



Western Technical College

10515171 Respiratory Therapeutics 1

Course Outcome Summary

Course Information

Description	Introduces the topics of medical gas administration and humidity and aerosol therapy. The learner will apply physics, math and patient assessment concepts to oxygen, aerosol and humidity therapy. Emphasis is placed on promotion of evidence-based practice using established clinical practice guidelines and published research for its relevance to patient care.
Career Cluster	Health Science
Instructional Level	Associate Degree Courses
Total Credits	3
Total Hours	72

Pre/Corequisites

Prerequisite 10515174 Respiratory/Cardiac Physiology

Textbooks

Egan's Fundamentals of Respiratory Care. 12th Edition. Copyright 2021. Kacmarek, Robert M., James K. Stoller and Albert J. Heuer. Publisher: Elsevier Science. **ISBN-13:** 978-0-323-81121-7. Required.

Kettering – Therapist Multiple Choice Home Study Bookset and Audio. Publisher: Kettering Seminars. Required.

Success Abilities

1. Cultivate Passion: Expand a Growth-Mindset
2. Live Responsibly: Foster Accountability

3. Refine Professionalism: Improve Critical Thinking
4. Refine Professionalism: Participate Collaboratively

Program Outcomes

1. Apply respiratory therapy concepts to patient care situations
2. Demonstrate technical proficiency required to fulfill the role of a Respiratory Therapist
3. Practice respiratory therapy according to established professional and ethical standards

Course Competencies

1. Develop a care plan

Assessment Strategies

- 1.1. by developing a care plan

Criteria

Your performance will be successful when:

- 1.1. care plan includes subjective data
- 1.2. care plan includes objective data
- 1.3. care plan includes an assessment of the data
- 1.4. care plan includes a therapeutic intervention related to the data
- 1.5. care plan includes an outcomes assessment
- 1.6. care plan includes modification

Learning Objectives

- 1.a. Describe the purpose of a respiratory care plan.
- 1.b. Differentiate care plans, care paths, protocols, policies, procedures, and disease management.
- 1.c. Describe the elements that constitute a clinical practice guideline.
- 1.d. Utilize a decision making algorithm to develop a care plan.

2. Perform procedures to assess oxygenation

Assessment Strategies

- 2.1. during a skill demonstration
- 2.2. in the laboratory
- 2.3. with a role-play partner, peer

Criteria

Your performance will be successful when:

- 2.1. you select the correct equipment
- 2.2. you perform all of the relevant steps on the procedure checklist
- 2.3. you employ basic physical assessment
- 2.4. you follow safety procedures
- 2.5. you verbalize an explanation of the process as you perform it

Learning Objectives

- 2.a. Identify the goals of oxygen therapy.
- 2.b. Differentiate invasive and noninvasive methods of assessing oxygenation.
- 2.c. Summarize common clinical manifestations and patient assessments used to evaluate hypoxemia.
- 2.d. Describe how to evaluate and monitor a patient's response to oxygen therapy.

3. Evaluate oxygenation

Assessment Strategies

- 3.1. by preparing a written or oral response to a case study
- 3.2. by collecting, analyzing and reporting data related to oxygenation

Criteria

Your performance will be successful when:

- 3.1. case study response demonstrates a thorough understanding of relevant aspects of the case
- 3.2. case study response is supported by relevant evidence
- 3.3. data collection is accurate
- 3.4. data is relevant
- 3.5. data analysis includes a written or oral description and analysis of the results
- 3.6. data analysis makes a recommendation based on the results; recommendation is clearly supported by the data (correlating ABG results with oximetry)
- 3.7. data identifies the signs and symptoms of hypoxemia and hypoxia
- 3.8. data analysis differentiates among ventilation, V/Q mismatch, diffusion defect, shunt, low PIO₂, etc.

Learning Objectives

- 3.a. Evaluate laboratory and clinical data to assess the need for, and response to, oxygen therapy.
- 3.b. Describe the two types of electrochemical oxygen analyzers.
- 3.c. List the potential advantages and disadvantages of point of care testing.
- 3.d. Describe the basic principles of pulse oximetry.
- 3.e. Differentiate pulse oximetry and transcutaneous monitoring.

4. Perform calculations for oxygen therapy

Assessment Strategies

- 4.1. in the laboratory
- 4.2. by performing calculations (format may be written or oral)

Criteria

Your performance will be successful when:

- 4.1. you perform all critical steps in the right order
- 4.2. you verbalize an explanation of the process as you perform it as indicated
- 4.3. your explanation presents sound reasoning as you describe the decisions you make throughout the process
- 4.4. you predict approximate PaO₂ based on age and FIO₂

Learning Objectives

- 4.a. Calculate duration of flow for D, E and H cylinders.
- 4.b. Calculate duration of flow for liquid oxygen systems.
- 4.c. Explain Bernoulli's principle and relate the concept to air entrainment gas delivery systems.
- 4.d. Determine air to oxygen entrainment ratios for all concentrations of oxygen.
- 4.e. Calculate total flow for air entrainment systems at all oxygen concentrations.

5. Demonstrate the use of medical gas equipment

Assessment Strategies

- 5.1. in a lab setting through a skill demonstration
- 5.2. by answering questions related to learning objectives

Criteria

Your performance will be successful when:

- 5.1. you perform all of the relevant steps on the procedure checklist
- 5.2. you apply physics concepts to medical gas equipment
- 5.3. you calculate total flow from an air entrainment device
- 5.4. you calculate duration of flow from a gas or liquid system
- 5.5. you convert and correct for helium/oxygen flows
- 5.6. you explain the operation of oxygen administration devices
- 5.7. you follow medical gas safety guidelines
- 5.8. you use an oxygen analyzer

Learning Objectives

- 5.a. Describe how medical gases are produced.
- 5.b. Demonstrate proper use of oxygen cylinders and regulators.
- 5.c. Differentiate high and low flow oxygen delivery systems.
- 5.d. Assemble and apply oxygen delivery devices appropriate to the patient care plan.

5.e. Identify and trouble shoot common problems associated with oxygen delivery devices.

6. Assess the need for medical gas therapy

Assessment Strategies

6.1. by preparing a written or oral care plan to a case study

Criteria

Your performance will be successful when:

- 6.1. care plan includes subjective data
- 6.2. care plan includes objective data
- 6.3. care plan includes an assessment of the data
- 6.4. care plan includes a therapeutic intervention related to the data
- 6.5. care plan includes an outcomes assessment
- 6.6. care plan includes modification
- 6.7. care plan response is supported by relevant evidence
- 6.8. care plan identifies appropriate modification to therapy based on patient response

Learning Objectives

- 6.a. Identify the indications, complications, and hazards of oxygen therapy.
- 6.b. Select an oxygen delivery system appropriate for the respiratory care plan.
- 6.c. Identify when and how to provide nitric oxide therapy.
- 6.d. Identify when and how to provide helium-oxygen therapy.
- 6.e. Modify oxygen delivery based on a patient's response to therapy.

7. Assess patient need for humidity and bland aerosol therapy

Assessment Strategies

7.1. by preparing a written or oral care plan to a case study

Criteria

- 7.1. care plan includes subjective data
- 7.2. care plan includes objective data
- 7.3. care plan includes an assessment of the data
- 7.4. care plan includes a therapeutic intervention related to the data
- 7.5. care plan includes an outcomes assessment
- 7.6. care plan includes modification
- 7.7. care plan response is supported by relevant evidence
- 7.8. care plan identifies appropriate modification to therapy based on patient response
- 7.9. care plan is based on indications for sputum induction, humidification, aerosol treatment and USN.

Learning Objectives

- 7.a. Describe how airway heat and moisture exchange normally occurs.
- 7.b. State the effect of dry gases on the respiratory tract.
- 7.c. State when to warm and humidify inspired gases.
- 7.d. Describe how to select the appropriate therapy to properly condition inspired gases.
- 7.e. Identify the indications, contraindications, and hazards associated with humidity therapy.

8. Demonstrate the use of humidity and bland aerosol equipment

Assessment Strategies

- 8.1. in a lab setting through a skill demonstration
- 8.2. by answering questions related to learning objectives

Criteria

Your performance will be successful when:

- 8.1. you perform all of the relevant steps on the procedure checklist
- 8.2. you apply physics concepts to humidity and bland aerosol equipment
- 8.3. you calculate total flow from an air entrainment device
- 8.4. you calculate relative, absolute, body humidity and humidity deficit
- 8.5. you explain the operation humidifiers and aerosol generators
- 8.6. you select appropriate device for humidity/aerosol delivery

Learning Objectives

- 8.a. Differentiate nebulizers and humidifiers.
- 8.b. Describe how various types of nebulizers and humidifiers operate.
- 8.c. Describe how to enhance humidity output.
- 8.d. Describe how to identify and resolve common problems with aerosol delivery systems.

9. Demonstrate medication delivery devices

Assessment Strategies

- 9.1. in a lab setting through a skill demonstration
- 9.2. by answering questions related to learning objectives

Criteria

Your performance will be successful when:

- 9.1. you perform all of the relevant steps on the procedure checklist
- 9.2. you apply physics concepts to medication delivery equipment
- 9.3. you explain the operation of MDI, DPI and small volume nebulizers
- 9.4. you select appropriate device for delivery of aerosol medication to specific patient needs

Learning Objectives

- 9.a. Describe how particle size, motion, and airway characteristics affect aerosol deposition.
- 9.b. Explain how aerosols are generated.
- 9.c. Select the best aerosol delivery method for a variety of patient situations.
- 9.d. Describe how to assess a patient's response to bronchodilator therapy.
- 9.e. 5 State the information a patients need to know to properly self administer inhaled medications.