

Document control sheet

GUIDELINE NUMBER	MONO-PAEDS/800/23
AREA IN WHICH THIS MONOGRAPH APPLIES	Paediatrics

DIVISIONAL AUTHORISATION	
GROUP	DATE
Paediatric monograph review group	27/12/2023

AUTHORS		
Author	Position	Date
Written by: Lisa Taylor	Paediatric Pharmacist	June 2017
Checked by: Kevin Inglesant	Paediatric Pharmacist	June 2017

If review:

Author	Position	Date
Reviewed and transferred to new template by: Naomi Gladwell	Specialist pharmacist women's and children's	April 2020
Checked by: Dayana El Nsouli	Shift Working Pharmacist	May 2020
Reviewed by: Ellie Cheale	Specialist pharmacist women's and children's	December 2023

Change history:

Changes Reference	Change details	Date
	Conversion of nanograms to micrograms. Changes to peripheral administration and calculations Addition of side effects	April 2020
	Changes made to preparation where >50kg in line with CoMET	October 2020
	Addition of flush instruction. Removal of Y-site compatibility chart. Updated references	December 2023

Paediatrics: Adrenaline (Epinephrine)

Presentation:	Adrenaline (epinephrine) base 1mg/ml ampoules = adrenaline (epinephrine) 1 in 1000												
Indication:	Inotropic support (if on NICU please see separate guideline)												
Dose:	<p>Neonate to 18 years</p> <p>Initially 0.1micrograms/kg/minute, adjusted according to response</p> <p>Higher doses up to 1.5micrograms/kg/min have been used in acute hypotension [this should <u>only</u> be used with consultant approval]</p> <p>When stopping infusion, the dose should be gradually decreased rather than stopped suddenly to</p>												
Route of administration:	<p>Continuous intravenous infusion via central line whenever possible.</p> <p>A lower concentration (see below) may be given peripherally, but this should only be a temporary measure whilst central access is obtained.</p> <p>Administration via intra osseous line is also possible.</p>												
Instructions for preparation:	For central / IO administration:												
	<table border="1"> <thead> <tr> <th>Patient Weight</th> <th>Amount of adrenaline 1 in 1000 to be added to 50ml syringe</th> <th>Dilute to 50ml with either:</th> <th>Dose range</th> </tr> </thead> <tbody> <tr> <td>≤ 50kg</td> <td>300 micrograms x body weight (kg)</td> <td>5% Glucose 10% Glucose</td> <td rowspan="2">0.05 to 1 micrograms/kg/min</td> </tr> <tr> <td>> 50kg</td> <td>16mg*</td> <td>0.9% Sodium Chloride</td> </tr> </tbody> </table>	Patient Weight	Amount of adrenaline 1 in 1000 to be added to 50ml syringe	Dilute to 50ml with either:	Dose range	≤ 50kg	300 micrograms x body weight (kg)	5% Glucose 10% Glucose	0.05 to 1 micrograms/kg/min	> 50kg	16mg*	0.9% Sodium Chloride	
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<p>*1 mg = 1000 micrograms</p> <p>To calculate the number of mL/hr:</p> $\text{mL/hr} = \frac{\text{dose (micrograms/kg/min)} \times \text{kg} \times 60 \text{ (minutes)}}{\text{drug concentration (micrograms/mL)}}$ <p>Example for a 10kg child prescribed 0.05micrograms/kg/min;</p> $\text{mL/hr} = \frac{0.05 \text{ (micrograms/kg/min)} \times 10 \text{ (kg)} \times 60 \text{ (minutes)}}{60 \text{ (micrograms/mL)}}$ <p>Therefore, in this example, 0.5mL/hr is the infusion rate to provide 0.05micrograms/kg/min</p> <p>Example for a 60kg child prescribed 1micrograms/kg/min:</p> $\text{mL/hr} = \frac{1 \text{ (micrograms/kg/min)} \times 60 \text{ (kg)} \times 60 \text{ (minutes)}}{320 \text{ (micrograms/mL)}}$ <p>Therefore, in this example, 11.25mL/hr is the infusion rate to provide 1 micrograms/kg/min</p> <p>For peripheral administration <u>(use only in exceptional circumstances – consider IO access first):</u></p> <table border="1"> <thead> <tr> <th>Amount of adrenaline 1 in 1000 to be added to 50 mL syringe</th> <th>Dilute to 50 mL with either:</th> <th>Dose range</th> </tr> </thead> <tbody> <tr> <td>75 micrograms x body weight (kg)</td> <td>5% Glucose 0.9% sodium chloride</td> <td>0.05-0.2 micrograms/kg/min</td> </tr> </tbody> </table>				Amount of adrenaline 1 in 1000 to be added to 50 mL syringe	Dilute to 50 mL with either:	Dose range	75 micrograms x body weight (kg)	5% Glucose 0.9% sodium chloride	0.05-0.2 micrograms/kg/min				
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	<p>To calculate the number of mL/hr:</p> $\text{mL/hr} = \frac{\text{dose (micrograms/kg/min)} \times \text{kg} \times 60 \text{ (minutes)}}{\text{drug concentration (micrograms/mL)}}$ <p>For example for a 8 kg child;</p> $\text{mL/hr} = \frac{0.05 \text{ (micrograms/kg/min)} \times 8 \text{ (kg)} \times 60 \text{ (minutes)}}{12 \text{ (micrograms/mL)}}$ <p>Therefore, 2mL/hr is the infusion rate to provide 0.05 micrograms/kg/min</p> <ul style="list-style-type: none"> Protect the syringe from light – please contact pharmacy if a black bag is required Discard diluted adrenaline (epinephrine) solution after 24 hours or if brown colouration develops. After infusion is finished, aspirate the contents of the vascular device first then flush with sodium chloride 0.9% 																																																												
<p><u>Prescribing</u></p>	<p>RDH – prescribe on paper chart (and reference on Lorenzo) QHB – prescribe on Meditech</p> <p>**Please ensure concentration (in micrograms/ml) is completed to enable use of SMART pumps**</p> <p>To calculate concentration of infusion for SMART pumps (in micrograms/ml) divide total mg in infusion by total volume of infusion (mls) and multiply by 1000: e.g. 3mg in 50mls = $\frac{3\text{mg}}{50\text{mls}} = 0.06\text{mg/ml} \times 1000 = 60\text{micrograms/ml}$</p> <p>Therefore, for a 10kg child:</p> <table border="1" data-bbox="316 1256 1501 1451"> <tr> <td>Drug Adrenaline</td> <td>Drug amount in syringe</td> <td>Diluent</td> <td>Total volume (ml)</td> <td>Route</td> </tr> <tr> <td>1 in 1000</td> <td>3mg</td> <td>glucose 5%</td> <td>50ml</td> <td>IV</td> </tr> <tr> <td>Start date</td> <td>Drug concentration per ml</td> <td>Infusion range</td> <td>M in</td> <td>M ax</td> </tr> <tr> <td>6/3/18</td> <td>60 micrograms/ml</td> <td>Dose/kg/time</td> <td>0.05micrograms/kg/min</td> <td>1 micrograms/kg/min</td> </tr> <tr> <td>Pharm</td> <td></td> <td>ml/hr</td> <td>0.5</td> <td>10</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>#1234</td> </tr> </table> <p>For a 60kg child:</p> <table border="1" data-bbox="316 1556 1501 1749"> <tr> <td>Drug Adrenaline</td> <td>Drug amount in syringe</td> <td>Diluent</td> <td>Total volume (ml)</td> <td>Route</td> </tr> <tr> <td>1 in 1000</td> <td>16mg</td> <td>glucose 5%</td> <td>50ml</td> <td>IV</td> </tr> <tr> <td>Start date</td> <td>Drug concentration per ml</td> <td>Infusion range</td> <td>M in</td> <td>M ax</td> </tr> <tr> <td>6/3/18</td> <td>320 micrograms/ml</td> <td>Dose/kg/time</td> <td>0.05micrograms/kg/min</td> <td>1 micrograms/kg/min</td> </tr> <tr> <td>Pharm</td> <td></td> <td>ml/hr</td> <td>0.56</td> <td>11.2</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>#1234</td> </tr> </table>	Drug Adrenaline	Drug amount in syringe	Diluent	Total volume (ml)	Route	1 in 1000	3mg	glucose 5%	50ml	IV	Start date	Drug concentration per ml	Infusion range	M in	M ax	6/3/18	60 micrograms/ml	Dose/kg/time	0.05micrograms/kg/min	1 micrograms/kg/min	Pharm		ml/hr	0.5	10					#1234	Drug Adrenaline	Drug amount in syringe	Diluent	Total volume (ml)	Route	1 in 1000	16mg	glucose 5%	50ml	IV	Start date	Drug concentration per ml	Infusion range	M in	M ax	6/3/18	320 micrograms/ml	Dose/kg/time	0.05micrograms/kg/min	1 micrograms/kg/min	Pharm		ml/hr	0.56	11.2					#1234
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<p>Known compatibility issues</p>	<p>See Medusa for compatibility information. Incompatible with sodium bicarbonate and alkaline solutions.</p>																																																												
<p>SMART pump directions:</p>	<p>Load Syringe, prime line using the pump for accurate dosing.</p> <ul style="list-style-type: none"> Open 'Children' folder then open 'Adrenaline' programme. Using DATA chevrons enter concentration in microgram/ml and confirm Enter the Child's weight in kg and confirm Enter/confirm the dose in micrograms/kg/min Visually confirm the rate (ml/h) against the prescribed dose(microgram/kg/min) 																																																												

	<ul style="list-style-type: none"> • Perform STOP moment with medical team (Pump against prescription) • Connect to Child • Press start button
Additional Comments:	<ul style="list-style-type: none"> • Cardiovascular and renal parameters should be monitored, including heart rate and ECG, blood pressure, urine output and cardiac output. • Adrenaline (epinephrine) contains sodium bisulphite. Bisulphite can cause allergic type reactions, including anaphylactic symptoms, in susceptible patients. Sulphite sensitivity is seen more frequently in asthmatic patients. • If using peripherally, monitor insertion site for signs of phlebitis

Note: The contents of this monograph should be read in conjunction with information available in the BNFC and Medusa

References:

- British National Formulary for Children 2019-2020, accessed via www.medicinescomplete.com 27/12/23
- Medusa Injectable Medicines Guide, accessed via <http://medusa.wales.nhs.uk>, 27/12/23
- AHSP, Handbook on Injectable Drugs, accessed via www.medicinescomplete.com 01/04/2020
- Sheffield Children's NHS Foundation trust – PCCU inotrope infusion info – Jan 2018 – accessed 27/12/23
- CoMET standardised infusions for use on Transport V2017 09 22
- Nottingham Children's Hospital – Adrenaline monograph – v4 (2018) – accessed December 2023 #
- <https://em3.org.uk/foamed/25/9/2020/time-critical-infusions-for-children-peripheral-adrenaline#:~:text=Draw%20up%2075%20micrograms%20per,micrograms%20per%20kg%20per%20hour>. East Midlands emergency medicine time critical infusions. Accessed 27/12/23