

T34 Syringe Driver - Use of

Skill Level	Resource Advisor
Registered Nurse (who has achieved NM subcutaneous certification)	

What is a Syringe Driver?

A syringe driver is a portable battery powered device that administers medication subcutaneously over a chosen period of time. A syringe containing medication is attached to the driver, which pushes the plunger forward at a controlled rate.

At Nurse Maude the T34 syringe driver is used. All T34 syringe drivers owned by Nurse Maude are locked on to 24 hour duration. A code is required to enter the "Change Set Up" menu to alter the duration. To access the code contact the Hospice Nursing Staff on Ph: 375 4274

Main Indications For Use

Oral administration of medication is inappropriate due to:

- ▶ Persistent nausea and vomiting
- ▶ Dysphagia
- ▶ Gastro-Intestinal obstruction
- ▶ Poor absorption of oral medication
- ▶ Weakness/ alteration in level of consciousness

Prescribing Information

- ▶ All medications given via a syringe driver should be clearly and correctly prescribed on a prescription chart.
- ▶ In the community an Authority for Administration of Prescribed Medication via Continuous Subcutaneous Infusion should be used.
- ▶ All patients should be prescribed breakthrough analgesia to have on a prn basis. In the community these medications should be prescribed on an Authority for Administration of Prescribed Medication.

Calculating the Dose of Morphine

Morphine remains the most commonly used opioid in syringe drivers in New Zealand. For patients who are on alternative opioids, refer to the Hospice Palliative Care Service.

1. Work out how many milligrams of oral or rectal morphine the patient has had in the last 24 hours (include regular and prn doses).
2. Divide that dose by 2 to get the subcutaneous 24 hour dose. For example, suppose a patient is taking mEslon™ 30mg twice a day.
 - ▶ The total daily dose of oral morphine is 60mg.
 - ▶ Divide the total daily dose by 2
 - ▶ This gives a subcutaneous dose of 30mg over 24 hours.

Practice Point

The patient may require a dose of immediate release medication prior to commencement of the syringe driver, as medication from a syringe driver may take up to four hours to reach the desired blood level.

Commonly Used Drugs

Drug	Usual Dose Range	Indication
Clonazepam	1-6 mg/24 hours	Agitation, confusion, seizures
Cyclizine	75-150 mg/24 hours Can crystallize, dilute well	Nausea/vomiting
Dexamethasone	4-16 mg/24 hours	Cerebral oedema
Haloperidol	1-3 mg/24 hours	Nausea/vomiting Anxiety
Hyoscine butylbromide (Buscopan)	40-100 mg/24 hours	Gastrointestinal colic and excessive secretion
Levomepromazine /Methotrimeprazine (Nozinan)	6.25 – 25mg/24 hours	Nausea/vomiting Anxiety/restlessness
Metoclopramide (Maxalon)	30-60 mg/24 hours	Nausea/vomiting
Midazolam	5-150 mg/24 hours	Agitation, confusion
Morphine	½ oral daily dose	Pain
Oxycodone		Pain

Managing Breakthrough Pain

- ▶ If the patient is receiving morphine, the breakthrough dose should be approximately one-sixth of the current 24 hour dose.
- ▶ Anything less will be ineffective.
- ▶ For example, for a patient receiving 30 mg of subcutaneous morphine over 24 hours
 - ▶ The prn dose for breakthrough pain would be 5 mg sub cut.
 - ▶ 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.

Equipment Required

- ▶ Prescribed medication
- ▶ Saf-T-Intima cannula (has a soft flexible Vialon™ cannula and can be left in situ for up to 7 days)
- ▶ CODAN extension set (BC576) 152cm x 0.35ml
- ▶ Luer-lok syringe (20 or 30 ml) & needle
- ▶ T34 syringe driver
- ▶ 9v battery (a spare battery should also be available)
- ▶ Lock-Box & key if needed
- ▶ Calculator
- ▶ Drug additive label
- ▶ Alcohol wipe
- ▶ Small tegaderm
- ▶ Syringe driver check list and Community subcutaneous medications record sheet (community) or Syringe Driver Observation chart (Hospice/Hospital)

Practice Points

- ▶ T34 syringe drivers are calibrated in mls per hour
- ▶ The standard delivery period for a continuous subcutaneous infusion in palliative care is 24 hours
- ▶ Always use a Luer-Lok syringe to prevent risk of disconnection
- ▶ Think about the medications you are using – are they irritant? Do they need to be well diluted? Are they already high volume?
- ▶ It is best practice to make the solution as dilute as possible to reduce the likelihood of drug incompatibility and minimise site irritation
- ▶ If the medication needs to be increased or altered a new prescription will be required and the syringe driver will need to be stopped and fitted with a new syringe.

Setting Up

1. Collect the necessary equipment
2. Check the prescription chart
3. Draw up medications accurately as prescribed
4. Dilute with water for injection to: **18mls in a 20ml BD syringe**
23mls in a 30ml BD syringe
NB these are the maximum volumes that will fit in the syringe driver
5. Attach medication label to syringe
6. Attach syringe to infusion set and cannula and manually prime the line. Apply the clamp to infusion line
7. Insert a 9V battery into the battery compartment aligning the + / - contacts and slide the cover back on
8. Ensure the syringe driver is turned off and the barrel clamp is down
9. Press and hold the ON/OFF key. Wait until the actuator stops moving and the LOAD SYRINGE screen appears
10. If the actuator is not in the correct position to hold the syringe use the FF or BACK keys to reposition it
11. Lift and turn the barrel clamp and load the syringe into the pump ensuring the flange sits in the central slot and the plunger clicks into the actuator
12. Lower the barrel clamp
13. The screen will display the size and brand of syringe detected. If it is correct press YES to confirm. If not scroll with up and down arrows until the correct selection appears then press YES to confirm.
14. The next screen shows an infusion summary
15. Check that all the information on the screen is correct (use a calculator to check the rate) then press YES to confirm
16. The screen will display START INFUSION

17. Select a site (see below) and insert the cannula. Release the clamp on the infusion line
18. Press YES/START to commence the infusion
19. While infusing the display shows: pump delivering, time remaining, rate and syringe size and brand
20. Support the syringe driver in a carry bag or a lock-box if needed
21. Complete documentation

Keypad Lock

When infusing all of the keys on the keypad are inactive except the INFO, STOP and ON/OFF keys. There is an additional keypad lock which also inactivates the ON/OFF key thereby preventing the syringe driver from being inadvertently turned off. To activate the keypad lock:

1. With the syringe driver infusing press and hold the INFO key, a bar will move across the screen from left to right and a beep will sound to confirm the lock has been activated
2. To turn the lock off repeat this procedure. The bar will move from right to left and a beep will be heard to confirm lock has been inactivated

The keypad lock does not affect the operation of the STOP and INFO keys

The keypad lock is not routinely used at Nurse Maude

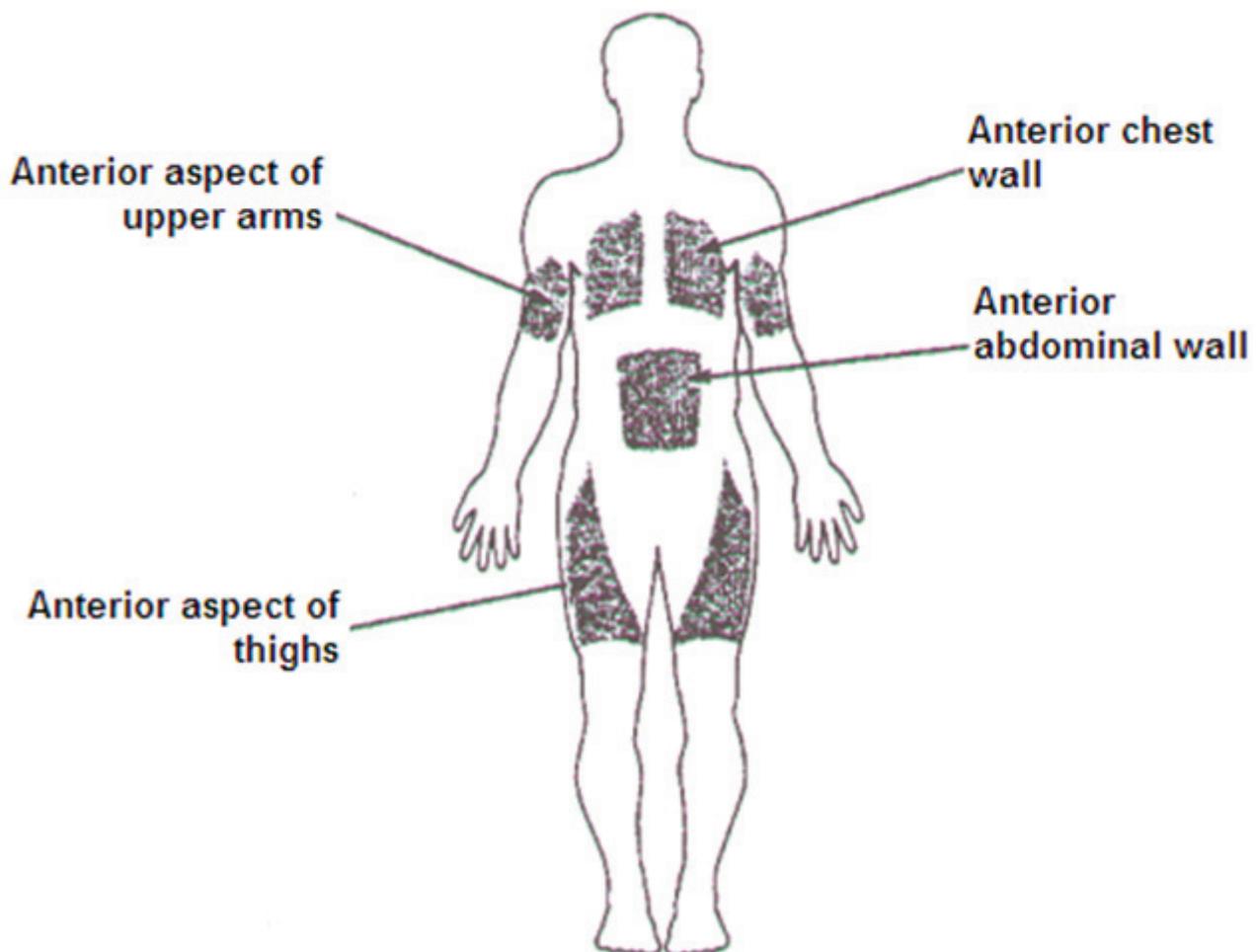
Lockbox

A lockbox is available to prevent access to the syringe while still allowing access to the battery and keypad. The lockbox is not routinely used at Nurse Maude but should be used at the discretion of the clinicians involved. If a lockbox is used in the community all the nurses involved in refilling syringes need access to a key.

Selecting a Site

General principles for appropriate site selection include: Use an area with good depth of subcutaneous tissue.

- ▶ Use a site that is not near a joint.
- ▶ Select a site that is easily accessible such as the chest or abdomen.
- ▶ Wash hands.
- ▶ Swab site with alcohol swab and leave to dry.
- ▶ To ensure subcutaneous placement of needle, lift a fold of skin between finger and thumb and insert needle at approximately 30° angle.
- ▶ Loop tubing to prevent accidental displacement. Secure with tegaderm.
- ▶ Saf-T-Intima can remain in situ for up to 7 days if no redness, swelling or hardness appears.
- ▶ Sites are only changed when there is dislodgement of needle/cannula or evidence of skin reaction.



Observations

Symptom, infusion and site check 4 hourly in an inpatient unit and daily or, at each nurse visit, in the community.

- ▶ Check insertion site for leakage, irritation, inflammation, infection and needle displacement.
- ▶ Check syringe and infusion set for precipitation or crystallization.
- ▶ Check the syringe driver screen for time remaining, rate, correct syringe size and brand. Press the blue INFO button for volume to be infused (VTBI); volume infused (VI) and press INFO button again for battery level.
- ▶ In inpatient units batteries can be used until they are depleted. An alarm will indicate the need for replacement
- ▶ In the community the battery life should be checked each time the syringe is replaced. If the battery has 30% or less life remaining it should be replaced. Ensure a spare battery is available and show patient/family how to replace the battery. Return the old battery to the hospice where it will be used in the inpatient unit.

To Stop the infusion:

1. A warning is shown on the screen 15 minutes before the end of the infusion
2. When the infusion is completed the syringe driver stops automatically and an alarm will sound
3. To stop the infusion before the syringe is empty press the red STOP button then press and hold the ON/OFF button (wait for the beep)
4. If the infusion has been stopped before the syringe is empty and the syringe remains loaded the infusion can be resumed. Press the ON/OFF button. Press YES to confirm syringe size and brand. The screen will then display "Press YES to Resume" or "NO for New Syringe". Press YES to resume then press YES to confirm volume, duration, and rate. Screen will display "Start Infusion" press YES.

Temporary interruption of infusion for showering

1. Leave the syringe driver running
2. Disconnect the infusion line from the cannula
3. Attach a luer plug to the cannula
4. After showering reconnect the line to the cannula

Syringe driver Alarms and Alerts

When the syringe driver detects a problem an alarm sounds continuously, the infusion stops, the LED indicator light turns red and the screen displays a message indicating the cause of the alarm.

In an alert condition the alarm sounds briefly and a message appears on the screen but the infusion continues.

ALARM / ALERT	POSSIBLE CAUSE	ACTION
Occlusion/Syringe Empty	Infusion line clamped Infusion line kinked Site inflamed or tissue Precipitation of medication	Release the clamp Check line not kinked Replace the cannula Renew the syringe, review medications, increase dilution
Syringe Displaced	Syringe has been displaced and one or more of the syringe sensors is not detecting the syringe	Check the syringe is in the correct position
Pump paused too long	Syringe driver has been left in STOP mode for 2 minutes	Start or restart the infusion, continue programming or turn the syringe driver off
Near End (alert)	15 minutes from end of infusion	Prepare to change syringe or turn syringe driver off
End Programme	Infusion complete	Syringe driver will alarm and turn off
Low battery (alert)	Battery is almost depleted	Change the battery
End Battery	Battery is depleted	Change the battery

TROUBLESHOOTING		
PROBLEM	POSSIBLE CAUSE	ACTION
Syringe driver will not start	Battery is very low or depleted Battery is in the wrong way Pump is faulty	Replace battery and check it is in correct position Send syringe driver for service
The infusion is fast (running more than an hour ahead of expected time)	Wrong syringe brand confirmed during set up Incorrect rate Syringe driver faulty	Correct error and start again Remove from use and send for service
The infusion is slow (running more than an hour behind expected time)	Wrong syringe brand confirmed during set up Incorrect rate Pump has been stopped and restarted Infusion line is kinked Precipitation in tubing Site inflamed Syringe driver faulty	Correct error and start again Check event log Remove from use and send for service
Syringe driver has stopped before the syringe is empty	Alarm state has occurred Battery exhausted	Check event log Replace battery

Removal of Subcutaneous Cannula / Butterfly

- ▶ Wash hands.
- ▶ Gently remove the occlusive dressing and then the needle.
- ▶ Dispose of the needle into Sharps container.
- ▶ Place band-aid over site if bleeding occurs at site.
- ▶ Wash hands.
- ▶ Document care given in patient's notes.

Documentation

- ▶ Document all procedures and outcome of insertion/medication administration in patient notes.
- ▶ Liaise closely with medical staff involved in care.

Cleaning

- ▶ The syringe driver and lock box should be cleaned with a detergent wipe and dried thoroughly

Caution

- ▶ Do not use near strong magnetic fields such as MRI scanner.
- ▶ Do not allow the syringe driver to get wet
- ▶ Avoid dropping the syringe driver
- ▶ Syringe drivers require annual maintenance.

Note: Needlestick injury, refer to Nurse Maude "Employee Blood Body Fluids, Exposure Package"

Refer to

- ▶ Clinical Guideline Safe Administration of Medication
- ▶ Medication Policy (currently under review)
- ▶ Guideline for syringe driver management in palliative care in New Zealand – <http://www.moh.govt.nz/moh.nsf/indexmh/guidelines-syringe-driver-management-palliative-care-nz>
- ▶ Niki T34 Syringe Pump Instruction Manual, 2010, CME Ltd
- ▶ Hospice New Zealand T34 Syringe Driver Competency Programme Workbook
- ▶ Palliative Care Handbook