

Document control sheet

GUIDELINE NUMBER	
AREA IN WHICH THIS MONOGRAPH APPLIES	CED, Dolphin Unit

DIVISIONAL AUTHORISATION	
GROUP	DATE
Paediatric monograph review group	
Clinical Director – Paediatric BU	
Divisional Clinical Governance Committee – Integrated care	

AUTHORS		
Author	Position	Date
Written by: Kevin Inglesant Russel Turner	Advanced Pharmacist – Women's & Children's Equipment Library Trainer	21/3/18
Checked by: Naomi Gladwell	Specialist Clinical Pharmacist – Rotational	21/3/18

If review:

	Position	Date
Reviewed by: Name	Paeds Cincial Practice Group	5 th April 2018
Checked by: Name		

Change history:

Changes Reference	Change details	Date

Paediatrics: Morphine (sedation)

Presentation:	Morphine 10mg/ml injection								
Indication:	Analgesia and sedation in the opioid-naïve child								
Dose:	<table border="1"> <thead> <tr> <th>Age</th> <th>Initial infusion rate</th> </tr> </thead> <tbody> <tr> <td>Neonate</td> <td>5 – 20 micrograms/kg/hr</td> </tr> <tr> <td>1 month – 11 years</td> <td>10 – 30 micrograms/kg/hr</td> </tr> <tr> <td>12 years – 18 years</td> <td>20 – 30 micrograms/kg/hr</td> </tr> </tbody> </table> <p>Rate should be titrated up or down according to response. Up to 60 micrograms/kg/hr has been used, but consider switching to fentanyl if 40micrograms/kg/hr inadequate.</p> <p>50-100micrograms/kg bolus may be given from infusion syringe as necessary. Boluses may take up to 15mins to take effect. If >4 boluses required within 60min period, review infusion rate.</p>	Age	Initial infusion rate	Neonate	5 – 20 micrograms/kg/hr	1 month – 11 years	10 – 30 micrograms/kg/hr	12 years – 18 years	20 – 30 micrograms/kg/hr
Age	Initial infusion rate								
Neonate	5 – 20 micrograms/kg/hr								
1 month – 11 years	10 – 30 micrograms/kg/hr								
12 years – 18 years	20 – 30 micrograms/kg/hr								
Route of administration:	Continuous intravenous infusion. Central or peripheral.								
Instructions for preparation:	<p>Children under 50kg</p> <ul style="list-style-type: none"> • Measure 1mg/kg morphine • Dilute with 0.9% sodium chloride or 5% glucose to 50ml • 10micrograms/kg/hr = 0.5ml/hr <p>Children 50kg and over</p> <ul style="list-style-type: none"> • Use pre-made 50mg/50ml syringe • 20micrograms/kg/hr = 0.02ml/kg/hr • NB. SMART pump will ask for dose in mg/hr in line with adults/PCA Guideline within the Trust. To convert the rate in micrograms/kg/hr to mg/hr, multiply by the weight (kg) and divide by 1,000 								

Prescribing

To calculate concentration of infusion for SMART pumps (in micrograms/ml) divide total mg in infusion by total volume of infusion (ml) and multiply by 1,000:

$$\text{e.g. } 8\text{mg in } 50\text{mls} = \frac{8\text{mg}}{50\text{mls}} = 0.16\text{mg/ml} \times 1,000 = 160 \text{ micrograms/ml}$$

Example prescription for 8kg child:

Drug	Drug amount in syringe	Diluent	Total volume (ml)	Route
<i>Morphine</i>	<i>8mg</i>	<i>5% glucose</i>	<i>50ml</i>	<i>IV</i>
Start date	Drug concentration per ml	Infusion range	Min	Max
<i>6/3/18</i>	<i>160</i>	Dose/kg/time	<i>10micrograms /kg/hr</i>	<i>30micrograms /kg/hr</i>
Pharm	mg / micrograms / units	ml/hr	<i>0.5</i>	<i>1.5</i>
				<i>A.Doctor</i>
				<i>#1234</i>

Example prescription for 60kg child:

Drug	Drug amount in syringe	Diluent	Total volume (ml)	Route
<i>Morphine</i>	<i>50mg</i>	<i>5% glucose</i>	<i>50ml</i>	<i>IV</i>
Start date	Drug concentration per ml	Infusion range	Min	Max
<i>6/3/18</i>	<i>1</i>	Dose/kg/time	<i>20micrograms /kg/hr</i>	<i>30micrograms /kg/hr</i>
Pharm	mg / micrograms / units	ml/hr	<i>1.2</i>	<i>1.8</i>
				<i>A.Doctor</i>
				<i>#1234</i>

NB. Pump will require dose in mg/hr. To convert micrograms/kg/hr to mg/hr, multiply by weight (kg) and divide by 1,000.

$$\text{e.g. } 20\text{micrograms/kg/hr} \times 60\text{kg} = \frac{1,200\text{micrograms/hr}}{1,000} = 1.2\text{mg/hr}$$

<p>Directions for administration via SMART pump</p>	<p>Children under 50kg</p> <ul style="list-style-type: none"> • Load syringe, prime line using the pump for accurate dosing. • Open 'Children' folder then open 'Morphine <50kg' programme. • Using DATA chevrons enter concentration in micrograms/ml and confirm • Enter child's weight in kg • Enter loading dose in micrograms/kg (zero if not required) • Confirm bolus time (at least 5mins) • Enter the dose in micrograms/kg/hr • Visually confirm the rate (ml/hr) against the prescribed dose (micrograms/kg/hr) • Perform STOP moment with medical team (check pump against prescription) • Connect to child • Press start button <p>Children 50kg and over</p> <ul style="list-style-type: none"> • Load syringe, prime line using the pump for accurate dosing. • Open 'Children' folder then open 'Morphine >50kg' programme. • Using DATA chevrons enter loading dose in mg (zero if not required) • Confirm bolus time (to be given over minimum 5mins) • Enter the dose in mg/hr • Visually confirm the rate (ml/hr) against the prescribed dose (mg/h) • Perform STOP moment with medical team (check pump against prescription) • Connect to child • Press start button
<p>Known compatibility issues</p>	<p>Compatible: adrenaline*, atracurium, atropine, caffeine, cefotaxime, ceftriaxone, cefuroxime, dobutamine*, dopamine*, insulin, KCl, magnesium sulphate, metronidazole, meropenem, midazolam, noradrenaline*, vancomycin</p> <p>*see notes below about mixing morphine with inotropes in a line</p> <p>Incompatible: aciclovir, flucloxacillin</p>
<p>Additional Comments:</p>	<ul style="list-style-type: none"> • Children on regular morphine may be opioid tolerant, and subsequently may need higher doses to achieve the same response. To convert oral morphine to IV, divide by between 2 and 3 (caution with high doses). • While morphine is compatible with inotropes, it should not normally be infused via the same line due to the risk of bolus inotrope delivery when sedation boluses are given. • Approximately one third of morphine in plasma is protein bound so individuals with low albumin may be more susceptible to opioid toxicity. • All opioids can cause respiratory depression. If respiration rate falls below 20 (ages 1-5), 12 (ages 6-12) or 10 (ages 12-15), stop the infusion and call a doctor. Administer O₂ via non-rebreathe mask and dilute 1ml of naloxone 400micrograms/ml injection to 10ml with 0.9% sodium chloride to make 40micrograms/ml solution. Give 1microgram/kg ever 2-3mins until respiration rate / conscious level return to normal. Remember that naloxone reverses analgesic effect as well as respiration depression / sedation.

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

References:

- NUH PICU Pharmacopoeia morphine monograph, accessed via www.nuh.nhs.uk on 12/3/18
 British National Formulary for Children, accessed via www.medicinescomplete.com on 12/3/18
 SPC for morphine accessed via www.medicines.org.uk on 12/3/18
 Medusa Injectable Medicines Guide, accessed via <http://medusa.wales.nhs.uk> on 12/3/18
 Trissel LA (Ed), Handbook on Injectable Drugs, accessed via www.medicinescomplete.com on 12/3/18