



## Consult with Ontario Poison Control Centre

### Purpose:

The naloxone injection guideline is developed provide information to nurses<sup>1</sup> to mix the medication and administer it safely and accurately to clients who may require naloxone bolus dose, and naloxone intravenous (IV) infusion if required. This would support the quality and safety in delivery of health services provided to our clients.

### Background:

- Naloxone is an antidote to treat respiratory depression caused by opioid
- Naloxone may be administered initially as a bolus dose via intranasal (usually provided by the client's family member or friend), intramuscular (IM), subcutaneous, or intravenous (IV) route
- Naloxone half-life is shorter than many opioids; therefore a naloxone intravenous (IV) infusion may be required, following bolus dose(s) of naloxone
- Naloxone IV infusion is indicated when:
  - previous bolus doses of naloxone have been given and symptoms of overdose have recurred;
  - suspected or known opioid taken has a long half-life (methadone, fentanyl patch);
  - large quantity of opioid has been taken.

### Recommendations for Nurses:

Nurses in Ontario must consult with Ontario Poison Control Centre if opioid overdose is suspected or known.

1

<sup>1</sup> Nurses include Registered Nurses in the General Class; Registered Nurses in the Extended Class; Registered Practical Nurses.

<sup>2</sup> An independent double-check is a process which a second healthcare professional conducts a verification without any prior knowledge of the preparatory steps or calculations performed by the first healthcare professional.



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**DRUG NAME:** Naloxone [Narcan®]

### Preparation for Naloxone Intravenous Administration:

**Bolus Dose:** 0.1 mg to 0.4 mg direct IV, IM, or subcutaneous, and repeat q2 to 5 minutes PRN

Direct IV: Dilute 0.4mg (1mL vial) with 9mL of normal saline for a total of 10mL to achieve 0.04mg/mL. Give as slow IV push over at least one minute. Repeat as necessary, until response is obtained from the client

IM/Subcutaneous (undiluted) may be given, if IV route is not possible; however, IM/Subcutaneous route has a slower onset of action, and may have erratic absorption compared to IV

### IV Infusion (Use large vein, as it may be irritating):

Paediatrics: Dilute 2mg of naloxone (5mL of 0.4mg/mL concentration) and mix in 500mL of NS or D5W to achieve a concentration of 0.004 mg/mL or 4 mcg/mL. Dose may range from 2.5 to 160 mcg/kg/hour, and it is titrated according to the client's response. Obtain dosage recommendation from Ontario Poison Control Centre.

Adults: Remove and discard 25mL from 100mL NS or D5W. Add 10mg of naloxone (25mL of 0.4mg/mL concentration) to this 75mL of NS or D5W to achieve a final concentration of 0.1 mg/mL or 100 mcg/mL

**Obtain IV infusion dosage recommendation from Ontario Poison Control Centre, particularly for clients with history of opioid dependence, or chronic opioid use. Naloxone may induce opioid withdrawal in these clients.**

Naloxone IV infusion rate is typically initiated at 0.2 mg/hour (200 mcg/hour) to 0.4 mg/hour (400 mcg/hour), or 60% of the bolus needed to obtain a response and the rate may be adjusted according to clinical response.





Prior to the administration of naloxone by intravenous infusion rate, it is recommended that the nurse seeks an independent double check<sup>2</sup> with another nurse or physician to ensure the medication, the dose and the rate are correct prior to administering the medication. If another health professional is not available, a self-check can be conducted by reviewing and double-checking one's own medication calculation and preparations. The calculations and signatures for all team members involved must be well documented.

**An example of an adult naloxone infusion rate, using 60% of the total bolus dose:**

If a total bolus dose of naloxone for obtaining a response from the client is 1200 mcg (1.2 mg) (see left column), then the initial rate per hour would be 720 mcg per hour (60% of total bolus dose of 1200 mcg; see middle column), and the infusion rate would be 7.2 mL per hour ( see right column).

Initial Bolus Dose Giving Response	Initial Hour Rate Infusion (60% of total bolus dose)	Volume per Hour (100mcg/mL concentration)
400 mcg (0.4 mg)	240 mcg/hour	2.4 mL /hour
600 mcg (0.6 mg)	360 mcg/hour	3.6 mL/hour
800 mcg (0.8 mg)	480 mcg/hour	4.8 mL/hour
1000 mcg (1 mg)	600 mcg/hour	6.0 mL/hour
<b>1200 mcg (1.2 mg)</b>	<b>720 mcg/hour</b>	<b>7.2 mL/hour</b>
1400 mcg (1.4 mg)	840 mcg/hour	8.4 mL/hour
1600 mcg (1.6 mg)	960 mcg/hour	9.6 mL/hour
1800 mcg (1.8 mg)	1080 mcg/hour	10.8 mL/hour
2000 mcg (2 mg)	1200 mcg/hour	12 mL/hour

**Side effects:**

- Nausea, vomiting, sweating, tachycardia, tremor and hyperventilation
- Hypotension, hypertension, pulmonary oedema, atrial and ventricular arrhythmias and cardiac arrest have been reported, particularly in those with pre-existing cardiac abnormalities
- Irritation to vein

**Monitoring Parameters:**

- Respiratory rate, level of consciousness, oxygen saturation, heart rate, and blood pressure
- Opioid withdrawal signs and symptoms (for clients with opioid dependence or on opioid for chronic pain)

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## References

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