South Australian Neonatal Medication Guidelines

morphine

10mg/mL injection, 1mg/mL oral solution

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This is a High Risk Medication ⚠

An overdose can be rapidly fatal.

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Contact: South Australian Neonatal Medication Guidelines Workgroup at:
NeoMed@health.sa.gov.au

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Dose and Indications

1mg = 1000micrograms

Analgesia and Sedation

Intravenous, Intramuscular & Subcutaneous Bolus

0.05mg to 0.2mg/kg/dose. Repeat every four hours if necessary.

Intravenous Infusion

10 to 20micrograms/kg/hour

Commence at the lowest infusion rate and titrate to effect; higher doses may be required with specialist consultation.

A loading dose of 100micrograms/kg (0.1mg/kg) may be given prior to commencement of infusion.

After prolonged use, titrate dose to discontinue.

Oral

0.1mg to 0.2mg/kg/dose. Repeat every four hours if necessary.

Neonatal Abstinence Syndrome

Oral

Refer the South Australian Perinatal Practice Guidelines

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Preparation and Administration

Intravenous Bolus

Dilute 1mL of the 10mg/mL morphine solution with 9mL of compatible fluid (to a total volume of 10mL). The resulting solution contains 1mg/mL morphine.

Dose	50micrograms (0.05mg)	100micrograms (0.1mg)	200micrograms (0.2mg)	300micrograms (0.3mg)	400micrograms (0.4mg)
Volume	0.05mL	0.1mL	0.2mL	0.3mL	0.4mL

Shake well to ensure thorough mixing.
It may be administered undiluted or diluted to a suitable volume with compatible fluid for ease of administration.
Administered as a push over at least 5 minutes
Discard remaining solution.

Intravenous Infusion

Select the strength required based on the weight of the infant in the context of any fluid restrictions. Morphine Concentration Selection Tables can be found on the following pages of this guideline to assist prescribers to gauge which strength is best for the patient.

There are TWO STEPS to this process.

STEP ONE: Dilute 1mL (10mg/mL) of morphine injection with 9mL of 0.9% sodium chloride (to a total of 10mL). This makes a 1mg/mL solution

STEP TWO: Dilute the appropriate volume of the 1mg/mL morphine solution using compatible fluid; and administer by continuous infusion. Diluted preparation is stable for 24 hours at room temperature.

The three standard strengths used are:

- Morphine 40microgram/mL
- Morphine 80microgram/mL
- Morphine 160micrograms/mL

Dilute before use and administer by 24 hour infusion.

Formulae

To calculate infusion rate (mL/hr):

$$\text{Rate (mL/hr)} = \frac{\text{dose (micrograms/kg/hour) x weight(kg)}}{\text{Strength (microgram/mL)}}$$

To calculate the dose (micrograms/kg/hour):

$$\text{Dose (micrograms/kg/min)} = \frac{\text{Rate (mL/hr) x Strength (microgram/mL)}}{\text{Weight (kg)}}$$

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Morphine Concentration Selection Table for 25mL syringes

Double Dilution for Morphine 40micrograms/mL

STEP ONE: Dilute 1mL (10mg/mL) of morphine injection with 9mL of 0.9% sodium chloride (to a total of 10mL). This makes a 1mg/mL solution.

STEP TWO: Add 1mL Morphine (1mg/mL) to 24mL of compatible fluid (to a total of 25mL). This makes a 40microgram/mL (0.04mg/mL) solution.

Rate (mL/hr)		0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	
1		Rate (mL/hr)								
Weight (kg)		Approximate micrograms/kg/hour					Weight (kg)			
1	8	12	16	20	24	28	32	36	40	1
2	4	6	8	10	12	14	16	18	20	2
3	3	4	5	7	8	9	11	12	13	3
4	2	3	4	5	6	7	8	9	10	4

Discard remaining solution

Double Dilution for Morphine 80micrograms/mL

STEP ONE: Dilute 1mL (10mg/mL) of morphine injection with 9mL of 0.9% sodium chloride (to a total of 10mL). This makes a 1mg/mL solution.

STEP TWO: Add 2mL morphine (1mg/mL) to 23mL of compatible fluid (total of 25mL). This makes an 80microgram/mL (0.08mg/mL) solution.

Rate (mL/hr)		0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	
1		Rate (mL/hr)								
Weight (kg)		Approximate micrograms/kg/hour					Weight (kg)			
1	16	24	32	40						1
2	8	12	16	20	24	28	32	36	40	2
3	5	8	11	13	16	19	21	24	27	3
4	4	6	8	10	12	14	16	18	20	4
5	3	5	6	8	10	11	13	14	16	5

Discard remaining solution

Double Dilution for Morphine 160micrograms/mL

STEP ONE: Dilute 1mL (10mg/mL) of morphine injection with 9mL of 0.9% sodium chloride (to a total of 10mL). This makes a 1mg/mL solution.

STEP TWO: Add 4mL morphine (1mg/mL) to 21mL of compatible fluid (total of 25mL). This makes a 160microgram/mL (0.16mg/mL) solution.

Rate (mL/hr)		0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	
1		Rate (mL/hr)								
Weight (kg)		Approximate micrograms/kg/hour					Weight (kg)			
1	32									1
2	16	24	32	40						2
3	11	16	21	27	32	37				3
4	8	12	16	20	24	28	32	36	40	4
5	6	10	13	16	19	22	26	29	32	5

Discard remaining solution

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Morphine Concentration Selection Table for 50mL syringes

Double Dilution for Morphine 40micrograms/mL

STEP ONE: Dilute 1mL (10mg/mL) of morphine injection with 9mL of 0.9% sodium chloride (to a total of 10mL). This makes a 1mg/mL solution.

STEP TWO: Add 2mL Morphine (1mg/mL) to 48mL of compatible fluid (to a total of 50mL). This makes a 40microgram/mL (0.04mg/mL) solution.

Rate (mL/hr)	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	
1	Rate (mL/hr)								
Weight (kg)	Approximate micrograms/kg/hour								Weight (kg)
1 8	12	16	20	24	28	32	36	40	1
2 4	6	8	10	12	14	16	18	20	2
3 3	4	5	7	8	9	11	12	13	3
4 2	3	4	5	6	7	8	9	10	4

Discard remaining solution

Double Dilution for Morphine 80micrograms/mL

STEP ONE: Dilute 1mL (10mg/mL) of morphine injection with 9mL of 0.9% sodium chloride (to a total of 10mL). This makes a 1mg/mL solution.

STEP TWO: Add 4mL morphine (1mg/mL) to 46mL of compatible fluid (total of 50mL). This makes an 80microgram/mL (0.08mg/mL) solution.

Rate (mL/hr)	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	
1	Rate (mL/hr)								
Weight (kg)	Approximate micrograms/kg/hour								Weight (kg)
1 16	24	32	40						1
2 8	12	16	20	24	28	32	36	40	2
3 5	8	11	13	16	19	21	24	27	3
4 4	6	8	10	12	14	16	18	20	4
5 3	5	6	8	10	11	13	14	16	5

Discard remaining solution

Double Dilution for Morphine 160micrograms/mL

STEP ONE: Dilute 1mL (10mg/mL) of morphine injection with 9mL of 0.9% sodium chloride (to a total of 10mL). This makes a 1mg/mL solution.

STEP TWO: Add 8mL morphine (1mg/mL) to 42mL of compatible fluid (total of 50mL). This makes a 160microgram/mL (0.16mg/mL) solution.

Rate (mL/hr)	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	
1	Rate (mL/hr)								
Weight (kg)	Approximate micrograms/kg/hour								Weight (kg)
1 32									1
2 16	24	32	40						2
3 11	16	21	27	32	37				3
4 8	12	16	20	24	28	32	36	40	4
5 6	10	13	16	19	22	26	29	32	5

Discard remaining solution

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Oral

The oral solution contains 1mg/mL morphine.

Dose	0.1mg	0.25mg	0.5mg	0.75mg	1mg
Volume	0.1mL	0.25mL	0.5mL	0.75mL	1mL

Compatible Fluids

Glucose 5%, glucose 10%, sodium chloride 0.9%

Adverse Effects

Common

Vomiting (initial dose/s), drowsiness, miosis, constipation, urinary retention

Infrequent

Urticaria, hypothermia, bradycardia or tachycardia, increased intracranial pressure, ureteric or biliary spasm, rigidity, flushing

Rare

Respiratory depression (dose related), Syndrome of inappropriate anti-diuretic hormone secretion (SIADH), tremor, muscle twitching and seizures

Monitoring

- If on morphine infusion, cardio-respiratory monitoring is mandatory
- Close observation of the neonate for at least 30 minutes is required to assess for respiratory depression
- Observe for abdominal distention and loss of bowel sounds
- Sedation is best monitored by using a sedation score
- Urinary retention.

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Practice Points

- Naloxone should be available where morphine is administered
- Consider the place of paracetamol as an adjunct when using morphine as an analgesic
- Continuous morphine infusions should only be administered to ventilated patients
- Therapeutic doses can cause respiratory depression, bradycardia, hypotension and urinary retention. Respiratory Depression is a severe adverse effect of morphine and is best judged by degree of sedation, as respiratory rate is a late and unreliable indicator. When occurring as an acute overdose use naloxone as the antidote
- Neonates requiring morphine treatment for >14 days requires Health Department notification. Consult pharmacist or visit DASSA website.
- Chronic dependent use and Neonatal Narcotic Abstinence Syndrome should not be treated with Naloxone due to potential for withdrawal.
- Contraindicated in patients with a hypersensitivity to opiates as well as shock, hypotension, increased intracranial pressure and convulsions.
- Use cautiously in patients with irregular breathing patterns, in patients with cardiac arrhythmias, in patients with hepatic or renal impairment and in patients with urinary retention.

Version control and change history

PDS reference: OCE use only

Version	Date from	Date to	Amendment
1.0	November 2012	current	Original version

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