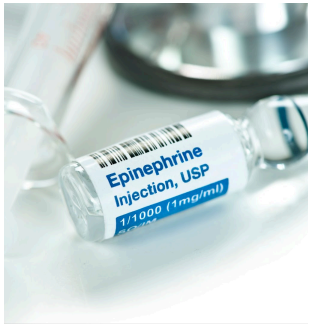
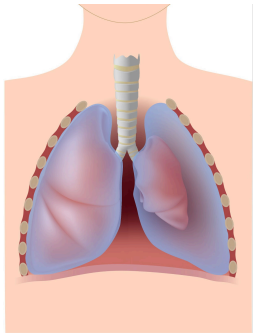
TMC_MX_R_01 Special Procedures

Rise Template	TMC
Duration	
Course description	Throughout this course, you will review important terms associated with essential medical procedures including bronchoscopy, endobronchial ultrasound (EBUS) bronchoscopy, central line placement, thoracentesis, and VQ Scans. Your goal is to understand the purpose for these procedures, the risks involved, and how to conduct each procedure effectively.
Self-paced Modalities	
Performance Objectives	By the end of this lesson, learners will be able to identify various procedures, anticipate the complications, and treat them appropriately.
Instructional Designer	Serena Olivi

Design Info:

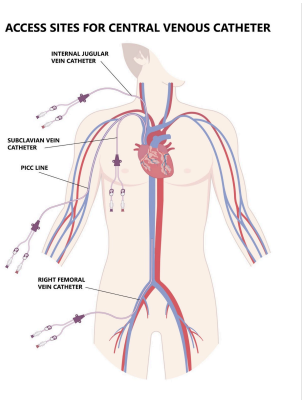
- Header font size: 32pt
- Subheader: 28pt
- Body font size: 20pt
- Font: Raleway

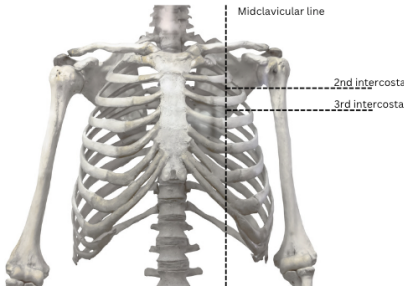
Rise Block Type	Text Content	Images/Screenshots/Custom Images or Infographics	LxD Notes
Heading	Get Started		
Page Header	Overview	Banner	
Image & Text	Respiratory therapists must have clear knowledge of some **key respiratory procedures**. Understanding these procedures, their purposes, associated risks, and treatment options is essential for healthcare professionals.	Circle Image with healthcare provider	Font Size 20 Image on left
Section Title	Section 1: Special Procedures		
Page Header	Bronchoscopy		
Text on Image	Bronchoscopy	Banner	
Image & Text	The purpose of a bronchoscopy is to allow you as the healthcare provider to **visualize the inside of a patient's airway**. You can use a bronchoscopy to remove foreign body aspiration, to perform procedures such as a bronchoalveolar lavage (BAL), or to help remove secretions.	Image of lungs/airway	Font Size 20 Image on left
Heading	Complications and Management		
Paragraph	Select the plus + icons to open and learn more.		
Interactive: Acco…	1. Recognizing and Managing Bronchospasm -You can cause a bronchospasm if the scenario describes **expiratory, wheezing** following a bronchoscopy.	Tab 1: Nurse and Bronchodilator	Center align images

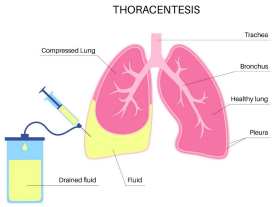
	-Typically, you will **treat this with a bronchodilator**, most likely albuterol. 2. Identifying and Treating Bleeding During Bronchoscopy -**If bleeding occurs** during a bronchoscopy, you can often treat it by putting **epinephrine** onto the site of bleeding. -Epinephrine is a **vasoconstrictor**, and it will constrict those vessels and hopefully stop the bleeding. 3. Pneumothorax -You can cause a pneumothorax, which occurs when air leaks into the space between the lungs and chest wall. You will notice **absent breath sounds** on one side or the other, **tracheal deviation** away from that side, **asymmetrical chest rise**, **subcutaneous emphysema** on the affected side, **hyper resonant note**, and/or **decreased fremitus**. -If it is a **tension pneumothorax**, you're going to see a reduction in blood pressure. If that happens, you're going to need to **decompress**.	 Tab 2: Racemic epi  Tab 3: Pneumothorax Lungs 	
Knowledge Che…	Q: During a bronchoscopy, the patient starts to exhibit expiatory wheezing. What is the most likely cause and how should it be treated? a. Pneumothorax; treat with needle decompression b. Bronchospasm; treat with a bronchodilator such as albuterol (correct) c. Hemoptysis; treat with epinephrine d. Pleural effusion; perform thoracentesis		

	Feedback: Correct: That's right! Expiratory wheezing after bronchoscopy is indicative of bronchospasm. The appropriate treatment is a bronchodilator, commonly albuterol. Incorrect: Not quite. Expiratory wheezing after bronchoscopy is indicative of bronchospasm. The appropriate treatment is a bronchodilator, commonly albuterol.		
Knowledge Che…	Q: A patient undergoing bronchoscopy begins bleeding at the site of the procedure. Which of the following is the best initial management? a. Administer a bronchodilator b. Apply epinephrine to the bleeding site (correct) c. Perform needle decompression d. Administer anticoagulants Feedback: Correct: That's right! In case of bleeding during bronchoscopy, applying epinephrine is effective due to its vasoconstrictive properties, helping to stop the bleeding. Incorrect: Not quite. In case of bleeding during bronchoscopy, applying epinephrine is effective due to its vasoconstrictive properties, helping to stop the bleeding.		
Knowledge Che…	Q: A respiratory therapist observes decreased breath sounds and hyper-resonance on one side		

	of a patient's chest after bronchoscopy. What is the most likely diagnosis? a. Bronchospasm b. Pleural effusion c. Hemoptysis d. Pneumothorax (correct) Feedback: Correct:That's right! Decreased breath sounds and hyper-resonance on one side are classic signs of pneumothorax, a potential complication of bronchoscopy. Incorrect: Not quite. Decreased breath sounds and hyper-resonance on one side are classic signs of pneumothorax, a potential complication of bronchoscopy.		
Knowledge Che…	Q: During a procedure, a patient exhibits tracheal deviation and hypotension. What condition should the respiratory therapist suspect and how should it be managed? a. Pleural effusion; thoracentesis b. Hemoptysis; administer epinephrine c. Tension pneumothorax; needle decompression (correct) d. Bronchospasm; administer a bronchodilator Feedback: Correct:That's right! Tracheal deviation and hypotension are indicative of a tension pneumothorax, which requires urgent needle decompression.		

	Incorrect: Not quite. Tracheal deviation and hypotension are indicative of a tension pneumothorax, which requires urgent needle decompression.		
Page Header	Central Line Placement		
Text on Image	Central Line Placement	Banner	
Image & Text	A Central Line refers to a type of catheter that can **deliver fluids to a larger vein**. Typically, central line placement will be in a large (central) vein in the neck, upper chest, or groin.	Central Line Access Sites 	Font Size 20 Image on left
Heading	Pneumothorax and Central Line Placement		
Paragraph	Pneumothorax, or a collapsed lung, can occur because central lines are input a lot of times into subclavian arteries (putting a needle in beneath the clavicle can puncture the lungs, which can cause this apical pneumothorax).		
Heading	Proactive Measures and Response to Complications		
Image & Text	Anytime you see a **pneumothorax** from any of these procedures, especially if it's accompanied by hypotension, you need to **needle decompress** the patient.	Image of intercostal spacing	Font Size 20 Image on right

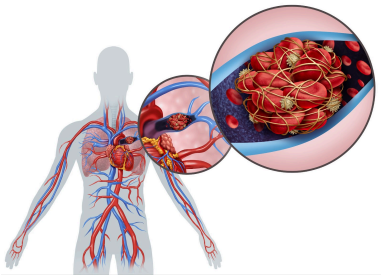
	Needle decompression can be performed the same way as proper chest tube for a pneumothorax. You will go **second to third intercostal spacing, mid clavicular**. Then, you need to decompress to allow for quick evacuation of the air.		
Knowledge Che…	Q: A respiratory therapist is assisting in a central line placement when the patient suddenly exhibits symptoms of a pneumothorax. Which symptom is least likely to be observed? a. Tracheal deviation b. Bilateral breath sounds (correct) c. Subcutaneous emphysema d. Hypotension Feedback: Correct: That's right! Bilateral breath sounds are unlikely in pneumothorax where absent breath sounds are typically noted on the affected side. Other symptoms like tracheal deviation, subcutaneous emphysema, and hypotension may be present. Incorrect: Not quite. Bilateral breath sounds are unlikely in pneumothorax where absent breath sounds are typically noted on the affected side. Other symptoms like tracheal deviation, subcutaneous emphysema, and hypotension may be present.		
Knowledge Che…	Q: After a central line placement, a patient develops a tension pneumothorax. What is the immediate course of action?		

	a. Perform needle decompression (correct) b. Administer a bronchodilator c. Apply epinephrine to the puncture site d. Initiate thoracentesis Feedback: Correct: That's right! In cases of tension pneumothorax, especially following a central line placement, immediate needle decompression is required, typically at the second to third intercostal space, mid-clavicular line. Incorrect: Not quite. In cases of tension pneumothorax, especially following a central line placement, immediate needle decompression is required, typically at the second to third intercostal space, mid-clavicular line.		
Page Header	Thoracentesis		
Text on Image	Thoracentesis	Banner	
Image & Text	Thoracentesis is a needle procedure used to **remove excess fluid**, called **pleural effusion**, from the pleural space–the area between the lungs and the chest wall. This procedure is essential in diagnosing and treating various respiratory conditions.	Thoracentesis Diagram 	Font Size 20 Image on left
Paragraph	Select the plus icons (+) to learn more.		
Interactive: Acco…	1. Diagnostic Purposes -The procedure helps **determine the cause of pleural effusion** by analyzing the fluid removed from the pleural space. This analysis can identify		

	infections, cancer, autoimmune diseases, or other conditions. 2. Therapeutic Purposes -Thoracentesis can **relieve symptoms** caused by the accumulation of fluid in the pleural space, such as shortness of breath, chest pain, and discomfort. By removing excess fluid, the procedure can improve breathing and overall comfort for the patient.		
Interactive: Proc…	Procedure Steps (intro) - Thoracentesis is a critical procedure for respiratory therapists to understand and perform safely. It requires a thorough knowledge of anatomy, aseptic technique, and patient assessment skills. - Let's go through the steps of this procedure to help you better prepare for your boards! Preparation (Step 1) - Obtain **informed consent** from the patient. - Perform a **thorough assessment**, including a physical examination and reviewing imaging studies (e.g., chest X-ray, ultrasound) to **confirm the presence and location of the pleural effusion**. - Position the **patient sitting upright** with their arms resting on a table (if possible) to maximize the fluid accumulation in the lower part of the pleural space. - **Aseptic Technique**: Clean the skin over the insertion site with an antiseptic solution. Drape the area to maintain a sterile field.		

	- **Local Anesthesia**: Inject a local anesthetic (e.g., lidocaine) into the skin and deeper tissues to numb the area. Needle Insertion (Step 2) - Under ultrasound guidance (if available), insert a needle or catheter **into the pleural space**, typically in the mid-axillary line **between the 7th and 8th ribs**. - Advance the needle while aspirating until pleural fluid is obtained. Fluid Removal (Step 3) - **Attach a syringe to the needle** or catheter to aspirate the fluid. - For therapeutic thoracentesis, **remove the necessary amount of fluid** to relieve symptoms, often guided by the patient's comfort and respiratory status. - **Once the procedure is complete**, remove the needle or catheter and apply a sterile dressing to the site. Post-Procedural Care (summary) - **Monitor the patient** for any complications, such as pneumothorax (collapsed lung) or bleeding. - Obtain a **follow-up chest X-ray** to ensure no complications have occurred.		
Note	**Do not** use needle decompression for thoracentesis.		
Subheading	Potential Complications		
List: Bulleted	● Pneumothorax ● Bleeding ● Infection ● Re-expansion Pulmonary Edema (rare)		

Image & Text	As you prepare for your boards, be sure to focus on mastering the indications, procedural steps, and potential complications associated with thoracentesis.	Test Taking Tip template	Font Size 20 Image on left
Knowledge Che…	Q: A respiratory therapist is deciding between needle decompression and thoracentesis for a patient. Which scenario would necessitate thoracentesis? a. Tension pneumothorax with hypotension b. Pneumothorax after central line placement c. Pleural effusion with pleural fluid buildup (correct) d. Bronchospasm following bronchoscopy Feedback: Correct: That's right! Thoracentesis is indicated for pleural effusion where pleural fluid needs to be evacuated, not for pneumothorax or bronchospasm. Incorrect: Not quite. Thoracentesis is indicated for pleural effusion where pleural fluid needs to be evacuated, not for pneumothorax or bronchospasm.		
Page Header	VQ Scans		
Text on Image	VQ Scans	Banner	
Paragraph	A VQ scan refers to the two scans that **examine air flow and blood flow in the lungs**. The "V" stands for **ventilation**, or airflow in and out of your lungs. The "Q" stands for **quantity of perfusion**, or blood flow to the small blood		

	vessels in your lungs. You might also hear it called a **ventilation-perfusion scan.**		
Image & Text	Typically, this means you are talking about some type of **dead space problem**, most likely a **pulmonary embolism**.	Pulmonary Embolism 	Font Size 20 Image on left
Heading	Interpretation of VQ Scan Results		
Paragraph	Diagnosing a pulmonary embolism can be done in two ways.		
Paragraph	Select each tab to learn more:		
Interactive: Tabs	1. Pulmonary Angiography - You could use a pulmonary angiography, which will show you that there is a pulmonary embolism happening. 2. VQ Scan - You could also use a VQ scan, which will serve the purpose of giving you insight into the fact that a pulmonary embolism is present with an increase in this space ventilation.		
Knowledge Che…	Q: A patient undergoing a VQ scan is suspected to have a pulmonary embolism. What does the VQ scan primarily detect to confirm this diagnosis? a. Airway obstruction b. Bronchospasm		

	c. Ventilation-perfusion mismatch (correct) d. Excessive bronchial secretions Feedback: Correct: That's right! A VQ scan is used to detect ventilation-perfusion mismatches, which is a key indicator of pulmonary embolism. Incorrect: Not quite. A VQ scan is used to detect ventilation-perfusion mismatches, which is a key indicator of pulmonary embolism.		
Section Title	Section 2: Wrap Up		
Page Header	Summary		
Image on Text	Wrap Up	Banner	
Paragraph	You're one step closer to passing your exam!		
Paragraph	You've reviewed the core competencies for the medical procedures bronchoscopy, endobronchial ultrasound (EBUS) bronchoscopy, central line placement, thoracentesis, and VQ scans. Understanding the purpose, risks, and implementation of these procedures will play a crucial role in your career as a respiratory therapist. Now head over to the Skills Practice section so you can show what you've learned and continue preparing for your board exams!		
Interactive: Button	To receive completion credit for this module, select **Submit**.		