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	

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If review:

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

Change history:

Changes Reference	Change details	Date

Review due: June 2024

Paediatrics: Morphine (sedation)

Presentation:	Morphine 10mg/ml injection
Indication:	Analgesia and sedation in the opioid-naïve child
Dose:	<table><tr><th>Age</th><th>Initial infusion rate</th></tr><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></table> 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. 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.
Route of administration:	Continuous intravenous infusion. Central or peripheral.
Instructions for preparation:	**Children under 50kg** • Measure 1mg/kg morphine • Dilute with 0.9% sodium chloride or 5% glucose to 50ml • 10micrograms/kg/hr = 0.5ml/hr **Children 50kg and over** • 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

<u>Prescribing</u>

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:

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

Example prescription for 8kg child:

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

Example prescription for 60kg child:

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

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.

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

Directions for administration via SMART pump	**Children under 50kg** • 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 **Children 50kg and over** • 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
Known compatibility issues	**Compatible:** adrenaline*, atracurium, atropine, caffeine, cefotaxime, ceftriaxone, cefuroxime, dobutamine*, dopamine*, insulin, KCl, magnesium sulphate, metronidazole, meropenem, midazolam, noradrenaline*, vancomycin *see notes below about mixing morphine with inotropes in a line **Incompatible:** aciclovir, flucloxacillin
Additional Comments:	• 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 O_2 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