

Bergen Community College
Division of Health Professions
Respiratory Care Program
RSP-241 Neonatal / Pediatric Respiratory Care

Course Information

Course and Section Number: RSP-241-00x

Meeting Times and Locations:

Instructor:

Office Location:

Phone:

Departmental Secretary:

Office Hours:

Email Address:

Course Description

This course provides a comprehensive overview of pediatric and neonatal respiratory care. Special considerations of respiratory care practice unique to pediatrics and neonatology are discussed. Topics include pediatric anatomy and physiology, fetal development, clinical assessment, oxygen therapy, airway management, mechanical ventilation, resuscitation, cardiopulmonary pathophysiology and disorders specific to this specialty profession within respiratory care.

Credits: 3 (lectures 2 hours and lab 2 hours)

Prerequisites: RSP 231, 240, 250

Co-requisites: RSP 235, 260

Student Learning Outcomes

As a result of meeting the requirements in this course the student will:

1. Choose the appropriate oxygen and airway management devices utilized for disease management.
2. Formulate methods to initiate mechanical ventilation for various pathophysiologic conditions.
3. Differentiate between adult and neonatal/pediatric anatomy and physiology.
4. Distinguish various cardiopulmonary disorders in the infant and pediatric patient.
5. Demonstrate resuscitation skills on the high-fidelity manikins.

Means of Assessments

- A student in this course is assessed through:
- Four (4) quizzes that contain multiple choice, short answer, or calculation questions that will be used to assess competency.
- Two lab practical exams to assess competency in the affective, cognitive, and psychomotor domains.
- Successful completion of AHA basic life support skills and exam.

Course Content

This course is intended to introduce students to the fundamental concepts of neonatal-pediatric respiratory therapy. The course begins with the foundations of respiratory care such as patient assessment skills of the neonate and pediatric patient. The course then covers basic therapeutics including infant and child CPR, airway management, medical gas therapy and delivery, aerosol and humidity therapy, aerosol drug therapy, lung expansion therapy and bronchial hygiene therapy. The course culminates to provide an in depth understanding of all aspects of fetal development, circulation, neonatal and pediatric airway diseases, mechanical ventilation, Nasal CPAP management and homecare of the neonatal/pediatric patient.

Section 1: Fetal Development, Assessment and Delivery

Walsh: Chapters 1-3, 5, 15 and Chapter 12 Surfactant Replacement Therapy

1. Identify the five periods of embryonic lung growth and describe the features of each period.
2. Define surface tension and how it is developed.
3. Describe the purpose and function of surfactant.
4. Describe the indications, contraindications, administration techniques and outcomes of surfactant therapy.
5. Explain how lung maturity is determined.
6. Explain fetal circulation and identify the fetal shunts.
7. Trace the flow of blood through fetal circulation.
8. Outline the development of the fetus with emphasis on cardiopulmonary development, including the relationship of gestational age to key structures.
9. Describe the changes that occur during the fetal-neonatal transition.
10. Explain the significance of lecithin/sphingomyelin ratio testing and identify normal and abnormal results.
11. List and describe the methods used to estimate the date of delivery.
12. Explain the implications of meconium-stained amniotic fluid in assessing fetal status.
13. Explain what is meant by the term “high risk infant”.
14. Identify the most common birth presentation.
15. Describe each of the following: complete breach, incomplete or footling breach, breach, face presentation, transverse lie, prolapse of umbilical cord.
16. Identify and describe placenta previa.
17. List the factors that are responsible for the first breath.

Section II: Assessment and Monitoring of the Neonatal and Pediatric Patient

Section III: Therapeutic Procedures for Treatment of Neonatal and Pediatric Disorders

Walsh: Chapters 4,15 and Chapter 17-20 and Chapter 39 Pharmacology

1. Describe the ABCs of an infant resuscitation.
2. Discuss thermoregulation in infants and the special problems it represents.
3. Contrast normal neonatal blood gas results to that of an adult.
4. Explain in detail the use of Apgar scoring, normal and abnormal values.
5. Discuss the indications, procedure for placement, and complications of an umbilical artery catheter.
6. Identify those arterial sampling sites that are pre-ductal and post-ductal and describe how a right-to-left shunt through the ductus arteriosus can be detected using blood gas PaO₂, transcutaneous monitors, or pulse oximeters.
7. Explain the purpose of the Ballard Score in evaluation of the newborn and the significance of gestational age assessment.
8. State the anatomic and physiologic differences between the infant and the adult.
9. Describe the difference between croup and epiglottitis on x-ray.
10. Identify pneumothorax and IRDS on x-ray.
11. List the indications and contraindications of airway clearance therapy.
12. Discuss the physiology of thermoregulation of the newborn.
13. Describe how a neonate reacts to cold stress and to hyperthermia.
14. Discuss thermoregulation of the neonate in the delivery room and nursery to include methods of heat loss prevention.
15. Define a teratogenic substance and describe its actions on the fetus.
16. For each of the following cardiovascular conditions, describe at least one drug that is used in its treatment: CHF, closure of the ductus arteriosus, pulmonary hypertension, hypotension, and edema.
17. Explain the effects of maternal drug abuse on the fetus.

Section IV: Neonatal and Pediatric Disorders: Presentation, Diagnosis and Treatment

Walsh Chapters 9-11, 21-30

1. Describe the clinical signs of cardiopulmonary distress in the newborn and pediatric patient. Contrast these responses to the adult.
2. Discuss the evaluation of the newborn and pediatric patient including, identification of risk, clinical assessment, and monitoring techniques.
3. Discuss the etiology, epidemiology, pathology, pathophysiology, clinical manifestations, complications, course, and treatment of specific neonatal and pediatric disorders as follows:
 - a. Infant Respiratory Distress Syndrome, Bronchopulmonary Dysplasia, Retinopathy of Prematurity, Intracranial and Intraventricular hemorrhages, Sudden Infant Death Syndrome (SIDS), Transient Tachypnea of the Newborn (TTN), AOP, Meconium Aspiration, Pneumothorax, Pneumopericardium, Persistent Pulmonary Hypertension, Patent Ductus Arteriosus (PDA), Persistent Fetal Circulation (PFC), Asthma, Respiratory Syncytial Virus (RSV), Bronchiolitis, Cystic Fibrosis, Croup, Epiglottitis, Aspiration/poisoning Syndromes, Tetralogy of Fallot, Ventricular Septal Defects, Atrial Septal Defects, Shock and Meningitis, Pediatric trauma, Surgical Disorders and congenital disorders of the airway, and the diaphragm.

Section V: Management of Oxygenation and Ventilation

Walsh Chapters (13, 14 and 33-38)

1. Describe the indications of mechanical ventilation in the neonate and the methods to achieve this goal.
2. Define how ventilator parameters are determined and the appropriate settings and alarms for each one.
 - a. PIP peak inspiratory pressure
 - b. Tidal volume
 - c. Respiratory rate
 - d. Inspiratory time
 - e. Mean airway pressure
 - f. Minute ventilation
 - g. Flow rates
 - h. I:E ratio
 - i. PEEP/CPAP
 - j. CMV/SIMV/PS
3. Determine initial ventilator settings for various patient sizes.
4. Identify common complications of CPAP and how they can be avoided.
5. Describe the indications and contraindications of continuous positive airway pressure (CPAP) and describe how it increases FRC.
6. Demonstrate how to set up a Nasal CPAP system/H₂O system and mechanical ventilator system, describe the monitoring, hazards and weaning of this therapy.
7. Compare and contrast volume ventilation and pressure ventilation regarding the advantages and disadvantages.
8. Identify the advantages and disadvantages of High Frequency Jet Ventilation and High Frequency Oscillatory Ventilation.
9. Describe ECMO therapy, how it is initiated, the indications for the termination and the complications associated with its use.
10. Set up high flow infant nasal cannula device according to protocols.
11. Discuss how adjustments affect ventilation and oxygenation in PPV.

Section VI Transport and Homecare

Walsh Chapters 41-42

1. Discuss and recognize the importance of team composition, roles, and education.
2. Compare and contrast the types of transport, regarding distances covered, advantages and disadvantages.
3. Discuss the effects on altitude on PaO₂ and discuss the changes required in FiO₂ as altitude increases to maintain PaO₂.
4. List the equipment needed for transport and describe the modifications required for use during transport.
5. Discuss the preparation required before transporting the infant.
6. Review safety and accreditation requirements for pediatric transport agencies.
7. Identify the factors that make home care preferable over hospital care.
8. Describe steps in selecting a home care patient and all the discharge steps to home.

9. Describe preparation, selection, and training of parents and family for a home ventilator patient.
10. Describe the equipment and techniques for administering aerosols, chest physiotherapy and suctioning in the home.
11. Regarding home apnea monitoring, describe each of the following: identification of patients for monitoring, problems associated with home monitoring.
12. Compare and contrast oxygen concentrators, liquid systems, and cylinders for home oxygen use.
13. Discuss the role of each care giver who is involved with discharge planning and the critical components of a discharge plan including the role of the case manager.
14. Discuss the effects of home care on the family.
15. Describe why home care fails and what the practitioner can do to prevent failure.

Course Texts and/or Other Study Materials

- Egan's Fundamentals of Respiratory Care, Kacmarek, Stoller, Heuer 12th Ed. Elsevier 2021. ISBN 978-0-323-51112-4.
- Neonatal and Pediatric Respiratory Care, Walsh, 6th Edition Elsevier 2023 ISBN 978-0-323-793094
- Competency System by Clinical Trac

Quiz, Laboratory, Presentation Requirements

Quizzes

The course will have two (2) quizzes covering the section presented. Quizzes consist of multiple-choice and matching questions.

Laboratory

The laboratory exam will be a practical evaluation that requires higher-level critical thinking skills. The exam laboratory will be a comprehensive evaluation. This grade will be calculated as part of the course points.

Computer Simulation

Two computer-based simulation based on a neonatal and pediatric patient case study.

Research / Oral Presentation Project

Presentation must be at least 10-15 minutes in length. Handouts, pictures, PowerPoint, or other sources may be used. Presentation must be clear, concise and a thorough review of material. Format for presentation: background information (i.e., current statistics), etiology, pathophysiology, clinical signs and symptoms, diagnostic tests (labs /CXR / etc.), treatments and medications. See grading rubric posted on Canvas.

Grading Policy

| Assignment | Percentage |
|------------|------------|
|------------|------------|

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|------------------------------|----------------|
| 2 Lecture examinations | (25% each) 50% |
| Laboratory practical exam | 20% |
| Oral presentation project | 20% |
| 2 Clinical simulations (LJs) | 10% |
| Total | 100% |

Grading System

| Letter | Percentage |
|--------|-------------|
| A | 93 -100% |
| B+ | 88 – 92.9 % |
| B | 83 – 87.9 % |
| C+ | 78 – 82.9 % |
| F | Below 78% |

Late work or Assignments:

Make-up examinations and course work will be the exception and only sparingly approved by the instructor. If, in the instructor's judgment, the student has presented a good excuse for missing the examination or work, the instructor may approve a make-up examination with the exam penalized. If the student does any late work, they will be penalized, and their grade will be no greater than 78%. Makeup exams and quizzes will be completed at the end of the semester.

Academic Integrity Policy and Attendance Policy

Academic Integrity

Academic dishonesty is a serious violation of BCC policy and personal ethics and will be treated as such if the reason for suspicion should arise. Students should be careful to avoid plagiarism, falsification, and compliance. Academic integrity is vital to an academic community and for fair evaluation of student assessments. All assessments submitted must be your own, completed in accordance with the college's academic policies and the student code of conduct. You may not engage in unauthorized collaboration or make use of any artificial intelligence (AI) composition systems. Academic dishonesty also includes cheating on examinations. Refer to the [BCC student code of conduct](#), student handbook for additional information, and the statement on plagiarism (<https://catalog.bergen.edu/content.php?catoid=4&navoid=163#academic-dishonesty>).

BCC Attendance Policy

All students are expected to attend every scheduled meeting of each course for which they are registered. Attendance and lateness policies and sanctions are to be determined by the instructor for each section of each course. These will be established in writing on the individual course outline. Attendance is maintained by the instructor for administrative and counseling purposes.

Course Attendance Policy

Attendance and punctuality in all class sessions is required. Attendance for lectures is factored into the total grade for the course. Two (2) points are deducted for every absence. One (1) point is deducted if the student arrives after the attendance is recorded. If you are late, be sure to see the professor in that class so the absence can be corrected to a lateness.

Departmental Policy Statements

- Acceptable quality of work and mature behavior is always expected from every student. Students are regarded as professionals and are expected to conduct themselves accordingly.
- High standards of professional performance demand that students maintain good academic progress throughout their course of study in the program.
- Students demonstrating chronic tardiness or absenteeism will be placed on academic warning or probation and may be subjected to termination from the program.
- Absence from a class during a scheduled exam will be subject to the policy of the instructor for that specific course. If the student is going to miss a scheduled exam it is expected that the student will contact the instructor ahead of time by email.
- All students are required to adhere to the policies and procedures of the school as outlined in the college catalog.
- Additional department policies are in the Student Policies and Procedures Manual.
- Remediation
 - The program's defined process for addressing deficiencies in a student's knowledge, skills, professional behavior, and competencies so that the correction of these deficiencies can be ascertained and documented. The program must conduct these evaluations equitably and with sufficient frequency to facilitate prompt identification of learning deficiencies and the development of a means for their remediation within a suitable time frame.
 - The remediation process is initiated by faculty when any student is at risk of failing a course due to difficulty accomplishing course objectives and / or requirements. At-risk behaviors include academic deficiency (non-passing quiz, examination, laboratory competency), lack of clinical competency (not abiding by policy and procedures, unsafe behavior), and lapses in professional conduct.

Support Services

- The program faculty maintains office hours for counseling and is available to provide tutorial assistance to students.
- Students must make appointments in advance to meet with the respective instructors.
- Students may also obtain assistance from the [College Tutoring Center](#). Appointments must be made in advance through this center.
- The College has a [personal counseling center](#) for those students who may need personal assistance. Appointments are made directly through this center.
- Any problems, concerns, or questions should be directed to the course instructor or the student's advisor.
- Statement on Civility

- Refer to the [Standards of Conduct](#) Subsection found in the Student Judicial Affairs Policies & Procedures Section found in the Student Handbook.
- Academic Integrity
- Refer to the Academic Integrity Subsection; found in the [Academic Regulations](#).
- Other possible College, Divisional, or Departmental Policy Statements to be referenced.
 - ADA statement
 - Students with documented disabilities who require accommodations by the American with Disabilities Act (ADA) can request support services from the Office of Specialized Service of Bergen Community College located in room L-115 of the Pitkin Learning Center. (www.bergen.edu/oss)
 - Sexual Harassment statement
 - Statement on acceptable use of [BCC technology](#)
- Support Services
 - [Writing Center](#)
 - [Math Lab](#)
 - [Online Writing Lab](#) (OWL)
 - [Office of Specialized Services](#)
- BCC Library
 - The [Sidney Silverman Library](#) is committed to providing a quiet, welcoming, respectful atmosphere conducive to study and research in an environment that is comfortable, clean, and safe. The use of the library will be beneficial in providing resources on researching topic information, citation styles, and finding current articles among many other media services available.

Proposed Class / Lab Schedule / Assignments

| Week | Date | Lecture Topic | Lab / Reading Assignment |
|-------------|-------------|---|--|
| 1 | | <p>Review course syllabus, exams, oral presentation assignments, grading rubrics.</p> <p>Review RSP-235 course syllabus, Clinical trac graduate/employer surveys, graduation requirements, end of semester responsibilities.</p> | <p>Lab: Review neonatal intubation / extubation</p> |
| 2 | | <p>PP Assessment of the Neonatal/Pediatric Patient</p> <p>Anatomy & Physiology Specific to Neonates/Pediatrics</p> <p>Assessment of the Neonatal and Pediatric Patient</p> <p>Video: Gestational Age Assessment & Newborn Reflexes</p> <p>Vocabulary list: exercise</p> | <p>Video: Newborn Stabilization & Care – Apgar Scoring System</p> <p>Apgar Scoring</p> <p>Apgar cases/handouts</p> |
| 3 | | <p>Resuscitation of the newborn</p> <p>Stabilization and Monitoring techniques</p> <p>PP Infant Resuscitation</p> <p>Assessment of the Newborn: First 10 minutes</p> | <p>Lab: Adult/Child/Infant CPR</p> <p>Recertification Class</p> |
| 4 | | <p>Embryological Development of the Cardiopulmonary System</p> <p>Fetal lung development</p> <p>PP Ch 1 Fetal Lung Development</p> <p>Handout exercise</p> | <p>Respiratory Care Procedures</p> <p>Oxygen Therapy / Suctioning</p> <p>Lab: Oxygen Worksheet</p> <p>Video: Resp. Distress in the Pediatric Patient Assessment & Intervention RJ431.R382012</p> <p>Resp. Distress in the Pediatric Patient: anatomy, B/S</p> <p>ABG Analysis & Monitoring</p> |

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| | | | <p>O2 Therapy / Procedures Worksheet</p> <p>Lab Competencies: Oxyhood / High Flow NC</p> <p>Review oxygen devices</p> |
| 5 | | <p>Assessment of Fetal Growth and Development</p> <p>PP Assessment of Fetal Growth / Development</p> | <p>Lab worksheet Walsh Chapter 10-12 Exercises</p> <p>Nasal CPAP Exercises</p> <p>Pharmacology review</p> <p>Lab: CPAP Therapy</p> <p>PP Ch 13 CPAP Therapy</p> <p>Persing CD Baby Greta-CPAP</p> |
| 6 | | Review for exam 1 | Lab Competency: CPAP Therapy |
| 7 | | EXAM 1 Ch. 1, 5,15 | <p>Lab Competency: CPAP Therapy</p> <p>Simulation Center: birth / apgar scoring</p> <p>PP Ch 14, 17</p> <p>Video: Assisted Delivery & Cesarean Section</p> |
| | | Spring Break | |
| 8 | | <p>Review Exam 1</p> <p>Labor, Delivery and Physiological Changes After Birth Fetal circulation / Fetal Shunts</p> <p>Adult Circulation</p> <p>PP Labor, Delivery and Physiological Changes After Birth</p> | <p>Lab: Mechanical Ventilation of the Neonate Walsh 14</p> <p>Video: FHR/Tocolysis/Early labor</p> |
| 9 | | Ethics | <p>Lab: Mechanical Ventilation of the Neonate Walsh 14</p> <p>PP Ch 14</p> <p>Video: Beginnings of Life: Understanding Childbirth</p> |

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| 10 | | Review for exam 2 | Walsh Ch 14, 32 Lab: Mechanical Ventilation of the Pediatric Patient |
| 11 | | Homecare Transport of Infants / Children | Ch 41 Lab Competency: Neonatal Vent. Check, & Set-Up, Circuit Change |
| 12 | | Persistent Perinatal Illnesses / Cardiac Anomalies / Defects Video Cardiopulmonary Assessment of the Newborn RJ 253.A781 2010 | Lab: Special Procedures & Ventilatory Techniques, Perinatal Transport |
| 13 | | Exam 2 Chapters | Lab: Review for Lab Practical Exam |
| 14 | | Review for Lab practical exam | Lab: Practical Exam |
| 15 | | Final Class | |