

# fentanyl

## 100microgram/2mL injection

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**This is a High Risk Medication** ⚠

Rapidly fatal in overdose.

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### 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

### 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.

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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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### 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
1.5	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
2.5	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
3.5	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

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
2.5		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	
3.5			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	

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.

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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							
1.5	2.1	3.2	4.3					
5.3								
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
3.5	0.9	1.4	1.8	2.3	2.7	3.2	3.7	4.1
	3.5							4.6
4 0.8	1.2	1.6	2	2.4	2.8	3.2	3.6	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

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

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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								
1.6	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	1.2	1.6	2	2.4	2.8	3.2	3.6	4	
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	
3.5			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	

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								
2.1	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	1.6	2.1	2.7	3.2	3.7	4.3	4.8	5.3	
3.5	0.9	1.4	1.8	2.3	2.7	3.2	3.7	4.1	4.6
	3.5								
4.0	1.2	1.6	2	2.4	2.8	3.2	3.6	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	

Discard remaining solution

### Compatible Fluids

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

### Adverse Effects

#### Common

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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 bradycardia or hypotension

## Version control and change history

### PDS reference: QOE use only

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