

Module 10 - Neonatal Respiratory Therapy

This module introduces the learner to the neonatal patient in the child health environment

Rationale

Why is it important for you to learn this material?

Neonatal respiratory therapy is an important but specialized area. There are several physiologic changes that must occur for a neonate to transition from uterine to extrauterine life, and understanding these is crucial to providing respiratory care to an ill neonate. In addition, there are a few techniques unique to the assessment of the newborn such as APGAR scoring and neurologic reflex tests. Further, several pathophysiologies, both surgical and nonsurgical, are unique to the newborn and thus an understanding of these pathophysiologies is needed to offer appropriate respiratory therapy both in the first minutes of life, as well as for ongoing care.

Learning Outcome

When you complete this module you will be able to

Discuss the respiratory development of the neonate from conception to birth and describe the transition from fetal circulation to extrauterine life. You will also be able to describe techniques for assessment of the newborn. You will have knowledge of a variety of pathologies specific to the newborn and how they affect the respiratory system.

Learning Objectives

Here is what you will be able to do when you complete each objective.

1. Discuss the stages of fetal lung development.
2. Discuss the function of the placenta and fetal circulation.
3. Discuss the components of a comprehensive prenatal and perinatal history.
4. Discuss techniques for the physical examination of a newborn.
5. Discuss special problems related to the newborn, including thermoregulation, nutrition, jaundice, and electrolyte balance.
6. Discuss pulmonary pathologies unique to the newborn such as RDS and PPHN.
7. Discuss surgical disorders of the neonate.
8. Discuss congenital heart defects.

Objective 1

When you complete this objective you will be able to...

Discuss the stages of fetal lung development:

- embryonic
- pseudoglandular
- canalicular
- saccular
- alveolar

Learning Activity

Complete each of the Learning Activities listed below.

Objective Content – Read Chapter 1 in Walsh, Brian K., Perinatal and Pediatric Respiratory Care, 3rd Edition.

Answer the following questions:

1. During what stage of lung development do the primary airways form?
2. During what stage of lung development are smooth muscle and lymphatics developed?
3. During what stage of lung development is immature surfactant present, and what specialized cells produce surfactant?
4. At how many weeks' gestation is mature surfactant produced?

Objective 2

When you complete this objective you will be able to...

Discuss the role of the placenta and describe fetal circulation including:

- Placental pathologies
- Which vessel carries oxygenated blood to the fetus
- The role of fetal hemoglobin in the neonate
- The role of amniotic fluid
- The purpose of the foramen ovale and ductus arteriosus
- The transition from fetal to postpartum circulation

Learning Activity

Complete each of the Learning Activities listed below.

Objective Content – Read Chapter 2 in Walsh, Brian K., Perinatal and Pediatric Respiratory Care, 3rd Edition.

1. Briefly describe abruptio placentae
2. Describe the three vessels of the umbilical cord, including which vessels carry oxygenated blood to the fetus.
3. In what direction does fetal hemoglobin shift the oxyhemoglobin dissociation curve?
4. Briefly describe oligohydramnios.
5. Describe the causes and transition from fetal to postpartum circulation.

Objective 3

When you complete this objective you will be able to...

Discuss the components of a comprehensive prenatal and perinatal history:

- Describe the factors that lead to classification of a high-risk pregnancy/delivery
- Describe methods of fetal monitoring and assessment
- Describe the process of labour and delivery

Learning Activity

Complete each of the Learning Activities listed below.

Objective Content – Read Chapter 3 in Walsh, Brian K., Perinatal and Pediatric Respiratory Care, 3rd Edition.

Answer the following questions:

1. What fetal problems are associated with gestational diabetes?
2. With regards to maternal/fetal infection, what does the TORCH acronym stand for?
3. List some of the complications of post-term babies (>42 weeks gestation).
4. Describe the following methods of fetal assessment:
 - Ultrasound:
 - Amniocentesis:
 - Chorionic villus sampling
 - Fetal heart rate monitoring
5. List the 3 stages that comprise labour:

Objective 4

When you complete this objective you will be able to...

- Discuss the techniques for the physical examination of the newborn.

Learning Activity

Complete each of the Learning Activities listed below.

Objective Content – Read Chapters 4 and 5 in Walsh, Brian K., Perinatal and Pediatric Respiratory Care, 3rd Edition.

Answer the following questions:

1. Describe what the acronym APGAR stands for, and how it is scored.
2. List the 4 neonatal reflex tests performed after birth:
3. What is the normal respiratory rate for a neonate?

Objective 5

When you complete this objective you will be able to...

- Discuss special problems related to the newborn, including thermoregulation, nutrition, jaundice, and electrolyte balance.

Learning Activity

Complete each of the Learning Activities listed below.

Objective Content – Read the attached PowerPoint titled, Special Problems Relating to the Newborn.

Answer the following questions:

1. What is the primary mechanism a newborn uses to maintain adequate body temperature?
2. What are the 4 ways infants lose heat?
3. What neonatal population most commonly suffers from hypoglycemia?
4. Briefly describe each of the following:
Physiologic jaundice –
Pathologic jaundice –

Objective 6

When you complete this objective you will be able to...

Discuss a variety of pathologies specific to the neonate:

- Respiratory distress syndrome
- Transient tachypnea of the newborn
- Meconium aspiration syndrome
- PPHN
- Apnea of prematurity
- Bronchopulmonary dysplasia
- Retinopathy of prematurity
- Intraventricular hemorrhage

Learning Activity

Complete each of the Learning Activities listed below.

Objective Content – Chapters 27 and 29 in Walsh, Brian K., Perinatal and Pediatric Respiratory Care, 3rd Edition.

Answer the following questions:

1. Briefly describe the etiology and pathophysiology of the following:
RDS –
TTN –
PPHN –
Meconium aspiration syndrome –

Objective 7

When you complete this objective you will be able to...

Describe a variety of surgical disorders of the neonate.

- Choanal atresia
- Gastroschisis
- Congenital diaphragmatic hernia
- Necrotizing enterocolitis

Learning Activity

Complete each of the Learning Activities listed below.

Objective Content – Read Chapter 28 in Walsh, Brian K., Perinatal and Pediatric Respiratory Care, 3rd Edition.

Answer the following questions:

1. What would be the most appropriate ventilation strategy for a newborn with a congenital diaphragmatic hernia?
2. Briefly describe the respiratory implications of choanal atresia.

Objective 8

When you complete this objective you will be able to...

Discuss a variety of congenital heart defects and their respiratory implications.

- Tetralogy of Fallot
- Hypoplastic left heart
- ASD/VSD
- Transposition of the great vessels
- PDA
- Left ventricle outflow tract obstruction
- Anomalous pulmonary venous drainage

Learning Activity

Complete each of the Learning Activities listed below.

Objective Content – Read Chapter 30 in Walsh, Brian K., Perinatal and Pediatric Respiratory Care, 3rd Edition.

Answer the following questions:

1. List three respiratory interventions that can increase pulmonary vascular resistance in children with congenital heart defects.
2. Which drug is given to maintain patency of the ductus arteriosus in ductal-dependent cardiac anomalies? What is the name of the drug given to help close a PDA?
3. Complete the following table:

	<i>Cyanotic</i>	<i>Acyanotic</i>
Hypoplastic left heart		
Tetralogy of Fallot		
VSD		
PDA		
Transposition of the great arteries		
Aortic stenosis		
Truncus arteriosus		
Hypoplastic right ventricle		
ASD		