




Please read this document in conjunction with this [DISCLAIMER](#)

ADRENALINE

<p>DESCRIPTION</p> 	<ul style="list-style-type: none"> Adrenaline is a direct acting sympathomimetic agent which exerts its effect on alpha and beta-adrenoreceptors.¹ The effect of a given dose of adrenaline is determined by receptor specificity, compensatory reflexes induced and dose.² Major effects of adrenaline are increased systolic blood pressure, reduced diastolic pressure, tachycardia, hyperglycaemia and hypokalaemia.¹ Adrenaline is a powerful cardiac stimulant, has vasopressor properties, an antihistaminic action and is a bronchodilator.¹ Adrenaline has a rapid onset of action and short duration.¹ Adrenaline is a high risk medication; extra care must be taken in the safe storage, handling, prescribing and administration of high risk medications. 															
<p>INDICATIONS</p>	<p>Adrenaline is used at PMH for the following indications:</p> <ul style="list-style-type: none"> Anaphylactic and allergic reactions; Severe croup: 1% solution of inhaled adrenaline relaxes bronchial smooth muscle and constricts mucosal and bronchial muscle vessels, relieving congestion and oedema.³ Cardiac arrest: Adrenaline improves coronary perfusion, cardiac contractility and stimulates spontaneous contractions.¹ Inotropic support: Adrenaline is a vasopressor and has direct action on beta-1 receptors increasing cardiac contractility (positive inotrope)¹ 															
<p>FORMULATIONS</p>	<p>The following formulations are available at PMH, the product and route of administration used depends on the indication for use:</p> <table border="1" data-bbox="466 1704 1493 2002"> <thead> <tr> <th>Adrenaline Product</th> <th>Strength</th> <th>Indication</th> </tr> </thead> <tbody> <tr> <td>Adrenaline Nebulising Solution</td> <td>1% (10mg/mL)</td> <td>Croup</td> </tr> <tr> <td>Adrenaline</td> <td>1 in 10,000 (1mg/10mL)</td> <td>Adjunct in management of cardiac arrest</td> </tr> <tr> <td>Adrenaline</td> <td>1 in 1000 (1mg/1mL)</td> <td>Acute anaphylactic reactions</td> </tr> <tr> <td>Adrenaline (Epipen Jnr[®])*</td> <td>150microgram/0.3mL</td> <td>Acute anaphylactic reactions</td> </tr> </tbody> </table>	Adrenaline Product	Strength	Indication	Adrenaline Nebulising Solution	1% (10mg/mL)	Croup	Adrenaline	1 in 10,000 (1mg/10mL)	Adjunct in management of cardiac arrest	Adrenaline	1 in 1000 (1mg/1mL)	Acute anaphylactic reactions	Adrenaline (Epipen Jnr [®])*	150microgram/0.3mL	Acute anaphylactic reactions
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<p>DOSAGES</p>	<p>*Epipen® and Epipen Junior® are to be used only in the outpatient and Hospital in the Home setting.</p> <p>Adrenaline 1 in 10,000 (1mg/10mL) is kept in the Resus Trolley in all wards/departments.</p> <p>The doses below are within the standard reference range for each indication; however depending on the indication the dosage of adrenaline may need to be adjusted depending on the patient's clinical needs and response.</p> <p><u>Severe croup:</u></p> <p>>1 month: 0.05mL/kg of 1% adrenaline nebulising solution (maximum 1.5mL) made up to 4mL with sodium chloride 0.9%, repeat as required.⁴</p> <p>OR</p> <p>Adrenaline ampoules 1:1000, 0.5mL/kg (maximum 5mL) undiluted, may be used as an alternative to 1% adrenaline nebulising solution.^{4,5}</p> <p><u>Anaphylactic reactions:</u></p> <p>>1 month: IM 0.01mg/kg/dose (0.01mL/kg of adrenaline 1:1000) up to a maximum of 0.5mg (0.5mL).^{5,6,7}</p> <p>*IM injection into mid-anterolateral thigh is preferred. Repeat dose 5 minutely as required.^{5,6,7}</p> <p>*Epipen® and Epipen Junior® are used only in the outpatient and Hospital in the Home setting. Epipen Junior® is used in children weighing 10-20kg and Epipen® is for children >20kg.⁵</p> <p><u>Cardiac arrest:</u></p> <p>1 month to 18 years: IV/IO initially 0.01mg/kg/dose (0.1mL/kg of adrenaline 1:10,000) up to the adult maximum of 1mg as a single dose, repeat every 3-5minutes if required.^{3,5,6}</p> <p><u>Inotrope infusion for support in acute heart failure, cardiogenic shock and septic shock (low cardiac output, hypotension):</u></p> <p>1 month to 18 years: IV infusion, initially 0.05-0.1micrograms/kg/minute, then titrate according to response.^{5,7}</p> <p>Adrenaline prescribed for inotropic support is restricted for use in critical care areas ONLY.</p>							

	<p><u>Neonates:</u></p> <p>Please refer to neonatal clinical drug protocols: NCCU Adrenaline Protocol</p>
<p>ADMINISTRATION</p>	<ul style="list-style-type: none"> • Adrenaline administered by infusion must only be administered in the ICU where continuous monitoring occurs. • Intravenous infusion can be prepared using: 0.3mg/kg (1:1000) in 50mL 5% glucose giving an adrenaline solution of 1mL/hr=0.1micrograms/kg/minute.⁴ • A medical officer must be present and available at the bedside for a patient receiving adrenaline intravenously on a general ward. • Injection: can be given neat as an intravenous push using the 1:10,000 strength ampoule.⁸ • Do not use if injection is brown or contains a precipitate.¹ • Epipen® and Epipen Junior® should only be injected into the anterolateral aspect of the thigh.⁵ • For treatment of anaphylaxis the IM route of adrenaline is preferred as it is safer than the IV route.² IV administration may be necessary when response to repeated IM doses and volume expansion is inadequate, however, it should only be given by those experienced in its use with continuous monitoring of ECG, pulse oximetry and BP.² • If a repeat dose of IM adrenaline is required, avoid injecting into the same site. • A medical officer must supervise the administration of adrenaline in patients prescribed adrenaline in the general ward setting for croup. (See monitoring below)
<p>MONITORING</p>	<p><u>Cardiac arrest, inotropic support, anaphylaxis:</u> ECG and continuous pulse oximetry, BP.^{3,5}</p> <p><u>Croup:</u></p> <p><i>Emergency Department:</i> ECG monitoring and continuous medical supervision is recommended.⁶ All children requiring an adrenaline nebuliser in the Emergency Department should be observed for at least 3 hours.</p> <p><i>General Wards:</i> Adrenaline inhalations may be given to a child with moderately severe croup on a general ward. It may be ordered by a Resident, but the Registrar must always be notified of the decision. The medical officer is required to supervise the administration of the</p>

	adrenaline and observe the child for 15 minutes afterwards. Be aware that upper airway narrowing may recur after about 60 minutes.
ADVERSE EFFECTS	<p><i>Common:</i> Anxiety, palpitations, tachycardia, restlessness, tremor, dizziness, dyspnoea, weakness, sweating, hyperglycaemia.²</p> <p><i>Infrequent/rare:</i> Excessive increase in BP, ventricular arrhythmias, pulmonary oedema, angina, peripheral ischaemia and necrosis, allergic reaction (sodium metabisulphite in products).²</p> <p><i>Adrenaline nebuliser solution:</i> Dry mouth. Palpitations and restlessness with over dosage and in patients who are hypertensive.¹</p>
COMPATIBLE FLUIDS	<p>Glucose 5%, glucose 10%, Ringer's, sodium chloride 0.9%.⁹</p> <p>*Incompatible with sodium bicarbonate 5%.^{6,8}</p>
STORAGE	<ul style="list-style-type: none"> • <i>Adrenaline 1% Nebulising Solution:</i> protect from light, store below 25 degrees celsius, discard 4 weeks after opening. • <i>Ampoules:</i> Store below 25 degrees celsius, protect from light. • <i>Epipen[®] and Epipen Junior[®]:</i> Store between 15-25 degrees celsius. Protect from light. • Discoloured solutions (pink or brown) or solutions containing precipitates must not be used.⁸
CONTRAINDICATIONS	<ul style="list-style-type: none"> • There are no absolute contraindications to giving adrenaline in anaphylactic reactions; adrenaline is often life saving.² • All adrenaline products contain a sulphite which may cause allergic reactions in susceptible people. The possibility of an allergic reaction to sodium metabisulphite should be considered in asthmatic patients who show paradoxical worsening of their condition following use of the drug.⁸
PRECAUTIONS	<ul style="list-style-type: none"> • Adrenaline has many drug interactions; please consult PMH approved references, your ward pharmacist or Pharmacy on extension 8703 for more information. • Use with caution in severe renal impairment.¹⁰ • Use with caution in patients with hyperthyroidism, hypertension, ischaemic heart disease, diabetes mellitus, narrow angle glaucoma and known allergy to sympathomimetic amines due to direct catecholamine effect of adrenaline.¹ • Adrenaline should not be used in patients with organic brain damage or during general anaesthesia with halogenated hydrocarbons or cyclopropane.¹

	<ul style="list-style-type: none"> • Adrenaline should not be injected into fingers, toes, ears, nose or genitalia.¹ • Patients receiving cardiac glycosides, quinidine, some antihistamines, thyroid hormones or tricyclic antidepressants may have increased effects of adrenaline or risk of arrhythmias.¹ • Rapid intravenous administration may cause death from cerebrovascular haemorrhage or cardiac arrhythmias; however, rapid IV administration during pulseless arrest is necessary.³
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****Please note:** The information contained in this document is to assist with the preparation and administration of adrenaline. Any variations to the doses recommended should be clarified with the prescriber prior to administration**

Related policies, procedures, protocols and guidelines

ED Croup Guidelines: [Croup Portfolio](#)

ED health facts-Croup : [HF CAHS 316](#)

PNPM Adrenaline inhalation for Croup Protocol:

[PNPM Adrenaline Inhalations for Croup](#)

[CAHS High Risk Drug Policy](#)

Useful resources

The Australasian Society of Clinical Immunology and Allergy:

<http://www.allergy.org.au/>


Australian Prescriber; Anaphylaxis: Emergency management for health professionals: <http://www.australianprescriber.com/magazine/34/4/artid/1210>

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