

# Syringe Driver Management in Palliative Care

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## Syringe Driver Usage

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### Subcutaneous Syringe Driver Management in Palliative Care

The subcutaneous administration of medications using a syringe driver is a common and accepted practice in palliative care for assisting with the management of pain and other distressing symptoms when other routes are inappropriate or ineffective (Dickman et al. 2005).

A syringe driver is a portable battery operated device that administers medications subcutaneously over a specified period of time.



The recommended device for use in New Zealand is the NIKI T34 and T34L which is manufactured and distributed by REM Systems.

# Syringe Driver Usage

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## Indications for Subcutaneous Syringe Driver

The patient is unable to take oral medication due to:

- persistent nausea and vomiting
- dysphagia
- gastrointestinal obstruction
- poor absorption of oral medications
- weakness and/or alteration in a patient's level of consciousness

## General Management Principles

- The standard delivery period for a continuous subcutaneous infusion in palliative care is 24 hours.
- 10, 20 or 30 mL Luer-Lock® syringes should be used for 24-hour infusions, even though the NIKI T34 syringe driver can accommodate a 2mL and 50mL syringe.
- Luer-Lock® syringes should be used to prevent accidental disconnection of the tubing from the syringe. The NIKI T34 syringe driver automatically detects the syringe brand, size and volume and sets the rate to deliver the infusion over the required time period.
- Irritant medications such as methadone, cyclizine, ketamine and high doses of dexamethasone will often need to go into a 30 mL syringe in order to ensure adequate dilution.

## Syringe volumes

- There is no definitive evidence to indicate how much diluent should be used. However, it is best practice to make the solution as dilute as possible to reduce the likelihood of drug incompatibility and minimise site irritation (Dickman et al 2005; Mitten 2001).
- High-volume medications such as metoclopramide, oxycodone and fentanyl will often need to go into a 30 mL syringe. To reduce the need for more than one syringe change in a 24-hour period it may not be possible to add much, if any, diluent.

## Calculating the Dose of Morphine

Morphine is the most commonly used opioid in syringe drivers in New Zealand.

### Patients who are not currently on any opioids

A suitable starting dose of morphine for a patient who has not previously been on any opioids would usually be 10 mg subcutaneously over 24 hours (Dickman et al 2005; MacLeod et al 2009; Twycross & Wilcock 2008).

### Patients already on oral morphine

When transferring from oral morphine the 2:1 rule is a useful guide.

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First, work out how many milligrams of oral morphine the patient has had in the last 24 hours (include regular and prn doses).

Then divide that dose by 2 to get the subcutaneous 24-hour dose (Dickman et al 2005; MacLeod et al 2009; Twycross & Wilcock 2008).

**EXAMPLE:**

Suppose a patient is taking mEslon™ 10 mg twice a day.

- The total daily dose of oral morphine is 20 mg.
- Divide the total daily dose by 2.
- This gives a subcutaneous morphine dose of 10mg over 24 hours

### Patients on other opioids

For those patients who are on opioids other than morphine, such as methadone, oxycodone or fentanyl, contact your Specialist Service for further advice.

### Managing breakthrough symptoms

The most commonly reported symptoms at the end of life are pain, excessive secretions, restlessness, dyspnoea, and nausea and vomiting (Ellershaw & Wilkinson 2011). The prescription of prn medications to manage these symptoms is recommended. Anticipatory prescribing will ensure there is no delay in responding to a symptom if it occurs.

### Pain

All patients should be prescribed analgesia for breakthrough pain, to have on a prn basis.

If the patient is receiving morphine, the breakthrough dose should be approximately one-sixth of the current 24-hour morphine dose.

Anything less may be ineffective (Dickman et al 2005; MacLeod et al 2009; Twycross & Wilcock 2008).

**EXAMPLE:**

Suppose a patient is receiving 30 mg of subcutaneous morphine over 24 hours

- The prn dose for breakthrough pain would be 5 mg subcutaneously. (1/6 of 30 mg)
- Remembering the 2:1 rule, if the breakthrough dose is to be given orally, the equivalent dose is 10 mg orally
- If the 24-hour dose increases or decreases, the breakthrough dose also alters accordingly (i.e, it should always be one-sixth of the current 24-hour dose).

# Syringe Driver Usage

## Guide to Prescribing and Charting

All medications given via a syringe driver should be clearly and correctly prescribed on a medication chart.

The following charts are used by Arohanui Hospice for prescribing syringe drivers and prn medications. To access these charts please go to "Clinical Support Resources" section on the Arohanui hospice website [www.arohanuihospice.org.nz](http://www.arohanuihospice.org.nz).

When a syringe driver is charted prn medications should always be charted and prescribed also.

If the patient is recognized as dying then follow the Last Days of Life guidelines for prescribing for the most common symptoms (pg. 105).



## SUBCUTANEOUS INFUSION PUMP CHART

Bradma			
Patient Name: Mrs Florence Pie		Allergies	
NHI: ABC1234 DOB: 14/1/1921			
Date	Prescription/Drug	Dose	Infusion Duration
1/1/2015	Morphine sulphate	10mg	
	Levomethamphetamine	5mg	
	Midazolam	10mg	
Diluent: H <sub>2</sub> O for injection		Pump No	
Name: Dr J Brown		Reg No:	
Signature: J Brown			
<b>Practice Points</b> 1. Refer to Resource Manual for syringe types and filling volumes 2. If battery charge less than 30% in community - consider change of battery			

Date							
Time							
Syringe brand/size							
VTBI							
Duration							
Rate mls/hr							
Battery status							
Site							
Signature							
Date							
Time							
Syringe brand/size							
VTBI							
Duration							
Rate mls/hr							
Battery status							
Site							
Signature							
Date							
Time							
Syringe brand/size							
VTBI							
Duration							
Rate mls/hr							
Battery status							
Site							
Signature							

# Syringe Driver Usage



## COMMUNITY DRUG TREATMENT CHART

Bradma

### PATIENT ALLERGY / DRUG REACTION

Patient Name: \_\_\_\_\_

Address: \_\_\_\_\_

DOB: \_\_\_\_\_

NHI: \_\_\_\_\_

### Regular Medications

Drug	Dose	Date	Time	Dose	Init	Date	Time	Dose	Init	Date	Time	Dose	Init
Directions/Indications/Min. Dose Interval	Route												
	Date												
Prescribers Name	Signature	Stop Date & Init											

### As Required (PRN) Drugs

Drug <i>Morphine sulphate</i>	Dose <i>2.5-5mg</i>												
Directions/Indications/Min. Dose Interval	Route <i>s/c</i>												
<i>3-4 hourly for pain / dyspnoea</i>	Date: <i>1/1/15</i>												
Prescribers Name	Signature	Stop Date & Init											
Drug <i>Midazolam</i>	Dose <i>2.5-10mg</i>												
Directions/Indications/Min. Dose Interval	Route <i>s/c</i>												
<i>4 hourly for restlessness/agitation/distress</i>	Date: <i>1/1/15</i>												
Prescribers Name	Signature	Stop Date & Init											
Drug <i>Hyoscine N-Butylbromide</i>	Dose <i>20mg</i>												
Directions/Indications/Min. Dose Interval	Route <i>s/c</i>												
<i>4 hourly prn for chest secretions</i>	Date: <i>1/1/15</i>												
Prescribers Name	Signature	Stop Date & Init											
Drug <i>Levomopromazine</i>	Dose: <i>2.5-5mg</i>												
Directions/Indications/Min. Dose Interval	Route <i>s/c</i>												
<i>8 hourly for nausea / vomiting</i>	Date: <i>1/1/15</i>												
Prescribers Name	Signature	Stop Date & Init											

### Once only / Verbal or Standing Orders / Nurse initiated medications

Date	Generic Medication Name	Dose	Route	Time to	Prescriber's Signature	Time	Nurses

## Syringe Driver Usage

Subcutaneous Infusion Drug Compatibility Chart

	Morphine	Oxycodone	Methadone	Fentanyl	Clonazepam	Cyclizine	Dexamethasone	Glycopyrrolate	Haloperidol	Hyo, Butylbromide	Hyo.	Ketamine	Metoclopramide	Midazolam	Nozinan	Octreotide	Phenobarbitone	Ranitidine
Morphine	♦		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	x	✓
Oxycodone		♦			✓	#	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
Methadone	✓		♦		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓		x	
Fentanyl	✓			♦		✓	✓		✓	✓	✓	✓	✓	✓	✓		x	
Clonazepam	✓	✓	✓		♦	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		x	✓
Cyclizine	✓	#		✓	✓	♦	#	✓	✓	#	✓	✓	✓	#	#	✓	x	#
Dexamethasone	✓	✓	✓	✓	✓	#	♦	x	#	✓	✓	✓	#	#	#	#	x	✓
Glycopyrrolate	✓	✓	✓	✓	✓	✓	x	♦	✓		✓		✓	✓	✓	✓	x	
Haloperidol	✓	✓	✓	✓	✓	✓	#	✓	♦	✓	✓	✓	✓	✓	✓	#	x	✓
Hyo. Butylbromide	✓	✓	✓	✓	✓	#	✓		✓	♦			✓	✓	✓	✓	x	✓
Hyo. Hydrobromide	✓	✓	✓	✓	✓	✓	✓	✓	✓		♦		✓	✓	✓	✓	x	
Ketamine	✓		✓	✓	✓	✓	✓		✓			♦	✓	✓	✓		x	
Metoclopramide	✓	✓	✓	✓	✓	✓	#	✓	✓	✓	✓	✓	♦	✓	✓	✓	x	✓
Midazolam	✓	✓	✓	✓	✓	#	#	✓	✓	✓	✓	✓	✓	♦	✓	✓	x	x
Nozinan	✓	✓	✓	✓	✓	#	#	✓	✓	✓	✓	✓	✓	✓	♦	✓	x	#
Octreotide	✓	✓				✓	#	✓	#	✓	✓		✓	✓	✓	♦	x	
Phenobarbitone	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	♦	x
Ranitidine	✓				✓	#	✓		✓	✓			✓	x	#		x	♦

Not Compatible: X

Compatible: ✓

Variable according to concentration:

Drug Compatibility:

This table must be used as a guide only.

It has been compiled from evidence in Dickman's The Syringe Driver, 2<sup>nd</sup> Ed (2005), The Palliative Care Handbook 6<sup>th</sup> Ed (2012) and Palliative Care Formulary 4<sup>th</sup> ed (2012) and also from physical evidence in clinical practice at Arohanui Hospice. **Research regarding use of diluent continues to be reviewed. Please consult with PCF4 (2012), Twycross & Wilcock or [www.palliativedrugs.com](http://www.palliativedrugs.com)**

In clinical practice, every prescription should be checked to see if drug combination is compatible. It is always important to **continually** monitor contents of syringes and tubing to detect any incompatibility when there has been combination of medicines. (Twycross, Wilcock, Thorp., 1999).

**Tilcotil:** recommended as given as single daily injection.

## Syringe Driver Usage

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### Special Notes regarding mixing of Drugs for Subcutaneous Infusion

- Methadone is best diluted in a 30ml syringe to reduce chance of site irritation.
- Use sterile water to make up volume in the syringe, unless otherwise stated.
- Do not mix morphine sulphate with morphine tartrate.
- Ketamine must be mixed with normal saline.
- Cyclizine causes many drugs to precipitate and should always be diluted with sterile water and added last.
- If incompatibility/precipitation occurs, and the prescribed drugs are essential:
  - a) Try mixing the combination in a larger syringe.
  - b) Use two separate infusion pumps.

### Access to Syringe Drivers

To access syringe drivers contact the Palliative Care Co-ordinator of your area and they can arrange and co-ordinate the management of the subcutaneous syringe driver together with the District Nurses or nurses working in Residential care.

Advice on any aspect of syringe driver use is available 24 hours a day from Arohanui Hospice ph 3566606.