

Fentanyl

100 microgram/2 mL injection

20 microgram/2 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 bolus

0.5 to 4 microgram/kg as a single dose.

Repeated as required (usually every 2 to 4 hours)

Intravenous Infusion

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

Intubation for Ongoing Ventilation

Intravenous Bolus

4 microgram/kg/dose

In-Out Intubation for Surfactant Therapy

Intravenous Bolus

1 to 2 microgram/kg/dose



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Preparation and Administration

Intravenous

Fentanyl 10 microgram/mL *prefilled syringe**

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

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

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

Shake well to ensure thorough mixing.

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

Rapid administration of fentanyl is associated with hypotension, bradycardia, apnoea, respiratory depression and muscle rigidity.

Discard remaining solution.

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

Formulae

To calculate infusion rate (mL/hr):

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

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

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



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Fentanyl Concentration Selection Table

Fentanyl 4 microgram/mL

To make 25 mL syringe:

Dilute 2 mL fentanyl (100 microgram/2 mL) with 23 mL of compatible fluid (total of 25 mL). This makes a 4 microgram/mL solution.

To make 50 mL syringe:

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

Recommended for neonates weighing less than 1 kg

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 microgram/kg/hour									Weight (kg)
0.5	1.6	2.4	3.2	4	4.8	5.6				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

Fentanyl 8 microgram/mL

To make 25 mL syringe:

Dilute 4 mL fentanyl (100 microgram/2 mL) with 21 mL of compatible fluid (total of 25 mL). This makes a 8 microgram/mL solution.

To make 50mL syringe:

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

Recommended for neonates weighing 1 kg to 3 kg

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 microgram/kg/hour									Weight (kg)
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



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Fentanyl 16 microgram/mL

To make 25 mL syringe:

Dilute 8 mL fentanyl (100 microgram/2 mL) with 17 mL of compatible fluid (total of 25 mL). This makes a 16 microgram/mL solution.

To make 50 mL syringe:

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

Recommended for neonates greater than 3 kg

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 microgram/kg/hour									Weight (kg)
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

Compatible Fluids

Glucose 5%, sodium chloride 0.9%

Glucose 10% (stability data not available, however accepted in clinical practice)

Adverse Effects

Common

Laryngospasm, respiratory depression, miosis, urinary retention, constipation, rash, erythema and bradycardia.

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

Infrequent

Chest wall rigidity, 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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Monitoring

- > Continuous cardiorespiratory monitoring and SpO₂
- > 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
- > Urine output (continuous infusion) to monitor for urinary retention

Practice Points

- > Physiological dependence and tolerance may occur with prolonged use (i.e. 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
- > 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.

Document Ownership & History

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18/10/2023	V5.0	Domain Custodian, Safety and Quality	Updates to dose and indications, prep and administration, compatible fluids, adverse effects, and monitoring
11/2017	V4.0	SA Health Safety and Quality Strategic Governance Committee	Addition of pre-filled syringes
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