

## Fentanyl for neonates

### BRIEF ADMINISTRATION GUIDE

For detailed information refer to [The Australasian Neonatal Medicines Formulary fentanyl guideline](#)



**Note:** Shaded text indicates where Te Whatu Ora Waikato practice differs from ANMF

### 1. Medicine

#### 1.1. Indications

- Intubation
- Analgesia (first line except in neonatal encephalopathy –then use morphine)
- Sedation

#### 1.2. Route and Presentation

Intravenous, **intramuscular, intranasal**

- Supplied as fentanyl 100 microgram/2 mL or 500 microgram/10 mL ampoule
  - pH of fentanyl is 3.8 to 7.5

#### 1.3. Dose

##### IV Injection

- **2** – 4 microgram/kg/dose
- May be repeated every 2 to 4 hours, titrate dose to effectiveness (maximum frequency every 4 hours if receiving muscle relaxants)

##### Continuous IV Infusion

- 1 – 5 microgram/kg/hour
- Doses up to 10 microgram/kg/hour have been used in clinical practice for sedation in Persistent Pulmonary Hypertension. Use should be restricted to a short duration to obtain effect before rapidly reducing the rate to avoid toxicity

##### Intramuscular

- 4 microgram/kg/dose
- May be repeated every 2 to 4 hours, titrate dose to effectiveness
- Use should be restricted for intubation with no IV access

##### Intranasal

- 1.5 microgram/kg/dose
- A second dose of 0.5 micrograms/kg/dose can be given after 10 mins if there is an inadequate effect.
- Use should be restricted to patients without IV access

### 2. Preparation and Administration

#### 2.1. Compatible fluids

glucose 5%, glucose 10% (not tested), sodium chloride 0.9%

#### 2.2. Administration Method

##### IV Injection

- Administer undiluted or dilute 2 mL fentanyl (50 microgram/mL) with 8 mL of compatible fluid to make 10 mL of a **10 microgram/mL solution**
- Draw up the prescribed dose and filter prior to administration through a PALL 0.2 micron filter
- Administer by slow IV injection over 5 to 15 minutes using a syringe driver with Guardrails settings (fentanyl bolus)
- Discard any remaining solution

##### Continuous IV Infusion

- Select the **concentration** of fentanyl required based on the weight of the infant and in the context of any fluid restrictions (refer to appendix for assistance) and dilute the appropriate volume of fentanyl injection using compatible fluid in accordance with the following table:

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Final Fentanyl Concentration	4 microgram/mL	10 microgram/mL	50 microgram/mL
Volume of fentanyl (100 microgram/ 2 mL)	4 mL	-	-
Volume of fentanyl (500 microgram/ 10 mL)	-	10 mL	20 mL
Volume of compatible fluid	46 mL	40 mL	0 mL
<b>Total volume</b>	50 mL	50 mL	20 mL

- Administer at the prescribed rate by continuous IV infusion using a syringe driver with Guardrails settings (fentanyl)

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

### Intramuscular Administration

- Undiluted 100mcg/2ml solution injected into anterolateral thigh. No more than 0.5mL per injection site.

### Intranasal Administration

- Take fentanyl 100mcg/2ml solution and dilute with sodium chloride 0.9% as follows:
  - <2kg: take 1 mL of fentanyl and make up to 5 mL (concentration 10 microgram/mL)
  - >2kg: take 1.5 mL of fentanyl and make up to 3 mL (concentration 25 microgram/mL)
- Draw up prescribed dose +0.1mL (to prime dead space) in a 1mL syringe and administer into nostril with a mucosal atomiser device

### 2.3. Monitoring

- Monitor blood pressure, heart rate, respiratory rate and oxygen saturations closely
- Monitor urinary and bladder functions
- Observe for abdominal distension or loss of bowel sounds
- Rapid administration may cause chest wall rigidity and respiratory distress. Ensure suxamethonium is readily accessible
- Assess for signs of hypersensitivity or severe adverse reactions

### 2.4. Storage and Stability

- Prepare a fresh solution at least every 24 hours

### 2.5. Competency for Administration

This procedure is carried out by, or under, the direct supervision of a registered nurse/registered midwife who holds current Te Whatu Ora Waikato Generic Medicine Management and IV certification as well as Neonatal specific competency NCV/NAC and NIC2.

### 2.6. Guardrails

Fentanyl is Guardrail profiled on the CC pump for NICU as **two entries; ensure you select the correct dataset**. Following are the guardrail limits:

Guardrails Drug Name	Fentanyl	Fentanyl BOLUS*
<b>Concentration (microgram/mL)</b>		
Minimum	4	4
Maximum	50	50
<b>Dose rate (microgram/kg/hr)</b>		
Default	2	8
Soft minimum	0.5	0.9
Soft maximum	6	16
Hard max	10	50

## 3. Associated Te Whatu Ora Waikato Documents

- [Naloxone for neonates drug guideline \(Ref. 2941\)](#)

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### 4. References

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### Document Ownership

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## Fentanyl for neonates

### Appendix A – Infusion tables to assist concentration selection

**Table 1:** Infusion rates when using fentanyl concentration **4 microgram/mL** (most useful for neonates < 1 kg)

Rate (mL/hr)	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
Weight (kg)	Approximate micrograms/kg/hour									
0.5	0.8	1.6	2.4	3.2	4	4.8	5.6	6.4	7.2	8
1	0.4	0.8	1.2	1.6	2	2.4	2.8	3.2	3.6	4
1.5	0.3	0.5	0.8	1.1	1.3	1.6	1.9	2.1	2.4	2.7
2	0.2	0.4	0.6	0.8	1	1.2	1.4	1.6	1.8	2
2.5	0.2	0.3	0.5	0.6	0.8	1	1.1	1.3	1.4	1.6
3	0.1	0.3	0.4	0.5	0.7	0.8	0.9	1.1	1.2	1.3

**Table 2:** Infusion rates when using fentanyl concentration **10 microgram/mL** (likely useful for neonates 1 – 4 kg)

Rate (mL/hr)	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
Weight (kg)	Approximate micrograms/kg/hour									
1	1	2	3	4	5	6	7	8	9	10
1.5	0.7	1.3	2	2.7	3.3	4	4.7	5.3	6	6.7
2	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5
2.5	0.4	0.8	1.2	1.6	2	2.4	2.8	3.2	3.6	4
3	0.3	0.7	1	1.3	1.7	2	2.3	2.7	3	3.3
3.5	0.3	0.6	0.9	1.1	1.4	1.7	2	2.3	2.6	2.9
4	0.3	0.5	0.8	1	1.3	1.5	1.8	2	2.3	2.5
4.5	0.2	0.4	0.7	0.9	1.1	1.3	1.6	1.8	2	2.2
5	0.2	0.4	0.6	0.8	1	1.2	1.4	1.6	1.8	2

**Table 3:** Infusion rates when using fentanyl concentration **50 microgram/mL** (most useful for neonates > 4 kg)

Rate (mL/hr)	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
Weight (kg)	Approximate micrograms/kg/hour									
3	1.7	3.3	5	6.7	8.3	10	11.7	13.3	15	16.7
3.5	1.4	2.9	4.3	5.7	7.1	8.6	10	11.4	12.9	14.3
4	1.3	2.5	3.8	5	6.3	7.5	8.8	10	11.3	12.5
4.5	1.1	2.2	3.3	4.4	5.6	6.7	7.8	8.9	10	11.1
5	1	2	3	4	5	6	7	8	9	10