

# Simulation Scenario Template

## Section 1: Case Summary

<b>Scenario Title:</b>	NSTEMI/CHF/AFib
<b>Brief Description of Case:</b>	Tertiary ED. 70F presents in respiratory distress complaining of chest pain. She is found to be in rapid AF of unknown duration as well as CHF. Patient will require analgesia, initiation of afterload reduction with nitroglycerin infusion, respiratory support with bipap, and cautious rate control which improves her vitals and symptoms to a reasonable extent. She will also ultimately require consult to cardiology for consideration of early invasive management given her unstable state.

Goals and Objectives	
<b>Educational Goal:</b>	Approach to unstable NSTEMI
<b>Objectives:</b> (Medical and CRM)	<p><b>Educational:</b> Recognition and management of NSTEMI/CHF Managing rapid AF of unknown duration in a patient with NSTEMI/CHF Use of nitrates, nitroglycerin infusion, and bipap in management of CHF</p> <p><b>CRM:</b> <u>Effective Communication:</u> sharing of mental model. For example, explain why you are concerned about heart rate but also about side effects from rate control drugs. Provide clear target goals for your team members. <u>Anticipate and Plan:</u> Plan and prepare ahead of time for patient deterioration, ie set up art line, call for help early, repeat investigations such as ECG and US/CXR to frequently reassess the patient. <u>Distribute the Workload:</u> If you don't know doses of meds such as NTG infusion then delegate someone on your team to look up</p>
<b>EPAs Assessed:</b>	

Learners, Setting and Personnel			
<b>Target Learners:</b>	<input checked="" type="checkbox"/> Junior Learners	<input checked="" type="checkbox"/> Senior Learners	<input checked="" type="checkbox"/> Staff
	<input checked="" type="checkbox"/> Physicians	<input type="checkbox"/> Nurses	<input type="checkbox"/> RTs
	<input type="checkbox"/> Other Learners:		
<b>Location:</b>	<input checked="" type="checkbox"/> Sim Lab	<input checked="" type="checkbox"/> In Situ	<input type="checkbox"/> Other:
<b>Recommended Number of Facilitators:</b>	Instructors: 1		
	Sim Actors: 1		
	Sim Techs: 1		

Scenario Development	
<b>Date of Development:</b>	April 2023
<b>Scenario Developer(s):</b>	Aaron Truesdell, Jeanne Macleod
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<b>Last Revision Date:</b>	April 13, 2023



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Revised By:	Aaron Truesdell, Jeanne Macleod
Version Number:	2



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## Section 2A: Initial Patient Information

A. Patient Chart					
Patient Name: Mabel McGregor		Age: 70	Gender: F	Weight: 90kg	
Presenting complaint: dyspnea/CP					
Temp: 37C	HR: 156	BP: 164/105	RR: 26	O <sub>2</sub> Sat: 89%	FiO <sub>2</sub> : 6L NP
Cap glucose: 10mmol/L			GCS: 14 (E3 V5 M6)		
Triage note: Chest pain started 3hrs ago while working in the garden. It is central, heavy, non-radiating. It has gradually been getting worse and is now an 8/10. It is associated with shortness of breath which has been getting worse. She has not vomited. She does not feel palpitations. She has no history of similar episodes.					
Allergies: None					
Past Medical History: HTN T2DM TIA COPD			Current Medications: Amlodipine Metformin Gliclizide ASA LABA puffer		

## 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, sim actors, SP, etc.)?</i></p> <p>Social History: Widowed, lives alone, retired. Ex-40 pack year smoker. Rare alcohol, no other substances</p> <p>Family History: Thinks her father may have had heart problems after he retired but unsure exact age</p>	
B. Physical Exam	
<p><i>List any pertinent positive and negative findings</i></p>	
Cardio: Rapid irregular rhythm, S1S2 N, no murmurs/rubs	Neuro: In pain, GCS 14 E3V5M6
Resp: Decreased air entry to bases, crackles to bases bilaterally	Head & Neck: Normal
Abdo: SNT	MSK/skin: pale
Other:	



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## Section 3: Technical Requirements/Room Vision

A. Patient
<input checked="" type="checkbox"/> Mannequin ( <i>specify type and whether infant/child/adult</i> ): Computerized adult mannequin
<input type="checkbox"/> Standardized Patient
<input type="checkbox"/> Task Trainer
<input type="checkbox"/> Hybrid
B. Special Equipment Required
ECG, NIBP, art line, pulse ox, temperature probe, ETCO <sub>2</sub> , gloves, stethoscope, IV bags/lines, NRB mask, bipap, nasal prongs
C. Required Medications
ASA, hydromorphone/morphine/fentanyl, NTG spray/infusion, furosemide, acetazolamide, digoxin, metoprolol, diltiazem, amiodarone
D. Moulage
Patient is dressed in casual clothes
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
<i>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.</i> Crackles and decreased air entry to bases bilaterally Rapid and irregularly irregular pulse Eyes closed but alert and oriented



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## Section 4: Sim Actor and Standardized Patients

<b>Sim Actor and Standardized Patient Roles and Scripts</b>	
<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>
EMS	If asked by learner they will state that patient called with complaint of chest pain and shortness of breath. On EMS arrival her vitals were BP 164/105, HR 156, RR 26, SpO2 84%, T37C. SpO2 improved a bit with supplemental oxygen to 89%.  If asked specifically, medical history of HTN, T2DM, TIA



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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
<b>1. Baseline State</b> Rhythm: Irregular HR: 156 BP: 164/105 RR: 26 O <sub>2</sub> SAT: 89 T: 37C	<i>Is the patient alert? In distress? Seizing? What symptoms do they currently have?</i> On 6L O <sub>2</sub> by NP, pale, upright, working to breath, complaining of dyspnea and chest pain	<u>Expected Learner Actions</u> <ul style="list-style-type: none"> <li>• Attach monitors</li> <li>• Place 2 large IVs</li> <li>• Switch NP to 100% NRB</li> <li>• Call for ECG, labs, CXR</li> <li>• Obtain history/physical/POCUS</li> <li>• Analgesia</li> <li>• ASA load</li> </ul>	<u>Modifiers</u> <i>Changes to patient condition based on learner action</i> <ul style="list-style-type: none"> <li>• O<sub>2</sub> improves minimally with NRB</li> <li>• Opiates reduce her pain</li> </ul> <u>Triggers</u> <i>For progression to next state</i> Monitors attached, IVs placed, on NRB	ASA 325mg PO Morphine 2-4mg IV Hydromorphone 0.2-0.4mg IV Fentanyl 25-50mcg IV
<b>2.</b> Rhythm: AFib HR: 156 BP: 166/102 RR: 26 O <sub>2</sub> SAT: 92% T: 37°C	On 100% O <sub>2</sub> by NRB, pale, upright, still working to breath, complaining of dyspnea and chest pain	<u>Expected Learner Actions</u> <ul style="list-style-type: none"> <li>• Review ECG/CXR</li> <li>• Recognize acute CHF/AFib</li> <li>• Trial nitro spray</li> <li>• Call for bipap</li> <li>• Give furosemide +/- acetazolamide</li> <li>• Start nitro infusion</li> </ul>	<u>Modifiers</u> <ul style="list-style-type: none"> <li>• Nitro spray has little effect on symptoms or BP, infusion improves symptoms and BP</li> <li>• Bipap helps with oxygenation and work of breathing</li> <li>• No immediate effect from diuretics</li> <li>• Cardioversion, if attempted, is unsuccessful</li> <li>• If attempted, rate control with CCB/BB/amiodarone resu</li> </ul>	NTG 0.4mg SL Furosemide 40mg IV Acetazolamide 500mg IV NTG infusion titrate dose to symptom and BP improvement, starting dose 5-10 mcg/min IV every 3-5 minutes increase by 5-10mcg/min and if no response increase by 20 mcg/min every 3-5 min. ( Max rate 400mcg/minute)



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			<p>Its in worsening cardiogenic shock with anything other than very low doses</p> <ul style="list-style-type: none"> <li>• Digoxin load slows HR to 119, improves symptoms</li> </ul> <p><u>Triggers</u> Nitro spray trialed/infusion started, bipap initiated</p>	
<p>3. Rhythm: AFib HR: 152 BP: 128/86 RR: 22 O<sub>2</sub>SAT: 94% T: 37°C</p>	<p>On bipap, pale, upright, work of breathing present but somewhat improved, complaining of dyspnea and chest pain but dyspnea has improved</p>	<p><u>Expected Learner Actions</u></p> <ul style="list-style-type: none"> <li>• Review labs and recognize unstable NSTEMI</li> <li>• Recognize contribution of AFib with RVR, trial cautious rate control with digoxin as first line if not already done</li> <li>• Art line placement for continuous and accurate BP monitoring, especially if using BB/CCB</li> <li>• Serial ECGs to monitor for developing STEMI</li> <li>• Consult cardio for possible PCI</li> </ul>	<ul style="list-style-type: none"> <li>• Cardioversion, if attempted, is unsuccessful as the AFib is likely a result of the CHF/hypoxia/ischemia rather than the acute driver. The underlying issues need to be addressed first. Given unknown duration of AFib she would also be at high risk for thromboembolic event</li> <li>• Rate control with CCB/BB/amiodarone results in worsening cardiogenic shock with anything other than very cautious use</li> <li>• Digoxin load slows HR to 119, improves symptoms</li> <li>• Cardio suggests unfractionated heparin and</li> </ul>	<p>Digoxin 0.25-0.5mg IV Diltiazem 0.25 mg/kg IV Metoprolol 2.5mg IV Amiodarone 150mg IV over 10min followed by 1mg/minute for 6 hours and then reassess. UFH bolus 60U/kg max 5000U</p>





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			<p>early invasive approach given HD instability</p> <p><u>Triggers</u></p> <ul style="list-style-type: none"> <li>• Rate controlled</li> <li>• Unstable NSTEMI recognized, cardio consulted for consideration of PCI</li> </ul>	
<p>4. Rhythm: AFib HR: 119 BP: 134/86 RR: 18 O<sub>2</sub>SAT: 96% T: 37°C</p>	<p>On bipap, pale, upright, work of breathing present but noticeably improved, chest pain and dyspnea improved. Cardio at bedside</p>	<p><u>Expected Learner Actions</u> Case done</p>	<p><u>Modifiers</u> - - - <u>Triggers</u> - -</p>	



# Simulation Scenario Template

## Appendix A: Laboratory Results

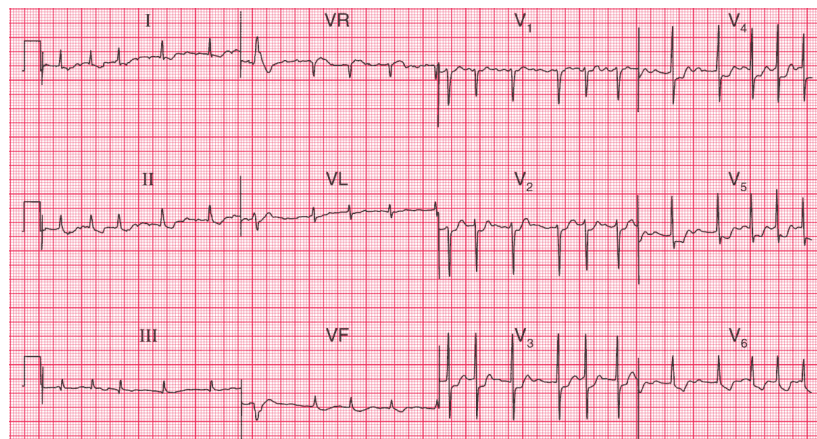
<p><u>CBC</u> WBC 14 Hgb 134 Plt 166</p> <p><u>Lytes</u> Na 133 K 4.2 Cl 101 HCO<sub>3</sub> 28 AG 10 Urea 5 Cr 124 Glucose 10</p> <p><u>Extended Lytes</u> Ca 2.3 Mg 0.85 PO<sub>4</sub> 1.0 Albumin 40 TSH 2.4</p> <p><u>VBG</u> pH 7.31 pCO<sub>2</sub> 55 pO<sub>2</sub> 40 HCO<sub>3</sub> 28 Lactate 3.9</p>	<p><u>Cardiac/Coags</u> Trop 4010 BNP 3545 INR 1.1 aPTT 44</p> <p><u>Biliary</u> AST 34 ALT 55 GGT 53 ALP 66 Bili 6 Lipase 89</p> <p><u>Tox</u> EtOH undetectable ASA undetectable Tylenol undetectable Dig level undetectable Osmols undetectable</p> <p><u>Other</u> B-HCG undetectable</p>
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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 sources so you can find them later!*



# Simulation Scenario Template

Cardiac POCUS if asked  
“Poor cardiac contractility”  
“Moderately to severely reduced LVEF”



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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.*

Importance of early ASA, NTG spray, attention to O<sub>2</sub>

Use of ultrasound in assisting diagnosis

Bipap as ventilation method of choice over intubation

Transition to NTG infusion for afterload reduction to improve symptoms and physiology

Recognition of AFib and unstable patient – discuss fact that AFib likely not driver of patients instability, rather it is more likely to be a result of the ischemia/CHF

No role for cardioversion given AFib not a driver of the instability, AFib also of unknown duration therefore risk of thromboembolic event high – would require anticoagulation even in absence of ACS

Discuss rate control in this situation – very tricky!

CCB/BB (and amiodarone to some extent) are negative inotropes meaning use of them in someone with acute ischemic CHF and decreased EF would be quite risky

Digoxin is weak positive inotrope with capability to decrease heart rate as well making it likely the safest agent

Target HR likely 100-120bpm

Discuss use of acetazolamide in management of acute decompensated CHF

“HF with reduced EF (HFrEF) – For patients with HFrEF, we use intravenous (IV) amiodarone, IV digoxin, (and rarely IV diltiazem) to acutely control the heart rate. Beta blockers are generally avoided. After starting the medication, we continually reassess the heart rate and titrate the medication to achieve the goal heart rate of <120 beats per minute.” -UpToDate

[Acetazolamide in Acute Decompensated Heart Failure with Volume Overload | NEJM](#)

## References

1. Acetazolamide in Acute Decompensated Heart Failure with Volume Overload | NEJM, N Engl J Med 2022; 387:1185-1195
2. [https://www.uptodate.com/contents/overview-of-the-acute-management-of-non-st-elevation-acute-coronary-syndromes?search=nstemi%20management&source=search\\_result&selectedTitle=1~141&usage\\_type=default&display\\_rank=1#H23](https://www.uptodate.com/contents/overview-of-the-acute-management-of-non-st-elevation-acute-coronary-syndromes?search=nstemi%20management&source=search_result&selectedTitle=1~141&usage_type=default&display_rank=1#H23)
3. [https://www.uptodate.com/contents/treatment-of-acute-decompensated-heart-failure-specific-therapies?search=acute%20CHF%20treatment&source=search\\_result&selectedTitle=1~150&usage\\_type=default&display\\_rank=1](https://www.uptodate.com/contents/treatment-of-acute-decompensated-heart-failure-specific-therapies?search=acute%20CHF%20treatment&source=search_result&selectedTitle=1~150&usage_type=default&display_rank=1)



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