

Simulation Scenario Template

Section 1: Case Summary:

Scenario Title:	COPD/Pneumothorax Case
Keywords:	Respirology
Brief Description of Case:	Severe COPD Exacerbation

Goals and Objectives	
Educational Goal:	
Objectives: (Medical and CRM)	<ul style="list-style-type: none"> -Recognize signs of and consequences of COPD exacerbation <ul style="list-style-type: none"> ○ Acute management of COPD exacerbation -Recognize signs and symptoms of pneumothorax post intubation <ul style="list-style-type: none"> ○ Acute management of pneumothorax including chest tube insertion
EPAs Assessed:	

Learners, Setting and Personnel			
Target Learners:	<input type="checkbox"/> Junior Learners	<input checked="" type="checkbox"/> Senior Learners	<input type="checkbox"/> Staff
	<input checked="" type="checkbox"/> Physicians	<input type="checkbox"/> Nurses	<input type="checkbox"/> RTs
	<input type="checkbox"/> Inter-professional		
	<input type="checkbox"/> Other Learners:		
Location:	<input type="checkbox"/> Sim Lab	<input type="checkbox"/> In Situ	<input type="checkbox"/> Other:
Recommended Number of Facilitators:	Instructors:		
	Confederates:		
	Sim Techs:		

Scenario Development	
Date of Development:	May 28, 2023
Scenario Developer(s):	
Affiliations/Institutions(s):	St. Paul's Hospital/RTVS
Contact E-mail:	
Last Revision Date:	
Revised By:	Mandeep Mann MD, Jeanne Macleod MD
Version Number:	



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Section 2A: Initial Patient Information

A. Patient Chart					
Patient Name:		Age: 70	Gender: Male	Weight:	
Presenting complaint: Shortness of Breath					
Temp: 38C	HR: 140	BP: 180/100	RR: 40	O ₂ Sat: 88%	FiO ₂ : High Flow
Cap glucose: 5			GCS: 15(E V M)		
Triage note: Called to trauma bay for CTAS Level 1 patient. 70 year old male with SOB, in distress and unable to speak in full sentences.					
Allergies: No Known Drug Allergies					
Past Medical History:			Current Medications:		
<ul style="list-style-type: none"> • 55 pack years smoking history • peripheral vascular disease • TIAs • COPD • Several previous admissions to hospital for COPD exacerbation. 			<ul style="list-style-type: none"> • ASA • Flovent • Ventolin • Atrovent • Prednisone • Amoxicillin Rx by GP last few days 		

Section 2B: Extra Patient Information

A. Further History	
<p><i>Include any relevant history not included in triage note above. What information will only be given to learners if they ask? Who will provide this information (mannequin's voice, confederate, SP, etc.)?</i></p> <p>History from paramedics: patient unwell for a week with increasing SOB, fever, cough and scant sputum production. Worsened today.</p>	
B. Physical Exam	
<p><i>List any pertinent positive and negative findings</i></p>	
Cardio: decreased heart sounds, tachycardic	Neuro:
Resp: tachypneic, accessory muscle use, cannot speak in full sentences. Classic COPD findings: decreased laryngeal height, increased AP diameter, hyperresonance to percussion. Bilateral expiratory wheeze and crackles on auscultation	Head & Neck: Patent Airway
Abdo:	MSK/skin:
Other:	

Section 3: Technical Requirements/Room Vision



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A. Patient
<input checked="" type="checkbox"/> Mannequin (<i>adult Sim Man 3G</i>)
<input checked="" type="checkbox"/> Standardized Patient
<input type="checkbox"/> Task Trainer
<input type="checkbox"/> Hybrid
B. Special Equipment Required
<ul style="list-style-type: none">• Laryngoscope• Glidescope• ETT #8• Suction• Stylet• +/- Bougie• BiPAP• Thoracostomy tube (24 or 28 Fr)• Scalpel• Kelly clamps• Straight scissors• Drainage system
C. Required Medications
<ul style="list-style-type: none">• Ventolin nebs• Ipratropium nebs• Methylprednisolone• Levofloxacin/Ceftriaxone/Azithromycin• Ketamine/Etomidate• Succinylcholine/Rocuronium
D. Moulage
E. Monitors at Case Onset
<input type="checkbox"/> Patient on monitor with vitals displayed
<input checked="" type="checkbox"/> Patient not yet on monitor
F. Patient Reactions and Exam



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Include any relevant physical exam findings that require mannequin programming or cues from patient (e.g. – abnormal breath sounds, moaning when RUQ palpated, etc.) May be helpful to frame in ABCDE format.

A – Patent

B – Unable to speak in full sentences. Bilateral expiratory wheeze and crackles

C – Distant heart sounds

D –

E –



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Section 4: Confederates and Standardized Patients

Confederate and Standardized Patient Roles and Scripts	
<i>Role</i>	<i>Description of role, expected behavior, and key moments to intervene/prompt learners. Include any script required (including conveying patient information if patient is unable)</i>



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Section 5: Scenario Progression

Scenario States, Modifiers and Triggers				
Patient State/Vitals	Patient Status	Learner Actions, Modifiers & Triggers to Move to Next State		Facilitator Notes
1. Baseline State Rhythm: Sinus HR: 140 BP: 180/100 RR: 40 O ₂ SAT: 88% on nasal prongs at 5 L/min. T: 38 °C GCS: 15	Respiratory distress, using accessory muscles, unable to speak in full sentences	<u>Expected Learner Actions</u> <input type="checkbox"/> Place on Monitors and O2 <input type="checkbox"/> 2 x Large bore IVs <input type="checkbox"/> Primary Survey <input type="checkbox"/> Obtain glucose <input type="checkbox"/> Obtain collateral history, pharmanet and medical history <input type="checkbox"/> Secondary Survey <input type="checkbox"/> Order STAT labs and imaging <input type="checkbox"/> Patient needs to be started on a non rebreather mask at 15L/Min	<u>Modifiers</u> CXR: Bilateral patchy infiltrates <u>Triggers</u> When physical exam conducted: - worsening respiratory distress - increased accessory muscle use	Learners should recognize thar DDX includes pneumonia, COPDE, PE, HF and order the appropriate investigations +/- treatment
2. Repeat Vitals HR: 140 BP: 160/90 RR: 40 O ₂ SAT: 88% GCS: 14		<u>Expected Learner Actions</u> <input type="checkbox"/> Antibiotics <input type="checkbox"/> Nebs vs repeat MDI <input type="checkbox"/> Corticosteroid <input type="checkbox"/> BiPAP (if available) OR Hi Flow O2 start at 100% Fi O2 at 60L/min and titrate down to keep O2 Sat'n between 92-94%. If no Hi flow or BIPAP then use nasal prongs AND Face mask non rebreather to keep sat'n between 92-94%.	Learner should give ² Ventolin (Salbutamol) 2.5-5 mg diluted to 3mL via neb or repeat MDI 100mcg 4 - 8 puffs q 20-30min via spacer. Ipratropium 500 mcg via neb q 4-6h or MDI 2 puffs via spacer q 4-6h. ² Methylprednisolone 60- 125mg IV <u>Triggers:</u> -Patient deteriorates and is not tolerating BiPAP	Learner should recognize that despite treatment the patient continues to have respiratory distress and hypoxia and set up for intubation. Note according to First Line app https://firstline.org/ Complicated COPD Exacerbation should be treated with Ceftriaxone 1 g IV q 24 h. If severe Beta lactam allergy then Moxifloxacin 400mg IV daily.
3. Repeat Vitals Pre intubation:		<u>Expected Learner Actions</u> <input type="checkbox"/> Rapid Sequence Intubation	<u>Modifiers</u>	Pre-oxygenation with nonrebreather facemask- may



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<p>HR: 140 BP 160/90 RR: 6 O₂SAT: 85% GCS: 8</p> <p>Post intubation HR=130 BP 130/90 RR- Bagged Os Sat'n initially = 94% and good CO2 wave form with ETCO2= 35 mmHG</p>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<p>- patient stabilizes for a few minutes, learners should reassess vitals. Then there's a sudden deterioration</p> <p><u>Triggers</u> -if learners do not intubate patient goes into respiratory failure and arrests</p>	<p>require assisted bag valve ventilation if unable to get sat'n up- ideally should strive to get sat'n > 92% PRIOR to intubation.</p> <p>Ketamine 70-140mg IV for induction (1-2 mg/kg), Rocuronium 1-1.2 mg/kg 100mg IV</p> <p>Prepare for possible drop in blood pressure by having phenylephrine drawn up in pre loaded syringes 100mcg or have Norepinephrine drip ready to start.</p> <p>Ideally have 2 good working IVs PRIOR to intubation</p> <p>Learner should confirm proper intubation: watch chest rise, auscultate bilaterally, end tidal CO2 monitoring, and CXR to confirm ETT in trachea vs in mainstem bronchi</p> <p>Post Intubation Sedation: Propofol infusion 50mcg/min use preset targets (Ie Richmond Agitation Sedation Scale)</p>
<p>4. Sudden Deterioration: Vitals</p>		<p><u>Expected Learner Actions</u> <input type="checkbox"/> Re-evaluate ABCs</p>	<p><u>Modifiers</u></p>	<p>Learners should work through the DOPE mnemonic</p>



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<p>HR: 160 BP: 60/40 O₂SAT: 80%</p>		<p><input type="checkbox"/> Auscultate chest <input type="checkbox"/> Chest tube insertion <input type="checkbox"/> <input type="checkbox"/></p>	<p>- O/E markedly reduced air entry on the R lung, tympanic to percussion, tracheal deviation to the left, distended neck veins</p> <p>Development of a pneumothorax that evolves into a tension pneumothorax</p> <p>-CXR: right tension pneumothorax</p> <p><u>Triggers</u> - If pneumothorax not recognized, rapid deterioration into VFib followed by PEA arrest</p>	<p>Displacement of the ETT tube Obstruction of the ETT tube Pneumothorax Equipment failure</p> <p>Learners can also do a finger thoracostomy or needle decompression followed by chest tube placement ASAP.</p> <p>Lidocaine 1% 300mg max, 4th or 5th intercostal place, anterior axillary line, then finger thoracotomy and chest tube placement, learner should confirm tube placement with a CXR and patient should be transferred to the ICU</p>
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Appendix A: Laboratory Results

<p><u>CBC</u> WBC: 15 Hgb: 100 Plt: 300</p> <p><u>Lytes</u> Na: 135 K: 3.5 Cl: 101 HCO₃:20 Urea: 8 Cr: 120 Glucose: 7</p> <p><u>Extended Lytes</u> Ca 2.2 Mg 0.9 PO₄ 1.0</p> <p><u>ABG</u> pH: 7.20 pCO₂:60 pO₂:58 HCO₃:20 Lactate: 3</p>	<p><u>Cardiac/Coags</u> Trop < 0.02 INR: 1 aPTT 26</p>
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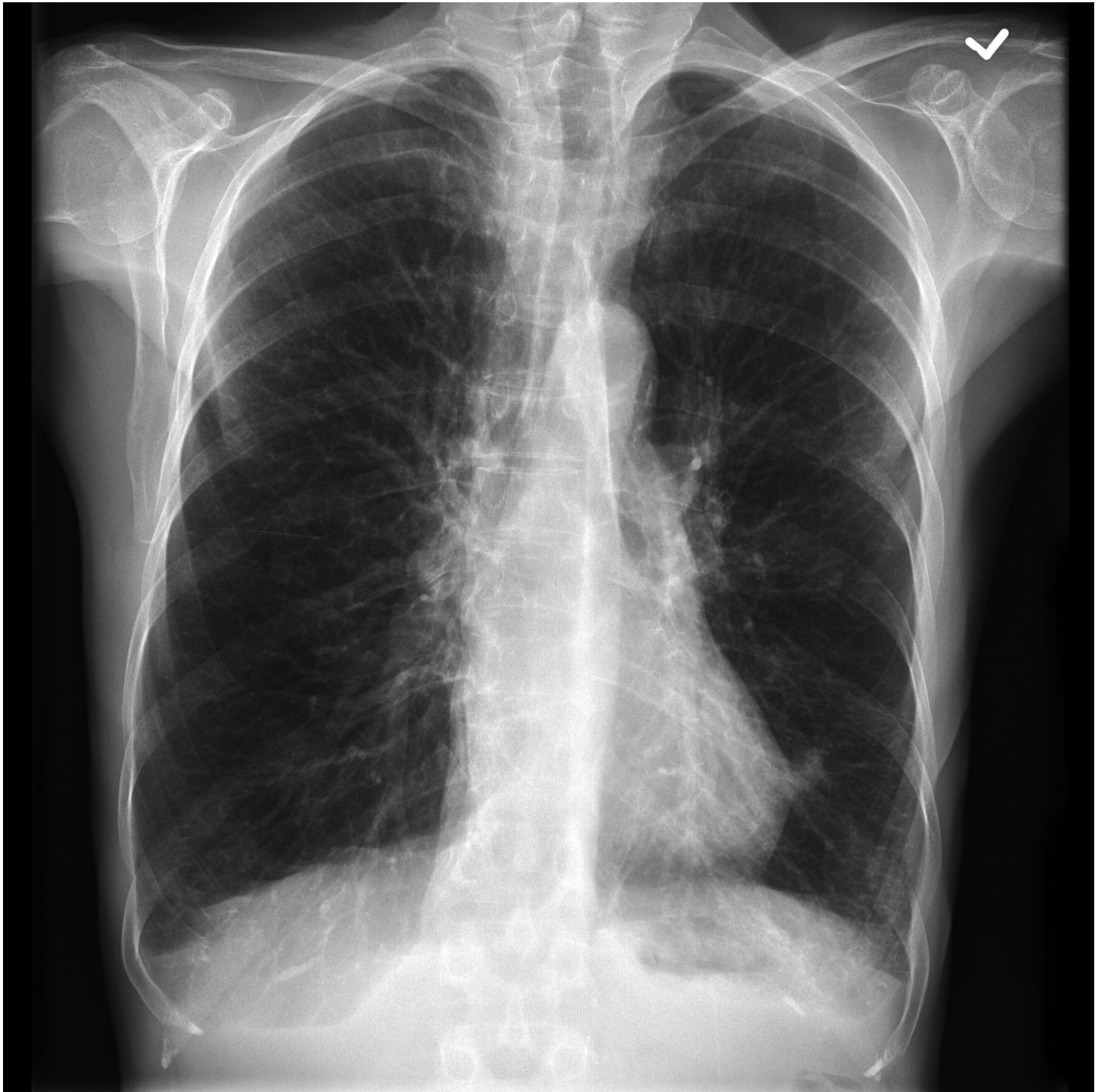
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Appendix B: ECGs, X-rays, Ultrasounds and Pictures

Paste in any auxiliary files required for running the session. Don't forget to include their source so you can find them later!



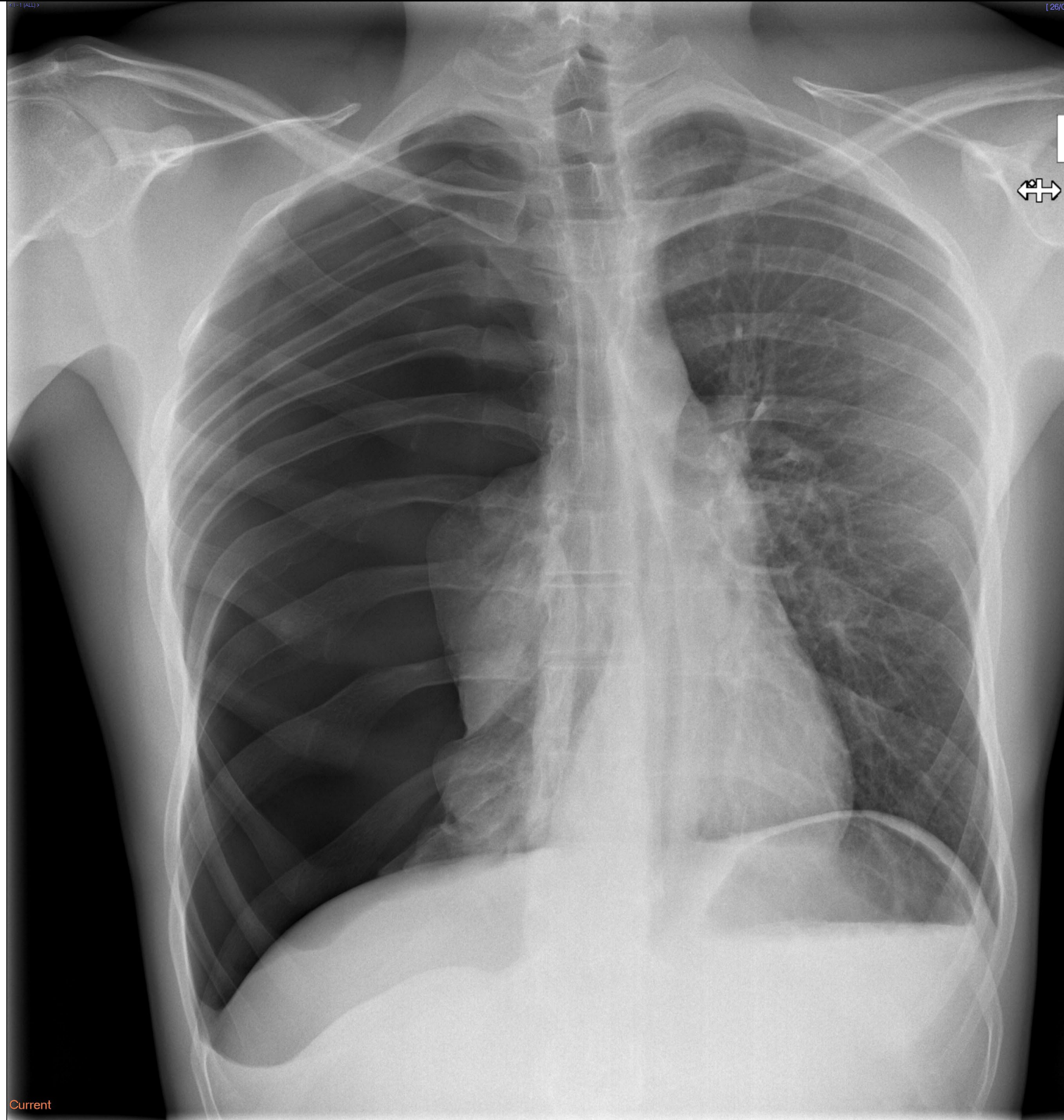
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COPD Marked
Hyperinflation



Simulation Scenario Template



¹¹Case courtesy of Jack Garnham, Radiopaedia.org, rID: 82478



Simulation Scenario Template



¹²ECG courtesy of LIFTL

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Appendix C: Facilitator Cheat Sheet & Debriefing Tips

Include key errors to watch for and common challenges with the case. List issues expected to be part of the debriefing discussion. Supplemental information regarding any relevant pathophysiology, guidelines, or management information that may be reviewed during debriefing should be provided for facilitators to have as a reference.

¹³Traumatic pneumothorax can occur iatrogenically from procedures including CVC insertion, thoracentesis, and mechanical ventilation.

Review POCUS for pneumothorax:

1. Lung Sliding:
 - lack of pleural sliding
 - this can be indicative of many other condition and so other signs should be present too
2. Comet Tails and B Lines:
 - normal reverberation artifact
 - if these are absent and there is no lung sliding, this combination improves the PPV for pneumothorax
3. Lung Point:
 - where lung starts to be in contact with the pleural line
 - presence of a lung point with the absence of lung sliding and comet tails, improves specificity of pocus to 100%
4. Lung Pulse:
 - slight movements of the pleural line corresponding with heartbeats
 - indicates normal visceral-parietal pleura interface – not seen in pneumothorax
5. Pneumothorax mimics on POCUS:
 - pleural scarring (previous pleurodesis, radiation changes, infectious/inflammatory pleural disease)
 - lung volume loss (atelectasis, mucous plug, right mainstem intubation)
 - COPD (bullous emphysema)
 - pulmonary fibrosis
 - phrenic palsy

¹⁴<https://emergencymedicinecases.com/video/pocus-cases-2-pneumothorax/>

¹⁵Pigtail Insertion:

<https://www.youtube.com/watch?v=FDxZyR9abAs>



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