

	PEDIATRIC CARDIAC	Release for Public Comment	Due	
6.1	Pediatric Cardiac Arrest - General	6/28/2022	8/29/2022	Revised
6.2	Pediatric Bradycardia	6/28/2022	8/29/2022	Revised
6.3	Pediatric Tachycardia	6/28/2022	8/29/2022	Revised

Pediatric Cardiac Arrest – General



This protocol should be followed for all pediatric cardiac arrests.

- If an arrest is of a known traumatic origin refer to the **Traumatic Arrest Protocol**.
- If it is unknown whether the arrest is traumatic or medical, continue with this protocol.
- Once arrest is confirmed, emphasis should be on avoiding interruptions in CPR.
- CPR should be done in accordance with current guidelines established by the American Heart Association.
-

Note: Primary cardiac arrest in the pediatric patient is rare. Most arrests are secondary to respiratory failure. Maintaining basic airway management techniques unless unable or ineffective. Advanced airway insertion attempts should be performed only if BLS airway management is ineffective. Keep CPR interruptions to a minimum. Medications given during cardiac arrest are given IV or IO.

1. Confirm Arrest
 - a. Assess for signs of normal breathing.
 - b. Check a carotid or brachial pulse as age appropriate for no more than 10 seconds.
2. Initiate CPR or continue CPR if already in progress and apply and use AED per **Electrical Therapy Procedure** as soon as possible.
3. Ensure CPR quality
 - a. Compressions at least 1.5” in depth for infants, 2” in depth for children (at least one third the anteroposterior diameter of the chest).
 - b. Compression rate of at least 100-120 per minute (An FDA approved mechanical CPR device operating at the manufacturers pre-set rate meets this requirement).
 - c. Allow full chest recoil with each compression for maximum perfusion.
 - d. Avoid excessive ventilation (volume and rate).
4. Continue CPR with minimal interruptions, changing the rescuer doing compressions
5. Initiate ALS response if available.
6. Establish a patent airway, maintaining C-Spine precautions if indicated, beginning with BLS airway adjuncts and a BVM with high flow oxygen. Ventilations with BVM are at least as effective as endotracheal intubation in children.
7. If Return of Spontaneous Circulation (ROSC) has **not** been achieved after three, two-minute cycles of CPR AND ALS is not available or delayed, contact medical control, initiate transport.
8. If unable to ventilate or unable to maintain a patent airway, establish an airway per the **Emergency Airway Procedure**. (Supraglottic airways are first choice advanced airway for pediatrics)
 - a. Minimize interruptions in compressions during airway placement to less than 10 seconds.



- b. After insertion provide continuous CPR, without pauses for ventilation and ventilate at 20 breaths per minute or 1 breath every 3 seconds.
 - c. All airway adjuncts should be utilized with high flow oxygen.
 - d. Utilize waveform capnography (if advanced airway has been placed).
9. Verify CPR quality frequently and any time rescuer providing compressions or ventilations change.
-  10. Start an IV/IO NS KVO. IO may be the first choice. See **Vascular Access & IV Fluid Therapy Procedure**.
11. Administer Epinephrine -
- a. initial dose should be administered within 5 minutes of compressions or LALS contact, whichever is first
 - b. 1 mg/10 ml, 0.01 mg/kg (0.1 ml/kg)
 - c. Max dose 1mg (10 ml)
 - d. Repeat every 3-5 minutes
-  12. Check rhythm, shock if indicated (**2 J/kg**) and continue CPR.
13. If airway has not been established, **and** unable to ventilate, establish airway per **Emergency Airway Procedure**.
- a. Minimize interruptions in compressions during airway placement to less than 10 seconds.
 - b. Supraglottic airways are preferable to endotracheal intubation.
 - c. After advanced airway placement, ventilation rate is 20 breaths per minute
14. Utilize waveform capnography; if PETCO₂ is < 10 mm Hg attempt to improve CPR quality.
15. Recheck rhythm and pulse every 2 minutes
16. If shockable rhythm persists
- a. Shock at **4 J/kg** every 2 minutes with immediate resumption of compressions. Subsequent shocks must be at least 4 J/kg, but may escalate to 10J/kg or adult dosage.
 - b. Administer Antiarrhythmic per MCA selection

Per MCA Selection

- Amiodarone 5 mg/kg (max single dose 300 mg) IV/IO (May repeat twice) Do not exceed 450 mg total IV/IO
or
- Lidocaine 1 mg/kg IV/IO (May repeat 0.5 mg/kg twice at 5-10 minute intervals. Maximum 3 doses total)

17. Consider causes of arrest (non-shockable)
- a. Hypovolemia – Administer 20 ml/kg NS IV/IO bolus
 - b. Hypoglycemia – check blood glucose
 - i. If less than 60 mcg/dL, then...
18. If MI-MEDIC unavailable, administer Dextrose 0.5 g/kg
- a. For patients up to 2 months of age, utilize Dextrose 12.5%

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- i. To obtain dextrose 12.5%, discard 37.5 ml out of one amp of D50, then draw 37.5 ml of NS into the D50 amp;
- ii. Administer 4 mL/kg
- b. For patients between 2 months and 6 years of age, utilize Dextrose 25%
 - i. To obtain **Dextrose 25%**, discard 25 ml out of one amp of D50, then draw 25 ml of NS into the D50 amp
 - ii. Administer 2 mL/kg
- c. For patients age 7 or greater, utilize Dextrose 50%
- d. May utilize 10% for all ages 5 ml/kg (0.5 gm/kg) up to 250 ml, according to **Dextrose Protocol**.
- e. Tension pneumothorax – see **Pleural Decompression Procedure**
- f. Hyperkalemia (renal failure) – Contact Medical Control
 - i. Administer Calcium Chloride (10%), 20 mg/kg (0.2 ml/kg), max single dose 1 gm
 - ii. Administer Sodium Bicarbonate 1 mEq/kg IV/IO with 20 ml NS flush between medications



19. Additional basic and/or advanced life support care as appropriate.

20. Consider termination of resuscitation per **Termination of Resuscitation Protocol**.



Michigan
PEDIATRIC CARDIAC
PEDIATRIC CARDIAC ARREST - GENERAL

Initial Date: 08/09/2017

Revised Date: 8/24/18

2022 REVISIONS – PUBLIC COMMENT READY

Section 6-1

Pediatric Cardiac Arrest – General

This protocol should be followed for all pediatric cardiac arrests.

- If an arrest is of a known traumatic origin refer to the **Traumatic Arrest Protocol**.
- If it is unknown whether the arrest is traumatic or medical, continue with this protocol.
- Once arrest is confirmed, emphasis should be on avoiding interruptions in CPR.
- CPR should be done in accordance with current guidelines established by the American Heart Association.
-

Commented [MOU1]: New update: For pediatric patients in any setting, it is reasonable to administer the initial dose of epinephrine within 5 minutes from the start of chest compressions

Note: Primary cardiac arrest in the pediatric patient is rare. Most arrests are secondary to respiratory failure. Maintaining basic airway management techniques unless unable or ineffective. Advanced airway insertion attempts should be performed only if BLS airway management is ineffective. Keep CPR interruptions to a minimum. Medications given during cardiac arrest are given IV or IO.

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1. Confirm Arrest
 - a. Assess for signs of normal breathing.
 - b. Check a carotid or brachial pulse as age appropriate for no more than 10 seconds.
2. Initiate CPR or continue CPR if already in progress and apply and use AED per **Electrical Therapy Procedure** as soon as possible.
3. Ensure CPR quality
 - a. Compressions at least 1.5" in depth for infants, 2" in depth for children (at least one third the anteroposterior diameter of the chest).
 - b. Compression rate of at least 100-120 per minute (An FDA approved mechanical CPR device operating at the manufacturers pre-set rate meets this requirement).
 - c. Allow full chest recoil with each compression for maximum perfusion.
 - d. Avoid excessive ventilation (volume and rate).

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4. Continue CPR with minimal interruptions, changing the rescuer doing compressions.
5. Initiate ALS response if available.
6. Establish a patent airway, maintaining C-Spine precautions if indicated, beginning with BLS airway adjuncts and a BVM with high flow oxygen. Ventilations with BVM are at least as effective as endotracheal intubation in children.
7. If Return of Spontaneous Circulation (ROSC) has **not** been achieved after three, two-minute cycles of CPR **AND** ALS is not available or delayed, contact medical control, initiate transport.
8. If unable to ventilate or unable to maintain a patent airway, establish an airway per the Emergency Airway Procedure. (Supraglottic airways are first choice advanced airway for pediatrics)
 - a. Minimize interruptions in compressions during airway placement to less than 10 seconds.

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Commented [MOU2]: For infant and children with a pulse but absent or inadequate respiratory effort, it is reasonable to give 1 breath every 2-3 seconds

Commented [BE(C3R2)]: Note - different protocol.

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Michigan
PEDIATRIC CARDIAC
PEDIATRIC CARDIAC ARREST - GENERAL

Initial Date: 08/09/2017

Revised Date: 8/24/18

2022 REVISIONS – PUBLIC COMMENT READY

Section 6-1

- b. After insertion provide continuous CPR, without pauses for ventilation and ventilate at 20 breaths per minute or 1 breath every 3 seconds.
- c. All airway adjuncts should be utilized with high flow oxygen.
- d. Utilize waveform capnography (if advanced airway has been placed).

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Commented [MOU4]: According to new guidelines: 1 breath every 2-3 seconds (20-30/min)

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9. Verify CPR quality frequently and any time rescuer providing compressions or ventilations change.

10. Start an IV/IO NS KVO. IO may be the first choice. See **Vascular Access & IV Fluid Therapy Procedure.**

11. Administer Epinephrine -

- a. initial dose should be administered within 5 minutes of compressions or LALS contact, whichever is first
- b. 1 mg/10 ml, 0.01 mg/kg (0.1 ml/kg)
- c. Max dose 1mg (10 ml)
- d. Repeat every 3-5 minutes

12. Check rhythm, shock if indicated (2 J/kg) and continue CPR.

13. If airway has not been established, and unable to ventilate, establish airway per **Emergency Airway Procedure.**

- a. Minimize interruptions in compressions during airway placement to less than 10 seconds.
- b. Supraglottic airways are preferable to endotracheal intubation.
- c. After advanced airway placement, ventilation rate is 20 breaths per minute

Deleted: <#> Administer Epinephrine (according to time of last administration) - initial dose should be administered within 5 minutes of compressions or ALS contact, whichever is first¶
1 mg/10 ml, 0.01 mg/kg (0.1 ml/kg)¶
Max dose 1mg (10 ml)¶
Repeat every 3-5 minutes¶

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Commented [KK(C6)]: Ashima Goyal: Checking pulse with rhythm check every 2 min?

14. Utilize waveform capnography; if PETCO2 is < 10 mm Hg attempt to improve CPR quality.

15. Recheck rhythm and pulse every 2 minutes

16. If shockable rhythm persists

- a. Shock at 4 J/kg every 2 minutes with immediate resumption of compressions. Subsequent shocks must be at least 4 J/kg, but may escalate to 10J/kg or adult dosage.

b. Administer Antiarrhythmic per MCA selection

Deleted: Amiodarone

Per MCA Selection

Amiodarone 5 mg/kg (max single dose 300 mg) IV/IO (May repeat twice) Do not exceed 450 mg total IV/IO

or

Lidocaine 1 mg/kg IV/IO (May repeat 0.5 mg/kg twice at 5-10 minute intervals. Maximum 3 doses total)

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17. Consider causes of arrest (non-shockable)

- a. Hypovolemia – Administer 20 ml/kg NS IV/IO bolus
- b. Hypoglycemia – check blood glucose
 - i. If less than 60 mcg/dL, then...

Commented [MOU7]: In patients with septic shock, consider 10 ml/kg or 20 ml/kg NS IV/IO bolus

Commented [BE(C8R7)]: Other protocol

18. If MI-MEDIC unavailable, administer Dextrose 0.5 g/kg

- a. For patients up to 2 months of age, utilize Dextrose 12.5%

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Michigan
PEDIATRIC CARDIAC
PEDIATRIC CARDIAC ARREST - GENERAL

Initial Date: 08/09/2017

Revised Date: 8/24/18

2022 REVISIONS – PUBLIC COMMENT READY

Section 6-1

- i. To obtain dextrose 12.5%, discard 37.5 ml out of one amp of D50, then draw 37.5 ml of NS into the D50 amp;
- ii. Administer 4 mL/kg
- b. For patients between 2 months and 6 years of age, utilize Dextrose 25%
 - i. To obtain **Dextrose 25%**, discard 25 ml out of one amp of D50, then draw 25 ml of NS into the D50 amp
 - ii. Administer 2 mL/kg
- c. For patients age 7 or greater, utilize Dextrose 50%
- d. May utilize 10% for all ages 5 ml/kg (0.5 gm/kg) up to 250 ml, according to **Dextrose Protocol**.
- e. Tension pneumothorax – see **Pleural Decompression Procedure**
- f. Hyperkalemia (renal failure) – Contact Medical Control
 - i. Administer Calcium Chloride (10%), 20 mg/kg (0.2 ml/kg), max single dose 1 gm
 - ii. Administer Sodium Bicarbonate 1 mEq/kg IV/IO with 20 ml NS flush between medications

Commented [BE(C9)]: Insert mL/kg that are equivalent to 0.5 mg/kg. Add instructions for dilution.

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Commented [MOU10]: Consider something like: for children unresponsive to fluids and require vasoactive support, consider stress=dose corticosteroid

Commented [BE(C11R10)]: Other protocol

Deleted: Hypothermia – see **Hypothermia Cardiac Arrest Protocol**, consider rapid transport



- 19. Additional basic and/or advanced life support care as appropriate.
- 20. Consider termination of resuscitation per **Termination of Resuscitation Protocol**.

DRAFT

Pediatric Bradycardia

Aliases: Slow heart rate, heart block

Bradycardia should be considered to be due to hypoxia until proven otherwise. This protocol applies to pediatric patients with bradycardia, a pulse, and poor perfusion (cardiopulmonary compromise).

NOTES: Signs of cardiopulmonary compromise include:

1. Hypotension:
 - a. In neonates, SBP less than 60
 - b. In infants 1 month to 1 year, SBP less than 70
 - c. In children aged 2 to 10 years, SBP less than $70 + (\text{age} \times 2)$.
 - d. For children greater than 10, SBP less than 90
2. Acutely altered mental status.
3. Signs of shock - indicated by absent and/or weak peripheral and femoral pulses, increased capillary refill time (> 3 seconds), skin cool/mottled.
4. Respiratory difficulty indicated by increased work of breathing (retractions, nasal flaring, grunting, tracheal tugging), cyanosis, altered level of consciousness (unusual irritability, lethargy, failure to respond to parents), stridor, wheezing.

General Treatment

- A. Manage airway as necessary
- B. Provide supplemental O₂ as needed to maintain O₂ saturation $> 94\%$
- C. Initiate monitoring

1. If pulse is < 60 confirm and support adequate oxygenation and ventilation.
2. If pulse remains < 60 and patient remains symptomatic perform CPR



3. Establish vascular access



4. Apply cardiac monitor to identify rhythm

5. If pulse remains < 60 , despite oxygenation & ventilation

- A. Administer Epinephrine 1mg/ 10mL,
 - i. 0.01 mg/kg (0.1 ml/kg) IV/IO up to 1 mg (10 ml),
 - ii. Repeat every 3-5 minutes.

- B. If patient remains unstable and pulse < 60 .

- i. Administer Atropine 0.02 mg/kg IV/IO (minimum dose 0.1 mg, maximum single dose 0.5 mg)
- ii. May repeat once in 5 minutes, if effective.
- iii. Continue administration of epinephrine as above

6. If patient remains unstable and pulse < 60 after Epinephrine and Atropine administration:

- i. Begin transcutaneous pacing at rate up to 100 bpm per **Electrical Therapy Procedure**.
 - ii. Sedation may be used to facilitate transcutaneous pacing per MCA selection. Refer to **Patient Procedural Sedation Procedure**.
7. Continuously monitor for pulses. If pulse is not present, refer to **Pediatric Cardiac Arrest Protocol**.
8. Ensure adequate patient warming.

Notes:

When CPR is required, a precise diagnosis of the specific bradyarrhythmia is not important.

DRAFT



Michigan
PEDIATRIC CARDIAC PROTOCOLS
PEDIATRIC SYMPTOMATIC BRADYCARDIA

Initial Date: 5/31/2012
Revised Date: 10/25/17

Section: 6-2

2022 REVISIONS – PUBLIC COMMENT READY

Pediatric Bradycardia

Aliases: Slow heart rate, heart block

Bradycardia should be considered to be due to hypoxia until proven otherwise. This protocol applies to pediatric patients with bradycardia, a pulse, and poor perfusion (cardiopulmonary compromise).

NOTES: Signs of cardiopulmonary compromise include:

1. Hypotension:
 - a. In neonates, SBP less than 60
 - b. In infants 1 month to 1 year, SBP less than 70
 - c. In children aged 2 to 10 years, SBP less than 70 + (age x 2).
 - d. For children greater than 10, SBP less than 90
2. Acutely altered mental status.
3. Signs of shock - indicated by absent and/or weak peripheral and femoral pulses, increased capillary refill time (> 3 seconds), skin cool/mottled.
4. Respiratory difficulty indicated by increased work of breathing (retractions, nasal flaring, grunting, tracheal tugging), cyanosis, altered level of consciousness (unusual irritability, lethargy, failure to respond to parents), stridor, wheezing.

Commented [AG1]: (Femoral pulses in neonates) *this is often forgotten

Commented [AG2]: Tracheal tugging

Commented [MOU3]: Should there be a general treatment section at the beginning like the tachycardiac protocol?
1. Support ABCs
2. Establish vascular access
3. Apply cardiac monitor to identify rhythm
4. If HR < 60, start CPR

General Treatment

- A. Manage airway as necessary
- B. Provide supplemental O2 as needed to maintain O2 saturation > 94%
- C. Initiate monitoring



1. If pulse is < 60 confirm and support adequate oxygenation and ventilation.
2. If pulse remains < 60 and patient remains symptomatic perform CPR
3. Establish vascular access
4. Apply cardiac monitor to identify rhythm
5. If pulse remains < 60, despite oxygenation & ventilation
 - A. Administer Epinephrine 1mg/ 10mL,
 - i. 0.01 mg/kg (0.1 ml/kg) IV/IO up to 1 mg (10 ml),
 - ii. Repeat every 3-5 minutes.
 - B. If patient remains unstable and pulse < 60,
 - i. Administer Atropine 0.02 mg/kg IV/IO (minimum dose 0.1 mg, maximum single dose 0.5 mg)
 - ii. May repeat once in 5 minutes, if effective.
 - iii. Continue administration of epinephrine as above
6. If patient remains unstable and pulse < 60 after Epinephrine and Atropine administration:

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Commented [MOU4]: If IV/IO access not available, but ET in place, consider ET dose (0.1 mg/kg)

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Commented [MOU5]: D. check if pulse is present every 2 minutes, if pulse present go to pediatric cardiac arrest algorithm

Moved up [1]: <#>May repeat once in 5 minutes, if effective. ¶

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Michigan
PEDIATRIC CARDIAC PROTOCOLS
PEDIATRIC SYMPTOMATIC BRADYCARDIA

Initial Date: 5/31/2012
Revised Date: 10/25/17

Section: 6-2

2022 REVISIONS – PUBLIC COMMENT READY

i. ~~Begin~~ transcutaneous pacing at rate up to 100 bpm per **Electrical Therapy Procedure**.

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Consider

ii. Sedation may be used to facilitate transcutaneous pacing per MCA selection. Refer to **Patient Procedural Sedation Procedure**.

Commented [MOU6]: 5. Identify and treat any underlying causes

7. Continuously monitor for pulses. If pulse is not present, refer to **Pediatric Cardiac Arrest Protocol**.

Commented [BE(C7)]: Make sure this matches the new name.

8. Ensure adequate patient warming.

Notes:

~~When CPR is required, a precise diagnosis of the specific bradyarrhythmia is not important.~~

Deleted: Signs of cardiopulmonary compromise include:¶
Hypotension: is ¶
In neonates, SBP less than 60¶
In infants 1 month to 1 year, SBP less than 70¶
In children aged 2 to 10 years, SBP less than 70 + (age x 2).¶
For children greater than 10, SBP less than 90¶
Acutely altered mental status.¶
Signs of shock - indicated by absent or weak peripheral pulses, increased capillary refill time, skin cool/mottled.¶
Respiratory difficulty indicated by increased work of breathing (retractions, nasal flaring, grunting), cyanosis, altered level of consciousness (unusual irritability, lethargy, failure to respond to parents), stridor, wheezing.¶

Deleted: If severe hypothermia follow **Hypothermia Cardiac Arrest Protocol**

DRAFT

Pediatric Tachycardia

Aliases: Supraventricular tachycardia (SVT), atrial fibrillation (a-fib), atrial flutter, ventricular tachycardia (V-tach)



This protocol is for paramedic use only.

This protocol is intended for symptomatic pediatric patients with elevated heart rate, relative for their age. Refer to MI-MEDIC for appropriate vital signs and medication doses.

- I. General Treatment
 - A. Manage airway as necessary
 - B. Provide supplemental O₂ as needed to maintain O₂ saturation > 94%
 - C. Initiate monitoring and perform 12-lead EKG
 - D. Establish vascular access
 - E. Identify and treat underlying causes of tachycardia such as dehydration, fever, vomiting, sepsis and pain.
 - F. Administer fluid bolus 20ml/kg with possible hypovolemia.
 - G. Consider the following additional therapies if specific dysrhythmias are recognized:
- II. Specific Dysrhythmia Treatment
 - A. **Regular Narrow Complex Tachycardia – Stable (SVT)**
 - i. Perform vagal maneuvers
 1. Ensure the patient is on oxygen and on a cardiac monitor.
 2. Run ECG strip during the procedure.
 3. If child is able to follow instructions:
 - a. Blow into a into a 10 mL syringe for 15 seconds
 - b. Squat and bear down
 4. If child is not able to follow instructions:
 - a. While supine elevate the patient's legs to the knee chest position for 60 seconds.
 - b. If available consider quickly placing a bag of ice on the eyes and forehead. Do NOT occlude the nose or place below the bridge of the nose.
 - i. Results are generally seen within 15 seconds.
 - ii. This is not an ongoing intervention, it is an abrupt maneuver not be maintained for more than 15 seconds.
 5. DO NOT USE CAROTID MASSAGE.
 - ii. Administer Adenosine
 1. 0.1 mg/kg (max of 6 mg) rapid IV push through the most proximal injection site, immediately followed by a 10 mL flush.



2. May repeat once with 0.2 mg/kg (max of 12 mg) administered as above.

B. Regular Narrow Complex Tachycardia – Unstable

- i. Deliver a synchronized shock; 1 J/kg for the first dose
- ii. Repeat doses should be 2 J/kg
- iii. DO NOT EXCEED ADULT DOSING.



C. Regular, Wide Complex Monomorphic QRS Tachycardia – Stable

- i. **Contact Medical Control**
- ii. Consider Adenosine 0.1 mg/kg (max of 6 mg) rapid IV push through the most proximal injection site, immediately followed by a 10 mL flush.
- iii. May repeat once with 0.2 mg/kg (max of 12 mg) administered as above.

D. Regular, Wide Complex Tachycardia – Unstable

- i. Synchronized cardioversion 1 J/kg
- ii. For recurrent or refractory wide complex – unstable tachycardia, Give antiarrhythmic medication per MCA Selection

Per MCA Selection

- Amiodarone 5 mg/kg (max single dose 300 mg) IV/IO (May repeat twice) Do not exceed 450 mg total IV/IO
- or
- Lidocaine 1 mg/kg IV/IO (May repeat 0.5 mg/kg twice at 5-10 minute intervals. Maximum 3 doses total)

E. Unstable, Irregular, Wide Complex Tachycardia –

- i. Defibrillate according to **Electrical Therapy Procedure**
 - ii. Refer to **Pediatric General Cardiac Arrest Protocol**
- III. If able to convert tachycardia, maintain full cardiac monitoring including pulse oximetry and supportive care until transfer of care at the receiving facility.



Michigan
PEDIATRIC CARDIAC PROTOCOLS
PEDIATRIC TACHYCARDIA

Initial Date: 07/27/2017

Revised Date: 10/25/17

2022 REVISION – READY FOR PUBLIC COMMENT

Section 6-3

Pediatric Tachycardia

Aliases: Supraventricular tachycardia (SVT), atrial fibrillation (a-fib), atrial flutter, ventricular tachycardia (V-tach)

This protocol is for paramedic use only.

This protocol is intended for symptomatic pediatric patients with elevated heart rate, relative for their age. Refer to MI-MEDIC for appropriate vital signs and medication doses.

- I. General Treatment
 - A. Manage airway as necessary
 - B. Provide supplemental O2 as needed to maintain O2 saturation > 94%
 - C. Initiate monitoring and perform 12-lead EKG
 - D. Establish vascular access
 - E. Identify and treat underlying causes of tachycardia such as dehydration, fever, vomiting, sepsis and pain.
 - F. Administer fluid bolus 20ml/kg with possible hypovolemia.
 - G. Consider the following additional therapies if specific dysrhythmias are recognized:

Commented [MOU1]: (IV/IO)

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Commented [MOU3]: 10 cc/kg or 20 cc/kg if in septic shock

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- II. Specific Dysrhythmia Treatment
 - A. **Regular Narrow Complex Tachycardia – Stable (SVT)**

- i. Perform vagal maneuvers
 - 1. Ensure the patient is on oxygen and on a cardiac monitor.
 - 2. Run ECG strip during the procedure.
 - 3. If child is able to follow instructions:
 - a. Blow into a into a 10 mL syringe for 15 seconds
 - b. Squat and bear down
 - 4. If child is not able to follow instructions:
 - a. While supine elevate the patient's legs to the knee chest position for 60 seconds.
 - b. If available consider quickly placing a bag of ice on the eyes and forehead. Do NOT occlude the nose or place below the bridge of the nose.
 - i. Results are generally seen within 15 seconds.
 - ii. This is not an ongoing intervention, it is an abrupt maneuver not be maintained for more than 15 seconds.
 - 5. DO NOT USE CAROTID MASSAGE.

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- ii. Administer Adenosine
 - 1. 0.1 mg/kg (max of 6 mg) rapid IV push through the most proximal injection site, immediately followed by a 10 mL flush.

Commented [MOU4]: 0.1 mg/kg rapid bolus

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**Michigan
PEDIATRIC CARDIAC PROTOCOLS
PEDIATRIC TACHYCARDIA**

Initial Date: 07/27/2017

Revised Date: 10/25/17

2022 REVISION – READY FOR PUBLIC COMMENT

Section 6-3

2. May repeat once with 0.2 mg/kg (max of 12 mg) administered as above.

Commented [MOU5]: Rapid bolus

B. Regular Narrow Complex Tachycardia – Unstable

- i. Deliver a synchronized shock; 1 J/kg for the first dose
- ii. Repeat doses should be 2 J/kg
- iii. DO NOT EXCEED ADULT DOSING.

Commented [BE(C6)]: Consider maximum dose? Is there a better way to word this?

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C. Regular, Wide Complex Monomorphic QRS Tachycardia – Stable

- i. Contact Medical Control
- ii. Consider Adenosine 0.1 mg/kg (max of 6 mg) rapid IV push through the most proximal injection site, immediately followed by a 10 mL flush.
- iii. May repeat once with 0.2 mg/kg (max of 12 mg) administered as above.

Commented [MOU7]: 0.1 mg/kg rapid bolus

Deleted: 0.1 mg/kg (max of 6 mg) for SVT with aberrancy (administered as above)

Commented [MOU8]: Rapid bolus

Deleted: <#>If ventricular in origin, give Lidocaine 1 mg/kg IV (max of 100 mg)¶

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D. Regular, Wide Complex Tachycardia – Unstable

- i. Synchronized cardioversion 1 J/kg
- ii. For recurrent or refractory wide complex – unstable tachycardia, Give antiarrhythmic medication per MCA Selection

Per MCA Selection

Amiodarone 5 mg/kg (max single dose 300 mg) IV/IO (May repeat twice) Do not exceed 450 mg total IV/IO

or

Lidocaine 1 mg/kg IV/IO (May repeat 0.5 mg/kg twice at 5-10 minute intervals. Maximum 3 doses total)

E. Unstable, Irregular, Wide Complex Tachycardia –

- i. Defibrillate according to **Electrical Therapy Procedure**
- ii. Refer to **Pediatric General Cardiac Arrest Protocol**

III. If able to convert tachycardia, maintain full cardiac monitoring including pulse oximetry and supportive care until transfer of care at the receiving facility.

Deleted: Amiodarone 300mg 5 mg/kg (max dose 150 mg) IV/IO (May repeat once 150 mg IV/IO)¶
or¶
 Lidocaine 100mg 1 mg/kg IV/IO (May repeat, every 5-10 minutes, 0.5 mg/kg, up to total dose of 3 mg/kg)¶

Commented [AG9]: As a rule of thumb, the maximum sinus tachycardia rate is: 220 - patient age in years.

MCA Name: [Click here to enter text.](#)

MCA Board Approval Date: [Click here to enter text.](#)

MCA Implementation Date: [Click here to enter text.](#)

Protocol Source/References: