# 6256.05 CARDIAC ARREST PEDS



## INTRODUCTION

Out-of-hospital cardiac arrest is uncommon in infants (under 1 year old) and children (up to and including 8 years old). In Canada, the estimated incidence of treated out-of-hospital pediatric cardiac arrest (OOHCA) is 9.1 per 100,000 population with 38% of patients under 1 year of age. Whereas survival from in-hospital cardiac arrest has steadily improved, the outcomes of out-of-hospital pediatric arrests lag behind, with only 8.3% of EMS-treated cardiac arrests surviving to hospital discharge. Certain interventions are associated with improved survival and should be at the forefront of paramedics' clinical thought process when managing a cardiac arrest.

**Interventions Known to Improve Survival from OOHCA:**

- Early recognition of cardiac arrest
- Early bystander CPR (**PEP 2 supportive**)
- High quality CPR (**PEP 2 supportive**)
- Early defibrillation
- High quality post-arrest care

CPR is essential for survival. Although each component of CPR is important (e.g., airway management, ventilations, compressions), provision of high-quality chest compressions is paramount. Paramedics must pay attention to their own CPR proficiency, compressions delivered by others, and watch for any changes in patient condition.

Systems of care must be well integrated to optimize the chances of recovery from cardiac arrests, which include community (e.g., early 911 access, effective chest compressions, public access defibrillation programs), EMS (e.g., CPR and defibrillation), ED and the in-hospital system (e.g., post-arrest care).

Please note that this Clinical Practice Guideline does not include resuscitation for neonates (0-28 days). See the Neonatal Resuscitation Algorithm for further information.

## SAFETY

Be aware of environmental hazards when approaching patients in cardiac arrest. Consider possible causes for cardiac arrests that could pose a risk to the clinician (e.g., drowning, electrocution, violent scenes, confined spaces, etc.).

Apply personal protective equipment to reduce exposure to bodily fluids and aerosolized particles.

Observe safety precautions when delivering electrical therapy.

## ASSESSMENT

Clinicians should provide immediate chest compressions upon recognizing a child or infant is unresponsive, has absent or agonal respirations, and has no pulse or a pulse less than **60 BPM**.

### Decision to Not Start Resuscitation

When the following conditions are present, the crew should collaboratively consider not starting resuscitative efforts:

- ✓ Signs of prolonged death
  - Rigor mortis
  - Decomposition
  - Dependent lividity
- ✓ Traumatic injuries incompatible with life
  - Decapitation
  - Incineration
- ✓ Valid directive indicating no resuscitation

### Etiology

During assessment, consider the possible causes of cardiac arrest. This may lead the clinician to alter interventions to provide better care for the patient. See Table 1 for various cardiac arrest etiologies and potential interventions.

### Broselow Tape

The Broselow Tape is a tool to be used when managing pediatric cardiac arrest. It uses the patient's height to estimate ideal body weight and provides information such as medication doses, defibrillation energy doses and equipment sizes. Clinicians should reference the Broselow Tape in any pediatric cardiac arrest as it will reduce the risk of errors and will help provide guidance for optimal management. Clinicians should also consider apps such as Pedi STAT for management of pediatric cases.

## MANAGEMENT

### CPR Sequence

The most recent resuscitation guidelines emphasize the importance of early and high-quality chest compressions. Therefore, the priority of interventions should be chest compressions and early defibrillation followed by airway and breathing management (C-A-B). It is important to note that cardiac arrest is often secondary to hypoxia in pediatrics. For this reason, management of the airway and providing ventilations should be addressed as soon as possible after compressions are initiated and defibrillator pads are applied. Unlike adults, passive ventilation (e.g., OPA

with non-rebreather) is not a commonly accepted practice in managing pediatric cardiac arrest.

**Chest Compressions** (**PEP 2 supportive**)
The person most likely to provide the highest quality chest compressions should be dedicated to this task for the initial two minutes. Depth of compression is often underestimated and not deep enough in pediatric cardiac arrest. Providing compressions within the optimal depth range has been associated with improved survival.

High Quality CPR includes:

- ✓ **Rate** between 100/min and 120/min
- ✓ **Depth** at least one third of the anterior-posterior diameter of the chest
  - **Approximately 4 cm (1.5 inches) in infants under 1 year**
  - **Approximately 5 cm (2 inches) in children from one year to puberty**
  - **At least 5 cm (2 inches) – in post-pubertal adolescents, not to exceed 6 cm**
  - **The thumb encircling technique should ideally be used with two rescuer CPR for infants** (**PEP 3 supportive**)
- ✓ Allow full chest recoil
- ✓ **Minimize pauses** in compressions
  - Less than 10 seconds for pulse and rhythm checks, compressor change, or moving the patient.
- ✓ **Avoid excessive ventilation**

Occasionally, personnel from other agencies (e.g., fire, law enforcement) may be assigned the role of compressor. Regardless of who is providing chest compressions, it is critical that EHS clinicians provide the required coaching to ensure high-quality CPR is provided.

**Defibrillation** (**PEP 2 supportive**)
The defibrillator should be applied, the rhythm analyzed, and a shock delivered (if applicable) as soon as possible. Chest compressions should be performed while the defibrillator is charging and immediately after the shock is delivered (with no pulse check) to minimize interruptions in compressions. Defibrillation energy should be 2 J/kg for the initial shock, 4 J/kg for the second shock and 6-10 J/kg for subsequent shocks (up to a maximum of 200 Joules). Subsequent rhythm and pulse checks occur at the end of every 2-minute cycle of compressions. For more information on defibrillation see the Defibrillation (Manual and Automatic) Clinical Procedure Document. It is important to note that by choosing alternate energy levels on the ZOLL X-Series you will be entering manual mode and responsible for rhythm analysis and timing.

**Airway and Breathing Management**
As mentioned previously, cardiac arrest in infants and children is commonly secondary to hypoxia, therefore providing manual ventilations may have a higher priority in pediatric cardiac arrest than in adult cardiac arrest. A compression to ventilation ratio of 30:2 with 1 responder or 15:2 with multiple responders has been associated with better neurological outcomes than compression-only CPR in pediatric patients. Focus on effective oxygenation rather than a specific intervention. ETI, i-gel or BMV are all considered acceptable methods of airway management (**PEP 1 neutral**).

It is important to avoid hyperventilation (both rate and volume). Hyperventilation can lead to gastric insufflation, decreased cardiac output, and decreased coronary and cerebral perfusion. If an advanced airway is in place, compressions and ventilations are provided asynchronously with a ventilation rate of 20-30 per minute (approximately 1 breath every 2-3 seconds). Ventilations should be delivered over a 1 second period until chest rise is observed.

**End-tidal $CO_2$ monitoring** should occur in all cardiac arrest settings to observe trends and changes. Normal $EtCO_2$ is between 35-45 mmHg; however, in the setting of cardiac arrest, clinicians should attempt to maintain the $EtCO_2$ above 20 mmHg, indicating that compressions are effective (**PEP 2 supportive**). A sudden increase in the $EtCO_2$ may indicate the presence of ROSC (**PEP 1 supportive**); however, DO NOT stop CPR to assess for a pulse until the end of your 2-minute cycle.

**Vascular Access & Drug Administration**
Tibial intraosseous (IO) (**PEP 2 neutral** (mechanical)) and intravenous (IV) (**PEP 2 neutral**) are both rapid, effective, and acceptable methods of establishing initial vascular access. In many cases, establishing an IV in smaller children and infants is difficult therefore inserting an IO may be more efficient. High quality chest compressions should not be delayed or interrupted to obtain vascular access.

**Although IV is the recommended first choice for vascular access, do not delay unnecessarily. If IV access is expected to be difficult or unsuccessful, it is acceptable to go straight to IO.**

Pharmacological options for pediatric cardiac arrest management include:

*Shockable Rhythms (VF and VT):*

- ✓ Epinephrine (**PEP 1 neutral**)

  **IV/IO EPI administered early in a resuscitation attempt is supported and should be repeated every 3-5 mins until ROSC is achieved.**
- ✓ Amiodarone (**PEP 2 neutral**)

  **Amiodarone may be used for shock-refractory VF/pVT.**
- ✓ Magnesium (**PEP white**)

*Non-Shockable Rhythms (Asystole and PEA):*

- ✓ Epinephrine (**PEP 1 neutral**)

Atropine for regular cardiac arrest is not recommended (**PEP 2 opposed**)

**Special Management Considerations**

There are certain circumstances which may require adaptations to normal interventions. Refer to Table 1 for special cases and possible interventions.

**Psychosocial Management**

Management of pediatric cardiac arrest often includes heightened emotions for bystanders, family, and responders. Family members may request to be present during management, and this should be allowed if possible. Responders should be aware of resources available to them regarding ongoing bereavement support.

**There is some evidence that giving family members the option of being present is helpful.**

**When possible, a team member should try to provide emotional support for family members (PEP 2 supportive) and try to provide updates to the family on the status of the resuscitation effort.**

**Guidelines for Termination of Resuscitation**

Although certain factors (age less than 1-year, prolonged cardiac arrest, non-shockable rhythm) are associated with poor patient outcome in out-of-hospital pediatric cardiac arrest, no single factor is accurate enough to recommend termination of resuscitation.

## SUDDEN UNEXPECTED INFANT DEATH

Sudden unexpected infant death (SUID) describes all causes of unexpected pediatric death including sudden infant death syndrome (SIDS). It accounted for 20% of pediatric pre-hospital cardiac arrests in Ontario. It primarily occurs in children from 1 month to 1 year of age.

If the patient has rigor mortis or dependent lividity (obviously dead), do not resuscitate or transport. Provide support measures for family and obtain a relevant history. This should focus on recent illness, when the child was last seen and how they appeared at the time, who found the infant and if anything in the environment has been moved or changed. There is a high risk for unnatural causes of death in this population therefore scene information is very important. Everything on scene should be left as close to its original state as possible.

Contact the medical examiner and document the emergency call, including parental support measures initiated, details of the environment, time law enforcement personnel arrive and when they assume responsibility for the scene.

**Transport Decisions**

If the decision is made to initiate resuscitation, pediatric patients should be transported to the nearest emergency healthcare facility as soon as possible (rapid decisions, extrication, transport, and access to a larger system of care) while maintaining high quality compressions and ventilations. Prolonged CPR is not always futile. 12% of pediatric patients who required CPR for more than 35 minutes survive to discharge and 60% have a good neurological outcome. Ensure early notification to the receiving facility who may in turn activate another system of care, such as critical care transport.

If family members wish to accompany the patient to hospital during cardiac arrest management, allow them to do so if space allows and there is no safety risk to the patient, family, or clinicians.

## PREHOSPITAL POST-ARREST CARE

Myocardial dysfunction is common in pediatrics after resuscitation from cardiac arrest of any etiology. It can produce hemodynamic instability, end-organ injury and can precipitate another cardiac arrest. Post-resuscitation management should focus on

optimizing vital organ oxygenation and perfusion and the prevention of secondary organ injury.

**Titrated Oxygen** (**PEP 2 neutral**)
After a return of spontaneous circulation (ROSC), it is still important to avoid hyperventilating the patient. 20-30 ventilations per minute is most often adequate. Oxygen should also be titrated to achieve a $SpO_2$ between 94 and 99%.

**Treat Hypotension**
Normotensive and normal heart rate are associated with survival to discharge. Treatment of hypotension is crucial to avoid secondary injury. Pediatric hypotension is defined by the following thresholds:

- Term neonates (0-28 days) - SBP < 60mmHg
- Infants (1-12 mo.) - SBP < 70 mmHg
- Children 1-10 yrs - SBP < 70 mmHg + (Age in years X 2).
- Children older than 10 - SBP < 90 mmHg

Fluid boluses of 20 mL/kg isotonic crystalloid should be administered over 5-10 minutes (per bolus) (**PEP White**). Using the Push/Pull method may help administer an accurate volume in a timely manner. See Push Pull Fluid Administration Clinical Procedure Document for further information. Reassess after each bolus to avoid excessive fluid administration in the presence of myocardial dysfunction or respiratory failure. If additional fluid boluses are not improving the perfusion, heart rate or blood pressure (fluid refractory shock) vasopressors such as epinephrine can be used to maintain a patient's blood pressure at an acceptable level (**PEP White**).

Transporting crews are encouraged to call for MCCP for assistance in cases of post-arrest care.

**Electrical therapy and dysrhythmias**
A post-arrest patient is typically unstable and will need to be monitored closely. Unstable tachyarrhythmias may need to be cardioverted (**PEP 3 supportive**), and conversely, unstable bradycardic patients may require chronotropic medications or pacing (**PEP White**). Amiodarone (**PEP 3 supportive**) may be indicated following MCCP consult for persistent VT in hemodynamically stable ROSC patients with a pulse.

**Obtain a 12-Lead ECG**
A 12-lead ECG should be obtained during post-arrest care and should be evaluated for underlying conduction/repolarization abnormalities, ischemia, or ingestions. Myocardial infarction can occur in pediatric patients; however, other causes such as myocarditis or hypertrophic cardiomyopathy should be considered if ST-segment elevation or depression is identified.

**Glucose**
Hypoglycemia is a frequent complication of critical illness in infants and children. It can occur in up to 18% of pediatric patients requiring resuscitation and can worsen neurologic and myocardial dysfunction. Blood glucose should be checked early and corrected promptly if necessary, using standard hypoglycemia correction protocols.

**Passive Cooling** (**PEP 1 neutral**)
Current evidence has not shown any improvement in neurological outcome or mortality with therapeutic hypothermia in the pediatric patient. If a child or adolescent is unable to respond to verbal commands or an infant is not moving spontaneously in the post-arrest setting, targeted temperature management, specifically avoiding hyperthermia, should be initiated. This involves treating any temperature of 38.0°C or higher with passive pre-hospital cooling. This includes:

- ✓ Removing clothing
- ✓ Cooling the environment

Ice packs should be avoided in small children and infants as they may rapidly cause significant hypothermia and worsen hemodynamic stability.

**Pediatric Cardiac Arrest Assessment and Care Goals for the EMR**

The EMR should focus on:

- Assessing ABC's
- Determining if the patient is in cardiac arrest
- Requesting additional resources early
- Knowing signs of obvious death/DNR and not starting resus if present
- Early defibrillation and chest compressions as priorities
- Compressing the chest at a rate of 100-120, a depth of at least 1/3 the depth of the chest (4 cm for infants, 5 cm for children) and allow for full recoil
- If ROSC, call MCCP and consider Life Flight

## CHILD ABUSE

If abuse, neglect, or non-accidental trauma is suspected, provide medical care as usual. Do not question or accuse the caretaker. Suspicious findings should be reported to the receiving hospital staff and law enforcement. Detailed documentation of circumstances, physical findings, and reporting should be made. Documentation should include who the suspected abuse was reported to including their name and title. Care should be taken to document objective observations (e.g., location, number, colour of bruises) and avoid charting guesses (e.g., age of injuries).

## TRANSFER OF CARE

During the transfer of care, it is important to relay the following information:

**If no ROSC:**

- **Priority:** Phase of CPR and how long until next cycle (e.g., 30 seconds to next analysis)
- Current rhythm
- Age of patient
- Estimated time of arrest
- Length of time providing CPR

For patients **without ROSC** despite ongoing resuscitation, it is critical to ensure quality chest compressions during the transfer of care and to provide support as needed to the hospital team. More information will be provided in the transfer of care in the moments that follow, but it is critical to ensure quality CPR and smooth transitions to the ED phase of care.

**If ROSC has been achieved:**

All relevant information can be provided in a format congruent with the stability of the patient. Key items include:

- Age of patient
- Time arrest
- Type of presenting rhythm
- All electrical and medical therapies
- Time of ROSC
- Most recent vitals

As soon as possible, notify LifeFlight of any instance of pediatric cardiac arrest with ROSC. Although in most cases LifeFlight will not launch for scene calls for non-traumatic cardiac arrest, the notification helps prepare for possible subsequent transfer from the receiving hospital.

## CHARTING

When documenting a cardiac arrest in ePCR, there are several important details to include, such as:

- ✓ Time of initial cardiac arrest
- ✓ Suspected etiology of the arrest
- ✓ If the arrest was witnessed and by whom
- ✓ If bystander CPR was attempted prior to EMS arrival – what kind (e.g., compression only), quality, and by whom
- ✓ If an AED was used prior to EMS arrival – if there was a shock and by whom
- ✓ Time of initial CPR
- ✓ The initial monitored cardiac arrest rhythm
- ✓ Suspected etiology of the arrest
- ✓ Time of first shock given (as well as any subsequent shocks)
- ✓ The rhythm on arrival at destination
- ✓ If there was a ROSC - time of ROSC and if it was sustained
- ✓ What interventions were done (including accurate times)
- ✓ Any communication with on-line medical support
- ✓ Reason resuscitation discontinued (if applicable)
- ✓ Circumstances and management related to suspected child abuse (as outlined above)

It is important to ensure the cardiac monitor/defibrillator records are pushed to the online server as soon as possible and any relevant 12 leads are imported and attached to the ePCR.

## Key Points – Pediatric Resuscitation

Cardiac arrest is commonly caused by hypoxia

Early chest compressions, defibrillation, and airway/ventilation management are all priorities

Adequate rate, depth, recoil and minimal pauses in compressions are critical

Rapid decisions, extrication and transport are essential

Teamwork, Teamwork, Teamwork

# 6256.05 CARDIAC ARREST PEDS

## PROVIDER SELF CARE

Clinician safety also involves being aware of the risk of occupational stress injury when attending cardiac arrests (or any other call). Occupational stress injuries can be acute (witnessing or experiencing one event) or cumulative (response to multiple events). Much like physical injury, preventative measures prior to the precipitating event and early interventions post-event will help to reduce the risk of PTSD. Resources are available to assist clinicians who are involved with any difficult call. These include the Peer Support Team (which can be activated through the Medical Communications Centre), a confidential employee and family assistance program and a Health and Wellness team who can provide assistance.

## KNOWLEDGE GAPS

Published evidence on the universal approach to cardiac arrests does not necessarily reflect the phases of prehospital care. For example, the scene survey/management, assessment, extrication, and transport are not reflected in the 2020 Resuscitation Guidelines. Practitioners need to translate this published knowledge into practice.

Also, many of the interventions in resuscitation such as ALS medications and airway management remain in question. This does not mean that there is no role for these interventions but rather that EMS systems need to validate their roles with contemporary research. Paucity of existing evidence for an intervention does not equate to evidence of ineffectiveness of an intervention.

It is not always possible to update all local resuscitation documents at the same rate at which international guidelines are changed. Please refer to current AHA guidelines for the most up-to-date information on resuscitation practices.

## EDUCATION IMPLICATIONS

Formal certification in CPR and PALS will enable improved care in the resuscitation of pediatric patients. Practitioners are encouraged to maintain certification in these courses. Ongoing simulation can improve the care provided in live resuscitation efforts.

## QUALITY IMPROVEMENT IMPLICATIONS

High quality CPR has been clearly associated with improved outcomes of patients.

**Key Challenges to Improving CPR Quality**

| CPR Component | Key Challenges to Improving Quality |
|---|---|
| Recognition | • Failure to recognize gasping as a sign of cardiac arrest<br>• Unreliable pulse detection |
| Initiation of CPR | • Low bystander CPR response rates<br>• Incorrect dispatch instructions |
| Compression rate | • Slow compression rate |
| Compression depth | • Shallow compression depth |
| Chest wall recoil | • Rescuer leaning on the chest |
| Compression interruptions | • Excessive interruptions for:<br>– rhythm/pulse checks<br>– ventilations<br>– defibrillation<br>– intubation<br>– intravenous (IV) access<br>– other |
| Ventilation | • Ineffective ventilations<br>• Prolonged interruptions in compressions to deliver breaths<br>• Excessive ventilation (especially with advanced airway) |
| Defibrillation | • Prolonged time to defibrillator availability<br>• Prolonged interruptions in chest compressions pre-and post-shocks |
| Team Performance | • Delayed rotation, leading to rescuer fatigue and decay in compression quality<br>• Poor communication among rescuers, leading to unnecessary interruptions in compressions |

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**Figure 1: Pediatric Cardiac Arrest Algorithm**

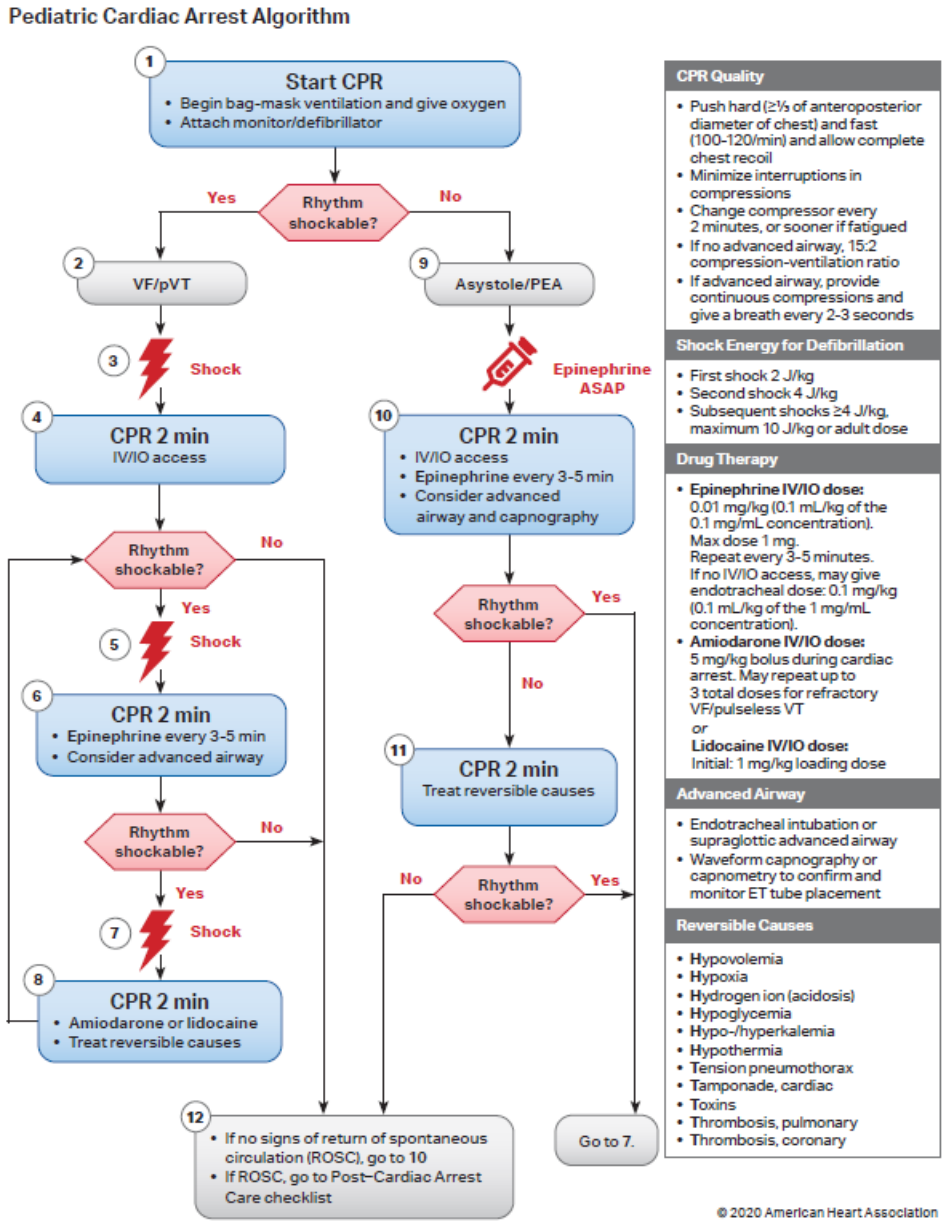

**Figure 2: PALS Management of Shock After ROSC Algorithm**

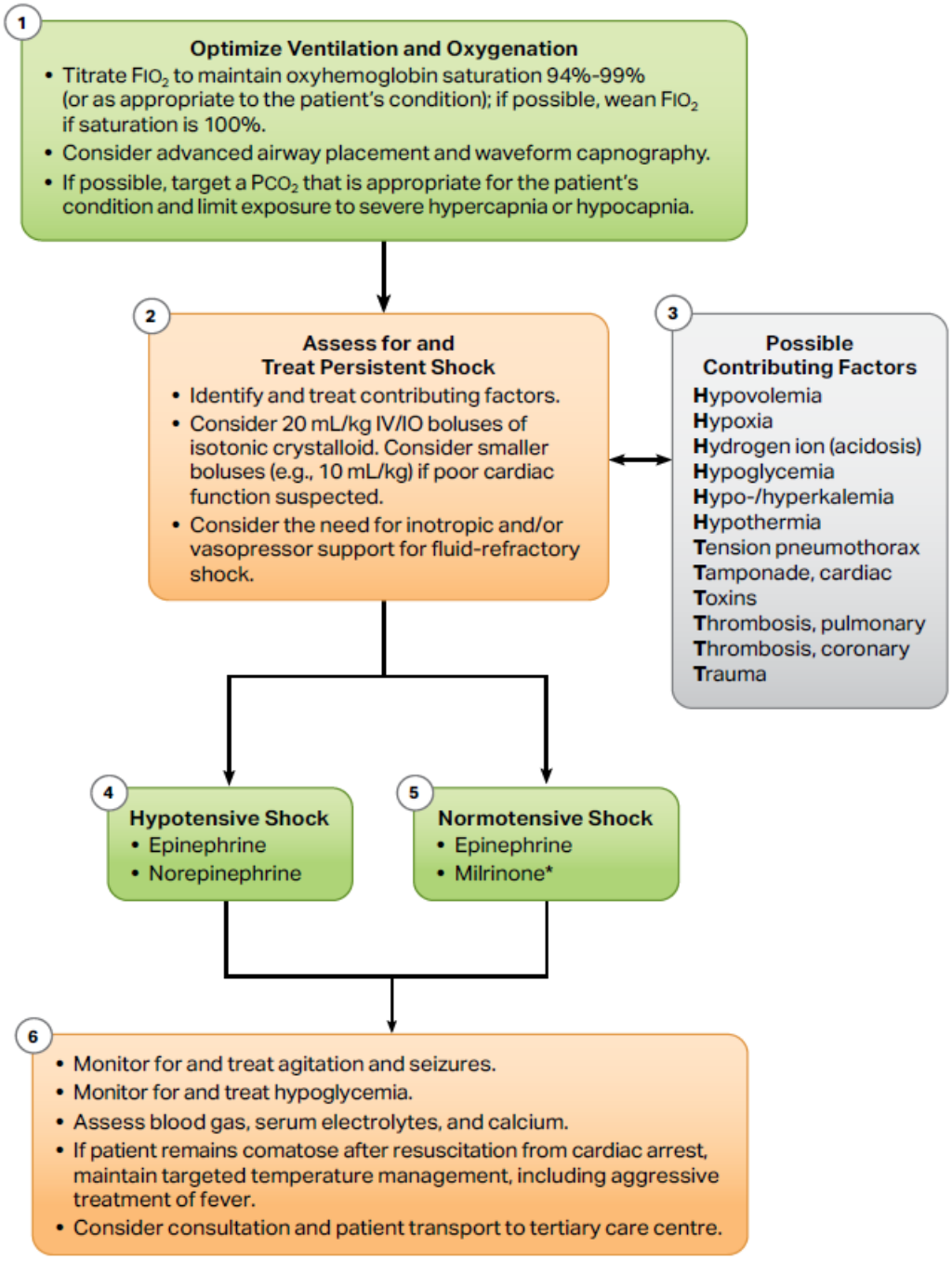

**Table 1: Possible etiologies of cardiac arrest**

| Cause | Situation in which to suspect | Physical Findings | Interventions/adaptations to standard resuscitation |
|---|---|---|---|
| Hypovolemia | Trauma, internal hemorrhage, severe dehydration | Flat neck veins<br>ECG: narrow complex, rapid rate | Volume infusion |
| Hypoxia | Suffocation, drowning | Cyanosis, airway obstruction<br>ECG: Slow rate | Increased focus on oxygenation and ventilation |
| Hydrogen ion (acidosis) | History of diabetes or renal failure | ECG: Small amplitude QRS complexes | Ventilation, sodium bicarbonate |
| Hypoglycemia | History of diabetes | BGL < 3.3 mmol/L | Dextrose 25% |
| Hypokalemia | Diuretic use | ECG: Flat T waves, prominent U waves, wide QRS, long QT | Magnesium |
| Hyperkalemia | History of diabetes, renal failure, or recent dialysis | Dialysis fistulas, medication<br>ECG: Tall peaked T waves, small P wave, wide QRS | Calcium chloride, sodium bicarbonate |
| Hypothermia | Exposure to the cold | Cold central body temperature<br>ECG: Osborne waves | 1 shock only, no meds |
| Tension pneumothorax | Blunt or penetrating chest trauma | No pulse with CPR, neck vein distension, tracheal deviation, difficult to ventilate<br>ECG: Narrow, initially rapid progressing to slow | Needle decompression |
| Tamponade (Cardiac) | Blunt or penetrating chest or upper abdominal trauma | No pulse with CPR, vein distension<br>ECG: Narrow and fast | Fluid infusion |
| Toxins (OD) | Empty tricyclic, digoxin, β blocker, or calcium channel blocker pill bottles | Pupils<br>ECG: Bradycardia, long QT (depends on drug) | Antidote* |
| Thrombosis (Pulmonary) | Extended period of stasis (e.g. long flight or bedridden) | No pulse with CPR, distended neck veins<br>ECG: Narrow and rapid | Thrombolysis* |
| Thrombosis (Cardiac) | Acute coronary symptoms prior to arrest | ECG: Q waves, ST segment changes, T wave inversion | Reperfusion after ROSC |
| Trauma | Commotio cordis (blunt chest trauma), electrocution | Varies | Defibrillate ASAP even though 'traumatic'.<br>Note: Ensure hemorrhage, hypoxia, and pneumothorax have all been considered and managed before standard PALS management. |

Adapted from American Heart Association (2020). *Pediatric Advanced Cardiovascular Life Support Provider Manual.*

* These interventions require on-line medical control consult

# 6256.05 CARDIAC ARREST PEDS

## PEP 3x3 TABLES for Pediatric OOHCA

Throughout the EHS Guidelines, you will see notations after clinical interventions (e.g.: **PEP 2 neutral**). PEP stands for: the Canadian **P**rehospital **E**vidence-based **P**rotocols Project.

The number indicates the Strength of cumulative evidence for the intervention:
**1 = strong evidence exists**, usually from randomized controlled trials;
**2 = fair evidence exists**, usually from non-randomized studies with a comparison group; and
**3 = weak evidence** exists, usually from studies without a comparison group, or from simulation or animal studies.

The coloured word indicates the direction of the evidence for the intervention:
**Green = the evidence is supportive** for the use of the intervention;
**Yellow = the evidence is neutral**;
**Red = the evidence opposes** use of the intervention;
**White** = there is no evidence available for the intervention, or located evidence is currently under review.

PEP Recommendations for Pediatric OOHCA Interventions, as of 2024/11/12. PEP is continuously updated. See: https://emspep.cdha.nshealth.ca/TOC.aspx for latest recommendations, and for individual appraised articles.

### General Cardiac Arrest Care

| Recommendation | | RECOMMENDATION FOR INTERVENTION | | | |
|---|---|---|---|---|---|
| | | SUPPORTIVE (Green) | NEUTRAL (Yellow) | AGAINST (Red) | NOT YET GRADED (White) |
| STRENGTH OF EVIDENCE FOR INTERVENTION | 1 (strong evidence exists) | | • Epinephrine | • High Dose Epi. | • ACDC<br>• Chest Compression devices<br>• CPR feedback device<br>• NaHCO3 in special cases<br>• NaHCO3-after long arrest<br>• Passive Oxygen Administration<br>• Precordial Thump |
| | 2 (fair evidence exists) | • BCLS<br>• Bystander CPR<br>• Early epinephrine<br>• Pre-Arrival Instructions<br>• Standard CPR | • ACLS<br>• Compression-only CPR<br>• ETCO2<br>• IV access<br>• Manual Intraosseous Insertion<br>• Mechanical Intraosseous Insertion<br>• NaHCO3<br>• Termination Resuscitation<br>• Vasopressin | | |
| | 3 (weak evidence exists) | • CPR-Finger technique<br>• CPR-Thumb technique<br>• HEMS<br>• Interfacility ECMO transfer | • One-handed CPR | | |



*PEP is the **Canadian Prehospital Evidence-based Protocols Project.** Every clinical intervention is given a recommendation based on the strength of available research evidence (1 = randomized controlled trials and systematic reviews of RCTs; 2 = studies with a comparison group; 3 studies without a comparison group or simulation) and direction of the compiled evidence: **supportive** of intervention; **neutral** evidence for intervention; or **opposing** evidence for intervention). See: https://emspep.cdha.nshealth.ca/TOC.aspx*

# 6256.05 CARDIAC ARREST PEDS

## PEA/Asystole

| Recommendation | | RECOMMENDATION FOR INTERVENTION | | | |
|---|---|---|---|---|---|
| | | SUPPORTIVE (Green) | NEUTRAL (Yellow) | AGAINST (Red) | NOT YET GRADED (White) |
| STRENGTH OF EVIDENCE FOR INTERVENTION | 1 (strong evidence exists) | | | | • Aminophylline<br>• Transcutaneous Pacing |
| | 2 (fair evidence exists) | | | • Anticholinergic | |
| | 3 (weak evidence exists) | | | | |

## VF/VT Pulseless (Shock Advised)

| Recommendation | | RECOMMENDATION FOR INTERVENTION | | | |
|---|---|---|---|---|---|
| | | SUPPORTIVE (Green) | NEUTRAL (Yellow) | AGAINST (Red) | NOT YET GRADED (White) |
| STRENGTH OF EVIDENCE FOR INTERVENTION | 1 (strong evidence exists) | | | | • CPR before defibrillation<br>• Magnesium Sulfate |
| | 2 (fair evidence exists) | • Biphasic Defibrillation | • Antiarrhythmic - Class I (Na+ channel blockers)<br>• Antiarrhythmic - Class III (K+ channel blockers) | | |
| | 3 (weak evidence exists) | | | | |

## Post-Cardiac Arrest Care

| Recommendation | | RECOMMENDATION FOR INTERVENTION | | | |
|---|---|---|---|---|---|
| | | SUPPORTIVE (Green) | NEUTRAL (Yellow) | AGAINST (Red) | NOT YET GRADED (White) |
| STRENGTH OF EVIDENCE FOR INTERVENTION | 1 (strong evidence exists) | | • Hypothermia | | • Fluid Resuscitation<br>• Inotrope<br>• Optimal Trip Destination<br>• Oxygen |
| | 2 (fair evidence exists) | | • Oxygen-titrated | | |
| | 3 (weak evidence exists) | | | | |

# 6256.05 CARDIAC ARREST PEDS

**Program Document Number Management System**

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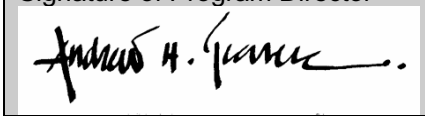
|---|---|---|
| **PDN:** 6256.05 | **Title:** Cardiac Arrest Peds | **Type:** CPG |
| **Effective Date:** Dec 19 2024 | | **Revision Date:** |
| **Approval Date:** Dec 19 2024 | | **Revision Date:** |
| **Review Date:** | | **Revision Date:** |
| **Replaces:** 6256.04 | | **Revision Date:** |
| Signature of Program Director  | | Signature of Program Document Coordinator |

| | | |
|---|---|---|
| **PDN:** 6256.99.01.01 | **Title:** Cardiac Arrest Peds | **Type:** Field Guide |
| **Effective Date:** | | Revision Date: |
| **Approval Date:** | | Revision Date: |
| **Review Date:** | | Revision Date: |
| **Replaces:** | | Revision Date: |
| Signature of Program Director  | | Signature of program Document Coordinator |