

Component III: Clinical

Module B Specialty procedures

Topic 3: Spirometry

Statement of Purpose

To prepare learner with basic knowledge and skills necessary to perform spirometry testing.

Student Learning Outcomes

Upon completion of this topic, the learner will be able to:

1. Spell and define the key terms.
2. Review the structures of the respiratory system.
3. Identify conditions and diseases associated with decreased pulmonary function.
4. List environmental and occupational exposures that may lead to respiratory disease.
5. Perform spirometry exam correctly.

Terminology

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| 1. Asthma | 11. Lung cancer |
| 2. Atelectasis | 12. Mean expiration flow |
| 3. Chronic Obstructive Pulmonary Disease (COPD) | 13. Pneumoconiosis |
| 4. Coryza | 14. Pneumonia |
| 5. Cystic fibrosis | 15. Pneumothorax |
| 6. Epistaxis | 16. Pulmonary function test |
| 7. Forced vital capacity | 17. Sinusitis |
| 8. Forced expiration volume | 18. Spirometer |
| 9. Hayfever | 19. Spirometry |
| 10. Influenza | 20. Tuberculosis |
| | 21. Upper Respiratory Infection (URI) |

References

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Content Outline/Theory Objectives	Suggested Learning Activities
<p>Objective 1 Spell and define key terms.</p> <ul style="list-style-type: none"> A. Review the terms listed in the terminology section. B. Spell the listed terms accurately. C. Pronounce the terms correctly. D. Use the terms in their proper context. 	<ul style="list-style-type: none"> A. Games: word searches, crossword puzzles, Family Feud, Jeopardy, bingo, spelling bee, hangman, and concentration. B. Administer vocabulary pre-test and post-test. C. Discuss learning gaps and plan for applying vocabulary.
<p>Objective 2 Review the structures of the respiratory system.</p> <ul style="list-style-type: none"> A. The respiratory system serves to convey oxygen into the body and remove carbon dioxide. B. The major organs include the trachea, bronchi and lungs. C. Respiration takes place in two phases <ul style="list-style-type: none"> 1. Inspiration. 2. Expiration. D. Movement of the diaphragm changes the air pressure in the thoracic cavity and allows air to rush into the lungs via the trachea. E. The trachea consists of C-shaped rings of cartilage. F. The trachea bifurcates into two bronchi leading to the lungs. G. The right lung has three lobes and the left lung has two lobes. H. The air travels through the lungs via the bronchi and bronchioles and terminates in the balloon like alveoli. I. In the alveoli, oxygen molecules move into the blood stream and are returned to the left side of the heart. J. At the same time, carbon dioxide leaves the bloodstream, crosses through the capillary and alveoli membranes and begins the pathway back up the respiratory tract to be exhaled. 	<ul style="list-style-type: none"> A. Lecture/Discuss B. Assigned Readings C. Show illustration of the respiratory system. Have students identify structures.
<p>Objective 3 Identify conditions and diseases associated with decreased pulmonary function.</p> <ul style="list-style-type: none"> A. Asthma. B. Allergies. C. Bronchitis. D. Chest pain. E. Cough, productive or non-productive. F. Cystic fibrosis. G. Chronic Obstructive Pulmonary Disease (COPD). 	<ul style="list-style-type: none"> A. Lecture/Discuss B. Assigned Readings C. Ask students to choose a respiratory condition such as asthma, cystic fibrosis or lung cancer. <ul style="list-style-type: none"> 1. List community resources

<ul style="list-style-type: none"> H. Fatigue. I. Hoarseness. J. Lung Cancer. K. Shortness of breath. L. Wheeze. 	<p>associated with each condition, as well as patient education provided through organizations and specialty camps.</p> <ul style="list-style-type: none"> 2. Bring information to class that they found about their organization and report it to class members.
<p>Objective 4 List environmental and occupational exposures that may lead to respiratory disease.</p> <ul style="list-style-type: none"> A. Allergens. B. Bacteria (e.g. legionella, tuberculosis, or viruses.) C. Pneumoconiosis; asbestos or silica. D. Carcinogens; smoking or asbestos. E. Irritant gases, smoke. F. Response to therapy or medications. 	<ul style="list-style-type: none"> A. Lecture/Discuss B. Assigned Readings
<p>Objective 5 Perform spirometry exam correctly.</p> <ul style="list-style-type: none"> A. Patient preparation <ul style="list-style-type: none"> 1. Effect of infections, illness and medical condition. 2. Medications, patient should not use bronchodilators such as rescue inhalers or maintenance inhalers 4-6 hours prior to testing. 3. No smoking and eating prior to testing. B. Equipment <ul style="list-style-type: none"> 1. Computerized. 2. Mechanical. C. Technique/Steps <ul style="list-style-type: none"> 1. Equipment preparation. 2. Machine calibration. 3. Patient identification. 4. Patient instructions. 5. Height and weight measurement. 6. Patient positioning. 7. Loosened clothing. 8. Nose clip applied to patient. 9. Patient instructed to take deep breath in and hold maximum air in lungs. 10. Patient instructed to insert mouthpiece. 11. Tightness of seal insured. 12. Patient instructed to blow into mouthpiece, hard and fast and until all air is out of lungs. 13. Patient instructed to remove mouth piece. 14. Test results documented in chart. 15. If requested by Clinician, administer nebulizer treatment or meter dose inhaled 	<ul style="list-style-type: none"> A. Lecture/Discuss B. Assigned Readings C. Bring in spirometer. Have students practice on each other. D. Bring in peak/flow meter.

<p>bronchodilator.</p> <p>16. Wait for approximately five minutes, then proceed to retest (steps 8 through 14).</p> <p>17. Equipment cleaned and disinfected.</p> <p>D. Results</p> <ol style="list-style-type: none"> 1. Provide clinician with air flow, volume, and capacity. 2. Provide clinician with forced vital capacity (FVC) which represents the volume of air that can be exhaled from the lung after the lung is filled with air to meet its total capacity. 3. Provide clinician with forced expiration volume at one second (FEV1), which is the volume of gas forcibly exhaled from the lungs the first second of expiration. 4. Provide clinician with mean expiration flow (FEF), which is a mean on a volume timed curve. 5. Provide clinician with effectiveness of bronchodilator if used. 	
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