

# Neonatal Medication Guideline

## Clinical Guideline

### Fentanyl

**Policy developed by:** SA Maternal, Neonatal & Gynaecology Community of Practice

**Approved SA Health Safety & Quality Strategic Governance Committee on:** 9 November 2017

**Next review due:** 9 November 2020

**Summary** The purpose of this guideline is to guide nursing, medical and pharmacy staff in the dosing and administration of fentanyl

**Keywords** fentanyl, neonatal medication guideline, intubation, analgesia, sedation, ventilation, surfactant, naloxone

**Policy history** Is this a new policy? **N**  
Does this policy amend or update an existing policy? **Y v3.0**  
Does this policy replace an existing policy? **N**  
If so, which policies?

**Applies to** All SA Health Portfolio  
All Department for Health and Ageing Divisions  
All Health Networks  
CALHN, SALHN, NALHN, CHSALHN, WCHN, SAAS

**Staff impact** All Clinical, Medical, Midwifery, Nursing, Students, Allied Health, Emergency, Mental Health, Pathology, Pharmacy

**PDS reference** CG026

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### Version control and change history

Version	Date from	Date to	Amendment
1.0	November 2012	January 2015	Original version
2.0	January 2015	September 2016	High Risk notification included
3.0	September 2016	November 2017	Review and update
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# fentanyl

## 100microgram/2mL injection

## 10microgram/mL pre-filled syringe

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### Note

This guideline provides advice of a general nature. This statewide guideline has been prepared to promote and facilitate standardisation and consistency of practice, using a multidisciplinary approach. The guideline is based on a review of published evidence and expert opinion.

Information in this statewide guideline is current at the time of publication.


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Health practitioners in the South Australian public health sector are expected to review specific details of each patient and professionally assess the applicability of the relevant guideline to that clinical situation.

If for good clinical reasons, a decision is made to depart from the guideline, the responsible clinician must document in the patient's medical record, the decision made, by whom, and detailed reasons for the departure from the guideline.

This statewide guideline does not address all the elements of clinical practice and assumes that the individual clinicians are responsible for discussing care with consumers in an environment that is culturally appropriate and which enables respectful confidential discussion. This includes:

- The use of interpreter services where necessary,
- Advising consumers of their choice and ensuring informed consent is obtained,
- Providing care within scope of practice, meeting all legislative requirements and maintaining standards of professional conduct, and
- Documenting all care in accordance with mandatory and local requirements

**This is a High Risk Medication**   
An overdose can be rapidly fatal.

## Dose and Indications

### Analgesia in Self-ventilating Patients

#### Intravenous Bolus

0.5 to 1 microgram/kg, a repeat dose may be given at the discretion of the treating consultant

### Analgesia and Sedation in Ventilated Patients

#### Intravenous Infusion

1 to 5 micrograms/kg/hour (titrate to response)

### Intubation for Ongoing Ventilation

#### Intravenous Bolus

4 micrograms/kg/dose

### In-Out Intubation for Surfactant Therapy

#### Intravenous Bolus

1-2 micrograms/kg/dose

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**Contact:**

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Health.NeoMed@sa.gov.au

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10microgram/mL pre-filled syringe

## Preparation and Administration

### Intravenous

#### Fentanyl 10microgram/mL *prefilled syringe\**

***\*Dilution instructions to make Fentanyl 10microgram/ml (if prefilled syringe unavailable)***

Dilute 1mL of the 100microgram/2mL fentanyl solution with 4mL of compatible fluid (to a total volume of 5mL). The resulting solution contains 10micrograms/mL fentanyl.

Dose	1microgram	3microgram	5microgram	7microgram	9microgram
Volume	0.1mL	0.3mL	0.5mL	0.7mL	0.9mL

Shake well to ensure thorough mixing.

Administered as a push **over at least 3 minutes**

Discard remaining solution.

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## Continuous Intravenous Infusion

Select the strength required based on the weight of the infant in the context of any fluid restrictions. Fentanyl 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.

Dilute the appropriate volume of 50microgram/mL fentanyl injection using compatible fluid; and administer by continuous infusion. The dilution solution is stable at room temperature for 24 hours.

The three standard strengths available are:

- > Fentanyl 4micrograms/mL
- > Fentanyl 8micrograms/mL
- > Fentanyl 16micrograms/mL

### Formulae

#### To calculate infusion rate (mL/hr):

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

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

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

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10microgram/mL pre-filled syringe

## Fentanyl Concentration Selection Table

### Fentanyl 4micrograms/mL

**To make a 25mL syringe:**

Dilute 2mL fentanyl (100microgram/2mL) with 23mL of compatible fluid (total of 25mL).

**To make a 50mL syringe:**

Dilute 4mL fentanyl (100microgram/2mL) with 46mL of compatible fluid (total of 50mL).

Recommended for neonates weighing <1kg

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)
0.5	1.6	2.4	3.2	4	4.8	5.6	6.4	7.2	8.0	0.5
1	0.8	1.2	1.6	2	2.4	2.8	3.2	3.6	4	1
1.5	0.5	0.8	1.1	1.3	1.6	1.9	2.1	2.4	2.7	1.5
2	0.4	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2
2.5	0.3	0.5	0.6	0.8	1	1.1	1.3	1.4	1.6	2.5
3	0.3	0.4	0.5	0.7	0.8	0.9	1.1	1.2	1.3	3
3.5	0.2	0.3	0.5	0.6	0.7	0.8	0.9	1	1.1	3.5
4	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1	4

Discard remaining solution

### Fentanyl 8micrograms/mL

**To make a 25mL syringe:**

Dilute 4mL fentanyl (100microgram/2mL) with 21mL of compatible fluid (total of 25mL).

**To make a 50mL syringe:**

Dilute 8mL fentanyl (100microgram/2mL) with 42mL of compatible fluid (total of 50mL).

Recommended for neonates weighing 1kg to 3kg

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)
0.5	3.2	4.8								0.5
1	1.6	2.4	3.2	4	4.8	5.6				1
1.5	1.1	1.6	2.1	2.7	3.2	3.7	4.3	4.8	5.3	1.5
2	0.8	1.2	1.6	2	2.4	2.8	3.2	3.6	4	2
2.5		1	1.3	1.6	1.9	2.2	2.6	2.9	3.2	2.5
3		0.8	1.1	1.3	1.6	1.9	2.1	2.4	2.7	3
3.5			0.9	1.1	1.4	1.6	1.8	2.1	2.3	3.5
4			0.8	1	1.2	1.4	1.6	1.8	2	4

Discard remaining solution

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# fentanyl

## 100microgram/2mL injection 10microgram/mL pre-filled syringe

**Fentanyl 16micrograms/mL**

**To make a 25mL syringe:**

Dilute 8mL fentanyl (100microgram/2mL) with 17mL of compatible fluid (total of 25mL).

**To make a 50mL syringe:**

Dilute 16mL fentanyl (100microgram/2mL) with 34mL of compatible fluid (total of 50mL).

Recommended for neonates >3kg

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)
1.5	2.1	3.2	4.3	5.3						1.5
2	1.6	2.4	3.2	4	4.8					2
2.5	1.3	1.9	2.6	3.2	3.8	4.5	5.1			2.5
3	1.1	1.6	2.1	2.7	3.2	3.7	4.3	4.8	5.3	3
3.5	0.9	1.4	1.8	2.3	2.7	3.2	3.7	4.1	4.6	3.5
4	0.8	1.2	1.6	2	2.4	2.8	3.2	3.6	4	4
4.5		1.1	1.4	1.8	2.1	2.5	2.8	3.2	3.5	4.5
5		1	1.3	1.6	1.9	2.2	2.6	2.9	3.2	5

Discard remaining solution

### Compatible Fluids

Glucose 5%, glucose 10% (Y-site only), sodium chloride 0.9%

### Adverse Effects

**Common**

Chest wall rigidity, laryngospasm, respiratory depression, miosis, urinary retention, constipation, rash, erythema and bradycardia.

May have a lower incidence of vomiting and constipation than other opioids

**Infrequent**

Bronchospasm, tremor, hypothermia, tachycardia, hypertension, ureteric or biliary spasm, urticaria, muscle rigidity and myoclonus

**Rare**

Syndrome of inappropriate antidiuretic hormone hypersecretion (SIADH) and seizures

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10microgram/mL pre-filled syringe

## Monitoring

- > Close observation of the neonate for at least 30 minutes is required to assess for respiratory depression
- > Pain is best monitored by using a pain score.

## Practice Points

- > Physiological dependence and tolerance may occur with prolonged use (ie greater than 5 days of continuous dosing)
- > Use with CAUTION in neonates:
  - not receiving assisted ventilation
  - with high intracranial pressure or convulsions
  - with urinary retention
  - with bradyarrhythmias or hypotension
- > Rapid administration of fentanyl is associated with hypotension, bradycardia, apnoea, respiratory depression and muscle rigidity
- > Fentanyl has a shorter half-life and greater cardiovascular stability than other opiates
- > If fentanyl is used in conjunction with other sedative medications (e.g. midazolam) the dose of each must be reduced
- > Naloxone should be available for reversal of opioid adverse effects.

## Version control and change history

**PDS reference:** OCE use only

Version	Date from	Date to	Amendment
1.0	November 2012	January 2015	Original version
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