### Alert
High risk medication—may cause significant patient harm when used in error.

### Indication
Analgesia/sedation:
1. During assisted ventilation
2. Post-surgery
3. Pre-medication prior to intubation or other procedure

### Action
Narcotic analgesic – stimulates brain opioid receptors.

### Drug Type
Narcotic analgesic.

### Trade Name
DBL Morphine Sulfate

### Presentation
Morphine 10 mg/mL (10,000 microgram/mL) vial

### Dosage/Interval

<table>
<thead>
<tr>
<th>CONTINUOUS IV INFUSION</th>
<th>5–40 microgram/kg/hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>IV BOLUS</td>
<td>50 microgram/kg every 4 hours</td>
</tr>
<tr>
<td>PRE-MEDICATION FOR INTUBATION</td>
<td>100 microgram/kg as a single dose</td>
</tr>
</tbody>
</table>

### Maximum Daily Dose
No extra benefit noted using doses higher than 20 microgram/kg/hour. Doses up to 100 microgram/kg/hour have been used in newborns; however this was associated with an increase in the duration of mechanical ventilation.

### Route
IV

### Preparation/Dilution

**SINGLE STRENGTH continuous IV infusion**

<table>
<thead>
<tr>
<th>Infusion strength</th>
<th>Prescribed amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 mL/hour = 20 microgram/kg/hour</td>
<td>1 mg/kg morphine and make up to 50 mL</td>
</tr>
</tbody>
</table>

Draw up 1 mL (10 mg morphine sulfate) and add 9 mL sodium chloride 0.9% to make a volume of 10 mL with a concentration of 1 mg/mL.

FURTHER DILUTE 1 mg/kg (1 mL/kg) of the above solution with glucose 5% or glucose 10% to make a final volume of 50 mL with a concentration of 1 mL/hour = 20 microgram/kg/hour.

**DOUBLE STRENGTH continuous IV infusion**

<table>
<thead>
<tr>
<th>Infusion strength</th>
<th>Prescribed amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 mL/hour = 40 microgram/kg/hour</td>
<td>2 mg/kg morphine and make up to 50 mL</td>
</tr>
</tbody>
</table>

Draw up 1 mL (10 mg morphine sulfate) and add 9 mL sodium chloride 0.9% to make a volume of 10 mL with a concentration of 1 mg/mL.

FURTHER DILUTE 2 mg/kg (2 mL/kg) of the above solution with glucose 5% or glucose 10% to make a final volume of 50 mL with a concentration of 1 mL/hour = 40 microgram/kg/hour.

**IV BOLUS**

Draw up 1 mL (10 mg morphine sulfate) and add 9 mL sodium chloride 0.9% to make a final volume of 10 mL with a concentration of 1 mg/mL.

**PRE-MEDICATION FOR INTUBATION**

As above for IV bolus.

### Administration
CONTINUOUS IV INFUSION: Via syringe driver.

**IV BOLUS**: Administer over 5 minutes. Flush with 1 mL sodium chloride 0.9% before and after injection. Rapid IV administration may increase adverse effects.

**PRE-MEDICATION FOR INTUBATION**: As above for IV bolus. Wait a minimum of 5 minutes for...

---

This RHW document is a modification of Neomed version. Dosage schedules remain the same. However, information on the commercial preparations not used at RHW is deleted. The risk rating is modified as per the Local Health District policy.
onset of action; however for maximum effect wait 15 minutes after giving the dose.

### Monitoring
- Observe for signs of respiratory and cardiac depression – continuous cardiorespiratory monitoring is mandatory. Respiratory depression/apnoea can be reversed with naloxone.
- Observe for urinary retention, abdominal distension or delay in passage of stool.
- Withdraw slowly following prolonged use.

### Contraindications
- Hypersensitivity to morphine sulfate or any component.

### Precautions
- Use with caution in patients with hypersensitivity reactions to other opioids.
- Hypotension and bradycardia.
- Transient hypotonia.
- Ileus and delayed gastric emptying time.
- Urinary retention.
- Respiratory depression.
- Tolerance may develop after prolonged use – wean slowly.
- Convulsions.
- Renal or hepatic impairment.

### Drug Interactions
- Concomitant use with other CNS depressants potentiates effects of opioids, increasing risk of respiratory depression, profound sedation or coma.

### Adverse Reactions
- See Precautions.

### Compatibility
- Fluids: Glucose 5%, glucose 10%, Hartmann’s, sodium chloride 0.45% and sodium chloride 0.9%
- Y site: Amino acid solutions, adrenaline hydrochloride, amifostine, amikacin, amiodarone, ampicillin, anidulafungin, atracurium, atropine, aztreonam, bivalirudin, caspofungin, ceftaxime, cefoxitin, ceftazidine, ceftriaxone, cephalosporin, chloramphenicol, cisatracurium, clindamycin, dexamethasone, digoxin, dopamine, epifibatide, erythromycin, esmolol, filgrastim, fluconazole, fosfarnet, gentamicin, granisetron, haloperidol lactate, hydrocortisone sodium succinate, hyoscine hydrobromide, insulin (short-acting), ketorolac, labetalol, levomepromazine, lignocaine, linezolid, magnesium sulfate, methylprednisolone sodium succinate, metoclopramide, metoprolol, metronidazole, midazolam, milrinone, noradrenaline, palonosetron, piperacillin-tazobactam (EDTA-free), potassium chloride, remifentanil, sodium nitroprusside, tacrolimus, tigecycline, tirolefiban, tobramycin, trimethoprim-sulfamethoxazole, vancomycin, vecuronium, zidovudine.

### Incompatibility
- Fluids: Morphine may precipitate out of solution when the final pH is greater than 6.4.
- Y-site: Aminophylline, azathioprine, azithromycin, flucloxacillin, folic acid, ganciclovir, indomethacin, pentamidine, pethidine, promethazine, sodium nitrite, thiopentone.

### Stability
- Diluted solution for continuous IV infusion is stable for 48 hours.

### Storage
- Ampoule:
  - Store below 25°C. Protect from light.
  - Discard remainder after use (in line with schedule 8 drug legislation).
  - Store in Dangerous Drug (DD) safe and record use in DD register.

### Special Comments
- Prolonged use (> 5–7 days) may be associated with dependence.

### Evidence summary
- Dosing:
  - A dose of 10 microgram/kg/hour is recommended by a systematic review and meta-analysis of 13 studies of ventilated neonates, a retrospective review examining age and infusion rates and a 5 year outcome of a large RCT using low dose morphine. In addition, hypotension is not a side effect of morphine when low doses are used.

  A prospective study of 68 neonates who underwent non-cardiac surgery measured morphine plasma concentrations and comfort scores during postoperative management. Doses of 5–7
Morphine (Parenteral)

| Level of evidence | Morphine should be used selectively based on clinical judgement and the use of a validated pain score (Level A, Grade A). A dose of morphine 10 microgram/kg/hour is recommended for ventilated neonates (Level A, Grade A). For postoperative management the recommended doses are 5─7 microgram/kg/hour for neonates 7 days or less and 10 microgram/kg/hour for neonates over 7 days (Level B, Grade B). A premedication regimen can be used for all elective intubation (Level C, Grade C). |

17. Lexi-comp paediatric and neonatal dosage handbook, Version:2.6.0, Hudson, OH, USA.