Simulation Scenario Template

Section 1: Case Summary

Scenario Title:	Rural STEMI
Keywords:	STEMI, MI, Rural,
Brief Description of Case:	Inferior STEMI in a community hospital, RUDI contacted for support in management and transport.

Goals and Objectives	
Educational Goal:	To practice managing a critical patient in a rural setting utilizing RTVS resources.
Objectives: (Medical and CRM)	1- Practice the management of STEMI in a rural setting, with TNK (tenecteplase). 2- Build relationships between nursing stations and Real Time Virtual Support pathways. 3-Improve telemedicine and SIM tele-facilitation skills of healthcare providers doing virtual medicine. 4- Consider logistical challenges in transferring patients from a rural community.
EPAs Assessed:	

Learners, Setting and Personnel				
Target Learners:	☒ Junior Learners	☒ Senior Learners	☒ Staff	
	☒ Physicians	☒ Nurses	☐ RTs	☒ Inter-professional
	☒ Other Learners:			
Location:	☒ Sim Lab	☒ In Situ	☐ Other:	
Recommended Number of Facilitators:	Instructors: One to two			
	Confederates: One			
	Sim Techs: One as needed if mannequin available			

Scenario Development	
Date of Development:	August 5, 2020
Scenario Developer(s):	Brydon Blacklaws, Scot Mountain
Affiliations/Institutions(s):	UBC
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Last Revision Date:	Feb. 02, 2023
Revised By:	Brydon Blacklaws, Scot Mountain
Version Number:	2

Section 2A: Initial Patient Information

A. Patient Chart					
Patient Name: Sarah Smith			Age: 55	Gender: Female	Weight: 100 kg
Presenting complaint: Chest pain continuous for last 1 hour, intermittent exertional chest pain over last 2 weeks					
Temp: 36.6	HR: 95	BP: 175/80	RR: 16	O_2Sat: 96%	FiO_2: RA
Cap glucose: 9.0			GCS: (E V M) 15 (4,5,6)		
Triage note: Central sqeezing chest pain constant for last 2 hours, intermittent over last 2 weeks with exertion. Mild nausea, no vomiting.					
Allergies: NKDA					
Past Medical History: HTN DM2 GERD			Current Medications: Ramipril 5mg po daily Metformin 1g po BID Pantoprazole 40mg po daily		

Section 2B: Extra Patient Information

A. Further History	
History provided by the patient The chest pain is central, squeezing, non pleuritic and radiating to her jaw and left shoulder. Severity is 7/10. She has mild nausea with the pain, but has not vomited. She has no back pain, no sob, no cough, no fever, no leg swelling. She has a history of GERD but this is nothing like that. The pain came on while she was sitting on the couch watching TV and hasn't gone away. She has been getting pain like this over the last 2 weeks with exertion but it would resolve with rest in the past, which is different from this episode. PMHx: as above; PSHx: Cholecystectomy 2y ago; Social Hx: No ETOH, 10py smoking hx, quit 20y ago, no drugs FHx: 2 Brothers and her father have had heart attacks, father died of a stroke at 65.	
B. Physical Exam	
List any pertinent positive and negative findings	
Cardio: NS1S2. No extra heart sounds, no murmurs	Neuro: Grossly normal. No focal deficits.
Resp: GAEB No increased work of breathing.	Head & Neck: JVP 3 cm above sternal angle. Otherwise normal.
Abdo: Soft, non-tender, no masses, no organomegaly.	MSK/skin: Normal.
Other: Mildly diaphoretic. Pain not reproducible with palpation or movement.	

Section 3: Technical Requirements/Room Vision

A. Patient
☒ Mannequin *Adult, if available*
☒ Standardized Patient (as alternative)
☐ Task Trainer
☐ Hybrid
B. Special Equipment Required
In situ simulation utilizing participants' usual facilities and equipment. Mannequin if available. Interior Health STEMI PPO.
C. Required Medications
Whatever is available on site. SIM will utilize: Nitro, Morphine, ASA, Clopidogrel, IV fluids, Oxygen, Ramipril, Atorvastatin, Metoprolol, TNK (tenecteplase).
D. Moulage
None
E. Monitors at Case Onset
☐ Patient on monitor with vitals displayed ☒ Patient not yet on monitor
F. Patient Reactions and Exam
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. Physical exam as above. Initial vitals on mannequin to show SpO2 96% on room air, HR 95, NSR, BP 175/80, RR 16.

Section 4: Confederates and Standardized Patients

Confederate and Standardized Patient Roles and Scripts	
Role	*Description of role, expected behavior, and key moments to intervene/prompt learners. Include any script required (including conveying patient information if patient is unable)*
	A standardized patient could provide the history information above, otherwise this can be provided by facilitator.

Section 5: Scenario Progression

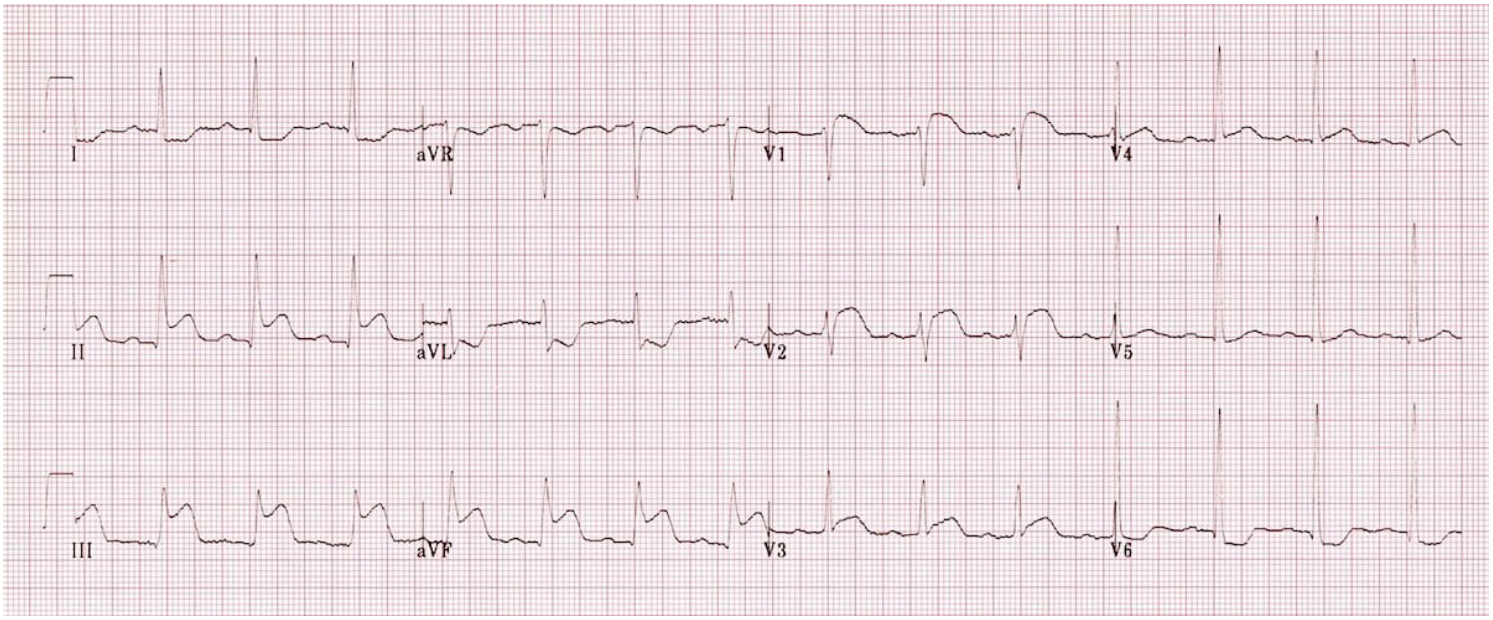
Scenario States, Modifiers and Triggers				
Patient State/Vitals	Patient Status	Learner Actions, Modifiers & Triggers to Move to Next State		Facilitator Notes
1. Baseline State Rhythm: NSR ST elevation inferior HR: 95 BP: 175/80 RR: 16 O_2SAT: 96% RA T: ^oC 36.6 GCS: 15	*Clutching chest, 7/10 chest pain radiating to jaw and Left shoulder*	Expected Learner Actions ☐ IV, O2, Monitors ☐ EKG, labs (hbg, glc, troponin, all point of care) ☐ Obtain baseline history when patient stable and on monitors.	Modifiers - Nitro will drop BP to 90/50 Triggers - RN calls RUDI with EKG result (2)	No xray available
2. RUDI on ZOOM Vitals unchanged (if nitro was given patient BP 90/50)	Unchanged (if nitro given, more nauseated) Patient still clutching chest	Expected Learner Actions ☐ Connect to RUDI doc through Zoom or telephone. They help with Hx and Physical with RN. ☐ Share EKG through secure app ☐ IV fluids 100/h (bolus if BP dropped due to Nitro) ☐ Morphine ☐ Identify Inferior STEMI on EKG.	Modifiers -If initial telephone call, RUDI doc asks to switch to Zoom to visualize pt. -Nitro will drop BP to 90/50 - Triggers -STEMI identified, decision that TNK is indicated, and PPO brought out.	
3. STEMI Protocol Vitals unchanged	Pain improved to 5/10 with morphine	Expected Learner Actions ☐ Locate STEMI PPO ☐ Evaluate contraindications (none found) ☐ PPO given with TNK at appropriate dose.	Modifiers - Nitro will cause BP to drop to 90/50 Triggers - Protocol initiated – 1 hour passes (4)	
4. 1 Hour later Vitals unchanged	Patient unchanged, Pain 6/10. EKG shows ongoing ST elevation.	Expected Learner Actions ☐ RUDI calls PTN ☐ RN and RUDI decide patient needs transfer as still having pain and persistent ST elevation.	Modifiers -PTN called – Will be delayed until morning at least pending weather - Snowing in small community in winter - Optional STEMI related issues could arise, as per facilitator	

Appendix A: Laboratory Results – only reveal if available in center. *(Normal values or ranges in parentheses)*.

<u>CBC</u> WBC – 11.9 *(4.0-10.0)* Hgb – 121 *(130-170)* Plt – 298 *(150-400)* <u>Lytes</u> Na – 145 *(136-145)* K – 3.8 *(3.4-5.1)* Cl -106 *(98-107)* HCO_3 – 26 *(21-31)* AG – 12 *(5-14)* Urea – 3.5 *(2.5-9.0)* Cr – 50 *(45-90)* Glucose – 9 *(4-11)* <u>Extended Lytes</u> Ca – 2.25 *(2.15-2.58)* Mg – 0.75 *(0.78-1.11)* PO_4 – 1.05 *(0.81-1.62)* Albumin – 38 *(35-60)* TSH <u>VBG</u> pH – 7.45 *(7.33-7.43)* pCO_2 – 36 *(41-51)* HCO_3-25 *(21-30)* Lactate – 1.1 *(0.7-2.1)*	<u>Cardiac/Coags</u> Trop (high sensitivity) – 150 *(<18)* D-dimer – 314 *(<500)* INR – 0.9 *(0.8-1.2)* aPTT - 26 *(25-40)* <u>Biliary</u> AST – 23 *(<40)* ALT – 16 *(< 52)* GGT – 23 *(12-43)* ALP – 76 *(38-126)* Bili – 9 *(3-22)* Lipase – 27 *(23-300)* <u>Tox</u> EtOH - <2 ASA – not detected Tylenol – not available Dig level – not available <u>Other</u> B-HCG – not done

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!



ECG: https://litfl.com/wp-content/uploads/2018/08/ECG-Right-ventricular-infarction-1.jpg

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.

Beware of nitro in inferior STEMI if RV involvement.

Communication challenges via ZOOM, Internet connection, video placement, etc.

Locating local health authority PPOs – requires logging in and finding them, which can be challenging.

What labs, investigations, monitors, drugs are available in different rural centres?

References

1. Thomas, JJ and Brady, WJ. Acute Coronary Syndrome. In: Rosen's Emergency Medicine: Concepts and Clinical Practice 9ed, Walls RM (Ed), Elsevier, Philadelphia, PA, 2018, pp. 891 – 928.
2. Thomas, L and Goldstein, JA. Right Ventricular Myocardial Infarction. In: UpToDate, Post, TW (Ed), UpToDate, Waltham MA, 2020
3. Reeder, GS and Kennedy, HL. Overview of the Acute Management of ST-Elevation Myocardial Infarction. In: UpToDate, Post, TW (Ed), UpToDate, Waltham MA, 2020

Interior Health

ST ELEVATION MI: EMERGENCY MANAGEMENT PRE-PRINTED ORDERS (PPO)

Weight (kg)

Bulleted orders are initiated by default, unless crossed out and initialed by the physician/prescriber. Boxed orders (☐) require physician/prescriber check mark (☑) to be initiated.

Please see reverse pages for supplemental information

1. ALLERGIES: See Allergy/Adverse Reaction record

2. CODE STATUS/MOST

- Refer to completed Medical Orders for Scope of Treatment (MOST) #829641

3. INITIAL MANAGEMENT

- Admit to: _____ MRP: _____
- MRP to order ST Elevation MI Admission pre-printed orders #829734
- Continuous cardiac monitoring
- Neurovitals: obtain baseline (if giving thrombolytic), then Q1H × 2 and then PRN
- HR, RR, Sp02, BP (both arms initially, then arm with highest reading) Q15min until stable, Q30MIN × 2 then Q1H
- Temp Q4H until stable, then Q12H and PRN
- Start oxygen if SpO_2 less than 90%, titrate or wean for goal SpO_2 between 90 to 94%
- Troponin, Na, K, Cl, CO_2 (lytes4), Mg, urea, creatinine, random glucose, AST, CBC, INR, PTT **STAT**
- Insert 2 large bore IVs. Avoid the right hand and wrist. Normal Saline 0.9% NaCl at 25 mL/H through one IV line. Saline Lock second IV line.
- Bed rest with bedpan/commode if ongoing chest pain or hemodynamic instability

☐ Other: _____

4. DIAGNOSTICS

- 12 lead ECG **STAT** (if ECG not completed and transmitted by ALS crew where available)

☐ 16 lead (extended lead) ECG for inferior STEMI

- 12 lead ECG 60 to 90 mins post tenecteplase (if thrombolytic given). Assess for Rescue PCI 90 min post tenecteplase *(see IH STEMI Transfer Algorithm on reverse of page 3)*
- 12 lead ECG PRN for increase or recurrence of chest discomfort, chest pain unrelieved by nitroglycerin or for sustained rhythm changes
- Chest X-ray (portable). URGENT

☐ Other: _____

5. REPERFUSION STRATEGY CHOOSE ONE OF A, B OR C

☐ **A. Primary PCI**

- Contact interventional cardiologist through KGH switchboard (1-250-862-4000)
- **acetylsalicylic acid [ASA] chewable 160 mg (2 × 80 mg TAB) chewed STAT**
- Select **ONE** of the following *(see reverse of page 1 for antiplatelet guidelines)*:
  - ☐ **ticagrelor 180 mg PO STAT** *(FIRST CHOICE)*
    OR*
  - ☐ **clopidogrel 300 mg PO STAT**
- **unfractionated heparin IV bolus (60 units/kg)** _____ **units STAT** (maximum 4,000 units)
  NO MAINTENANCE INFUSION

see page 2 for Reperfusion Strategy B: Thrombolytic, and Strategy C: Conservative Management

Date (dd/mm/yyyy)	Time	Prescriber's Signature	Printed Name or College ID#
/ /			

RISK MANAGEMENT ASSESSMENT Guidelines for STEMI

Percutaneous Coronary Intervention (PCI)

Indications for Primary PCI

- ST segment elevation MI within 12 hours of symptom onset
- Pulmonary edema (can lie flat)
- Recurrent VF / VT
- Diagnosis of STEMI in doubt (e.g., LVH with strain, pericarditis)
- Cardiogenic shock
- Contraindications to thrombolysis (see below)

Contraindications to Primary PCI / Relative to Rescue PCI

- Patient cannot lie flat
- Known terminal co-morbidities to limit lifespan to less than one year (e.g. lung disease, malignancy)
- Moderate to severe dementia
- Known severe PVD (peripheral vascular disease) without good arterial access or palpable pulses
- Known creatinine greater than 200 umol / L or dialysis (relative)
- Prior CABG (coronary artery bypass grafts) / Transcatheter Aortic Valve Implantation (TAVI) – unless contraindications to thrombolysis

Thrombolysis

Indications for Thrombolysis

- Chest pain greater than 15 minutes (but less than 12 hours in duration) consistent with myocardial ischemia ***and***
- New ST elevation at the J point in at least 2 contiguous leads of greater than or equal to 2 mm (0.2 mV) in men or greater or equal to 1.5 mm (0.15 mV) in women in leads V2–V3 ***or***
- Greater than or equal to 1 mm (0.1 mV) in other contiguous chest leads or the limb leads

Absolute Contraindications to Thrombolysis

- Any prior intracranial hemorrhage
- Known structural cerebral vascular lesion
- Known malignant intracranial neoplasm (primary or metastatic)
- Ischemic stroke within 3 months (except within 3 hours and thrombolytic indicated for treatment)
- Suspected aortic dissection
- Active bleeding or bleeding diathesis (excluding menses)
- Significant closed head or facial trauma within 3 months

Relative Contraindications to Thrombolysis

- SBP greater than180 mmHg and/or DBP greater than 110 mmHg
- History of prior ischemic stroke greater than 3 months, dementia or known intracranial pathology not covered above
- Prolonged (greater than 10 min) CPR
- Major surgery less than 3 weeks
- Recent (2 to 4 weeks) internal bleeding
- Noncompressible vascular punctures
- Pregnancy
- Active peptic ulcer
- Current use of anticoagulants

* For patients greater than 75 years of age, may consider half dose tenecteplase

ANTIPLATELET SELECTION GUIDE

Suggested Antiplatelet	Clinical Scenario
ticagrelor	• First line for Primary PCI • Allergy to clopidogrel • Previous in-stent thrombosis, recurrent myocardial infarction while on clopidogrel • History or ECG changes suggestive of left main or 3-vessel coronary artery disease requiring coronary artery bypass grafting
clopidogrel	• Use if receiving thrombolytic • Use if planned conservative management of ACS • If requiring an oral anticoagulant for atrial fibrillation, history of or active venous thromboembolism (deep vein thrombosis or pulmonary embolism), or left ventricular thrombus etc. • Use if history of medication non-compliance or cost and coverage concerns

Interior Health

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5. REPERFUSION STRATEGY *(cont'd)*

☐ **B. Thrombolytic (SELECT ONE COLUMN BASED ON PATIENT AGE)**

Drug	☐ **Age less than 75 years**	☐ **Age 75 years or greater**
Antiplatelet	• **acetylsalicylic acid [ASA] chewable 160 mg (2 × 80 mg) PO STAT** • **clopidogrel 300 mg PO STAT**	• **acetylsalicylic acid [ASA] chewable 160 mg (2 × 80 mg) PO STAT** • **clopidogrel 75 mg PO STAT**
Thrombolytic See dose/volume chart below	• **tenecteplase _____ mg IV over 5 seconds STAT**	• **tenecteplase _____ mg IV over 5 seconds STAT** *(*see thrombolysis section on reverse of page 1)*
Anticoagulation	☐ **enoxaparin 30 mg IV STAT, then 1 mg/kg _____ mg subcutaneously STAT** *(max 100 mg for STAT subcutaneous dose)* (eGFR greater than or equal to 30 mL/min OR unknown renal function) ***OR*** ☐ **unfractionated heparin IV bolus (60 units/kg) _____ units STAT** (maximum 4,000 units); then start infusion and adjust per site specific heparin PPO	☐ **enoxaparin 0.75 mg/kg _____ mg subcutaneously STAT** *(maximum 75 mg dose for STAT subcutaneous dose)* (eGFR greater than or equal to 30 mL/min) OR unknown renal function ***OR*** ☐ **unfractionated heparin IV bolus (60 units / kg) _____ units STAT** (maximum 4,000 units); then start infusion and adjust per site specific heparin PPO

Tenecteplase Dosing	
Weight (kg)	**Full dose (volume)**
Less than 60	30 mg (6 mL)
60 to less than 70	35 mg (7 mL)
70 to less than 80	40 mg (8 mL)
80 to less than 90	45 mg (9 mL)
greater than or equal to 90	50 mg (10 mL)

- Flush with normal saline 0.9% before and after tenecteplase administration
- Avoid IM injections within 24 hours of thrombolysis
- Assess if candidate for transfer per IH STEMI Transfer Algorithm (see reverse of page 3)

☐ **C. Conservative Management**

- **acetylsalicylic acid [ASA] chewable 160 mg (2 × 80 mg TAB) chewed STAT**
- **clopidogrel 300 mg PO STAT**
- Select **ONE** of the following based on eGFR:

eGFR greater than 30 mL/min (or unknown renal function)	eGFR less than or equal to 30 mL/min
☐ **enoxaparin 1 mg/kg _____ mg subcutaneously STAT** ***OR*** ☐ **fondaparinux 2.5 mg subcutaneously STAT**	☐ **unfractionated heparin IV bolus (60 units/kg) _____ units STAT** (maximum 4,000 units); then start infusion and adjust per site specific heparin PPO

Date (dd/mm/yyyy)	Time	Prescriber's Signature	Printed Name or College ID#
/ /			

HOME/PRIOR ANTITHROMBOTICS: Dosing and Administration Guidelines

*Provided as a guide only and may not apply in every clinical situation. Contact cardiologist/internist for advice if additional clinical advice is required.

Patient Already On This Agent Prior to Admission	Recommendation
ASA 81 to 325 mg PO daily	• Still load with ASA 160 mg PO then 81 mg PO daily
clopidogrel 75 mg PO daily	• Still load with clopidogrel 300 mg PO then 75 mg PO daily (unless 76 years or older and receiving thrombolytic)
ticagrelor 90 mg PO BID	• Still load with ticagrelor 180 mg PO then 90 mg PO BID
warfarin	• Still give ASA and clopidogrel (suggest avoiding ticagrelor due to increased risk of bleeding) • Hold warfarin • Start selected IV or subcutaneous anticoagulant (heparin, enoxaparin, fondaparinux) when INR less than 2
Direct oral anticoagulant (DOAC): apixaban, dabigatran rivaroxaban or edoxaban	• Still give ASA and clopidogrel (suggest avoiding ticagrelor due to increased risk of bleeding) • Stop DOAC and start IV or subcutaneous anticoagulant 12 hours after last dose of dabigatran or apixaban and 24 hours after last dose of rivaroxaban or edoxaban

Use Nitroglycerin with caution if:

- SBP below 90 mmHg or if SBP drops more than 30 mmHg below baseline
- Cautious use with Inferior MI. Avoid for known/suspected Right Ventricular infarct
- Critical aortic stenosis
- Avoid if recent use of phosphodiesterase inhibitors:
  - within 24 hours of last dose of sildenafil (Viagra®) or vardenafil (Levitra®)
  - within 48 hours of last dose of tadalafil (Cialis®)

Interior Health

ST ELEVATION MI: EMERGENCY MANAGEMENT PRE-PRINTED ORDERS (PPO)

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6. DIET

- Heart Healthy diet as tolerated, if diabetic enter Diabetic diet

☐ Other: _____

7. INTRAVENOUS THERAPY AND HYDRATION

- Flush saline lock with normal saline 0.9% Q12H

☐ Other: _____

8. MEDICATIONS

Nitrates *(see reverse of page 2 for contraindications/precautions)*

☐ No nitrates [Pharmacy do not process nitroglycerin spray order below]

- **nitroglycerin spray 0.4 mg sublingual Q5MIN PRN × 3 doses** for ischemic symptoms (if unresolved after 3 doses, call physician and if ordered, start nitroglycerin infusion)

☐ **nitroglycerin IV infusion, start at 10 mcg/min** for ischemic symptoms unresolved with nitroglycerin spray and titrate per Interior Health Medication Manual (for parenteral drugs)

☐ **nitroglycerin patch** _____ **mg/hour, apply at 0800 HR and remove at 2000 HR DAILY**
(***OR*** apply at _____ HR and remove at _____ HR)

*Hold nitroglycerin patch if symptomatic hypotension (dizziness, presyncope, syncope) or if nitroglycerin infusion running

PRN Medications

- **acetaminophen 325 to 975 mg PO Q4H PRN** pain (maximum 4 g/day)
- **antacid 30 mL PO Q6H PRN** indigestion or heartburn
- **atropine 0.5 to 1 mg IV Q5MIN PRN** for symptomatic heart rate less than 50 bpm (maximum 3 mg total dose)
- **morphine 2 to 5 mg IV Q5MIN PRN** chest pain unresponsive to nitroglycerin or if nitroglycerin contraindicated (maximum 20 mg/hour)
- if tobacco user, physician to complete NICOTINE REPLACEMENT THERAPY PPO #829435
- Physician to complete site specific bowel elimination protocol

☐ **dimenhyDRINATE 50 mg PO or 25 mg IV Q6H PRN** nausea

☐ **LORazepam 0.5 mg SL Q6H PRN** anxiety

☐ **zopiclone 3.75 to 7.5 mg PO HS PRN** insomnia

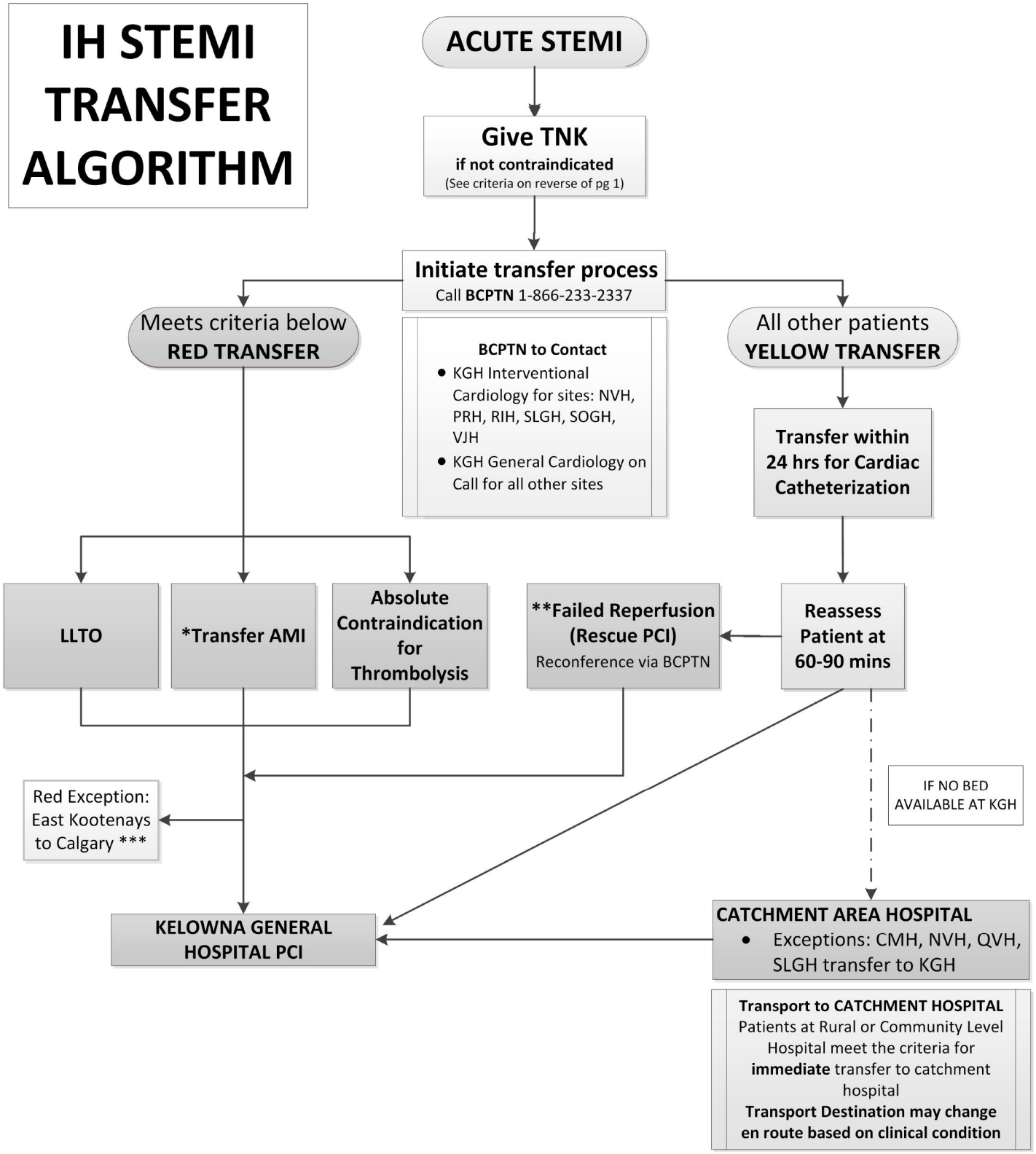
9. OTHER

- Transport personnel may continue ST Elevation MI PPO during inter-facility transport

10. ADDITIONAL ORDERS

Date (dd/mm/yyyy)	Time	Prescriber's Signature	Printed Name or College ID#
/ /			

IH STEMI TRANSFER ALGORITHM



*Transfer AMI Criteria

Any of:

- Persistant Tachycardia (>100bpm)
- Persistant Hypotenstion (SBP < 100mmHg)
- Heart Failure
- Reciprocal ST segment depression (≥2mm)
- RV Infarction (> 1mm ST segment elevation in V4R)

Case by Case Discussion for Red Transport:

- Anterior MI
- Multi-Territory MI

**Criteria for Failed Reperfusion

Any of:

- <50% ST segment elevation resolution
- Persistent ischemic symptoms
- Suspected reinfarction
- No Contraindications to Rescue PCI including
  - Severe GI or systemic bleed
  - New unexplained neuro findings
  - CABG or TAVI (see exclusion criteria)

*** CVH/GDH if unable to go to KGH due to transport/weather

FEB 2021