MORPHINE This drug must be guardrailed

Trade Name	**IV:** Morphine Sulphate injection B.P (DBL) **Oral:** RA – Morph (Pfizer)
Class	Opiate analgesic
Mechanism of Action	Stimulates brain opiate receptors. Releases histamine and centrally suppresses adrenergic tone, increasing venous capacitance. Alters perception of, and response to pain.
Indications	**Indication 1:** Analgesia **Indication 2:** Sedation **Indication 3:** Dependence following long term infusion **Indication 4:** Treatment of opiate withdrawal **Indication 5:** Palliative care
Contraindications	Hypersensitivity to morphine. Use with caution in patients with raised intracranial pressure, hepatic or renal impairment, hypotension or breathing difficulties.
Supplied As	**IV:** Morphine sulphate 10mg in 1 mL for injection. **Oral:** Morphine hydrochloride solution 1mg/mL for oral use.
Dilution… ***TWO dilution steps required for IV infusion***	▪ **IV Infusion:** See morphine iv infusion sheet

Drug	Add Diluent	Total Volume	Concentration
	0.9% sodium chloride		
10mg = 1mL	9 mL	10 mL	1 mg / mL

Step 2. Further dilute the 1 mg/mL solution in step 1

Drug	Add Diluent	Total Volume	FINAL CONCENTRATION
	0.9% sodium chloride, 5% or 10% dextrose		
Wt (kg) in mL	Make up to 50mL	50 mL	**Varies depending on weight**

1mL/hr = 20 microgram/kg/hr .

Maximum concentration to be **≤ 200 microgram/mL**

1mL/hr = 40 microgram/kg/hr if double strength the infusion for babies <1kg

… Dilution

- **Bolus Dose** (if not bolusing from an existing infusion)

Drug	Add Diluent	Total Volume	Concentration
	0.9% sodium chloride		
10mg = 1mL	9 mL	10 mL	1 mg / mL

- **Subcutaneous Infusion:** see separate subcutaneous infusion sheet

Dosage

Must chart guardrail and use Alaris pump for IV infusions

IV Bolus: **25 or 50 microgram/kg/dose**
Can be given as a bolus from the continuous infusion on the guardrailed pumps or from a separately drawn up 1mg/mL solution

If give >2 boluses in 24hrs consider increasing the infusion dose

Monitor the fluid volume received from the boluses (1.25ml - 2.5mL at standard infusion concentration)

100 microgram/kg/dose
Use if immediate analgesia/ sedation is required
Draw up a 1mg/mL solution to give this dose as the volume is too high if given directly from the infusion

IV Infusion: 5-30 microgram/kg/hour
Start at 10microgram/kg/hr for sedation while on mechanical ventilation.
Higher rates in surgical cases

Oral Dosing: 50 – 200 mcg/kg/dose every 4-6 hours

100mcg/kg/dose equates to about 5mcg/kg/hr iv and is a good starting option for most babies. Dose can be titrated up if needed. Lower starting dose of 50mcg/kg/dose may be better if there are concerns about respiratory state and sedation

If Converting from IV: Daily dose is 4 times the daily iv dose

$$\text{Oral mcg/dose} = \frac{\text{iv dose (mcg/kg/hr) x Wt (kg) X 24hrs X 4}}{\text{Number of oral doses per day (4 or 6 hourly)}}$$

Narcotic Abstinence Syndrome: See separate protocol

Guardrails

Conc: Min – 3 microgram/mL Max – 200 microgram/mL
Soft Min: 2 microgram/kg/hr Hard Max: 60 microgram/kg/hr
Soft Max: 30 microgram/kg/hr Default: 10 microgram/kg/hr

Guardrails Boluses

Default Rate: 50mL/hr – bolus will be given over 1.5-3 minutes at standard infusion concentration

Soft Min: 10 microgram/kg Hard Max: 50 microgram/kg
Soft Max: 50 microgram/kg Default: 25 microgram/kg

Interval	Bolus dose: as required , dose can last 1-4 hours Infusion: continuous Oral: 4-6 hourly
Administration	IV, oral, subcutaneous
Compatible With	**Solution:** 5% and 10% dextrose, sodium chloride 0.9% **Terminal Y-site:** Acyclovir, adrenaline, alprostadil, amikacin, aminophylline, amiodarone, ampicillin, atropine, benzylpenicillin, calcium chloride, casfofungin, cefazolin, cefotaxime, ceftazidime, ceftriaxone, chlorampenicol,clindamycin, dexmedetomidine, dexamethasone, digoxin, dobutamine, dopamine, enalapril, erythromycin, fentanyl, fluconazole, furosemide, gentamicin, glycopyrrolate, heparin, insulin, hydrocortisone, hyoscine hydrobromide, lidocaine, linezolid, lorazepam, magnesium, meropenem, methylprednisolone, metoclopramide, metronidazole, midazolam, milrinone, naloxone, noradrenaline, pancuronium, paracetamol, phenobarbital, piperacillin/tazocactam, potassium chloride, propranolol, ranitidine, sodium bicarbonate, sodium nitroprusside, ticarcillin/clavulanate, tobramycin, TPN, trimethoprim/sulphamethoxazole, vancomycin, vecuronium, voriconazole, zidovudine.
Incompatible With	Aminophylline, azathioprine, azithromycin, flucloxacillin, folic acid, ganciclovir, indomethacin, phenytoin, thiopental. There is no information on compatibility of morphine with lipid solutions
Interactions	Morphine decreases effects of diuretics by inducing release of ADH. Morphine may increase zidovudine levels by competitively inhibiting glucuronidation or directly inhibiting metabolism.
Monitoring	Respiratory and cardiovascular status. Bowel and urinary output (especially at higher doses).
Stability	**IV/Subcut:** Discard opened vial immediately after use Use a new vial for each dose. Continuous infusions need to be changed after 24 hours **Unused reconstituted 1mg/mL solution may be kept if repeated boluses may be required.** • May be kept for the **length of the shift** of the nurse who drew up the drug and is caring for the patient • The syringe must be **labelled** with the name of the **drug** and the name of the **patient** and may be stored in the **controlled drug safe**. • Any morphine remaining in the syringe at the end of that nurse's shift should be discarded and if ongoing treatment is required a new syringe should be prepared by nursing staff on the next shift.

	Oral: Open bottles of morphine mixture may be kept for 6months or the manufacturer's expiry whichever is shorter.
Storage	Store below 25^{o}C and in a controlled drug safe. Protect from light. Development of a yellow colour does not indicate toxicity, or loss of potency.
Adverse Reactions	Respiratory depression, bradycardia, hypotension, ileus and delayed gastric emptying, urinary retention, sweating, nausea and vomiting, development of tolerance. Seizures (higher or more rapid doses). Naloxone reverses effects. Mechanical ventilation may be preferable if narcotic effects required.
Comments	RA-Morph® is a clear colourless or pale yellow solution. It is sugar and alcohol free.
References	Neofax 2000, 1999 Medicines for Children RCPCH. ADC 2000;83:F101-3
Updated By	K Simonsen Nov 2003 (calculation of oral dose) P Schmidt, B Robertshawe December 2004 A Lynn, B Robertshawe September 2009 (guardrail) A Lynn, B Robertshawe Nov 2012 (re-order profile, discard vial) A Lynn May 2013/Aug 2015 (guardrail boluses) A Lynn, B Robertshawe October 2021 (routine review) A Lynn, B Robertshawe November 2022 (oral dosing) A Lynn, B Robertshawe March 2023 (double dilution instructions)