

**Emergency Cardiac Care: Decision Support Tool #3
RN-Initiated Treatment for Chest Pain or Discomfort Suggestive of Acute Coronary Syndrome**

**This tool was developed in collaboration with subject matter experts
from all Health Authorities in British Columbia**

PURPOSE

To guide registered nurses who may manage clients experiencing chest discomfort or other symptoms suggestive of acute coronary syndrome (ACS) (see Appendix I, Definitions and Abbreviations) and there is no physician/nurse practitioner present. This DST applies to situations in which cardiac monitoring MAY be available. It outlines the nursing actions that may be taken during the first 10 – 15 minutes, or until medical input is received.

*NOTE: This document defines what registered nurses *MAY* do, according to Section 6 of the Health Professions Act. However, employers may impose further limits and conditions on these actions, and nurses should consult and follow their agency-specific policies or protocols, if they exist.

For use by	Registered nurses in various practice settings
Indications	<p>For use in the initial assessment and treatment of chest pain/ discomfort in the adult client. Does not cover ongoing management of continuous, unresolved chest pain or discomfort, or acute myocardial infarction.</p> <p>All chest discomfort should be assumed to be cardiac in origin until determined otherwise. This DST does not address management of clients who are receiving palliative care. Also refer to agency- and unit-specific protocols for management of chest pain or discomfort.</p>

BACKGROUND

Chest discomfort, alone or in combination with other symptoms, may indicate an imbalance in the supply and demand of oxygen to the myocardium. The most common cause of this is atherosclerosis, resulting in occlusive coronary artery disease. Other causes include low cardiac output (e.g. from hypovolemia, hypotension from other causes, cardiac arrhythmias) or use of cocaine or other stimulants. Chest discomfort represents an emergency, because the longer the period of ischemia, the worse the outcome for the patient. Prompt and accurate assessment and treatment of chest discomfort is necessary to establish a definitive diagnosis (e.g., myocardial infarction [MI]), initiate treatment, and reduce myocardial damage.

ASSESSMENT

Because most studies about symptoms of cardiac ischemia have included people of primarily European ancestry, there is inadequate knowledge about the symptoms that people of other ethnicities may experience. Any unusual discomfort should be assessed carefully, including prodromal symptoms.

Assess the following:

Pain/Discomfort	<p>Precipitating factors Quality Radiation/Region Severity Time The most common signs and symptoms are:</p> <ul style="list-style-type: none"> ○ Sudden onset of sharp, stabbing, aching or crushing pain/discomfort in chest (can be central, left- or right-sided) ○ Pain/discomfort radiating to left arm/shoulder, neck or jaw ○ A tight, dull, heavy or band-like pressure or general discomfort ○ Diaphoresis ○ Nausea/vomiting, indigestion, belching ○ Shortness of breath ○ Clenching of fist over the sternum (Levine’s sign) ○ Dizziness or syncope ○ Feeling of impending doom ○ Precipitation by exertion, emotional stress, a heavy meal or cold weather <p>Thoroughly assess any symptom that patient describes as an unusual discomfort</p>
Vital Signs	<p>Vital signs, including oxygen saturation (SpO₂) when available. Findings might include:</p> <ul style="list-style-type: none"> ○ Irregular pulse or cardiac rhythm or changes in heart rate ○ Hypo- or hypertension ○ Shortness of breath
Focused Health History	<ul style="list-style-type: none"> ○ Personal medical history and family history of heart disease ○ Cardiac risk factors such as smoking, hypertension, diabetes, overweight and/or physical inactivity, high cholesterol ○ Any other signs or symptoms of heart disease such as general fatigue/lethargy, shortness of breath, edema
Medication History	<ul style="list-style-type: none"> ○ Cardiac medications ○ Recent use of cocaine or sildenafil (Viagra®), vardenafil (Levitra®) or tadalafil (Cialis®)

PRECAUTIONS / SPECIAL CONSIDERATIONS

All chest pain/discomfort should be assumed to be cardiac in nature (ACS or MI) until determined otherwise. Some patients may not have distinct chest pain, but may have arm, neck, jaw/throat or back discomfort, shortness of breath or dizziness. Both severe and subtler pain can indicate ACS. Women and men are equally likely to have coronary heart disease and experience ACS. Women may report *more* symptoms than men, making diagnosis more difficult, but most research has shown that women who are having ACS are equally likely as men to report chest discomfort.

Immediately communicate all new episodes of chest pain/discomfort or ischemic symptoms to the physician or nurse practitioner, to facilitate diagnosis, further monitoring and initiation of treatment. Agency protocol for management of chest pain, if one exists, should be followed after initial episode and consultation with physician or nurse practitioner.

Pulmonary embolus should be suspected with acute onset of pleuritic chest pain accompanied by dyspnea and severe hypoxia, in the setting of recent surgery, known malignancy or immobility.

Nitroglycerin can cause a sudden drop in blood pressure. If blood pressure (BP) is less than 90 mmHg, use caution when administering sublingual (SL) nitroglycerin. Withhold SL nitroglycerin if patient has used sildenafil (Viagra®), vardenafil (Levitra®) **within the last 24 hours** or tadalafil (Cialis®) **within 48 hours**.

INTERVENTIONS

The sequence of interventions may be different for patients with known cardiac history – consult agency policy/established order sets.

ALL SETTINGS

1. **Notify physician or nurse practitioner immediately.**
2. In non-acute care settings, call 911 or ambulance, according to agency guidelines.
3. Position in semi-Fowler's position

IF AVAILABLE

4. Measure O₂ saturation (SpO₂). If SpO₂ is less than 90%, initiate O₂ via suitable delivery system until 90% achieved. Oxygen therapy is **not indicated** for SpO₂ greater than 90%, and may cause harm. If SpO₂ monitoring not available, provide oxygen to any patient who exhibits signs of respiratory distress
5. Initiate continuous ECG monitoring. Review rhythm strip for ST deviation (elevation or depression) and bundle branch block, and report to physician/nurse practitioner if ST deviation of greater than or equal to 1 mm present in any lead or QRS duration > 0.12 seconds. Multi-lead monitoring with arrhythmia recognition and continuous ST segment monitoring is preferred.
6. Initiate process for acquiring a 12-lead ECG
7. If client has not taken aspirin, and has no clear history of aspirin allergy and no evidence of active gastrointestinal (GI) bleeding, administer:



- ***Aspirin** 160-325 mg PO (should be chewed, not swallowed). Can be given NG or by rectal suppository (300 mg) if client has nausea/vomiting, active peptic ulcer disease or other disorders of upper GI tract.
- 8. Initiate process for obtaining bloodwork (CBC, electrolytes, coagulation parameters [INR or aPTT], cardiac enzymes or biomarkers).
- 9. If systolic BP 90 mmHg or more, and if client has not used sildenafil (Viagra®), vardenafil (Levitra®) within the last 24 hours or tadalafil (Cialis®) (48 hours), administer SL **nitroglycerin**:
 - ***Administer 1-2 metered doses (0.4mg/dose) sublingual spray or one 0.3 mg tablet** every 5-10 minutes as needed, up to 3 doses in 15 minutes. Monitor BP 5 minutes after each dose and continue q5minute monitoring if systolic less than 90 mmHg
 - If pain unrelieved with 3 doses, anticipate (a) physician/nurse practitioner orders for morphine (if appropriate in setting) and (b) transfer to higher level of care (in collaboration with physician/nurse practitioner).

ALL SETTINGS

10. Monitor vital signs and SpO₂ (if available) during episode of chest pain/discomfort in anticipation of further orders or until help arrives. **(1:1 nursing care should be implemented during chest pain episode).**
11. If chest pain/discomfort is not resolved and/or patient continues to deteriorate **(i.e., hypotension, respiratory distress or decreasing level of consciousness)** call Code Blue as necessary or follow agency policy.
12. Complete documentation as soon as possible.

INTENDED OUTCOMES

With safe and effective initiation of treatment, chest pain/discomfort is relieved within 10-15 minutes, as evidenced by subjective and objective data, and associated complications are prevented or minimized.

- Signs of improvement within 5 minutes of initiating treatment
- Complete resolution of pain within 15 minutes

Communication takes place with the physician or nurse practitioner and orders are received for ongoing monitoring and/or management. Client with unresolved chest pain may require urgent transfer to a higher level of care.

UNINTENDED OUTCOMES

- Hypotension (side effects of nitroglycerin)
- Chest pain unresolved for longer than 15 minutes
- Acute myocardial infarction
- Cardiac arrest

See "Precautions / Special Considerations"

CLIENT/FAMILY EDUCATION

When appropriate, explain rationale for the treatment being provided and possible side effects. Instruct patient about importance of and method for communicating further episodes of chest pain/discomfort.

DOCUMENTATION

- Initial and ongoing assessment
- Date, time and dose of medications
- Oxygen concentration or flow
- Client's response to treatment
- Education/information given to client and family
- Any other interventions (e.g., transfer to high level of care)
- Communication with physician or nurse practitioner and any related orders for ongoing monitoring and/or management of chest pain/discomfort

REFERENCES

- Amsterdam, E.A., Wenger, N.K., Brindis, R.G., Casey, D.E. Jr., Ganiats, T.G., Holmes, D.R. Jr., Jaffe, A.S., Jneid, H., Kelly, R.F., Kontos, M.C., Levine, G.N., Liebson, P.R., Mukherjee, D., Peterson, E.D., Sabatine, M.S., Smalling, R.W. & Zieman, S. J. (2014) 2014 AHA/ACC Guideline for the management of patients with non-ST-elevation acute coronary syndromes. A report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines
- Devon, H., Ryan, C., Ochs, A. Shapiro, M. (2008) Gender Differences in Critical care. Symptoms Across the Continuum of Acute Coronary Syndromes: Differences Between Men and Women, *American Journal of Critical Care*, 17(1): 14-24.
- Drew, B.J. & Krucoff, M.W. (1999). Multilead ST-segment monitoring in patients with acute coronary syndromes: A consensus statement for healthcare professionals. *American Journal of Critical Care*, 8, 372-388.
- [Hazinski, M.F.](#), Nolan, J.P., [Aickin, R.](#), [Bhanji, F.](#), [Billi, J.E.](#), [Callaway, C.W.](#) et al. (2015). Part 1: Executive Summary: 2015 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science with Treatment Recommendations. *Circulation*. 2015; 132 (16 suppl 1), S2-39.
- [Jones, K.](#); [Raghuram, A.](#) (1999). Investigation and management of patients with pleuritic chest pain presenting to the accident and emergency department. *Journal of Accident and Emergency Medicine*, 616, 55-59.
- Shaffer, R. & Bucher, L. (adapted by Goldsworthy, S.) (2018). Nursing Management: Coronary Artery Disease and Acute Coronary Syndrome in M.A. Barry, J. Lok, J. Tyerman, & S. Goldsworthy (Eds). *Medical-Surgical Nursing in Canada* (4th ed., pp, 827-842). Milton, ON: Elsevier.
- Neumar, R. W. et al., Shuster, M., Callaway, C.W., Gent, L.M., Atkins, D.L., Bhanji, F., Brooks, S.C., de Caen, A.R., Donnino, M.W., Ferrer, J.M.E., Kleinman, M.E., Kronick, S.L., Lavonas, E.J., Link, M.S., Mancini, M.E., Morrison, L.J., O'Connor, R.E., Samson, R.A., Schexnayder, S.M., Singletary, E.M., Sinz, E.H., Travers, A.H., Wyckoff, M.H. & Hazinski, M.F. (2015). 2015 American Heart Association Guidelines Update for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. *Circulation*, 132(18) suppl 2, S313-S589

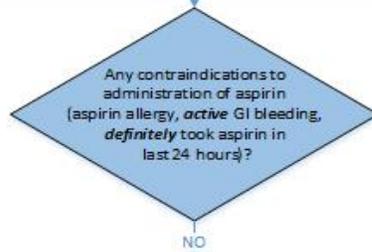
APPENDIX I: Treatment of chest pain/discomfort suggestive of acute coronary syndrome (graphic)

**Registered Nurse Independent Activities
Decision Support Tool
Treatment of Chest Pain and Discomfort Suggestive of Acute Coronary Syndrome**

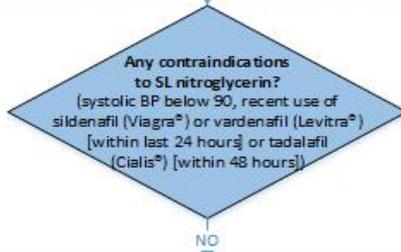
Chest pain/discomfort can be a sign of a life-threatening situation. All Chest pain/discomfort should be assumed to be cardiac in nature until determined otherwise

- Signs and Symptoms** (consider compounding health or medication history)
- Sudden onset of sharp, stabbing, aching or crushing pain/discomfort in chest (left, central or all over)
 - Pain/discomfort may radiate or be confined to the left arm/shoulder, neck/throat or lower jaw
 - Tight, dull, heavy or band-like sensation or sensation of pressure or general discomfort
 - Diaphoresis, nausea/vomiting, indigestion, belching
 - Clenching of fist over the sternum (Levine sign)
 - Dizziness or syncope, palpitations/irregular heart beat/arrhythmias, changes in BP, SOB, ↓ oxygen saturation
 - Feelings of impending doom
 - Symptoms precipitated by exertion, stress or other factors such as cold weather

- ✓ Position in semi-Fowlers position and measure O₂ saturation (SaO₂). If SaO₂ is less than 90%, initiate O₂ via suitable delivery system until 90% is achieved. Oxygen is *not* indicated for SaO₂ greater than 90%, and may cause harm.
- ✓ Initiate process for acquiring a 12-lead ECG, bloodwork, (CBC, electrolytes, coagulation studies, cardiac enzymes) and chest x-ray where possible (non-acute care would call 911 or ambulance according to agency guidelines)



Administer: Aspirin 160 – 325 mg PO (should be chewed and swallowed)
Can be given NG or by rectal suppository if client has nausea/vomiting, active peptic ulcer disease or other disorders of upper GI tract.



Administer: SL nitroglycerin one to two metered doses (0.4 mg/dose) translingual spray
Can be administered every 5 – 10 minutes (as needed) x maximum 3 doses in 15 minutes

- ✓ NOTIFY Physician or appropriate health professional immediately, initiate IV access if possible and prepare for transfer to higher acuity setting (Telemetry, ER, ICU, other site)
- ✓ Monitor vital signs and oxygen saturation during episode of chest pain/discomfort in anticipation of further orders or until help arrives. (1:1 nursing care should be implemented during pain episode)
- ✓ If chest pain/discomfort is not resolved and/or condition continues to deteriorate CALL CODE BLUE or OBTAIN MEDICAL ASSISTANCE per agency policy.
- ✓ Document as soon as possible.

APPENDIX II: Regulation, Limits and Conditions

<p>Applicable Nurses’ (Registered) and Nurse Practitioners’ Regulation</p>	<p>Excerpts from Section 6 of the Health Professions Act: Nurses (Registered) and Nurse Practitioners Regulation (activities that CAN be carried out without a physician’s/nurse practitioner’s order):</p> <p>Section 6(1):</p> <p>A registrant in the course of practicing nursing may:</p> <ul style="list-style-type: none"> (a) make a nursing diagnosis identifying a condition as the cause of the signs or symptoms of an individual; (e) administer oxygen by inhalation (j) apply electricity for the purpose of defibrillation in the course of emergency cardiac care (k) compound, dispense or administer by any method a drug specified in Schedule II of the Drug Schedules Regulation, B.C. Reg. 9/98...such as the following: sublingual nitroglycerin (l) in respect of a drug specified in Schedule 1 of the Drug Schedules Regulation, compound, dispense or administer the drug... for the purpose of treating cardiac dysrhythmia
<p>Applicable BCCNM Limit and Condition</p>	<p>(1) Registered nurses who, in the course of providing emergency cardiac care, apply electricity using a manual defibrillator, must possess the competencies established by Providence Health Care and follow decision support tools established by Providence Health Care.</p> <p>(2) Registered nurses may compound or administer: ...epinephrine, atropine, amiodarone or lidocaine to treat cardiac dysrhythmia.</p> <p>(3) Registered nurses who administer epinephrine, atropine, amiodarone or lidocaine must possess the competencies established by Providence Health Care and follow decision support tools established by Providence Health Care.</p> <p>https://www.heartcentre.ca/professionals/decision-support-tools</p>
<p>Related Resources, Policies and Standards</p>	<p>Core Competencies for Emergency Cardiac Care https://www.heartcentre.ca/sites/default/files/Core%20Competencies%20for%20Emergency%20Cardiac%20Care.pdf</p> <p>Scope of Practice for Registered Nurses https://www.bccnm.ca/RN/ScopePractice/Pages/Default.aspx</p> <p>BCCNM Scope of Practice: “Acting within autonomous scope of practice” https://www.bccnm.ca/RN/ScopePractice/part2/autonomous/Pages/Default.aspx</p> <p>BCCNM Standard: “Medications” https://www.bccnm.ca/NP/PracticeStandards/Pages/Medication.aspx</p>
<p>Definitions and Abbreviations</p>	<p>Emergency cardiac care: All responses necessary to treat sudden, life-threatening events affecting the cardiovascular and respiratory systems, with a particular focus on sudden cardiac arrest</p> <p>Acute Coronary Syndrome (ACS): umbrella term encompassing unstable angina, non-ST-elevation myocardial infarction (MI) and ST-elevation MI. It is caused by a sudden disruption of an atherosclerotic plaque in a coronary artery, which leads to inadequate myocardial perfusion. Treatment must be initiated quickly for patients to receive maximum benefit. Therefore, possible ACS requires prompt assessment and action</p> <p>Stable Angina: a chronic condition caused by the obstruction, constriction or intermittent spasm of one or more of the coronary arteries. This causes brief episodes of chest (or sometimes neck,</p>



jaw or arm) discomfort, most often during exertion or exercise, due to reduced myocardial blood supply. The discomfort of stable angina is relieved by rest or medication.

Pleuritic Chest Pain: Sharp, stabbing pain that typically worsens with inspiration or coughing, usually unilateral and quite localized. Ischemic cardiac discomfort does not usually worsen with inspiration and is usually more diffuse than pinpoint. Pleuritic chest pain is a symptom of pleuritis (pleurisy), pulmonary embolism, pneumothorax and other respiratory disorders.