

Medication: Epinephrine	PDN: 6930.087	Last Updated: May 5 2024 reh-29-2023	PMD: Andrew Travers*	PDC: Teena Robinsonanya-Fraser*	Page 1 of 2
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EPINEPHRINE

1.0 Classification

- Adrenergic
- Sympathomimetic

2.0 Mechanism of Action

- A naturally occurring catecholamine which increases heart rate, cardiac contractility, electrical activity, vascular resistance, and systolic blood pressure while also decreasing airway resistance.

3.0 Indications

- Cardiac arrest
- Non-hemorrhagic shock (pediatric ≤ 16 years of age)
- Symptomatic bradycardia
- Anaphylaxis
- Near-death asthma
- Stridor

4.0 Contraindications

- No contraindications in the emergency setting

5.0 Precautions

- Epinephrine can be deactivated by alkaline solutions (e.g., sodium bicarbonate) so ensure the infusion line is flushed between doses.

6.0 Route

- May be given IM, IV/IO, ETT or nebulized (route often depends on indication for use)

7.0 Dosage

Adult (see summary table in special notes)

- For cardiac arrest: 1 mg of 0.1 mg/mL (1:10 000) IV/IO (or 2 mg ETT), repeated q 4 minutes as needed.
- For symptomatic bradycardia unresponsive to atropine (with or without pacing):
 - 2 mcg/min **via infusion pump**, titrated to effect to a max of 10 mcg/min.
 - To prepare this epinephrine infusion, use the 0.1 mg/mL (1:10 000) formulation. Add 0.5 mg (5 mL of the 1:10 000 epinephrine) to a 500 mL normal saline bag. This results in a 1 mcg/mL solution.
- For anaphylaxis: 0.3 - 0.5 mg of 1 mg/mL (1:1000) IM (lateral thigh), repeated q 5-10 minutes as needed. EMR/PCP/ICP: continue with IM dosing for near-death anaphylaxis. ACP/CCP: see dosing for near-death anaphylaxis below if patient refractory to 3 IM doses.
- For near-death anaphylaxis (after 3 IM doses of epinephrine):
 - 2 mcg/min **via infusion pump**, titrated to effect to a max of 10 mcg/min.
 - To prepare this epinephrine infusion, use the 0.1 mg/mL (1:10 000) formulation. Add 0.5

mg (5 mL of the 1:10 000 epinephrine) to a 500 mL normal saline bag. This results in a 1 mcg/mL solution.

- For near-death asthma: 0.01 mg/kg to a maximum of 0.5 mg of 1 mg/mL (1:1000) IM (lateral thigh), repeated q 5-10 minutes as needed.
- For stridor: 5 mg (5 mL) of 1 mg/mL (1:1000) nebulized, repeat as needed.

Pediatric (see summary table in special notes)

- For cardiac arrest: 0.01 mg/kg (0.1 mL/kg) of 0.1 mg/mL (1:10 000) IV/IO OR 0.1 mg/kg (0.1 mL/kg) of 1 mg/mL (1:1000) ETT mixed with 3 mL sterile saline, q 4 minutes as needed.
- Non-hemorrhagic shock (pediatric patients ≤ 16 years):
 - 0.1 mcg/kg/min **via infusion pump**, titrated by 0.02 mcg/kg/min every 2-5 minutes until the desired effect is achieved to a max of 1 mcg/kg/min.
 - To prepare this epinephrine infusion, use the 1 mg/mL (1:1000) formulation. Add 8 mg (8 mL of the 1:1000 epinephrine) to a 500 mL normal saline bag. This results in a 16 mcg/mL solution.
 - Consult MCCP once the infusion has been initiated to discuss on going care.
- For symptomatic bradycardia: 0.01 mg/kg (0.1 mL/kg) of 0.1 mg/mL (1:10 000) IV/IO OR 0.1 mg/kg (0.1 mL/kg) of 1 mg/mL (1:1000) ETT mixed with 3 mL sterile saline, q 4 minutes as needed.
- For anaphylaxis: 0.01 mg/kg (0.01 mL/kg) of 1 mg/mL (1:1000) IM (anterior lateral thigh) (maximum of 0.5 mg), repeated q 5-10 minutes as needed (see Pediatric IM Anaphylaxis Dosing Guide below). EMR/PCP/ICP: continue with IM dosing for near-death anaphylaxis. ACP/CCP: see dosing for near-death anaphylaxis below if patient refractory to 3 IM doses.

Pediatric IM Anaphylaxis Dosing Guide

Weight (kg)	Epinephrine dose (1 mg/mL) amp	Epinephrine Auto-injector Dose
5-10	0.1 mg	0.15 mg (EpiPen® Junior)
11-15	0.15 mg	
16-20	0.2 mg	
21-25	0.25 mg	0.3 mg (EpiPen®)
26-30	0.3 mg	
31-35	0.35 mg	
36-40	0.4 mg	
41-45	0.45 mg	
≥46	0.5 mg	

- For near-death anaphylaxis (after 3 IM doses of epinephrine):
 - 0.05 mcg/kg/min **via infusion pump**, titrated by 0.02 mcg/kg/min every 2-5 minutes until the desired effect is achieved, to a max of 1 mcg/kg/min.
 - To prepare this epinephrine infusion, use the 1 mg/mL (1:1000) formulation. Add 8 mg (8 mL of the 1:1000 epinephrine) to a 500 mL normal saline bag. This results in a 16 mcg/mL solution.
- For near-death asthma: 0.01 mg/kg (0.01 mL/kg) of 1 mg/mL (1:1000) IM in anterior lateral thigh (maximum of 0.5 mg), repeated q 5-10 minutes as needed (see Pediatric IM Anaphylaxis Dosing Guide above).
- For stridor: 0.5 mg/kg (0.5 mL/kg) of 1 mg/mL (1:1000) nebulized (maximum of 5 mg) mixed with normal saline to a maximum of 5 mL total volume, repeat as needed.

8.0 Supplied

- 1 mg in a 10 mL preloaded syringe (1:10 000 concentration)
- 1 mg in a 1 mL ampoule (1:1000 concentration)

9.0 May Be Given By

Indication	Scope	Order
Cardiac Arrest	ICP / ACP / CCP	Standing Order
Non-hemorrhagic shock (pediatric patient ≤ 16 years of age) (infusion pump)	ACP / CCP	Standing Order; consult MCCP once infusion is started
Symptomatic Bradycardia	ACP / CCP	Standing Order
Anaphylaxis (IM)	EMR / PCP / ICP / ACP / CCP	Standing Order
Near-death Anaphylaxis (IV/IO) (infusion pump)	ACP / CCP	Standing Order
Near-death Asthma	PCP / ICP / ACP / CCP	Standing Order
Stridor	PCP / ICP / ACP / CCP	MCCP consult

10.0 Adverse Effects

- Arrhythmias
- Palpitations
- Tachycardia
- Myocardial ischemia
- Nausea/vomiting
- Tremors

11.0 Special Notes

- Most shock patients require fluid administration prior to vasopressors therefore normal saline should be initiated prior to epinephrine administration.
- It is recommended to administer a normal saline infusion by gravity with any epinephrine infusion. To do this:
 - Initiate a normal saline infusion at a rate appropriate to patient condition via gravity (i.e., not through the pump)
 - Connect the epinephrine infusion (via the pump) to the access port of the normal saline infusion line proximal to the patient
 - This will help as a driver when volumes of medication being infused are small
- Never give epinephrine 1 mg/mL (1:1000) formulation via the IV or IO route.
- Norepinephrine is the vasopressor of choice within the EHS ground ambulance system for adult non-hemorrhagic shock.
- Pregnancy category C [if the patient will benefit from a Category C drug, it is generally used]

Adult Epinephrine Dose Summary Table

Condition	Dose	Concentration	Route	Repeat
Cardiac Arrest	1 mg	0.1 mg/mL (1:10 000)	IV/IO	q 4 minutes PRN
Symptomatic Bradycardia (unresponsive to atropine)	2-10 mcg/min	1 mcg/mL	IV/IO (via infusion pump)	continuous infusion
Anaphylaxis	0.3-0.5 mg	1 mg/mL (1:1000)	IM	q 5-10 min PRN

Near-death Anaphylaxis	2-10 mcg/min	1 mcg/mL	IV/IO (via infusion pump)	continuous infusion
Near-death Asthma	0.01 mg/kg (max 0.5 mg)	1 mg/mL (1:1000)	IM	q 5-10 min PRN
Stridor	5 mg	1 mg/mL (1:1000)	Nebulized	PRN

Pediatric Epinephine Dose Summary Table

Condition	Dose	Concentration	Route	Repeat
Cardiac Arrest	0.01 mg/kg	1 mg/10 mL (1:10 000)	IV/IO	q 4 minutes PRN
	0.1 mg/kg	1 mg/mL (1:1000)	ETT	
Non-hemorrhagic shock (pediatric patients ≤ 12 years of age)	0.1 mcg/kg/min	16 mcg/mL	IV/IO (via infusion pump)	continuous infusion
Symptomatic Bradycardia	0.01 mg/kg	1 mg/10 mL (1:10 000)	IV/IO	q 4 minutes PRN
	0.1 mg/kg	1 mg/mL (1:1000)	ETT	
Anaphylaxis	0.01 mg/kg (max 0.5 mg)	1 mg/mL (1:1000)	IM	q 5-10 min PRN
Near-death Anaphylaxis	0.05 mcg/kg/min	16 mcg/mL	IV/IO (via infusion pump)	continuous infusion
Near-death Asthma	0.01 mg/kg (max 0.5 mg)	1 mg/mL (1:1000)	IM	q 5-10 min PRN
Stridor	0.5 mg/kg (max 5 mg)	1 mg/mL (1:1000)	Nebulized	PRN

12.0 References

- Cardiac Arrest Adult Clinical Practice Guideline
- Adult Respiratory Distress Clinical Practice Guideline
- Allergic Reactions Clinical Practice Guideline
- TREKK.ca
- Compendium of Pharmaceuticals and Specialties (CPS)

*Electronically Signed
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