Authorizing Prescriber(s)

LHO – Code Blue, Emergency Department & Critical Care Physicians
LHB – Emergency Department and Critical Care Physicians
LHPP – Emergency Department Physicians
LHAP – Emergency Department and Critical Care Physicians
Medicine Physicians with the following sub-specialties:

- Cardiology
- General Internal Medicine
- Hospitalist Medicine
- Respirology

Authorized to Whom

Intraosseous (IO) Cannulation and Infusion
Emergency/Critical Care Registered Nurses (RN) and Registered Respiratory Therapists (RRT) who have the knowledge, skill, judgement and successfully completed the education for IO and LMA insertion.

Cardiac Arrest/Symptomatic Bradycardia/Tachycardia with a Pulse/Opioid Associated Cardiac or Respiratory Arrest
Registered Nurses (RN) and Registered Respiratory Therapists (RRT) who have the knowledge, skill, judgement and hold competency in the Lakeridge Health Adult Advanced Life Support (ALS) competency validation program. Competency validation on theory and practical simulation testing must be completed every two years and current Advanced Cardiac Life Support (ACLS) provider status must be maintained (new or renewal course) every 2 years.

Co-Implementers
Nurses

Patient Description/Population

Any person that appears to be 16 years of age or older who meets procedure specific indications as per the **Order Form.**

A **patient** is the recipient of health care services and can include a visitor, guest, employee, or an individual registered within Lakeridge Health (LH) requiring medical treatment or care.

Order and/or Procedure

These orders or procedures are not presented in sequential order. Any one of or combination may be performed by an authorized Regulated Health Care Professional (RHCP) until either an appropriate emergency response or an authorised prescriber is present. Refer to the **Order Form**

Procedure:

a) Intraosseous (IO) cannulation and infusion **Appendix A**
b) Cardiac Arrest **Appendix B**
c) Symptomatic Bradycardia **Appendix C**
d) Tachycardia with a Pulse **Appendix D**

Delegated controlled acts within this medical directive:

- Applying or ordering the application of a form of energy
- Administering a substance by injection
- Putting an instrument, hand or finger beyond the larynx

Indications to the Implementation of the Directive

Any person with indications for IO cannulation and infusion, and/or LMA insertion, and/or cardiac arrest and/or symptomatic bradycardia and/or tachycardia with a pulse and/or opioid associated cardiac or respiratory arrest as per the **Order Form**.

Contraindications to the Implementation of the Directive

This medical directive must not be implemented in any of the following circumstances:

- The patient refuses to consent to the procedure
- Patient's advanced care planning contraindicates these treatments
- Existence of procedure specific contraindications as noted in the **Order Form.**

If a patient or substitute decision maker (SDM) refuses treatment, contact the Most Responsible Practitioner (MRP) immediately to determine plan of care.

Consent

The RHCP implementing the directive must obtain consent if the patient is capable of providing it. In an emergency situation, if the patient is not capable of providing consent, the RHCP may administer treatment without consent if, in his or her opinion, all of the following are true:

- The patient is incapable with respect to the treatment
- The patient is experiencing severe suffering or is at risk if the treatment is not administered promptly, or suffering serious bodily harm
- It is not reasonably possible to obtain a consent or refusal on the patient's behalf, or the delay required to do so will prolong the suffering than the patient is experiencing or will put the patient at risk of suffering serious bodily harm.

Documentation Requirements

In addition to standard documentation practices, the RHCP implementing this directive must document the following in the order section of the patient's health record:

- Name of this medical directive
- Procedure(s) performed
- Name of implementer
- Date and time initiated
- Legible signature of implementer including credentials (unless documenting electronically)

Review/Evaluation Process

Every 2 years by the Critical Care Program Quality Council.

References

Canadian Heart and Stroke Foundation (2020). *Advanced cardiovascular life support provider manual.* Heart and Stroke Foundation Canadian Guidelines. Toronto:ON.

College of Nurses of Ontario (2020). *Legislation and regulation RHPA: Scope of practice. controlled acts model.* College of Nurses of Ontario, Toronto:ON.

Government of Ontario (2017). *Regulated health professions act, 1991 S.O. 1992, chapter 18.* Retrieved from https://www.ontario.ca/laws/regulation/180261

Lakeridge Health (2021). Amiodarone. Pharmacy IV Monograph

Lakeridge Health (2021). Atropine. Pharmacy IV Monograph

Lakeridge Health (2021). DOPamine. Pharmacy IV Monograph

Lakeridge Health (2021). EPINEPHRine. Pharmacy IV Monograph

Lakeridge Health (2021). Naloxone (Narcan). Pharmacy Monograph

Lakeridge Health (2018). Off-site Naloxone Administration Medical Directive

Teleflex (2019). Arrow EZ-IO Intraosseous Vascular Access System. Retrieved from https://smclp.s4hana.ondemand.com/na/p/wCDwx?utm_source=teleflex&utm_medium=referral&utm_campaign=48hour-dwell-banner

This table must **not** be used independently apart from the Medical Directive

Order Form

Intraosseous (IO) cannulation and infusion			
Order	**Indication**	**Contraindication**	**Notes**
1. Insert an IO needle into the bone marrow using a battery-powered handheld drill into the proximal tibia, distal tibia, or the proximal humerus site. Flush with 10 mL of 0.9% Sodium Chloride. 2. **For alert persons** a. Administer 40 mg (2 mL) of preservative-free, EPINEPHrine-free, 2% lidocaine IO over 2 minutes. b. Allow lidocaine to dwell for 60 seconds. c. Flush with 5 - 10 mL of 0.9% Sodium Chloride. d. If there continues to be pain with infusion into the IO, slowly administer an additional dose of 40 mg (2 mL) lidocaine IO over 60 seconds. e. Obtain an order for systemic pain control if pain relief isn't obtained with lidocaine, or if there is a known allergy to lidocaine. f. If signs of methemoglobinaemia (e.g. worsening hypoxia and cyanosis), stop lidocaine administration and contact the physician STAT. 3. Deliver medication as ordered through IO push and start an infusion rate of 0.9% Sodium Chloride 30 ml/hr using an infusion pump.	All persons within LH who are in a potentially life-threatening situation and IV access has been unsuccessful after 2 attempts or 90 seconds of searching for a suitable vein.	**IO Insertion Site** 1. Any limb fractures or crush injuries near or at insertion site 2. Conditions in which the bone is fragile, such as osteogenesis imperfecta. 3. Excessive tissue or absence of adequate anatomical landmarks 4. Infection at the area of insertion 5. Previous attempt to establish in same bone 6. Previous orthopaedic procedure at the site 7. Prosthetic limb or joint at the site of insertion **Lidocaine Administration** 1. Any documented allergy 2. The use of any form of lidocaine other than preservative-free, EPINEPHrine-free 2% lidocaine	Refer to Appendix A Ensure MRP is aware of the treatment initiated. Flushing or instilling medication through an IO in a conscious patient will cause pain due to dispersing the marrow. An IO may still be inserted in a conscious patient without lidocaine administration if the lidocaine is contradicted. There is a rare but life-threatening risk of methemoglobinaemia due to lidocaine administration.

Adult Cardiac Arrest			
Order	**Indication**	**Contraindication**	**Notes**
1. Determine if the patient's cardiac rhythm is shockable or non-shockable upon arrival of defibrillator **2.** Complete a rhythm analysis after each CPR cycle of 2 minutes. **3.** Obtain IV access.	Any patient with all of the following: • Unresponsive • Absent or abnormal breathing (no breathing or only gasping) • No detectable pulse (check for 5 - 10 seconds)	A clearly expressed or documented Code Status or Personalized Wishes that contradict CPR or Defibrillation	Refer to Appendix B Follow BLS guidelines Ensure MRP is aware of the treatment initiated.
Non-shockable Rhythm **1.** With first rhythm analysis, administer EPINEPHrine (0.1 mg/mL) 1 mg IV/IO bolus STAT. **2.** Administer EPINEPHrine (0.1 mg/mL) 1 mg IV/IO with every alternative rhythm analysis for the duration of the cardiac arrest if indicated. **3.** Give medication at the beginning of the CPR cycle.	**Non-shockable Rhythm** • Asystole • Pulseless Electrical Activity (PEA)	Cardiac rhythm not identified as asystole or PEA. Documented allergies to the medication being administered.	Follow ACLS guidelines High doses of epinephrine do not improve survival or neurologic outcome and may contribute to post resuscitation myocardial dysfunction. Medication administration at the beginning of the CPR cycle ensures that the medication is circulated to the heart
Shockable Rhythm **1.** Defibrillate with 200 joules of energy after each rhythm analysis if indicated **2.** Immediately resume CPR post defibrillation (no pulse check) **3.** Administer first dose of EPINEPHrine (0.1 mg/mL) 1 mg IV/IO after second defibrillation, and with every alternative rhythm analysis for the duration of the cardiac arrest if indicated.	**Shockable Rhythm** • Ventricular Fibrillation (VF) • Pulseless Ventricular Tachycardia (pVT)	Cardiac rhythm not identified as VF or pVT. Documented allergies to the medication being administered	Follow ACLS guidelines Continue compressions while the defibrillator is charging. Prior to delivering the defibrillation (shock), the RHCP managing the defibrillator must call out **"ALL**

Adult Cardiac Arrest (con't)			
Order	**Indication**	**Contraindication**	**Notes**
4. For sustained or recurrent VF/pVT (after EPINEPHrine and defibrillation in the 2-minute CPR cycles), administer the first dose of Amiodarone 300 mg IV/IO bolus, with a repeat dose of 150 mg IV/IO bolus in 4 minutes if indicated. **5.** If amiodarone is not available, administer lidocaine 1 - 1.5 mg/kg IV/IO first dose, then 0.5 - 0.75 mg/kg in 5 - 10 minutes. **6.** Give medication at the beginning of the CPR cycle.			**CLEAR"** and conduct a safety check. The safety check involves: • ensuring no one is touching patient, bed and/or equipment • oxygen is removed from the patient and immediate area (not placed beside the patient) • once defibrillation is complete, the RHCP managing the defibrillator will communicate 'shock delivered' to indicate to resume CPR Epinephrine: • is the first medication administered in a cardiac arrest situation • high doses have not shown to improve survival or neurologic outcome and may contribute to post resuscitation myocardial dysfunction. Amiodarone: • do not administer with other drugs that prolong QT interval • affects sodium, potassium and calcium channels

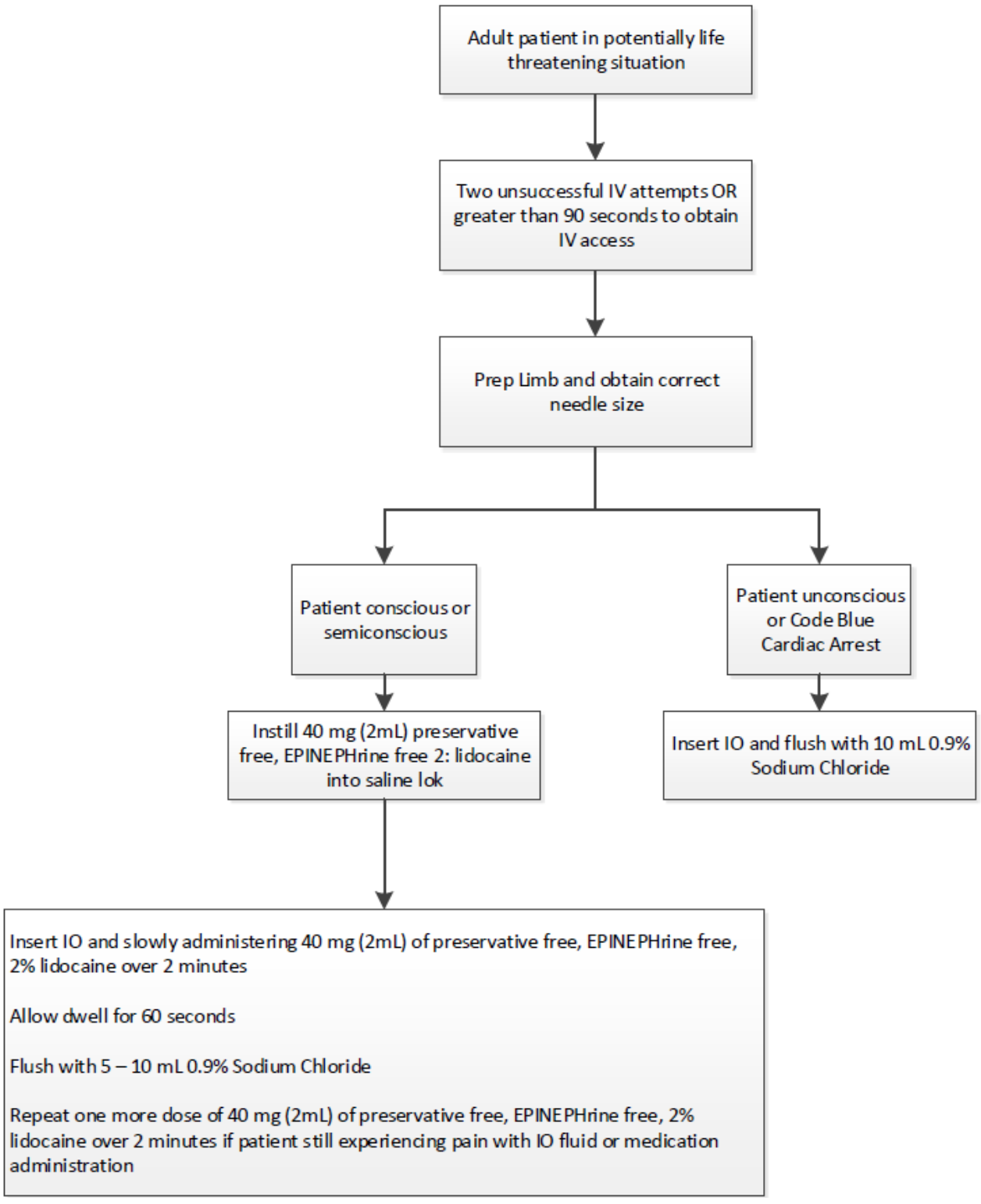
Symptomatic Bradycardia			
Order	**Indication**	**Contraindication**	**Notes**
1. Obtain baseline vital signs and reassess after each medication administration **2.** Obtain 12- Lead ECG **3.** Determine whether the rhythm is atropine responsive vs. atropine unresponsive. **4.** If patient is hypoxic, apply oxygen to keep O_2 sat between 90 – 94%. **5.** Obtain IV/IO access	Heart rate less than 50 beats per minute (bpm) and systolic blood pressure (SBP) less than 90 mmHg, plus any one or more of the following: • Acute altered mental status • Ongoing chest pain • Congestive heart failure • Signs of shock (dizzy, diaphoretic etc.)	A clearly expressed or documented Code Status or Personalized Wishes that contradict initiating this order Asymptomatic bradycardia	Refer to Appendix C Follow ACLS guidelines Ensure MRP is aware of the treatment initiated.
Atropine Responsive Cardiac Rhythms **1.** Administer Atropine 1 mg IV/IO over 30 seconds every 3 - 5 minutes as needed, to a maximum dose of 3 mg to achieve a SBP between 90 and 120 mmHg. **2.** If Atropine is ineffective (no change in person's status, person's condition is deteriorating, or total dose of 3 mg of Atropine given) move to Atropine unresponsive. **3.** Obtain 12 – Lead ECG post each Atropine administration.	**Atropine Responsive Cardiac Rhythms** • Sinus Bradycardia • First Degree AV Block • Second Degree AV Block Type 1	Avoid use in hypothermic bradycardia	Ensure immediate access to Transcutaneous Pacemaker and prepare for application. Atropine: • doses of less than 0.5 mg may result in paradoxical slowing of heart rate • use with caution in presence of myocardial ischemia and hypoxia as it will increase myocardial oxygen demand.

Symptomatic Bradycardia (con't)			
Order	**Indication**	**Contraindication**	**Notes**
Atropine-unresponsive Cardiac Rhythms **1.** DOPamine 400 mg in 250 mL D5W IV/IO infusion, and titrate between 5 mcg/kg/min to maximum dose of 20 mcg/kg/min to achieve SBP between 90 and 120 mmHg. **2.** Obtain 12-Lead ECG. **3.** Monitor Vital Signs (VS) q30 min **4.** If there is no change or condition deteriorates, initiate transcutaneous pacing. **5.** If there is adequate perfusion, continue to monitor and observe the patients status.	**Atropine-unresponsive Cardiac Rhythms** • Second Degree Heart Block Type 2, • Third Degree (Complete) Heart Block • Failed response to Atropine	Documented allergies to the medication being administered	Ensure immediate access to Transcutaneous Pacemaker and prepare for application. Dopamine: • may cause tachyarrhythmia's • do not mix with sodium bicarbonate
Transcutaneous Pacing (TCP) **Procedure:** **1.** Verify mode is set on demand **2.** Verify rate is set at 70 bpm **3.** Initiate pacing at a starting current of 30 mA **4.** Increase current by 10 mA until pacing captures **5.** Confirm cardiac output **6.** Once cardiac output confirmed increase current by 10 mA and continue pacing **7.** Obtain 12-Lead ECG **8.** Monitor VS q30min	Symptomatic bradycardia with continued decompensating cardiac output after atropine (if atropine responsive cardiac rhythm) or DOPamine infusion	Asymptomatic bradycardia	ECG leads are to be placed on the patient in addition to the pacer pads in order for transcutaneous pacing to be effective. Pacer pads are to be placed on the patient's chest either in anterolateral position or anterior-posterior (AP) position. The AP position is preferred because it minimizes transthoracic electrical impedance by sandwiching the heart between the two pads.

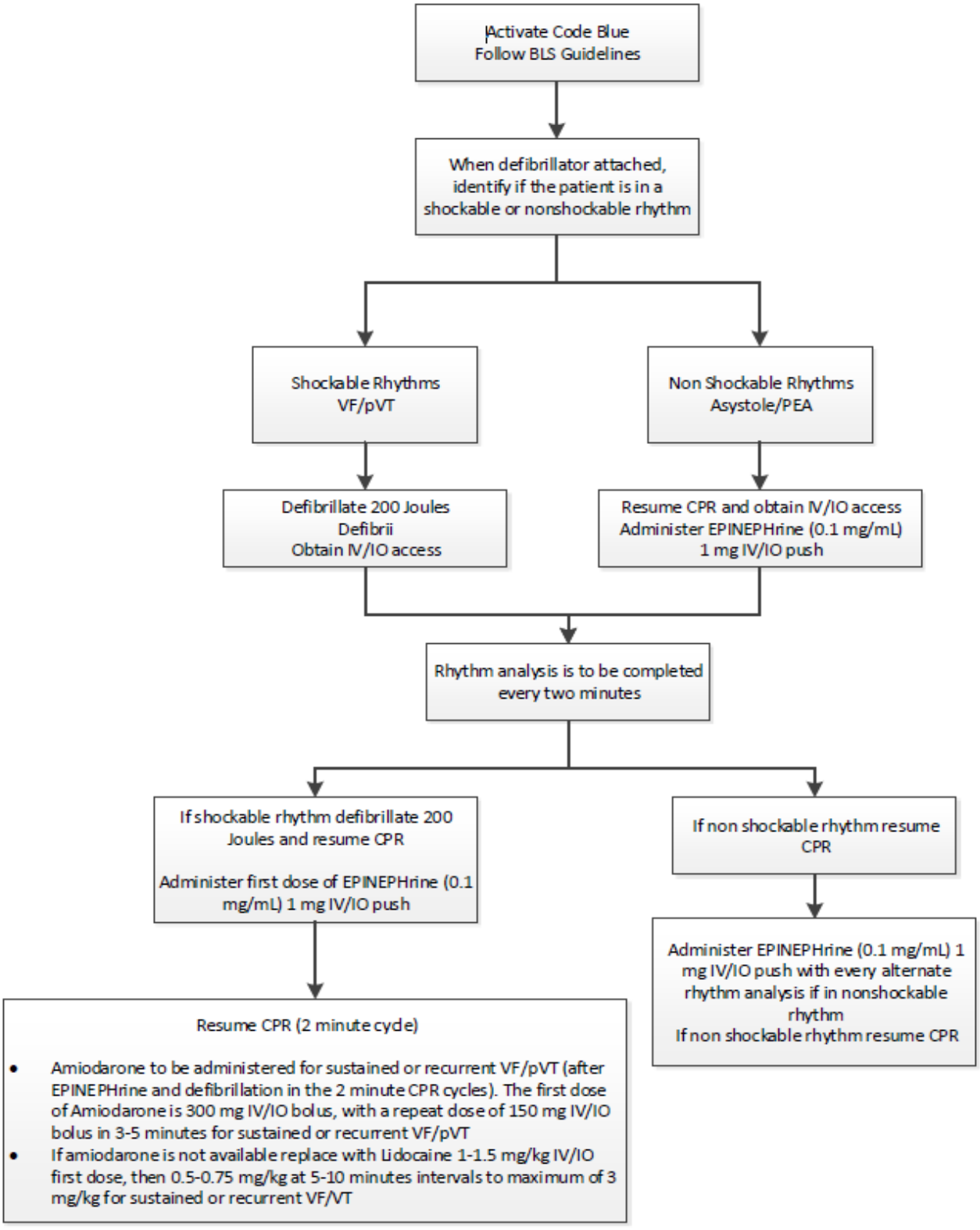
Tachycardia with a Pulse			
Order	**Indication**	**Contraindication**	**Notes**
1. Obtain baseline vital signs and reassess after each intervention **2.** Obtain 12- Lead ECG **3.** Administer oxygen if SpO_2 less than 92% and titrate to a target SpO_2 92 % to 96% **4.** For patients with COPD, administer oxygen if SpO_2 less than 88%, and titrate to a target SpO_2 range of 88 – 92% **5.** Obtain IV/IO access **6.** Attempt vasovagal manoeuvres **7.** If not effective, administer Amiodarone 150 mg mixed in 100 mL D5W IV and infuse over ten minutes. **8.** May repeat Amiodarone X1 more dose in 15 minutes if not affective and patient still symptomatic	Patients with the following: **Cardiac Rhythms** • Ventricular Tachycardia (VT) with a pulse • Supraventricular Tachycardia (SVT) Heart rate greater than or equal to 150 bpm and an SBP less than 90 mmHg plus one or more of the following: • acute altered mental status • ongoing chest pain • congestive heart failure • signs of shock (dizzy, diaphoretic etc.)	A clearly expressed or documented Code Status or Personalized Wishes that contradict initiating this order Rhythm confirmed to be sinus tachycardia Documented allergies to Amiodarone	Refer to Appendix D Follow ACLS guidelines Ensure MRP is aware of the treatment initiated. Ensure immediate access to defibrillator and prepare and for application of defibrillator pads Prepare patient for cardioversion if indicated Amiodarone: • do not administer with other drugs that prolong QT interval • affects sodium, potassium and calcium channels **Cardioversion is not within RN/RRT scope of practice nor covered by this directive**

Opioid Associated Cardiac or Respiratory Arrest			
Order	**Indications**	**Contraindications**	**Notes**
1. Naloxone 2 mg (1 mg/mL) IV/IO push STAT 2 Repeat dose in 2-3 minute intervals prn to a maximum dose of 10 mg.	Any patient with suspected opioid overdose and any of the following: • minimally responsive to unresponsive • respiratory rate of less than 10 breaths per minute • agonal breaths (snoring or gurgling sounds from upper airway) • patients fingernails or lips are blue or purple • patients body is limp • pupils constricted	The patient is not receiving narcotic analgesic The patient's decreased LOC and respiratory depression is expected/intended Documented allergy to Naloxone	If no response is observed after a total dose of 10 mg, diagnosis of opioid overdose should be questioned May precipitate withdrawal symptoms in opioid-dependent patients Naloxone's duration of action may be shorter than the opioid(s) causing respiratory depression. Will need to continue monitoring respiratory and mental status after naloxone administered

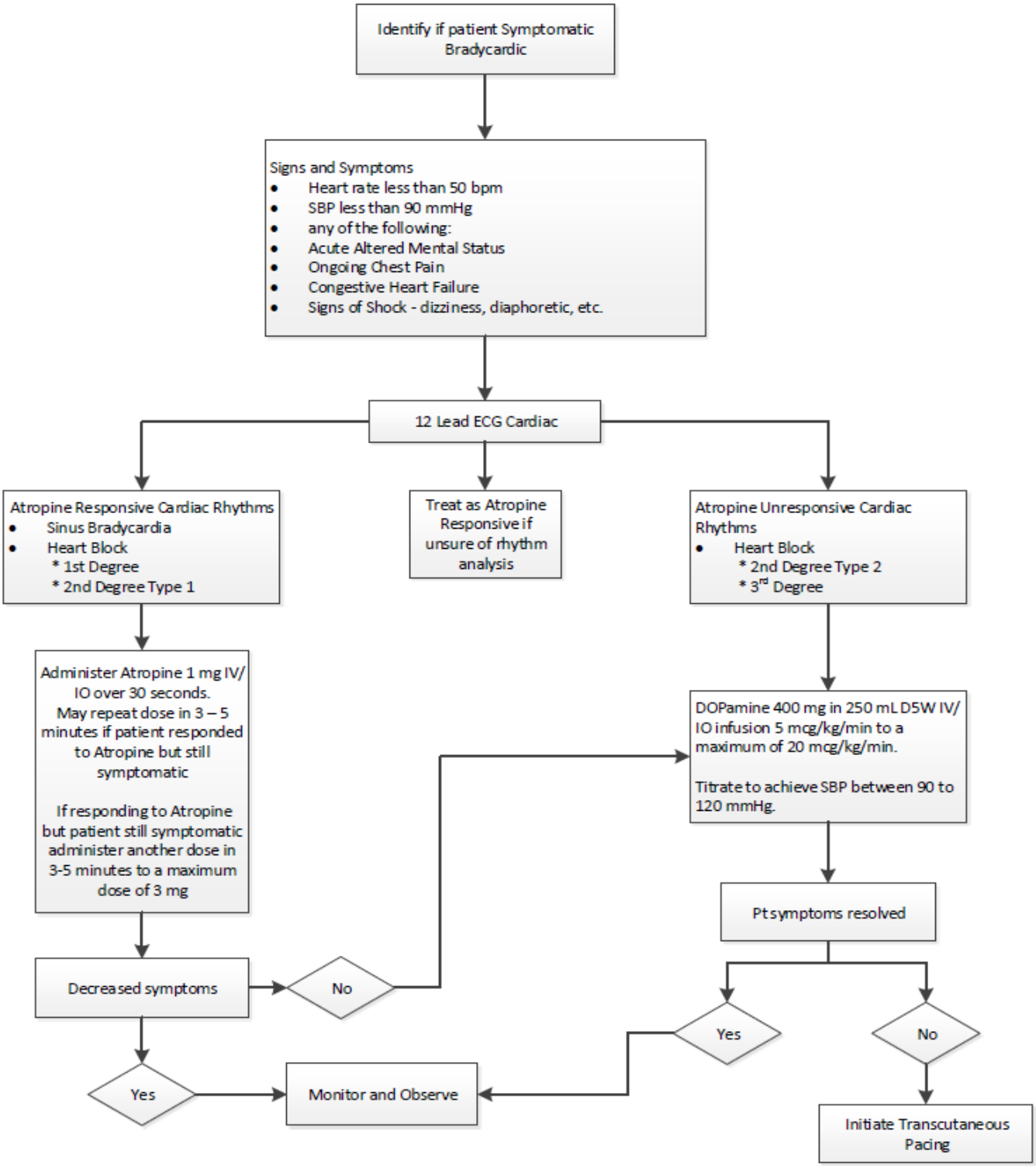
Appendix A: Adult Intraosseous (IO) and infusion



Appendix B: Adult Cardiac Arrest

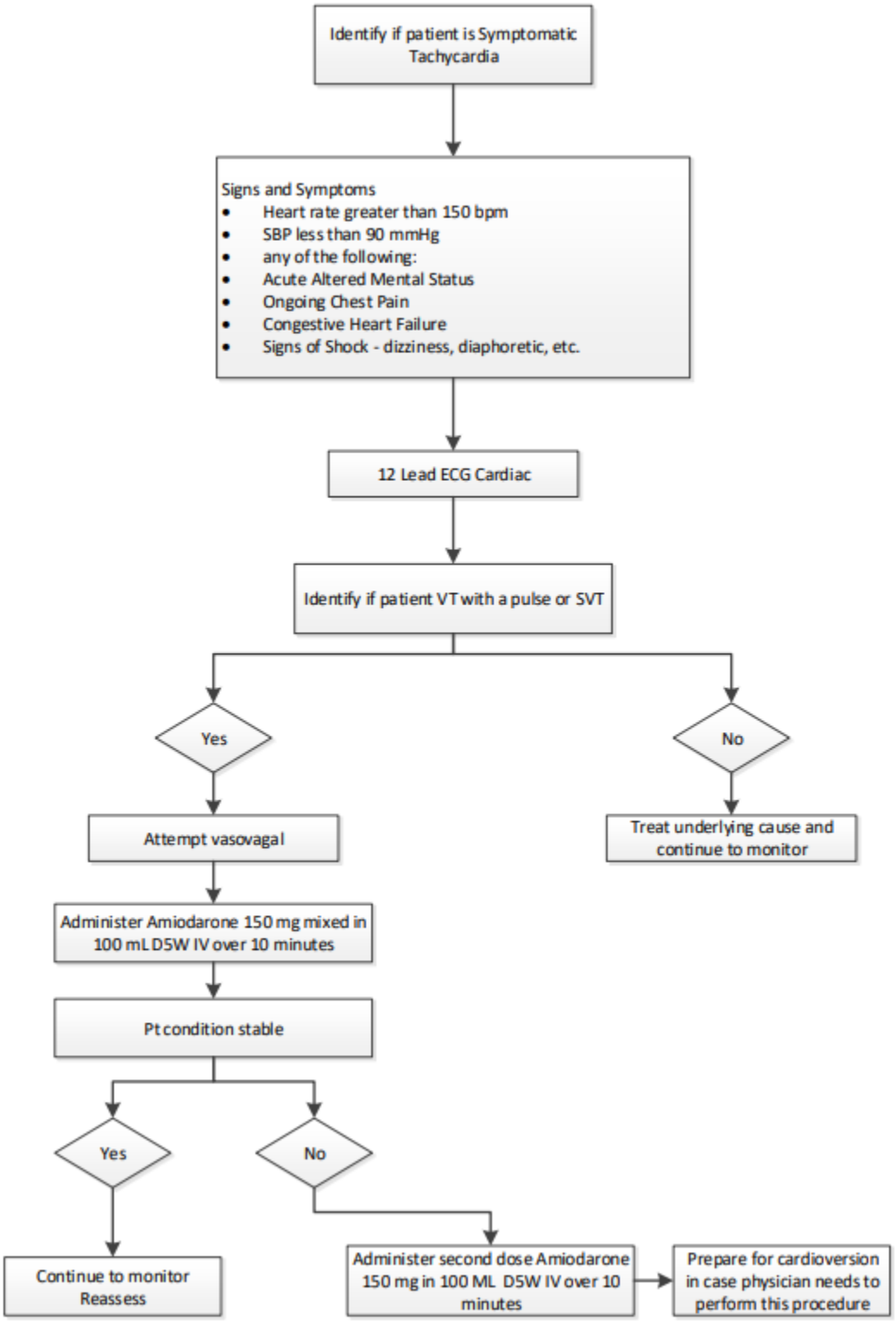


Appendix C: Symptomatic Bradycardia



Note* Vital signs and assessments should be completed after each intervention and PRN

Appendix D: Tachycardia with a Pulse



Note* Vital signs and assessments should be completed after each intervention and PRN