serve as the blueprint for the neonatal-perinatal medicine in-training, initial certification, and maintenance of certification examinations. This outline identifies for all important stakeholders (eg, prospective candidates, diplomates, the public, training programs, professional associations) the knowledge areas being measured by these exams.

This outline takes effect on March 1, 2022. All neonatal-perinatal medicine examinations administered after this date will adhere to the specifications within this outline.

DEVELOPMENT OF THE NEONATAL-PERINATAL MEDICINE CONTENT OUTLINE

The initial draft of this content outline was developed by a diverse, representative panel of 15 practicing neonatologists. The panel identified the knowledge required of neonatologists in clinical practice and categorized that knowledge into content domains and subdomains. All board-certified neonatologists (N = 5,119) were then invited to provide feedback via an online survey. A total of 614 neonatologists rated the frequency, criticality, and relevance of the content domains and subdomains. The survey also collected open-ended comments from respondents in order to identify any important content areas that were not included in the initial draft.

The survey results were used to make final revisions to the outline and to establish the exam weights (ie, the percentage of exam questions associated with each content domain). The content domains that were rated as highly critical, highly relevant, and frequently required in practice have been weighted more heavily than the domains rated as less critical, less relevant, and/or less frequently required. Establishing the exam weights in this manner helps to ensure that ABP's neonatal-perinatal medicine exams are measuring the full breadth of knowledge required for clinical practice, while also placing an appropriate amount of emphasis on the content domains that were identified by practicing neonatologists as being critically important.

CONTENT DOMAINS AND SUBDOMAINS

The knowledge for safe and effective practice as a neonatologist has been categorized into 17 content domains, presented in the table below. Within each domain, a set of content subdomains has been identified that provide a more detailed breakdown of the knowledge areas that may be assessed (beginning on page 4). Each exam question included on a neonatal-perinatal medicine exam (in-training, initial certification, and maintenance of certification) is classified according to the content domain and subdomain to which it is most closely aligned. If an exam question does not align with one of the content subdomains within this outline, it is removed from the question pool and is not included on an exam.

Neonatal-Perinatal Medicine Content Domains	
1.	Respiratory
2.	Cardiovascular
3.	Neurology and Neurodevelopmental Outcomes
4.	Immunology and Infectious Diseases
5.	Nutrition
6.	Gastroenterology and Bilirubin
7.	Maternal-Fetal Medicine
8.	Resuscitation and Stabilization
9.	Genetics and Dysmorphism
10.	Water, Salt, Renal
11.	Endocrine, Metabolic, Thermal
12.	Hematology and Oncology
13.	Head (EENT), Neck, and Skin
14.	Surgical and Complex NICU Patient Management
15.	Basic Pharmacology Principles
16.	Management of Neonatal Care Systems
17.	Scholarly Activities and Quality Improvement

UNIVERSAL TASKS

To help ensure the clinical relevance of neonatal-perinatal medicine exams, the neonatal-perinatal medicine subboard identified a set of four universal tasks, described in the table below, that reflect the primary ways in which neonatal-perinatal medicine knowledge can be applied in clinical practice. Each exam question is classified according to the universal task to which it is most closely aligned. If an exam question does not align with one of the universal tasks, it is removed from the question pool and is not included on an exam.

Universal Tasks for Neonatal-Perinatal Medicine	
Universal Task	Description
1. Core Science	Understanding and applying anatomy, embryology, physiology, and pathophysiology to the care of neonates
2. Epidemiology and Risk Assessment	Recognizing patterns of health and disease and understanding the variables (eg, risk factors, genetics, natural history) that impact patient outcomes
3. Diagnosis, Testing, and Monitoring	Using available information and diagnostic tools (eg, patient history, physical exam, prenatal imaging studies, laboratory tests, genetic testing) to formulate differential diagnoses, order additional tests when appropriate, and monitor disease evolution, response to treatment, and complications
4. Management, Treatment, and Prevention	Formulating comprehensive management plan, including appropriate use of pharmacology (including drug effects), medical technology, prenatal and postnatal counseling, consultation and co-management, reevaluation, anticipatory guidance, discharge planning, and long-term follow-up

Please note that most, but not all, exam questions are classified into one of the universal task categories. Questions that fall within any content subdomain pertaining to a disease, disorder, syndrome, or condition encountered by neonatologists will receive a universal task classification. Those subdomains to which the universal tasks apply are denoted by a “*” throughout this content outline.

Although those subdomains to which universal tasks apply have been worded in a way that appears to focus on the “abnormal” (eg, “disorders of glucose homeostasis and pancreatic function”), it is understood that knowledge of “normal” development, embryology, anatomy, and physiology is also important for the safe and effective diagnosis and management of those conditions. As a result, test takers should expect to see some exam questions (classified as “core science”) that focus on normal development, embryology, anatomy, and physiology.

A few sample test questions have been provided to illustrate how items are classified into content domains/subdomains and universal tasks.

SAMPLE QUESTIONS

Example #1:

Which of the following sets of laboratory findings best represents fasting hepatic glucose release (mg/kg/min) in unstressed full-term and preterm newborn infants?

	<i>Full-term</i>	<i>Preterm</i>
Set A	3 to 5	4 to 8
Set B	1 to 2	2 to 4
Set C	8 to 10	10 to 12
Set D	8 to 10	8 to 10

- A. Set A *
- B. Set B
- C. Set C
- D. Set D

Correct answer = Set A

This question would be classified as shown below. Please note that although this question is classified into the “Disorders of glucose homeostasis and pancreatic function” subdomain (11.B), the focus of this question is on “normal” glucose homeostasis and would fall into the “core science” universal task category.

Item Classification	
Content Domain/ Subdomain*	11. Endocrine, Metabolic, Thermal B. Disorders of glucose homeostasis and pancreatic function
Universal Task	1. Core Science

*Note: Content domain/subdomain 11.B can be found on page 4 of this document (within the detailed content outline section).

Example #2

A 7-day-old, full-term newborn infant has lethargy, jaundice, and hypoglycemia.

Urinalysis	
Glucose	Negative
Protein	1+
Ketones	Positive
Urine reducing substances	Positive

Which of the following is the most likely diagnosis?

- A. Hereditary fructose intolerance
- B. Glycogen synthetase deficiency
- C. Glucose-6-phosphate dehydrogenase deficiency
- D. Galactosemia *

Correct answer = D. Galactosemia

This question would be classified as shown below.

Item Classification	
Content Domain/Subdomain*	11. Endocrine, Metabolic, Thermal H. Inborn errors of metabolism and mitochondrial, lysosomal, and peroxisomal disorders
Universal Task	3. Diagnosis, Testing, and Monitoring

*Note: Content domain/subdomain 11.H can be found on page 4 of this document (within the detailed content outline section).

DEVELOPMENT AND CLASSIFICATION OF EXAM QUESTIONS

Although the field of neonatal-perinatal medicine is continually evolving, the content domains and subdomains within this outline should be viewed as broad categories of knowledge that are likely to remain relatively stable over time. The detailed knowledge within the content domains and subdomains, however, is likely to change as the field continues to advance. Because exam questions may assess a neonatologist's knowledge of a specific element within a content domain/subdomain, it is important to note that it is the responsibility of the test taker to ensure that his or her knowledge within each knowledge area is current and up to date.

In order to ensure all neonatal-perinatal medicine exam questions are current and up to date, the ABP follows a rigorous item development and approval process. Each exam question is written by a board-certified practitioner or academician who has received training on how to write high quality exam questions. Each question is classified according to the content domain/subdomain to which it is most closely aligned and according to the universal task to which it is most closely aligned.

Questions that do not align with a content domain/subdomain and, if applicable, a universal task are not included in the question pool and are not included on an exam.

Once a question has been written, it is then discussed and revised, if necessary, by the ABP's Subboard of Neonatal-Perinatal Medicine, a large, diverse panel of practicing neonatologists. During the revision process, each question is also reviewed multiple times by a medical editor to ensure accuracy and by staff editors who standardize question style, format, and terminology; correct grammar; and eliminate ambiguity and technical flaws, such as cues to the answer.

Once the subboard has approved a question, it is included in the question pool and is made available for future exams. All approved questions in the pool, including questions that have been used previously on an exam, are reviewed periodically for accuracy, currency and relevance.

Exam Weights

The tables below indicate the exam weights (ie, the percentage of exam questions associated with each content domain) for the ABP's neonatal-perinatal medicine exams. Please note that the weights reflect the content of a typical exam and are approximate; actual content may vary.

	Content Domain	Exam Weight
Direct Care of NICU Patients	1. Respiratory	14%
	2. Cardiovascular	10%
	3. Neurology and Neurodevelopmental Outcomes	9%
	4. Immunology and Infectious Diseases	7%
	5. Nutrition	9%
	6. Gastroenterology and Bilirubin	6%
	7. Maternal-Fetal Medicine	5%
	8. Resuscitation and Stabilization	6%
	9. Genetics and Dysmorphism	5%
	10. Water, Salt, Renal	6%
	11. Endocrine, Metabolic, Thermal	5%
	12. Hematology and Oncology	4%
	13. Head (EENT), Neck, and Skin	3%
	14. Surgical and Complex NICU Patient Management	3%
	15. Basic Pharmacology Principles	2%
	<i>Subtotal</i>	94%
General Knowledge	16. Management of Neonatal Care Systems	2%
	17. Scholarly Activities and Quality Improvement	4%
	<i>Subtotal</i>	6%
Total		100%

Detailed Content Outline

Domain 1: Respiratory

- A. Anatomy and development of the respiratory system
- B. Respiratory physiology and control of breathing
- C. Gas exchange, transport, and delivery
- D. Transition to air-breathing
- E. Aspiration syndromes*
- F. Respiratory distress syndrome*
- G. Bronchopulmonary dysplasia and chronic lung diseases*
- H. Common disorders of the chest wall, diaphragm, and pleura*
- I. Common disorders of the neonatal tracheobronchial tree*
- J. Common disorders of the neonatal pulmonary vasculature*
- K. Common disorders of the upper airway*
- L. Air leak syndromes*
- M. Infections of the respiratory system*
- N. Apnea*

Domain 2: Cardiovascular

- A. Anatomy and development of the cardiovascular system
- B. Cardiovascular physiology
- C. Hypotension*
- D. Hypertension*
- E. Congestive heart failure*
- F. Patent ductus arteriosus*
- G. Pulmonary hypertension*
- H. Acyanotic congenital heart disease*
- I. Cyanotic congenital heart disease*
- J. Cardiac arrhythmias*
- K. Cardiac tamponade*
- L. Cardiomyopathies*

Domain 3: Neurology and Neurodevelopmental Outcomes

- A. Physiology of the nervous system
- B. Neurologic examination and developmental evaluation
- C. Cerebral palsy*
- D. Disorders of migration of the central nervous system*
- E. Neural tube development disorders*
- F. Neonatal seizures*
- G. Disorders of neuromuscular function and neonatal muscle tone*
- H. Infections of the central nervous system*
- I. Hydrocephalus*
- J. Ischemic, hemorrhagic, and vascular lesions of the central nervous system*
- K. Hypoxic-ischemic encephalopathy*

Domain 4: Immunology and Infectious Diseases

- A. Development of immune defenses in the fetus and neonate
- B. Infection prevention and antibiotic stewardship
- C. Vaccination-related knowledge (eg, principles, schedules, vaccine-hesitancy)

- D. Immunodeficiencies and conditions with altered splenic function*
- E. Neonatal bacterial infections*
- F. Perinatal and postnatal viral infections*
- G. Fungal infections*
- H. Omphalitis*
- I. Cutaneous infections*
- J. Genitourinary infections*

Domain 5: Nutrition

- A. Principles and applications of parenteral nutrition
- B. Principles and applications of enteral nutrition
- C. Principles and applications of breast milk
- D. Vitamins and nutritional supplements
- E. Feeding and oral motor disorders*
- F. Postnatal growth failure and nutritional deficiencies*

Domain 6: Gastroenterology and Bilirubin

- A. Embryology, anatomy, and development of the normal GI system and liver
- B. Biochemistry and metabolism of bilirubin
- C. Congenital malformations of the GI system*
- D. Intestinal obstruction in newborn infants*
- E. Abnormal stooling*
- F. Neonatal liver failure*
- G. Gastroesophageal reflux*
- H. Gastrointestinal bleeding*
- I. Necrotizing enterocolitis and gastrointestinal perforation*
- J. Hyperbilirubinemia*

Domain 7: Maternal-Fetal Medicine

- A. Pregnancy physiology
- B. Assessment of fetal well-being
- C. Prenatal fetal interventions
- D. Multiple gestation
- E. Delayed cord clamping
- F. Lactation physiology
- G. Disorders of fetal growth*
- H. Prenatal substance exposure, including neonatal withdrawal syndromes*
- I. Preterm birth*
- J. Maternal medical disorders and medications affecting the fetus and newborn infant*
- K. Abnormalities of the umbilical cord, fetal membranes, and placenta*
- L. Delivery modalities and their complications, including birth trauma*

Domain 8: Resuscitation and Stabilization

- A. Ethic and legal principles (eg, limits of viability, fertility, decision-making)
- B. Palliative care principles
- C. Resuscitation of a newborn infant*
- D. Acute and chronic perinatal asphyxia*

Domain 9: Genetics and Dysmorphism

- A. Common inheritance patterns of genetic disease
- B. Common congenital anomalies (eg, dysmorphisms, deformations, disruptions, malformations, syndromes)*
- C. Common aneuploidies presenting in the neonatal period*
- D. Common chromosome deletion or insertion syndromes presenting in the neonatal period*
- E. Common single-gene disorders presenting in the neonatal period*
- F. Common disorders of genomic imprinting and triplet repeat syndromes presenting the newborn period*

Domain 10: Water, Salt, Renal

- A. Embryology, anatomy, and development of the kidneys and urinary tract
- B. Fetal and neonatal body fluid composition and distribution
- C. Disorders of acid-base balance*
- D. Water and electrolyte imbalance*
- E. Congenital malformations of the kidneys and urinary tract*
- F. Acute and chronic renal failure*
- G. Neonatal nephrotic syndromes*

Domain 11: Endocrine, Metabolic, Thermal

- A. Calcium, phosphorous, and magnesium metabolism
- B. Disorders of glucose homeostasis and pancreatic function*
- C. Disorders of thermal regulation*
- D. Disorders of the thyroid gland*
- E. Disorders of the adrenal gland and the hypothalamic pituitary axis*
- F. Disorders of the gonads and secondary sex characteristics*
- G. Osteopenia of prematurity*
- H. Inborn errors of metabolism and mitochondrial, lysosomal, and peroxisomal disorders*

Domain 12: Hematology and Oncology

- A. Neonatal anemias*
- B. Neonatal polycythemia*
- C. Neonatal neutropenia
- D. Erythrocyte disorders*
- E. Hemoglobinopathies and hemolytic disorders*
- F. Neonatal platelet disorders*
- G. Disorders of homeostasis and thrombosis (clotting disorders)*
- H. Congenital leukemias*
- I. Solid neoplasms*

Domain 13: Head (EENT), Neck and Skin

- A. Normal development of skin
- B. Retinopathy of prematurity*
- C. Neonatal hearing disorders*
- D. Congenital and acquired disorders of the eye*
- E. Cutaneous vascular anomalies*
- F. Cutaneous manifestation of systemic diseases*
- G. Disorders of the skin, hair, and nails*
- H. Congenital anomalies of the head, ears, nose, mouth, and neck*
- I. Neurocutaneous syndromes*

Domain 14: Surgical and Complex NICU Patient Management

- A. Physiologic principles and pharmacology of neonatal anesthesia, analgesia, and sedation
- B. Perioperative care of newborn infants (eg, respiratory, fluid, temperature, antibiotics, pain management)
- C. Indications, management, and complications of medical technology (eg, central lines, gastrostomy, tracheostomy, ostomy, ventriculoperitoneal shunt, ECMO)

Domain 15: Basic Pharmacology Principles

- A. Definitions and principles of pharmacokinetics
- B. Foundations of drug dosing in the NICU, including absorption, bioavailability, and distribution
- C. Foundations of drug level monitoring in the NICU, including metabolism and elimination

Domain 16: Management of Neonatal Care Systems

- A. Principles of resource organization, utilization, and management (eg, principles of value in healthcare)
- B. Principles of leadership (eg, leadership styles, team leadership, change management)
- C. Advocacy for the unmet healthcare needs of the maternal-infant dyad
- D. Health equity and health disparities (eg, access, social determinants of health, implicit bias, systemic racism)
- E. Handoff and transport principles, tools, and communication strategies
- F. Principles of public and population health, services, and evaluation (including definitions of perinatal, neonatal, post-neonatal, and infant mortality)
- G. Signs and symptoms of psychological trauma in self, peers, team members, and caregivers
- H. Principles of clinical guideline development and evaluation

Domain 17: Scholarly Activities and Quality Improvement

- A. Principles of biostatistics in research
- B. Principles of epidemiology and research design
- C. Ethics in research
- D. Quality improvement