

RN-Initiated Emergency Cardiac Care: Decision Support Tool #2 Emergency Cardiac Care in Areas Using Cardiac Monitoring, Defibrillation and Emergency Cardiac Drugs

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 sudden or unexpected life-threatening cardiac emergencies where cardiac monitoring and emergency cardiac drugs are available. This DST applies to situations in which a patient has sudden (expected or unexpected) collapse, loss of consciousness or decreased level of consciousness, and there is no physician/nurse practitioner present, but cardiac monitoring, manual defibrillator and emergency cardiac drugs are available. It outlines the nursing actions that may be taken during the first 10 – 15 minutes, or until medical input is received.

BACKGROUND

Patients may experience sudden and life-threatening cardiac arrhythmias, due to either acute coronary syndrome or other causes (e.g. hypovolemia, tension pneumothorax, electrolyte imbalance, shock, congenital heart defects). Once cardiac arrest has occurred, rapid resuscitation is critical to ensure survival. Among patients experiencing an *unwitnessed* in-hospital cardiac arrest, only 1-3% survive to hospital discharge; for *witnessed* in-hospital cardiac arrest, the rate of survival to hospital discharge is about 25%. Ideally, nurses should recognize clinical deterioration prior to cardiac arrest (using early warning systems or other protocols) and intervene by providing or accessing appropriate care to prevent the arrest. However, some arrest events are sudden and nurses are very likely to be the first health professional to discover a patient in cardiac arrest or with a life-threatening arrhythmia, and must be able to recognize the condition and intervene immediately.

Recognition of cardiac arrhythmias and use of specialised equipment (e.g. cardiac monitors, defibrillators, bag-valve masks) and techniques (e.g. intra-osseous administration of medications) requires additional education and regular practice.

When possible, efforts should be made to ascertain if the patient has expressed any directives or preferences for care before the current cardiac emergency (e.g., MOST form) from the family or those accompanying the patient. This information should be communicated to and discussed with the physician (and family members, as appropriate) at the first opportunity.

The early use of defibrillation and high-quality CPR is associated with the highest rates of survival. Therefore, the use of AEDs or manual defibrillators is strongly encouraged. Nurses who treat cardiac arrest in hospitals and other facilities with on-site AEDs or defibrillators should provide immediate CPR and should use the AED/defibrillator as soon as it is available. Other modes of emergency cardiac care (e.g., cardiac monitoring and administration of medications) can be used in conjunction with defibrillators, if they become necessary.

Registered nurses may administer medications via IV, endotracheal or intra-osseous routes, provided they possess the necessary competency.

Registered nurses are **not authorized** to initiate the following interventions without a physician's/nurse practitioner's order:

- emergency synchronized cardioversion

- transcutaneous or transvenous pacing
- adenosine
- carotid sinus massage
- vasoactive infusions
- discontinuation of resuscitation efforts (except if resuscitation has been initiated in error and does not align with the previously-documented scope of treatment (i.e., “MOST”, advance directives)).

However, in areas where there may be a long interval before a physician/NP is available for input (e.g. rural settings), it is recommended that physicians, employers and nurses collaborate to devise ways to address this need. Options include a client-specific order (including telephone orders) or medical delegation approved by the respective colleges.

INITIAL AND ONGOING EMERGENCY MANAGEMENT OF CARDIAC CONDITIONS

Patient with no pulse

- 1) Perform point of care risk assessment to determine scene safety and level of PPE required
- 2) Start basic life support as per most recent Heart and Stroke Foundation guidelines
ADULT patients: if you are alone in the facility, prioritize calling for help and obtaining a defibrillator or AED before starting CPR.
PEDIATRIC patients: if you are alone and the arrest was not witnessed, initiate CPR and continue for 2 minutes before obtaining defibrillator/AED. If arrest witnessed, call for help and obtain defibrillator/AED.
ALL PATIENTS: If there is more than one person available, start CPR while someone else activates the emergency response and obtains the defibrillator.
- 3) Follow ACLS or PALS algorithm for automatic or manual defibrillation and administration of medications (epinephrine, amiodarone and lidocaine only).
- 4) Assess ABCs and level of consciousness when an organized rhythm is present
- 5) Continue until physician arrives, or organised rhythm and pulse returns
- 6) Maintain constant nursing presence and continuous cardiac monitoring; monitor ABCs, VS and level of consciousness as above. Refer to institutional protocols for ongoing monitoring.
- 7) During resuscitative efforts, 100% oxygen may be used. Institute SpO₂ monitoring as soon as possible.
- 8) Consider use of a supraglottic airway adjunct if the need for rescue breathing persists for more than a few minutes, or there are insufficient personnel to maintain airway and breathing, or intubation has failed

Adult Bradycardia with Pulse

Follow ACLS algorithm up to and including administration of atropine. Up to a total of 3 mg of atropine may be given.

Note: Client-specific orders are required for initiating transvenous or transcutaneous pacing or administer dopamine or epinephrine infusion.

Pediatric Bradycardia with a Pulse

Follow PALS algorithm up to and including administration of atropine. Atropine dosing: 0.02 mg/kg to a maximum single dose of 0.5 mg.

Note: Client-specific orders are required for transthoracic or transvenous pacing.

All Patients: Bradycardia with a Pulse

If atropine is ineffective and patient remains unstable (e.g. hypotensive, altered mental status, signs of shock, ischemic chest discomfort, acute heart failure):

- a. Notify most responsible physician or nurse practitioner as early as possible and anticipate pacing or medications
- b. Monitor blood pressure every 2 - 5 minutes

Adult or Pediatric Tachycardia with a Pulse

1. Notify most responsible physician/ nurse practitioner immediately
2. For patients with tachycardia who are **UNstable** (hypotension, altered mental status, ischemic chest discomfort, signs of shock, acute heart failure)
 - a. Provide supportive care (treat hypoxia with oxygen, provide reassurance, initiate IV access)
 - b. Consider Valsalva maneuvers, for example, bearing down, ice on forehead (pediatrics). Nurses may **NOT** perform carotid massage.

Note: Client-specific orders are required for emergency synchronized cardioversion or administration of adenosine.

3. For patients with tachycardia who are **stable** (NONE of: hypotension, altered mental status, ischemic chest discomfort, signs of shock, acute heart failure), provide supportive care (treat hypoxia [$SpO_2 < 90\%$] with oxygen, provide reassurance, initiate IV access) and wait for physician/provider guidance.

All patients: collaborate with physician and refer to current PALS/ACLS guidelines for post-resuscitation care.

ADJUNCTIVE EMERGENCY PROCEDURES

Refer to institutional policies and protocols regarding: intra-osseus medication administration and adjunct (e.g., supraglottic) airways.

Special Considerations/Precautions

Proficiency in CPR requires regular practice and feedback.

Recognition of cardiac arrhythmias requires additional education and regular practice.

Safe operation of a cardiac defibrillator requires additional education and regular, hands-on practice.

For nurses working alone, implementing the full sequence of interventions will take longer.

Initiate SpO₂ monitoring as soon as possible. Titrate O₂ to **avoid** hyperoxemia.

Transfer to a higher level of care may be necessary in some situations.

Post-emergency team debriefing is highly recommended for ongoing learning and quality improvement.

A physician/nurse practitioner's order is required to discontinue resuscitation, (unless "no CPR" order is discovered). Factors that may be considered by the physician or nurse practitioner in making this decision are:

- Lack of any return of spontaneous circulation
- Prolonged period of asystole

- No evidence of circulation with high-quality CPR (no palpable pulses, no waveform with quantitative end-tidal CO₂ capnography)

In general, resuscitation should never be stopped:

- before 30 minutes (unless “no CPR” order is discovered or futility is determined)
- if there is intermittent return of spontaneous circulation
- if there is a likely, treatable cause, until the treatment for that cause is given (e.g., tension pneumothorax, tamponade, hypoxia, hyperkalemia)
- if hypothermia is the cause, until the patient is warmed to at least 35°

INTENDED CLINICAL OUTCOMES

Cardiac output that is adequate to perfuse all organs will be restored by restoring cardiac rate and rhythm. Indicators:

- return to previous level of consciousness
- return to previous blood pressure/perfusion status
- return to previous respiratory status or status adequate to maintain adequate oxygenation, and normal end-tidal CO₂ (PETCO₂)
- freedom from symptoms of cardiac ischemia (e.g. angina or equivalent).

POSSIBLE UNINTENDED OUTCOMES

- side effects related to medications (e.g., worsened ventricular arrhythmias, bradycardia, tachycardia, hypotension, seizures)
- electrical burn possibly due to improper defibrillation technique
- electrical shock of staff member(s)
- death

PATIENT AND FAMILY EDUCATION AND SUPPORT

When possible, regardless of patient’s level of consciousness, explain to them where they are, what has happened, and what you are doing to help them, throughout process. Facilitate communication amongst patient, family and team; encourage and support family to be with patient, if they so desire and there is sufficient staff available to support them.

In agencies where a standard of care for family presence during resuscitation has been fully implemented, families should be permitted into the resuscitation room. Otherwise, when patient care priorities permit, inform family of patient’s condition and what is being done, and facilitate communication with physician. **Allow family to see patient as soon as possible.**

DOCUMENTATION

Document initial assessment, including:

- Time of assessment
- Presence of pulse, perfusion status, respirations
- Cardiac rhythm – obtain and mount ECG rhythm strip
- Level of consciousness

List all staff and family members in attendance

Document all subsequent assessments (including vital signs), interventions and patient’s response

Obtain and mount ECG rhythm strip for each defibrillation and change in rhythm

Document time and content of each communication with physician or other health professionals

Document any specimens obtained and sent to laboratory

Document time and content of communication with family members.

Documentation tools designed specifically for cardiac emergencies can streamline the documentation process and improve completeness. Use of such a tool is recommended.

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APPENDIX I

<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 order): Section 6(1): 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 (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 (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
<p>Applicable BCCNP 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. (2) Registered nurses may compound or administer: ...epinephrine, atropine, amiodarone or lidocaine to treat cardiac dysrhythmia. (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. http://heartcentre.ca/professionals/decision-support-tools NOTE: cardioversion and initiating temporary pacing fall under Section 7 and therefore require a physician’s order: (Section 7.1. (e)...apply electricity for the purposes of destroying tissue or affecting activity of the heart or nervous system)</p>
<p>Related Resources, Policies and Standards</p>	<p>BLS Guidelines Current ACLS algorithms endorsed by Heart & Stroke Foundation (Canada) PALS algorithms endorsed by the American Heart Association</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>

APPENDIX II

Definitions and Abbreviations

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

AED: automated external defibrillator. Device that, when applied to the chest, automatically detects life-threatening arrhythmias and, if ventricular fibrillation or tachycardia is detected, delivers a shock to restore a normal heart rhythm (defibrillation).

CPR: cardiopulmonary resuscitation. Emergency procedure for persons who have circulatory and/or respiratory arrest. The two main components of conventional CPR are chest compressions and rescue breathing/ventilations (preferably mouth-to-mask, e.g., bag/valve/mask, if available, or via adjunctive airway)

BCLS: Basic cardiac life support

ACLS: Advanced cardiac life support

PALS: Paediatric advanced life support

BVM: Bag-valve-mask resuscitation devices

VF: ventricular fibrillation

VT: ventricular tachycardia

PEA: pulseless electrical activity

Joule: unit of energy delivered by defibrillators

Monophasic or biphasic waveform: two different methods by which electrical current is delivered by a defibrillation device. The effective dose of energy (i.e. joules) for defibrillation depends on which type of device is being used.

Symptomatic or hemodynamically unstable: (compared to patient's normal, if known): decreased level of consciousness; **OR** clinically significant hypotension (*paediatric patients: decreased perfusion and decreased capillary refill time*), **OR** angina or other symptom of myocardial ischemia; **OR** respiratory distress. One or more may be present.

Supraglottic: above the glottis, sometimes also referred to as extraglottic

LMA: Laryngeal Mask Airway – one type of supraglottic airway device (other devices used in British Columbia include the Combi-Tube®, i-gel®, or King®)

Unresponsive: decreased level of consciousness such that the patient does not respond to pain and protective reflexes are impaired or absent

High-quality CPR: A compression rate of at least 100/min with an adequate compression depth of at least 5 cm (2 inches) in adults and children (4 cm or 1.5 inches in infants). Allow the chest to re-expand



after each compression, minimize interruptions in chest compressions to < 10 seconds, give effective breaths that make the chest rise and avoid excessive ventilation