MORPHINE (sulfate and hydrochloride)

If prescribed for palliative care, refer to *MORPHINE for palliative care*

Indication	• Premedication for elective intubation • Analgesia[1,2] (e.g. procedural, post-operative) • Neonatal abstinence syndrome (NAS)[1] secondary to: o Maternal opioid dependency o Infant opioid dependency

ORAL

Presentation	• Oral solution 1 mg in 1 mL | 2 mg in 1 mL | 5 mg in 1 mL | 10 mg in 1 mL
NAS *(secondary to **maternal** opioid dependency)*	
Dosage[3]	• Commence at 0.125 mg/kg (125 microgram/kg) every 6 hours • Titrate to NAS assessment as per Queensland Clinical Guideline: *Perinatal substance use: neonatal*[3]
NAS *(iatrogenic **infant** opioid dependence)*	
Dosage[3]	• Commence oral daily dose at twice the IV daily dose (ratio of 2:1) • Usually 6 hourly in 4 divided doses
ANALGESIA	
Dosage[4]	• Starting dose 0.05 mg/kg (50 microgram/kg) every 3–6 hours o Titrate to response
Preparation	• Dilution not required but if volume adjustment indicated o Draw up 0.5 mg and make up to 5 mL total volume with water for injection o *Concentration now equal to 0.1 mg/mL (100 microgram/mL)*
Administration	• Draw up prescribed dose into oral/enteral syringe • Oral/OGT/NGT without regard to feeds

INTRAVENOUS

PREMEDICATION FOR ELECTIVE INTUBATION	
Presentation	• Ampoule: 5 mg in 1 mL | 10 mg in 1 mL o Morphine hydrochloride may be substituted at equivalent dosage
IV INJECTION *(wait at least 5 minutes (5–15) before administration of subsequent medications[5])*	
Dosage	• 0.1 mg/kg (100 microgram/kg) as a single dose
Dilution	• Draw up 5 mg (5000 microgram) and make up to 10 mL total volume with 0.9% sodium chloride o *Concentration now equal to 0.5 mg/mL (500 microgram/mL)*
Administration	• Draw up prescribed dose • IV injection over 2–3 minutes

INTRAVENOUS

ANALGESIA *(prior to commencing procedure)*	
Presentation	• Ampoule: 5 mg in 1 mL | 10 mg in 1 mL o Morphine hydrochloride may be substituted at equivalent dosage
IV INJECTION	
Dosage[1,6]	• 0.05 mg/kg (50 microgram/kg) every 4 hours o May commence at lower dose of 0.02 mg/kg (20 microgram/kg) o If required, titrate to a maximum of 0.2 mg/kg (200 microgram/kg) every 4 hours
Dilution	• Draw up 5 mg (5000 microgram) and make up to 10 mL total volume with 0.9% sodium chloride o *Concentration now equal to 0.5 mg/mL (500 microgram/mL)-the maximum concentration*
Administration	• Draw up prescribed dose • IV injection over at least 5 minutes[7]
IV INFUSION	
Dosage[1,2,6]	• Start at 0.01 mg/kg/hour (10 microgram/kg/hour) o May commence at lower dose of 0.005 mg/kg/hour (5 microgram/kg/hour) o Titrate according to response o Maximum dose 0.05 mg/kg/hour (50 microgram/kg/hour)[1]
Dilution	Single strength: Refer to Quick guide for other strength preparations • Draw up 1 mg/kg (1000 microgram/kg) and make up to 50 mL total volume with compatible fluid o *Concentration now equal to 0.02 mg/kg/mL (20 microgram/kg/mL)*
Administration	• Prime the infusion line and administer at prescribed rate via syringe driver pump o *Single strength infusion of 0.02 mg/kg/mL (20 microgram/kg/mL) infused at 0.5 mL/hour delivers 0.01 mg/kg/hour (10 microgram/kg/hour)*

Contraindication Caution	• Contraindication o Known hypersensitivity o Significant respiratory depression o Known or suspected gastrointestinal obstruction (including paralytic ileus) • Caution o HIE and hypothermia (may affect drug metabolism)[1,8] o Circulatory shock as further reduction in cardiac output or BP may occur o Renal or hepatic impairment[2,6]
Special considerations	• S8 high risk medication. Errors may result in significant harm • Rapid IV administration may result in chest wall rigidity • Oral to IV ratio is 2:1 (based on approximate oral morphine bioavailability of 48.5% in neonates)[9] • Do not cease abruptly following prolonged treatment (5–7 days)[1] o Wean by 10–20% of total daily dose every 2–3 days based on clinical requirements[1] • UAC route o Consult with neonatologist/paediatrician prior to use and refer to Queensland Clinical Guideline: *Neonatal medicines*[10]
Antagonist (naloxone)	• Naloxone is an opioid antagonist for reversal of overdose in the non-opioid dependent newborn[11] • Not for use in neonatal abstinence syndrome (NAS)
Monitoring	• Level of sedation[7] • Respiratory[7] and cardiovascular status[6] • Abdominal distention and loss of bowel sounds[1] • If decreased urinary output, consider retention[1] • If NAS, as per Queensland Clinical Guideline: *Perinatal substance use: neonatal*[3]

Compatibility	• Fluids o 5% glucose[12], 10% glucose (sulfate only)[12], 0.9% sodium chloride[12], 0.45% sodium chloride (sulfate only)[12], lipid emulsion at concentration of 0.5 mg/mL or weaker[13] • Y site: morphine sulfate *and* morphine hydrochloride o Amiodarone[12,14], caffeine citrate[12,14], calcium gluconate[12,14], cefazolin[12,14], cefotaxime[12,14], ceftazidime[12,14], ceftriaxone[12,14], dexmedetomidine[12,14], digoxin[12,14], dobutamine[12,14], dopamine[12,14], epinephrine[12,14], fluconazole[12,14], foscarnet[12,14], heparin sodium[12,14], hydrocortisone sodium succinate[12,14], methylprednisolone[12,14], metronidazole[12,14], midazolam[12,14], nicardipine[12,14], paracetamol[12,14], phenobarbital[12,14], piperacillin/tazobactam[12,14], posaconazole[12,14], sildenafil[12,14], sodium bicarbonate[12,14], voriconazole[12,14], zidovudine[12,14] • Y site: morphine sulfate *only* o Allopurinol[12], atracurium[12], atropine[12], caspofungin[12], cefoxitin[12], cefuroxime[12], cisatracurium[12], clindamycin[12], dexamethasone[12], epoetin alfa[12], esmolol[12], fentanyl[12], filgrastim[12], folinic acid[12], gentamicin[12], glyceryl trinitrate[12], glycopyrronium[12], lidocaine[12], magnesium sulfate[12], milrinone[12], naloxone[12], octreotide[12], pancuronium[12], potassium chloride[12], protamine[12], pyridoxine[12], rocuronium[12], sodium nitroprusside[12], theophylline[12], thiamine[12], tobramycin[12], vecuronium[12], zidovudine[12] • Y site: morphine hydrochloride *only* o Albumin[14], cefepime[14], flecainide[14], hydrocortisone sodium phosphate[14], levetiracetam[14], prednisolone sodium succinate[14], teicoplanin[14], tranexamic acid[14], vancomycin[14]
Incompatibility	• PN: co-infusion not recommended (evidence limited) o If unavoidable, seek pharmacist advice first, filter infusion and flush before and after • Fluids o Morphine may precipitate out of solution when mixed with alkaline drugs or solutions • Oral o Nil known • Y site: morphine sulfate *and* morphine hydrochloride o Aciclovir[12,14], ampicillin[12,14], furosemide[12,14], ganciclovir[12,14], micafungin[12,14] • Y site: morphine sulfate *only* o Amphotericin B liposome[12], azithromycin[12], cefepime[12], dantrolene[12], diazoxide[12], folic acid[12], hydralazine[12], ibuprofen[12], insulin human regular[12], indometacin[12], pantoprazole[12], phenytoin[12], trimethoprim/sulfamethoxazole[12], vancomycin[12] • Y site: morphine hydrochloride *only* o Benzylpenicillin[14], esomeprazole[14], omeprazole[14]
Interactions	• Benzodiazepines and CNS depressants: increased risk of respiratory depression[15] • Zidovudine: increased risk of morphine and/or zidovudine toxicity[15]
Stability	• Oral solution o Store below 30 °C.[16] Do not refrigerate.[16] Protect from light[16] o Discard 28 days after opening or as per product information • Ampoule o Store below 25 °C.[7] Protect from light[7] • IV infusion o Stable for 24 hours[7] o Change infusion within 24 hours to reduce risk of microbial contamination[7]
Side effects	• Circulatory: arrhythmias[2], hypotension[2], bradycardia[1] • Digestive: decreased gut motility[2], vomiting[2] • Integumentary: skin reactions[2] • Nervous: restlessness[2], opioid dependence[2], sedation[2] • Respiratory: respiratory depression (with larger doses)[2] • Urinary: urinary retention[2]
Actions	• Opioid analgesic that stimulates brain opioid receptors[1] • Decreases GI secretions and motility[1]
Abbreviations	BP: blood pressure, CNS: central nervous system, GI: gastrointestinal, HIE: hypoxic-ischaemic encephalopathy, IV: intravenous, NAS: neonatal abstinence syndrome, PN: parenteral nutrition, S8: schedule 8, UAC: umbilical artery catheter

Keywords	intubation, morphine, morphine sulfate, neonatal medicine, neonatal monograph, opioid, pain relief, palliative care, narcotic, rapid sequence induction, RSI, NAS, neonatal abstinence syndrome, Finnegan Score

The Queensland Clinical Guideline *Neonatal medicines*[10] is integral to and should be read in conjunction with this monograph. Refer to the disclaimer. Destroy all printed copies of this monograph after use.

Quick guide: morphine sulfate IV INJECTION (bolus) dose

Morphine dose is 100 microgram/kg	**Round weight to nearest 0.5 kg**							
Use the IV injection DILUTED concentration of 500 microgram/mL (as per instructions above)	**0.5 kg**	**1 kg**	**1.5 kg**	**2 kg**	**2.5 kg**	**3 kg**	**3.5 kg**	**4 kg**
Dose (microgram) for approximate weight	50 microgram	100 microgram	150 microgram	200 microgram	250 microgram	300 microgram	350 microgram	400 microgram
Administration volume (mL)	0.1 mL	0.2 mL	0.3 mL	0.4 mL	0.5 mL	0.6 mL	0.7 mL	0.8 mL

Quick guide: morphine sulfate IV INFUSION concentrations

Draw up morphine dose	Make up to total volume (mL)	Concentration (microgram/kg/mL)	Infusion rate (mL/hour)	Delivers (microgram/kg/hour)
1 mg/kg (1000 microgram/kg)	50 mL	20 microgram/kg/mL	@ 0.5 mL/hour	10 microgram/kg/hour
2 mg/kg (2000 microgram/kg)	50 mL	40 microgram/kg/mL	@ 0.25 mL/hour	10 microgram/kg/hour
4 mg/kg (4000 microgram/kg)	50 mL	80 microgram/kg/mL	@ 0.125 mL/hour	10 microgram/kg/hour

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Document history

ID number	Effective	Review	Summary of updates
NMedQ26.124-V1-R31	25/09/2026	25/09/2031	Endorsed by QNSAG • Combined morphine hydrochloride and sulfate monographs with new ID number • No change to dose or frequency • Updated: compatibilities, incompatibilities, side effects, presentation, interactions, references

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