

fentanyl

100mg/2mL injection

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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

1 to 2microgram/kg/dose every 2 to 3 hours

Analgesia and Sedation in Ventilated Patients

Intravenous Infusion

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

Intubation

Intravenous Bolus

4 micrograms/kg/dose

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Preparation and Administration

Intravenous

Dilute 0.5mL of the 50microgram/mL fentanyl solution with 4.5mL of compatible fluid (to a total volume of 5mL). The resulting solution contains 5micrograms/mL fentanyl.

| Dose | 1microgram | 2.5microgram | 5microgram | 7.5microgram | 10microgram |
|--------|------------|--------------|------------|--------------|-------------|
| Volume | 0.2mL | 0.5mL | 1mL | 1.5mL | 2mL |

Shake well to ensure thorough mixing.

Administered as a push over at least 3 minutes

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 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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Fentanyl Concentration Selection Table for 25mL syringes

Fentanyl 4micrograms/mL

Dilute 2mL fentanyl (50microgram/mL) with 23mL of compatible fluid (total of 25mL). The resulting solution contains 4microgram/mL fentanyl.

| 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

Dilute 4mL fentanyl (50microgram/mL) with 21mL of compatible fluid (total of 25mL). The resulting solution contains 8microgram/mL fentanyl.

| 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

Fentanyl 16micrograms/mL

Dilute 8mL fentanyl (50microgram/mL) with 17mL of compatible fluid (total of 25mL). The resulting solution contains 16microgram/mL fentanyl.

| 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

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Fentanyl Concentration Selection Table for **50mL** syringes

Fentanyl 4micrograms/mL

Dilute 4mL fentanyl (50microgram/mL) with 46mL of compatible fluid (total of 50mL). The resulting solution contains 4microgram/mL fentanyl.

| 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

Dilute 8mL fentanyl (50microgram/mL) with 42mL of compatible fluid (total of 50mL). The resulting solution contains 8microgram/mL fentanyl.

| 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

Fentanyl 16micrograms/mL

Dilute 16mL fentanyl (50microgram/mL) with 34mL of compatible fluid (total of 50mL). The resulting solution contains 16microgram/mL fentanyl.

| 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

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Compatible Fluids

Glucose 5%, glucose 10%, 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

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 (eg midazolam) the dose of each must be reduced
- > Naloxone should be available for reversal of opioid adverse effects.

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