Sandwell and West Birmingham Hospitals NHS
NHS Trust

PROCEDURE FOR THE USE OF McKINLEY T34 SYRINGE DRIVER TO DELIVER A CONTINUOUS SUBCUTANEOUS INFUSION IN PALLIATIVE CARE FOR ADULTS

Policy authors	Palliative Care Team
Accountable Executive Lead	Chief Nurse
Approving body	Patient Safety Committee, Drugs and Therapeutic Committee
Policy reference	SWBH/Pt Care/021

ESSENTIAL READING FOR THE FOLLOWING STAFF GROUPS:
1 – Clinical Staff, all Registered Nurses

STAFF GROUPS WHICH SHOULD BE AWARE OF THE POLICY FOR REFERENCE PURPOSES:
1 – Medical Staff

POLICY APPROVAL DATE:
December 2019

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DATE POLICY TO BE REVIEWED:
December 2022

DOCUMENT CONTROL AND HISTORY

Version No	Date Approved	Date of implementation	Next Review Date	Full re write in response to National Patient Safety Alert.
3	July 2008	September 2008	September 2010	No changes
4	November 2010	November 2010	November 2013	Full review undertaken
5	May 2013	May 2013	May 2016	
6	June 2015	June 2015	May 2016	Changes to appendix 6 and 8
7	Sept 2016			Page 10 Volumes to be drawn up to now stipulated Page 15 Clarification of action to be taken if infusion interrupted Appendix 1 – updated patient information.
8	December 2019	December 2019	December 2022	Patient information leaflet updated, infusion devices including use of butterfly, diluents in syringe drivers and appendices updated.

Procedure for the use of McKinley T34 syringe driver to deliver a Continuous subcutaneous infusion in palliative care for adults

KEY POINTS

1. **Initial and subsequent setting up of the syringe driver must be undertaken by Registered Nurses competent in the use of the McKinley T34 ambulatory syringe driver.**

2. **If the prescription for a patient is changed the registered nurse must prepare a new syringe and primed giving set. Never add additional medicine(s) to the syringe after an infusion has commenced. If medication dose or drug amended new infusion set should be used.**

3. **A lock box must be used at all times.**

4. **A syringe driver monitoring form must be completed whenever a syringe driver infusion is commenced.**

5. **To avoid an accidental bolus dose of drug, the infusion line must be disconnected from the syringe before the syringe is removed from the syringe driver.**

6. **If analgesics have been prescribed with an increment, this should usually be no more than 1/3rd of total dose per 24 hours, and if increments are required on more than 2 consecutive days, seek specialist advice.**

Contents page

1.0 INTRODUCTION

The McKinley T34 syringe driver can be used for patients who:

- Require control of their symptoms, with an aim to maintaining their quality of life, and can be considered to be used in end of life care.
- Require symptom control in acute illness or disease, which is not deemed as being end of life.

This procedure has been produced to promote the safe and effective subcutaneous administration of medicine(s) using the McKinley T34 syringe driver for adult patients with palliative care needs.

All staff using the McKinley T34 syringe driver must be familiar with the Controlled Drug Policy (Pt Care /06) and the Medicine management Policy (Pt Care 05).

2.0 OTHER POLICIES TO WHICH THIS POLICY RELATES

Controlled Drug Policy (Pt Care/06)
Medicines management Policy (Pt Care/05)
Medical Devices, Policy for the management (org/065)
Medical Devices, Policy for the safe use (org/066)
Incident Reporting Policy (org/050)
West Midlands Palliative Care Physicians Guidelines for the use of drugs in symptom control (2019)
Infection Control Decontamination of Equipment Policy (SWBH/COI/029)

3.0 OBJECTIVES

- To define the indications for use of continuous subcutaneous administration of medicine via a McKinley T34 syringe driver.
- To determine knowledge and skills criteria for the preparation, administration of medicine, use of McKinley T34 syringe driver and patient monitoring.
- To define patient monitoring standards and documentation templates. For use in secondary and primary care settings.
- To outline action to take if continuous subcutaneous medication is given outside the dose or rate of that prescribed or there appears to be mechanical problems with the medical device (McKinley T34).
- To ensure that all registered nurses understand their role and responsibilities with regard to the management and disposal of controlled and other medications.
- To ensure safe clinical practice.

4.0 SCOPE

This policy is intended to support the safe use of the McKinley T34 syringe driver by all registered nurses and applies to all Trust staff in all locations including temporary employees, locums and agency staff.

5.0 DEFINITIONS / ABBREVIATIONS

McKINLEY T34 SYRINGE DRIVER	a portable battery operated device that is used to deliver a continuous subcutaneous infusion of drug(s) over a predetermined time at a predetermined rate.
REGISTERED NURSE	any practitioner registered with the Nursing and Midwifery Council.
NURSE	a nurse or health care worker, trained in the checking and management of controlled drugs.
MEDICINES	Any drug(s) prescribed by a medical practitioner or non-medical prescriber for subcutaneous administration using a McKinley T34 syringe driver.
SUBCUTANEOUS	With a subcutaneous injection, a needle is inserted just under the skin. A drug can then be delivered into the subcutaneous tissues.

6.0 ROLES AND RESPONSIBILITIES

Roles and Responsibilities of the Nurse using the McKinley T34 Syringe Driver

6.1 Initial and subsequent setting up of the syringe driver:

- **Must only be undertaken by registered nurse(s) competent in using McKinley T34 syringe driver**
- All practitioners who perform this procedure should be aware of the content of this policy.
- In addition all registered nurses have an individual responsibility to ensure that they are confident and competent in the knowledge and skills of practice in line with their Code of Professional Standards (NMC 2018) and Standards for Medicines Management (2007). They should inform their immediate line manager if they feel they are not competent and discuss their education and support needs.

- **Acute Setting: Two registered nurses must be present when controlled drugs are prepared and administered.**

- **Community Setting: Follow the Standard Operating Procedure for the administration of controlled drugs in patients' homes (Appendix 8).**

6.2 The registered nurse must ensure that the McKinley T34 syringe driver has been properly maintained and calibrated by checking the next test label on the syringe driver and by checking for the "calibration due, send for service" message when turning on the syringe driver.

7.0 INDICATIONS FOR USING THE MCKINLEY T34 SYRINGE DRIVER TO DELIVER A CONTINUOUS SUBCUTANEOUS INFUSION (CSCI)

A continuous subcutaneous infusion (CSCI) using the McKinley T34 syringe driver can be considered for the administration of drug(s) that cannot be given orally or when other routes of administration are inappropriate, in the following situations:

- Persistent nausea and vomiting.
- Difficulty in swallowing (dysphagia).
- Poor alimentary absorption.
- Intestinal obstruction.
- Profound weakness/cachexia.
- Comatose or moribund patient.
- Administration of drugs that can only be administered via the parenteral route.
- Erratic concordance with the oral route, in spite of in-depth support, in the context of severe symptoms
- It should be noted that intractable pain is not in itself an indication for a continuous subcutaneous infusion. The oral route remains the preferred route to administer analgesics in the absence of one or several of the above indications.

N.B: Opioids administered via a syringe driver will not give better analgesia than those administered orally, unless there is a problem with enteral absorption.

7.1 Advantages and Disadvantages of Syringe Driver Use

Advantages in the use of the syringe driver:

- Avoids the necessity of intermittent injections.
- Provides patient with continuous unbroken administration of medication.
- Infusion timing is accurate.
- The device is convenient/unobtrusive/light to wear.
- Ambulant patients can move around freely.
- Patients/relatives can be taught to care for the syringe driver themselves if appropriate.
- Mixtures of drugs can be administered.

Disadvantages in the use of the syringe driver:

- The patient may become psychologically dependent upon the device.
- Need for trained nursing staff to administer medication on a daily basis
- Inflammation/infection can occasionally occur at the needle site. This may interfere with drug absorption.

8.0 INFORMATION FOR PATIENTS AND CARERS

In order to alleviate fears and promote understanding the patient and carer/s should be provided with both verbal and written information to include the following information:

- Explanation and rationale for the use of the syringe driver.
- Explanation and demonstration of how it works.
- What action to take if the alarm sounds or it becomes disconnected.
- Information on care of the syringe driver (to include not getting it wet).
- Who to contact if help is needed. In primary care setting 24/7 contact numbers should be included.
- Information about drugs being administered.

- Patients consent to treatment via a syringe driver.
- What to do in case of suspected overdose.
- What to do if the syringe driver appears to have stopped working.

9.0 PRESCRIBING AND ADMINISTERING DRUGS BY SUBCUTANEOUS INFUSION

9.1 The choice of drug(s) should be consistent with that outlined in The West Midlands Palliative Care Physicians Guidelines Palliative Care for the use of drugs in symptom control (2019) (accessed via intranet) and be based on a careful patient assessment.

9.2 A valid prescription (Appendix 2) or directive in the community (Appendix 3) authorising the administration of drugs via a syringe driver should be written by the Doctor or Non-Medical Prescriber and include the following information:

- The date when the infusion commenced.
- Patients name, address, date of birth, Hospital number (Acute)/NHS number (Community) and GP Practice (Community)
- Generic name and dose of each drug to be given over 24 hours
- Details of diluent e.g. water for injections
- Size of syringe to be used e.g. 20ml (Acute only)
- Any special instructions
- An appropriate dose of analgesic or other drug should be prescribed on an 'as required' (prn) basis in anticipation of 'breakthrough' symptoms
- With uncontrolled symptoms a bolus dose of the prn/breakthrough medication can be administered as a separate injection at the same time as the 24 hour infusion is commenced as a loading dose to ensure symptoms are controlled sooner than waiting for 24 hour infusion alone to reach peak plasma levels.

N.B. For opioids the breakthrough dose is usually equivalent to 1/6 of the total 24hrs dose though a smaller dose may be used if it is found to be effective. Prescriber to discontinue previous oral medication that will now be administered via the syringe driver to prevent drug errors, unless there is a clear rationale for using oral breakthrough medication.

10.0 DRUG STABILITY AND COMPATIBILITY

The selection of drugs used in the syringe driver is determined by:

- The patients' symptoms.
- the suitability of drugs to be used for the subcutaneous route, and
- The compatibility of medications to be included.

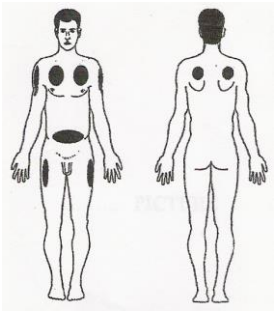
Reference should be made to current guidance on drug stability and compatibility, which can be found in the British National Formulary, the Palliative Care Formulary and the West Midlands Palliative Care Physicians Guidelines (2019).
In order to reduce risk of incompatibility, it is recommended that no more than three drugs should be mixed in the syringe driver where possible. Combinations of three drugs should be checked with the British National Formulary, the Palliative Care Formulary and the West Midlands Physicians Palliative Care Guidelines for the use of drugs in symptom control (2019). Combinations of more than three drugs should be checked with a specialist palliative care practitioner or pharmacist.
All drugs should be diluted with water for injection unless otherwise stated (Hirsch, 2002).

11.0 CHOICE OF SITE FOR USING SYRINGE DRIVER

Recommended sites include:

- Anterior chest wall (avoid if very cachexic)
- Lateral upper arms
- Anterior abdominal wall
- Anterior outer thigh
- Area over scapula
- Use patient's preferred site if possible whilst considering the following points:
- Siting in the chest or abdomen for ambulant patients.
- Siting in scapula for confused and/or agitated patients.

- **Avoid** siting in upper arms for bed-bound patients requiring regular turning.
- **Avoid** siting in areas of
- Inflammation,
- Oedema,
- Ascites,
- Broken skin,
- Bony prominences,
- Recently irradiated areas,
- Sites of tumour
- Sites of infection and skin folds.



Shaded areas indicate potential sites

12.0 CARE OF SITE

The infusion site should only be renewed when there is evidence of inflammation (erythema or reddening) or poor absorption (a hard cutaneous swelling, Faull 2005), do not inject into an already inflamed site. If sites break down rapidly always refer patient to the palliative care team. Sites can often be retained for longer with the following actions:

- Changing the diluent from water for injection to 0.9% sodium chloride if not contraindicated.
- Use an alternative cannula (e.g. Butterfly for cachexic patients). All other options must be considered and documented before using a needle device. If a needle device is used, this must be communicated to all professional involved in the patient care.
- Increase volume of diluent by changing to 30ml syringe
- Changing the site dressing (if this is the suspected irritant)

13.0 SETTING UP THE MCKINLEY T34 SYRINGE DRIVER

The McKinley T34 syringe driver has been designed to be used with 2ml to 50ml LUERLOK syringes. At Sandwell and West Birmingham NHS Trust the procedure is to use 20ml or 30ml Braun Omnifix luer lock syringes. Current recommendations are that in most cases a 20ml luer lock syringe is used. This is because a 20ml syringe affords appropriate drug dilution (thus reducing the risk of adverse drug reactions and incompatibility) whilst minimising the volume of fluid to be absorbed (Dickman et al 2005).

Drugs plus diluent should be drawn up to:

- 18ml in a 20ml
- 22mls in a 30ml

If the prescription for a patient is changed the registered nurse must prepare a new syringe and primed giving set. <u>Never</u> add additional medicine(s) to the syringe after an infusion has commenced. If medication dose or drug amended new infusion set should be used.

13.1 Equipment List

- Injection tray (Community - Sterile dressing pack)
- Syringe driver prescription (Appendix 2 or 3), Community administration record (Appendix 9), Community syringe driver observation chart (Appendix 10)
- Prescribed medicines and diluent.
- Label
- McKinley T34 syringe driver
- *Battery 9V (Duracell – 6LR61). A new battery will last for approximately 3-4 days dependant on use.
- 20ml or 30ml leur lock Braun Omnifix Syringe
- 30cm or 100cm administration device and extension set if required
- Neria Soft 90 (Appendix 14) (or Neria Guard (Appendix 15) for needle phobic patients, or Butterfly 25G winged needle for cachexic patients)
- Holster (if patient is mobile)
- Lockbox and key
- Transparent adhesive dressing (only if butterfly needle is used).

*Batteries with the marking ‘6LP3’ are not recommended. This type of battery has a higher resistance which could negatively impact the operation of the syringe driver (FSN2018-001).

13.2 Syringe Loading

T34 Feature Recognition Syringe Loading

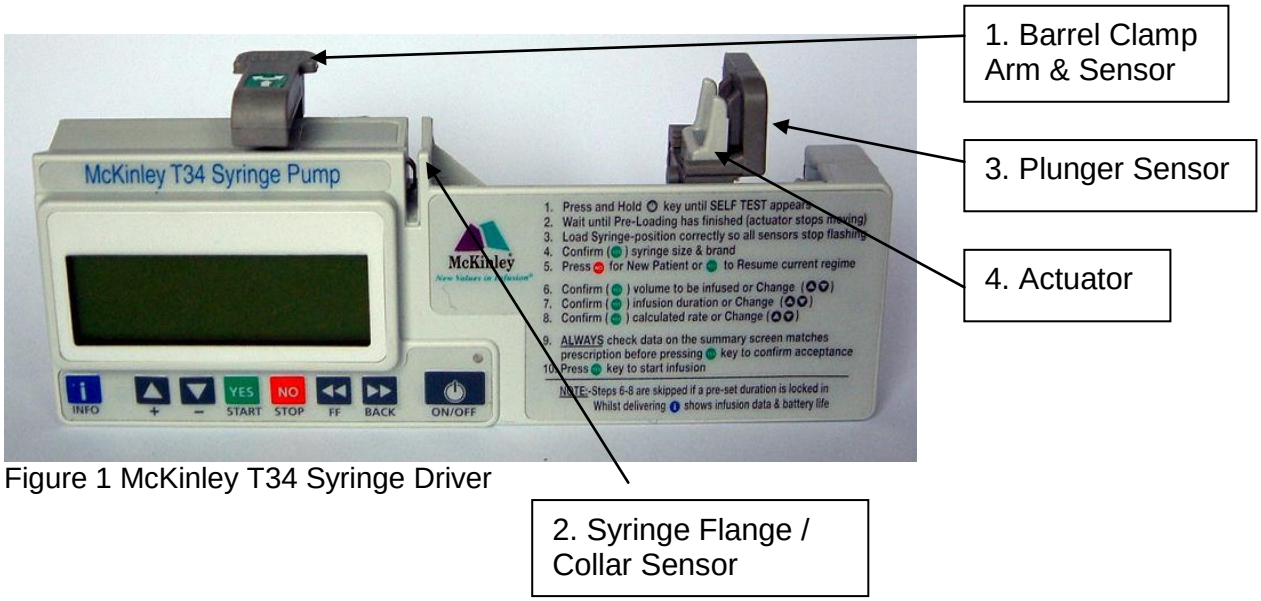


Figure 1 McKinley T34 Syringe Driver

1. Barrel Clamp Arm & Sensor – detects syringe size or width of barrel, secures syringe.

2. Syringe Flange/Collar Sensor – detects secure loading of syringe collar.

3. Plunge Sensor – detects secure loading of syringe plunger.

4. Actuator

T34 Feature Recognition Keypad

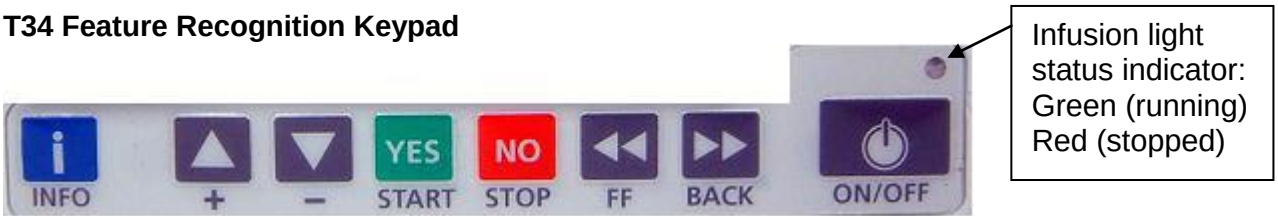


Figure 2 Keypad

I. "INFO" key – access event log/set up (code protected)/battery status

II. "Up/Down" arrow keys – increase/decrease parameters/scroll options.

III. "YES/START" key – confirms selection/starts infusion.

IV. "NO/STOP" key – step back a screen/stops infusion.

V. "FF" (forward) key – moves actuator forward/purge facility.
VI. "BACK" key – moves actuator back.

VII. "ON/OFF" KEY – power on/off.

13.2 Preparing the McKinley T34 Syringe Driver

I. Install battery (Duracell 9-volt (6LR61) battery)

Figure 3 Battery Compartment

II. Before placing the syringe onto the McKinley T34 Syringe Driver ensure the barrel clamp arm is down the press and hold the "**ON/OFF**" key until the "**SELF TEST**" screen appears. If “calibration due, send for service” message appears, return the syringe driver to the Medical Engineering department for servicing.

III. The LCD display with show "**Pre-loading**" and the actuator will start to move. Wait until it stops moving and the syringe sensor detection screen (**syringe graphic**) appears.

Figure 4 Preloading Indication Display

NOTE: During Pre-Loading the actuator always returns to the start position of the last infusion programmed.

IV. If the actuator is not in the correct position to accommodate the syringe, leave the barrel clamp arm down and use the "**FF**" or "**BACK**" buttons on the keypad to move the actuator. Forward movement of the actuator is limited for safety; therefore repeated presses of the "**FF**" key may be required when moving the actuator forward. Backwards movement is not restricted.

V. Check the battery by pressing the "**INFO**" key repeatedly until the battery level appears on the screen and press "**YES**" to confirm. Verify there is sufficient battery power for the programme. (Discard the battery if there is less than 40% power remaining. Replace with a new battery to ensure the syringe pump will deliver for 24 hours.)

Figure 5 Battery Level Indicator Display

13.3 Fitting the Syringe to the McKinley T34 Syringe Driver

Ensure the line is not connected to the patient at this point to avoid accidental bolus delivery of drug.

I. Lift the barrel clamp arm.

II. Seat the filled syringe collar/flange and plunger so the back of the collar/flange sits against the back of the central slot (ensure correct placement). The syringe collar/flange should be vertical.

III. Lower the barrel clamp arm.

IV. Ensure the syringe label does not interfere with the mechanism of the infusion device e.g. if there is contact with the barrel clamp arm and sensor. The syringe graphic on the

screen ceases to flash at each point as the syringe is correctly seated.

V. Confirm that the syringe size and brand match the screen message. Press the "**YES**" key to confirm or scroll up (**+**) or down (**-**) keys to view the other syringe types, select correct syringe and size and press the "**YES**" key to confirm (fig. 6).

Figure 6 Syringe Confirmation Display

VI. After the Syringe Confirmation Display (Figure 6), the first screen that appears is displayed below (Figure 7).

Figure 7 Volume, Duration and Rate Display

VII. The McKinley T34 Syringe Driver calculates and displays the deliverable volume, the duration of the infusion (24 hours) and the rate of the infusion (ml per hour).

13.4 Starting the syringe driver

Press the "**YES**" key to confirm the details. The display screen prompts "**Start Infusion?** (Figure 8).

Figure 8 Start Infusion Screen Prompt

I. Start the infusion by pressing the "**YES"** key.

II. When the McKinley T34 Syringe Driver is running the screen displays (Figure 9):

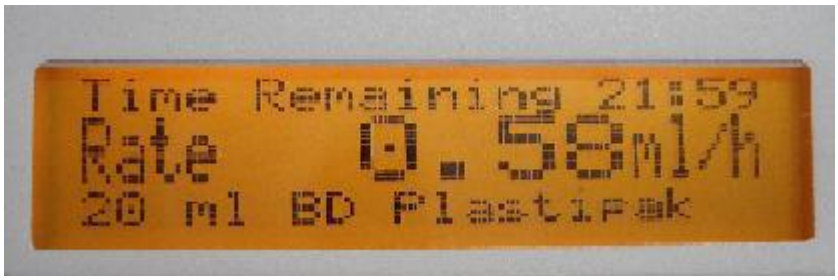


Figure 9 Syringe Driver Running Display

Top line – the time remaining for the current infusion

Main line – the infusion rate is displayed in ml/hour

Bottom line – alternates between syringe size and brand and the message "Pump Delivering".

The Infusion Light Status Indicator flashes green (Figure 2). Light flashes at 30 second intervals.

13.5 Keypad Lock

The McKinley T34 Syringe Driver allows all users to lock the operation of the keypad during infusion. This function should be routinely used to prevent tampering with the device (Figure 10).

Figure 10 Keypad Lock Display

I. To activate the keypad lock when the syringe driver is infusing press and hold the "**INFO**" key until a chart is displayed showing a 'progress' bar moving from left to right.

II. Hold the key until the bar has moved completely across the screen and a beep is heard to confirm the lock has been activated.

III. The "**STOP/NO**" and "**START/YES**" and "**INFO**" keys are still active.

IV. To turn off the lock, repeat the above procedure. The bar will now move from **right (lock)** to **left (lock)** and a beep will be heard.

A Syringe Driver Monitoring Form (T34 Syringe Driver Observation Chart – community) must be completed whenever a syringe driver infusion is commenced (Acute setting see appendix 2 & appendix 10 for Community Setting).

13.6 Lockboxes

Every T34 will be supplied with a lockbox. After starting the infusion, place the syringe driver in the supplied lockbox except if using a syringe larger than 30ml. N.B. Avoid using a SIMS Graseby Flo-Safer winged infusion set with a 30ml syringe as this will not easily fit into the lockbox. Universal keys will be supplied to each ward area / community nurse. Replacement keys if required are the responsibility of the individual teams. If a key is lost complete an incident report form.

The lockbox supplied with the McKinley T34 Syringe Driver

14.0 MONITORING OF THE INFUSION

In an inpatient unit the syringe driver should be checked regularly at 4 hourly intervals and the monitoring form completed.

Check for:

a) Time

b) Set rate of syringe driver

c) Millilitres remaining

d) Infusing at correct rate

e) Battery satisfactory

f) Site satisfactory

g) Clarity of infusion

h) Only change the site if there is any evidence of inflammation, infection or hypertrophy. This varies depending on the individual patient and the drug being used.

If the site needs to be changed or the drug regime changes part way through the infusion, the partially used syringe must be discarded and a complete new syringe and primed giving set should be commenced. ***Remember*** ***if the prescription for a patient is changed the registered nurse must prepare a new syringe and primed giving set.*** ***Never*** ***add additional medicine(s) to the syringe after an infusion has commenced. If medication dose or drug amended new infusion set should be used.***

Battery, Duracell 9-volt (6LR61), a new battery will last for approximately 3-4 days.

Two presses of the blue information key will show battery status. Staff in Sandwell and West Birmingham NHS Trust should be aware of the battery status on starting the device and any battery reading less than 40% should be changed. One press of the blue information key during the course of an infusion will show Volume infused (VI), and Volume to be infused (VTBI).

Document and sign chart for checking procedure using syringe driver monitoring chart **(T34 Syringe Driver Observation Chart – community)**. (See Appendix 2 for acute staff & Appendix 10 for community teams).

14.1 Documentation of the Infusion

Details of setting up each syringe driver and reloading needs to be documented on the administration chart by the healthcare professional(s) who have performed the procedure according to Trust policy. In the acute setting, this must be documented on Unity and in the community; the SystmOne syringe driver template must be completed.

Documentation should include:

a) Date and time infusion commenced.
b) Model of syringe driver
c) Rate of syringe driver
d) Site and type of cannula
e) Drug expiry date and batch number

The syringe should be labelled with the date, drug names, dosages and diluent. (Avoid the numbers on the barrel of the syringe so that amount remaining can be easily seen).

In the community setting, the quantities of controlled and other parenteral drugs present in the patient's home must be checked prior to and after the syringe driver is prepared. An accurate balance for each formulation must be maintained on a separate Community Administration Record (appendix 9). Any discrepancies must be promptly reported to the Team Leader, Medicines Management and an incident form must be completed.

14.2 How to Temporarily Stop the Infusion

This is not normal practice and should only be used in exceptional circumstances

- Press **"STOP".**
- Press and hold **"OFF"** button until a beep is heard. The screen will go blank.
- Do not remove syringe from the syringe driver
- Record on the monitoring chart, the length of time the infusion is stopped for.

14.3 What to do if the Infusion is interrupted

Figure 11 Resume Program Display

- Check that the prescription, syringe label and patient details match, to ensure that this is the correct syringe for this patient.

- Press and hold the "**ON**" button until a beep is heard. The screen will request confirmation of syringe size and syringe brand.

- Press "**YES**" to resume. The screen will display "**Remaining volume, duration and rate of infusion**". Press "**YES**" to confirm.

- The screen will also give the option to press "**No for New Program**". **DO NOT** press this as it will delete the current programme, enabling a new programme to be calculated using the syringe volume and will be delivered over the next 24 hours.

14.4 Completion of administration of subcutaneous infusion

- When the infusion is complete and the syringe is empty, it will stop automatically and the alarm will sound. If the syringe driver is no longer required for the patient, press "**OFF**" and then remove the battery from the syringe driver.

- Prescribe appropriate replacement medication, see prescribing guidelines.

- Explain the procedure to the patient.

- Remove giving set: cleanse skin with a wipe saturated with Chlorhexidine Gluconate 2% & 70% Isopropyl Alcohol if required.

- Cover the site with a small occlusive dressing if required.

- Dispose of winged device following organisational guidelines for the safe disposal of sharps.

- Clean the syringe driver as described in section 19.

15.0 DISCONTINUING A SYRINGE DRIVER

To avoid an accidental bolus dose of drug, the infusion line must be disconnected from the syringe before the syringe is removed from the syringe driver.

Removal of the cannula and/or discontinuation of the infusion should only be carried out by appropriately trained staff.

16.0 WHEN A PATIENT DIES

- Stop the syringe driver.

- Press "**INFO**" and record the date, time and amount of solution remaining to be infused (in mls).

- Once verification of death has taken place, the syringe driver can be removed and the contents destroyed according to local guidelines. If there are any concerns, refer to your line manager before doing so.

- The T34 syringe driver must be returned to Medical Engineering department.

- For further information on the disposal of controlled drugs in a community setting, please see appendix 11.

17.0 TRANSFER OF PATIENTS

When a patient is discharged from hospital to home/hospice with a syringe driver, information should be clearly communicated to the primary care team. Arrangements should be made for the timely prescribing of drugs in the community. A Medicine Administration Form (MAF) can be used for controlled drugs and drugs used in the syringe driver (Appendix 3) for Sandwell and a yellow card for Birmingham. A supply of the prescribed diluent should be included with the patient's TTO medications.

It is essential to contact the District Nursing Team/Care Home/Hospice as soon as the discharge date is known and inform them of patients proposed discharge with a McKinley T34 syringe driver. Patient documentation needs to be updated to include details of where the syringe driver is being transferred to.

Liaise with community team to ensure (if appropriate) they will stop and disconnect the T34 and replace the syringe driver with the appropriate device used in their area. The McKinley T34 syringe driver must then be returned to Sandwell and West Birmingham Hospitals Medical Engineering department and documented in the patient notes.

Give and discuss with the patient (where possible) and the carer the patient information leaflet (Appendix 1)

18.0 MAINTENANCE

The manufacturer of the drivers recommends that:

a) The syringe driver should be serviced every 12 months.

b) If the syringe driver is dropped or damaged at any time, it should be immediately removed from practice and checked by the Sandwell and West Birmingham Hospitals Medical Engineering department.

c) Following any fluid spillage onto the syringe driver, it should be returned for servicing.

d) Care must be taken to ensure that the McKinley T34 is NOT immersed in water or taken into a shower.

e) Syringe driver should be returned to Sandwell and West Birmingham Hospitals Medical Engineering department after an episode of care for a patient for recalibration for future use.

19.0 INFECTION CONTROL

Each syringe driver must be cleaned between patients. The outer surface of the driver should be kept clean by wiping with a soft damp cloth using a mild detergent. The driver should then be dried. **NB. Never dip or submerge the syringe driver in water.**

20.0 RISK MANAGEMENT

In the event of an incident, an Incident Form must be completed. This includes:

- Administration of incorrect medication, dose and/or diluent.
- Infusions completing ahead of time or carrying on beyond intended time of completion.
- Any other incident or near miss which may compromise patient safety or comfort.

Where there has been an incident with a syringe driver it must be sent to the Sandwell and West Birmingham Hospitals Medical Engineering department for investigation.

21.0 TROUBLE SHOOTING

LCD DISPLAY	ALERT/ALARM TYPE	POSSIBLE CAUSE	ACTION
Occlusion/Syringe Empty Check Line & Syringe Press YES to Confirm	Alarm Audible and visual alarm	-Occlusion -Precipitation -Line kinked -Actuator has reached minimum travel position	-New syringe & line required -New syringe & line required -Unkink consider renewing -End of program, turn syringe driver OFF
Press YES to Resume NO for New Syringe	Alarm Audible and visual alarm. Intermittent bleep	Something has occurred which has interrupted the current programme (e.g. syringe displaced/power failure) so the device is prompting the user to their attention.	Pressing YES: will continue current, interrupted infusion. Check/confirm infusion summary screens & press YES to resume the current infusion. Pressing NO: will programme a new infusion, e.g. new Syringe & or new patient. The syringe driver will calculate the volume of the syringe & based on duration required will start a new programme.
Syringe Driver Paused Too Long Confirm, Press YES	Audible and visual alarm. Intermittent bleep	Syringe driver left in stop mode (on hold) for 2 minutes	Either start infusion, continue programming or switch off
Syringe nearly empty	Alert Audible and visual alarm. Intermittent bleep	15 minutes from end of infusion	Prepare to change syringe or switch off
End Program Press YES to Confirm	Alarm Audible and visual alarm. Intermittent bleep	Infusion Complete	Syringe driver will alarm. Press YES to confirm end of program and OFF to switch syringe driver off.

Low Battery	Alert Visual alarm	Battery is almost depleted (15 minutes left)	Prepare to change battery and resume infusion
Battery End	Alarm Visual alarm	Battery is depleted	Change battery and resume infusion
System Error Press & Hold INFO for details. If problem persists send syringe driver for service.	Alarm: System error	Error has occurred	Pressing INFO key will display the reason for the alarm & give advice for correction, if applicable; If correction not possible: • Remove syringe driver from use & turn power off • Return to Medical Engineering for syringe driver interrogation.

21.1 The syringe driver will not start

- No battery present. Fit a battery
- Battery inserted incorrectly. Re-align battery terminals
- Battery is depleted/very low. Fit a new battery.
- Pump is faulty. Service required.

21.2 Infusion Running Too Fast

If over-infusion occurs, stop infusion, check condition of patient and contact medical team and duty manager immediately.

For patients receiving treatment in the community, stop the infusion, check condition of patient and obtain immediate medical advice or dial 999 as appropriate. The prescriber should be informed and the on call manager contacted if necessary for serious incidents occurring out of hours. All advice received must be documented in the nursing record.

This constitutes a drug error and an incident form must be completed
Refer to Incident and Hazard Reporting ORG/050

- Immediately undertake 15 min Temp, Pulse, Blood Pressure, Respirations, and document, until medical staff have reviewed patient and pain control prescription.
- If Respiration is reduced to 8 per minutes and below, and either Morphine/Diamorphine is prescribed, have in readiness Naloxone 400 microgram and Sodium Chloride 0.9% ampoules.
- Check rate setting for accuracy
- Check for disconnection of line or needle
- Check syringe securely attached to syringe driver
- Check box is locked & no tampering has occurred
- Check no air present in syringe (solution will siphon in if barrel cracked).
- If syringe driver could be faulty return to Medical Engineering department.

21.3 Infusion Running Too Slow

- Check Patient, seek medical advice if required. Has symptom control been lost, does patient require PRN medication?

- Check the syringe driver light is GREEN and flashing.
- Check the battery level.
- Check the rate setting is correct.
- Check the correct syringe brand or size has been programmed.
- Check that syringe is inserted correctly into syringe driver.
- Check if syringe driver has been stopped and restarted for any reason.
- Check contents of syringe/line-is there any evidence of crystallisation/kinking of tubing?
- Check needle site - is this red/hard/lumpy/sore/oedema? Change needle site if necessary.
- Consider further dilution of drugs to minimise irritation by setting up a fresh syringe Consider metal allergy from needle – contact Palliative Care Team.
- If syringe driver continues to run through too slowly, change entire syringe driver and return to Sandwell and West Birmingham Hospitals Medical Engineering department.
- Check rate of infusion at regular intervals.

21.4 The Syringe Driver has stopped Before Emptying the Syringe

- Check battery has not exhausted. Fit a new battery, turn syringe driver on, confirm syringe size and brand, select '**Resume'** to continue infusion.
- **WARNING – If you press NO, the syringe driver interprets this as a completely new 24 hour period and the remaining contents of the syringe would be delivered over the next 24 hours from confirming 'Start Infusion'. The patient would not therefore receive the prescribed dose. If NO has been pressed in error, discard the remainder of the syringe contents, and prepare and set up a new syringe.**
- Trapped/kinked infusion line. Free line or kink & resume infusion if appropriate. If still not working, return syringe driver to Sandwell and West Birmingham Hospitals Medical Engineering department.

21.5 Site irritation

- Change site (use a new infusion set when changing site) leave at least 3cm away from original site. If the site needs to be changed part way through the infusion, the partially used syringe must be discarded and a complete new syringe and primed giving set should be commenced.
- Review medication in syringe (Cyclizine and Levomepromazine most common causes).
- Dilute drugs to a larger volume in new syringe
- Consider separating into 2 syringe drivers
- Consider infection
- For severe site reactions which persist despite usual measures such as increased dilution of drugs(s), consult Pharmacist/Palliative Care Team for advice.

21.6 Precipitation, cloudiness or colour change in syringe contents or line

- Stop infusion and inform prescriber. Issues to check and discuss with prescriber include:-
- Compatibility information
- Diluent (seek advice from Pharmacist/Palliative Care Team)
- Is it possible to dilute further with water for injection, consider larger syringe?
- Consider separating into 2 syringe drivers or give one drug as a subcutaneous bolus injection if appropriate.
- Seek advice from Specialist Palliative Care Team.
- Keep away from sunlight and heat.

- Advise patient on keeping syringe driver away from hot pack/heat pad or hot water bottle
- Commence new infusion at a different site (at least 3cm away) with new infusion set.

21.7 Syringe Becomes Dislodged

If syringe becomes dislodged whilst infusion running:-

- The alarm will sound & the infusion light will turn red.
- Check Syringe Loaded Correctly. Window will be displayed
- Check that the prescription, syringe label and patient details match, to ensure that this is correct syringe for this patient.
- Replace syringe onto the syringe driver, as shown in 13.3.
- The next screen will request confirmation of syringe size and syringe brand.
- Press "**YES"** if correct.
- The screen will display:

- Press **'YES'** to resume previous program.
- **WARNING** – If you press **NO**, the syringe driver interprets this as a completely new 24 hour period and the remaining contents of the syringe would be delivered over the next 24 hours from confirming 'Start Infusion'. The patient would not therefore receive the prescribed dose. If **NO** has been pressed in error, discard the remainder of the syringe contents, and prepare and set up a new syringe.
- The screen will display: '**Remaining volume, duration and rate of infusion'**
- Press '**YES**' to confirm if this is correct prescription.
- Screen will display '**Start Infusion'**
- Press '**YES'** to confirm.

21.8 Event Log

The McKinley T34 syringe driver has an event log, which can store up to 512 pump events with date/time.
The 'Event Log' can only be viewed when the syringe driver is stopped (please contact Medical Engineering department).
It is mainly used if a near miss or clinical incident has occurred. The information will be downloaded and analysed by Medical Engineering department.

21.9 McKinley T34 Syringe Driver Alarm Conditions

When the syringe driver detects a problem four things occur:

- The infusion stops.
- An audible alarm is activated.
- A message appears on the display screen indicating the cause of the alarm.
- The Infusion Light Status Indicator turns red.

22.0 TRAINING & AWARENESS

All staff using the McKinley T34 syringe driver must be personally competent and accountable in the use and operation of this device. Staff must have completed a McKinley T34 syringe driver training e-learning session on: www.cmemedical.co.uk/training/clinical-training/clinical-elearning and be signed as competent by a competent core trainer using the McKinley T34 subcutaneous syringe driver competency booklet (appendix 4) as evidence.

23.0 Equality & Diversity

The Trust recognises the diversity of the local community and those in its employment. Our aim is, therefore, to provide a safe environment free from discrimination and a place where all individuals are treated fairly, with dignity and appropriately to their need. The Trust recognises that equality impacts on all aspects of its day-to-day operations and has produced and Equality Policy Statement to reflect this. All policies are assessed in accordance with the Equality initial screening toolkit, the results for which are monitored centrally.

24.0 REVIEW

This policy will be reviewed in 3 years time. Earlier review may be required in response to exceptional circumstances, organisational change, or relevant changes in legislation of guidance.

25.0 FURTHER ENQUIRES

If there are any questions, queries or comments regarding this guidance and its components please contact Sue Law Palliative & End of Life Care Team Leader.

26.0 REFERENCES

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Mitten, T (2000) Subcutaneous drug infusions: a review of the problems and solutions. British Journal of Palliative Nursing **6** (5)

Nottingham Palliative Care Team *Guidelines for the use of McKinley T34 Syringe Drivers in Palliative Care*, University Hospitals Nottingham.

Nursing and Midwifery Council (2018) The Code: Professional standards of practice and behavior for nurses and midwives and nursing associates, NMC, London

Twycross, R. and Wilcock, A. (2002) Symptom management in Advanced Cancer (3rd edition) Radcliffe Medical Press, Abingdon.

West Midlands Palliative Care Physicians (2019) *Palliative Care Guidelines for the use of drugs in symptom control. 2019 revision*. Birmingham: University Hospitals Birmingham.

27.0 BIBLIOGRAPHY

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2. Medical Devices Agency (1998) Adverse Incidents Report DB 9802 Medical Devices Agency, London

3. Medical Devices Agency (2003) Bulletin on Infusion Systems DB 2003. Medical Devices Agency, London

4. Nursing and Midwifery Council (2007) Standards for medicines management, NMC, London

5. Twycross, R G., Lack S.A., (1983) Symptom Control in Advanced Cancer: Pain Relief London, Pitman

6. Evans, N; Palmer A (1998) Controlling breakthrough pain in palliative care. Nursing Standard 13 (7)

7. Wilson, V (2000) Guidelines for the use of the MS26 daily rate syringe driver in the community. British Journal of Nursing. Vol 5 (4)

8. Dunne K et al (2000) An audit of subcutaneous syringe drivers in a non-specialist hospital. International Journal of Palliative Nursing 6 (5)

28.0 USEFUL LINKS

www.palliativedrugs,com

www.pallcare.info

www.cmemedical.co.uk/training/clinical-training/clinical-elearning

www.wmcares.org.uk

Appendix 1

Syringe Driver Information and advice for Patients

Palliative care

What is a syringe driver?

A syringe driver is a portable battery-operated pump with a syringe containing medication to manage symptoms. It allows the medication to be delivered at a regular rate over 24 hours and is small enough to be carried in a pouch attached to a belt, a shoulder holster or large pocket.

What are the benefits of a syringe driver?

Some people find it difficult to swallow their medication in tablet or syrup form.

Some people may feel sick or vomit frequently which means they can't keep their tablets in their stomach long enough for them to work.

Some people's symptoms are difficult to control by tablets alone and a syringe driver may be used as well.

Instead of having repeated injections to receive their medication the syringe driver can provide people with a simpler and more comfortable way to receive medication. Once the correct dosage has been established, levels of medication in your blood will remain steady, maximising the benefit. It is portable and light and can be worn under clothing so you can remain independent.

Before using a syringe driver

The nurses and doctors will have discussed with you the reasons why a syringe driver has been chosen as the best way for you to receive your medication. The nurse will explain how the syringe driver works to you and your family / carers and answer any questions you may have about it.

Using a syringe driver

The syringe in the syringe driver is attached to a thin piece of tubing which has a fine needle attached at the other end. The nurse will insert this needle just under the skin on your chest, tummy, the top of your arm or leg and will secure it in place with a clear dressing. Once the needle is in place, you should not feel it and it can stay there for a few days.

The nurse looking after you will refill your syringe once every day. If you are at home, a district nurse will come to your home to do this. At the same time they will:

Check that your machine is working properly

Check that the needle site is not painful, leaking, red or swollen

Check on your symptoms

Replace the needle in a different part of the body every few days

If you are at all worried that the syringe driver is not working, tell a nurse immediately.

How long will I need the syringe driver for?

You may only need to use a syringe driver for a few days or weeks. The nurse looking after you will give more detail about the amount of time you may need it for.

Do

Report any soreness, redness, irritation or swelling at the needle site to your nurse

Contact the nurse if the needle accidentally comes out.

Contact your nurse or doctor if you have any concerns regarding your syringe driver or medication

Keep all drugs away from children preferably in a locked cupboard

Keep the syringe contents out of direct sunlight. They must also not become too warm. Please ask your nurse for advice on the best place to keep your driver.

Take care when walking around with the syringe driver, use the holster provided or put the syringe driver in a pocket.

Do not

Immerse the syringe driver in water. You can have a bath or a shower but try to keep the needle site dry and keep the machine out of the water by putting it on a stool by the bath or shower.

Do not attempt to change the settings.

Place the syringe driver above the height of the needle site.

Things to report to your nurse

If the syringe driver is accidentally dropped, immersed in water or contaminated by fluids in any way, contact your nurse immediately as she/he will need to bring you a new syringe driver and return the other for inspection.

What to do with the syringe driver while sleeping?

Some people find it useful to tuck the syringe driver under their pillow at night to keep it from falling out of bed.

Alarms on the syringe driver to be aware of

There is an alarm on the syringe driver that will beep if there is a problem. The alarm usually sounds for one of two reasons:

- There is a blockage to the flow of medication caused by a kink in the long tubing.
- The syringe is empty.

If the alarm sounds contact your nurse.

Contact details

If you are in hospital and have any questions or concerns about your syringe driver, please contact the Palliative care team on one of the following numbers, or ask a member of staff to contact them for you:

Palliative Care Team
Sandwell Hospital
Tel: 0121 507 3611
City Hospital
Tel: 0121 507 3611

If you are at home and have any questions or concerns about your syringe driver please contact your district nurse.

Sources used for the information in this leaflet

- Dickman et al, ‘The Syringe Driver’, Oxford University Press, 2005
- Medicines and Healthcare products Regulatory Agency, ‘Infusion systems’, 2003
- Mitten T, ‘Subcutaneous drug infusion: a review of problems and solutions’, International Journal of Palliative Nursing, 2001
- Twycross R, ‘Palliative Care Formulary’, 4th Edition, 2012

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Appendix 2

Prescription for Syringe Drivers used in Palliative Care via subcutaneous (s/c) route use only

McKinley T34 Syringe Driver

Sandwell and West Birmingham Hospitals NHS
NHS Trust

Adult

This is a prescription for seven days only

If advice or support is required please contact Macmillian Palliative Care Team or Pharmacists

- **Medicines for management of 'breakthrough' symptoms must be prescribed separately**

Special instructions / Additional notes / Pharmacy notes

DRUG			DOSE
DRUG			DOSE
DRUG			DOSE
DILUENT	SYRINGE SIZE 20ml 30ml	ROUTE SC	DURATION
PRESCRIBER SIGNATURE		DATE & TIME	
PRINT NAME & DESIGNATION		PHARMACY	

Allergies Medicine sensitivities		
Medicine (generic) allergen	Types of reaction (e.g. rash)	Signature / date
Or		
No known allergies ☐ (please tick)		
Signature: _____		Date: _____

Surname		Reg no
Forename	Sex	Date of birth
Address		Cons
		Ward/Dept
		Hosp

2 Registered Nurse to sign. Administration, changing syringe or rate

Date	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Time							
Site Check							
Rate set in mls/hr							
Battery power remaining as a %							
Administered by							
Checked by							

If Diamorphine/Morphine is prescribed above, please ensure that 'As Required' s/c Diamorphine/Morphine equivalent to 1/6th of the daily dose for breakthrough pain is prescribed on the patients drug chart.

Syringe Driver Chart

Essential that syringe driver is monitored for the first four hours of its administration, then four hourly thereafter. 1 RN to sign when checking syringe diver

Date																						
Drugs in situ																						
Site of cannula																						
Time	1hr	2hr	3hr	4hr	2	6	10	14	18	22	2	6	10	14	18	22	2	6	10	14	18	22
Syringe fitted, secure (Yes/No)																						
Volume left in mls																						
Duration left in hours																						
Rate set in mls/hr																						
Site satisfactory (Yes/No)**																						
Solution clear (Yes/No)***																						
Initials																						

Date																						
Drugs in situ																						
Site of cannula																						
Time	1hr	2hr	3hr	4hr	2	6	10	14	18	22	2	6	10	14	18	22	2	6	10	14	18	22
Syringe fitted, secure (Yes/No)																						
Volume left in mls																						
Duration left in hours																						
Rate set in mls/hr																						
Site satisfactory (Yes/No)**																						
Solution clear (Yes/No)***																						
Initials																						

Battery should display 40% power or more on commencing infusion, if less than 40% replace battery.
** Site check: Location: Document insertion site of winged infusion devices e.g. Scapula region
Condition: NP = No problem P = Pain I = Inflammation SW = Swelling B = Bleeding H = Hardening
*** If contents of syringe look cloudy, precipitation has occurred. STOP infusion and refer to guidelines in the McKinley Syringe Driver Protocol

140513MP4100

Appendix 3 – Administration of Subcutaneous drugs via McKinley T34 syringe pump and as required bolus drugs for Sandwell

MEDICINE ADMINISTRATION FORM (MAF)

Authorisation to administer named medicines to an individually named patient in the community

Patient details:

Name of Patient: ..... NHS Number: .....

Date of Birth: .....

Address: .....

..... Telephone: .....

GP name: ..... Contact number: .....

Prescriber details:

Name of Prescriber (please print): .....

Title: .....

Address (practice, clinic): .....

Prescriber Contact Number: .....

The MAF form must be completed in indelible ink – please write drug names in CAPITALS

AUTHORISATION FOR ADMINISTRATION OF ANTICIPATORY OR AS REQUIRED MEDICINES

Please administer the drugs below to control the symptoms specified.

DRUG NAME	DOSE	ROUTE	FREQUENCY	TO CONTROL SYMPTOM OF	PRESCRIBER SIGNATURE	DATE
ANALGESIC (please specify):		SC		Pain		
MIDAZOLAM		SC		Agitation		
LEVOMEPROMAZINE		SC		Nausea/vomiting		
HYOSCINE BUTYLBROMIDE		SC		Secretions		

If analgesic dose changes, the prescriber must cross through the previous analgesic authorisation to avoid potential confusion or duplication.

The above anticipatory and as required medicines may be administered for 28 days from the date of signature above

Patient Name:	NHS number: Date of birth:

AUTHORISATION FOR ADMINISTRATION OF DRUGS VIA SYRINGE DRIVER

Please administer the drugs specified below by continuous subcutaneous infusion over 24 hours via syringe driver.

The prescriber completing this form authorises the mixing of the drugs specified below into one infusion.

Initial doses (over 24 hours):

DRUG NAME	DOSE	TO CONTROL SYMPTOM OF	PRESCRIBER SIGNATURE	DATE

Please prepare infusion with Water for Injection unless an alternative diluent is specified by the prescriber below.

Alternative diluent (if required):	Prescriber Signature:	Date:

ADDITIONAL INSTRUCTIONS:
PAIN: Please increase ..... by one third of the **'Total'** daily dose in the syringe driver, if required to control pain – please include all breakthrough pain doses in this calculation and round to the nearest 5mg
AGITATION: Please increase **MIDAZOLAM** by the **'Total'** daily dose of breakthrough medication over the last 24 hours up to maximum dose of **60mg in 24 hours**.
OTHER SYMPTOMS: Please increase ..... by daily increments of ..... to control ..... up to maximum dose of ..... in 24 hours. Please increase ..... by daily increments of ..... to control ..... up to maximum dose of ..... in 24 hours.

The medicines specified above may be administered via syringe driver for up to 28 days from the date of signature above

140313MP4099

Appendix 4

McKinley T34 Syringe Driver
Self-Assessment / Competencies

McKinley T34 subcutaneous syringe driver competency booklet

These competencies are used in conjunction with: -

- NMC Standards for Medicines Management (2007)
- NMC. The Code: Standards for Conduct; Performance and Ethics (2008)
- Pan Birmingham: Syringe Drivers in Palliative Care: Guidelines (2005)
- SWBH: Policy for competence in the use of medical devices (2016)
- SWBH: Procedure for using the McKinley T34 syringe driver to deliver a continuous subcutaneous infusion in palliative care (2019)

All staff using the McKinley T34 subcutaneous syringe driver are expected to undertake a self-assessment of competence against the performance standards for using this device. The purpose of these competencies is to clarify the knowledge and skills expected, to ensure safe practice in using McKinley T34 syringe driver.

To complete the self-assessment put a number corresponding to your level of competence as indicated on the key (fig 1) in the appropriate column next to the competency standard listed. If you consider yourself competent to use product without further training sign at the bottom of this competency sheet. If you require further training attend syringe driver training, read, and complete formal assessment of competencies with an Assessor (fig 2). When self-assessment / competencies achieved you Line Manager should notify L&D by completing and submitting an updated Medical Devices competency check, a copy should be sent to L&D & a copy retained in your Personal Development File. Responsibility for use remains with the user, so if you are in any doubt regarding your competence to use this device seek additional training.

Key for Self-Assessment

1	No knowledge / experience
2	some knowledge / experience
3	Competent
4	Very Experienced and able to teach others

Sandwell and West Birmingham Hospitals NHS
NHS Trust

Name _____ **Grade/Role** _____ **Hospital/Dept** _____ **Date:** _____

Competency Statement: Participant will demonstrate correct practical knowledge, theory of operation and clinical use of the McKinley T34 Syringe Driver

Performance Standard – The participant will be able to:		**1. Self Assessment**		**2. Formal Assessment**	
		Score (As Per Key)	**Date & Comments**	**Signature**	**Date**
1. Demonstrate pre-operational inspection and proper set up of the McKinley T34					
A	Define the reasons for usage of the Syringe Driver.				
B	Explain the equipment required.				
C	Explain the type & sizes of syringes that can be used.				
D	Explain the correct start up sequence (prime/load).				
E	Explain the battery type to be used, indications for battery change and the average battery life.				
F	Explain the two areas in the pump where you can verify the battery Life (%).				
G	Identify the correct infusion line to use and why the line priming volume is important.				
H	Explain the functions associated with the individual keys on the keypad.				
I	Explain the two purposes of pre-loading (automatic actuator movement).				
J	Explain how to confirm the infusion is running.				
K	Explain how to access information for pump monitoring:VTBI/VI, battery level.				
L	Explain how to apply the keypad lock.				
M	Explain how to recognise alerts and what actions to take when an alert is triggered.				
N	Explain how to recognise an alarm and what actions to take when an alarm is activated.				
O	Explain how to access the INFO menu.				
2. Are you able to operate the McKinley T34?					
A	Draw up drugs into the syringe (prime/load).				
B	Ensure adequate mixing of drugs by inverting the syringe several times.				
C	Insert the battery.				
D	Power on and observe Pre-loading.				
E	Check battery level (%).				
F	Load and confirm the correct syringe brand.				
G	Review volume, duration and rate of infusion.				
H	Connect line to the patient.				
I	Start the infusion.				
J	Check and confirm the infusion is running.				
K	Attach the lockbox.				

3. Monitoring an infusion in progress					
A	Identify and describe own professional accountability				
B	Explain the importance of correct prescription / documentation following set up or change of syringe driver.				
C	How often should checks be made & explain which checks are required?				
D	Check volume infused (VI/volume to be infused (VTBI) with infusion running.				
E	Check battery level with infusion running.				
F	Activate/deactivate keypad lock.				
G	Access and view event log.				
H	What action should be taken if drugs crystallise in the syringe.				
4. McKinley T34 maintenance / troubleshooting considerations & appropriate action					
A	When should a syringe driver be serviced?				
B	State the conditions which will cause the syringe driver to alarm.				
C	Explain possible causes for the following: • The syringe driver will not start. • The infusion ended early. • The syringe driver has stopped before emptying the syringe. • The infusion ended late/is running slowly.				
D:	What action would you take if the infusion ends early?				
E:	State the correct procedure to follow should a medication error occur?				
5. Has an understanding of commonly used drugs					
A	How can risk of drug incompatibility be reduced?				
B	State who can be contacted for further drug information.				

***I have completed the self-assessment above and taken into account my personal appraisal of my competence with the product. I declare that I am competent to use this product without further training.**

Signature: _____ Date:

***I require further training before using this product.**

Signature: _____ Date:

Appendix 5

Standard Operating Procedure
Prescribing of Controlled Drugs - Community

Responsibilities of Prescribers

Prescribers have 3 main responsibilities:

- To avoid creating dependency by introducing drugs to patients without sufficient reason;
- To see that the patient does not gradually increase the dose of a drug, given for good medical reasons, to the point where dependency becomes likely;
- To avoid being used as an unwitting source of supply for addicts

Legal requirements

CD Prescriptions **must**:

- Be indelible (may be handwritten or computer generated);
- Include the date (which may be printed);
- Be signed by the prescriber with their usual signature;
- Include the prescriber's address;

State:

- The name and address of the patient;
- The dosage form e.g. tablets (irrespective of whether it is implicit in the name of a drug, such as MST Continus, or where only one form is available) and, where appropriate, the strength (where more than one strength exists, the strength required must be specified);
- Dose ("as directed" or " when required" is not acceptable, but "one to be taken as directed/when required" is *legally* acceptable);
- The total quantity of the preparation, or the number of dosage units, in both WORDS and FIGURES.

Prescriptions for Controlled Drugs in schedule 2, 3 and 4 should be limited to a supply of up to 30 days' treatment. In exceptional circumstances, to cover justifiable clinical need and after assessment of risk, a prescription can be issued for a longer period but the reason for the decision should be clearly documented in the patient's records.

Other requirements for prescribing

- Medicines prescribed and dispensed for an individual patient **must** be supplied to, and used by, that patient only.
- Dosages and frequencies for all CDs must be written in full by the prescriber, to aid administration by nurses and carers.
- Particular care should be taken to ensure clarity of dosage instructions where systems such as syringe drivers are being used.
- Except in exceptional circumstances, the prescriber should not also personally undertake all of the following tasks: preparation, dispensing, transportation and administration of the CD.
- **Nurse independent prescribers may only prescribe controlled drugs for conditions within their competence.**
-

It is an offence to issue an incomplete prescription.

The pharmacist is not permitted to supply if all the information required by law is not present. Failure to comply will result in inconvenience to patients and delay in supplying the necessary medicines.

Appendix 6

SANDWELL AND WEST BIRMINGHAM HOSPITALS TRUST
COLLECTION OF CONTROLLED DRUGS FROM A COMMUNITY PHARMACY BY A NURSE ON BEHALF OF A PATIENT

This must remain in the nursing notes for 10 years

Name of Patient:

Address:

I give consent for (Nurse) ……..…… **to collect my prescription for the controlled drugs listed below from the named community pharmacy and deliver the controlled drugs to the address above.**

Signed (Patient or Representative): ……..… **Date:** ……

To be completed by the collecting nurse

	Drug 1	**Drug 2**	**Drug 3**
Drug Name			
Strength (if known)			
Quantity (if known)			
Name of Pharmacy			
Name of Nurse			
Signature of Nurse			
Date collected			
To be completed by collecting nurse or supplying pharmacist			
Name of supplying Pharmacist			
GPhC Registration Number			

I have issued the above listed controlled drugs to the nurse named on this form on behalf of the named patient.

Signature of Pharmacist ……

Pharmacy Stamp

Appendix 7

Standard Operating Procedure
Transportation of Controlled Drugs in the Community

Identification of situation

- The collection of controlled drugs from a community pharmacy should **not** normally be undertaken by members of the nursing team.
- In **exceptional circumstances**, where there is an urgent need for medication and every avenue for delivery and collection has been explored to no avail, a nurse may transport controlled drugs but this activity should be authorised by his/her manager or senior nurse on duty

Requirements for transportation

- Wherever possible, the nursing team and prescribers should ensure arrangements exist to maintain an adequate supply of medication in the patient's home through normal supply arrangements (for guidance on prescribing controlled drugs in the community, please see separate SOP – Prescribing of Controlled Drugs – Community).
- Prescribers should consider anticipatory prescribing where appropriate where indicated by the patient's condition.
- Quantities of prescribed medication should reflect the patient's condition and availability of safe and appropriate storage in the home.
- Before seeking authorization to transport controlled drugs, the nurse should explore all available avenues for collection and delivery that would allow medicines to be available within an acceptable timeframe.
- If transportation by a member of the nursing team is necessary, the nurse should contact his/her manager or the senior nurse on duty and the date, time, reason for this request and authorization received should be recorded in the nursing record.
- The declaration on the attached template should be completed by the patient or their representative, authorising the nurse to collect the required medicines on behalf of the patient.
- The nurse should then complete the form as directed and take this to the identified pharmacy.
- When collecting a controlled drug on behalf of the patient, the nurse must provide the following information to the supplying pharmacist:

- Healthcare professional's name and address;
- Evidence of identity
  - Professional registration number (if requested);
  - A signature on the back of the FP10 prescription form

- The nurse should also obtain the supplying pharmacist's name, registration number and practice stamp on the attached form.
- Any collected controlled drugs must be taken directly back to the patient.
-

- The controlled drug record in the home should be updated to reflect the new medication received and be countersigned by the practitioner transporting the medication and the practitioner attending to administer the dose necessitating collection (if different).
- The completed collection form should remain in the nursing notes for 10 years.

Appendix 8

Standard Operating Procedure
Administration of controlled drugs in patients' homes

Identification

- **This standard operating procedure applies only to patients receiving care in their own home (this may be their own residence or a care home facility); staff working in SWBH intermediate care units should follow existing written procedures for administration of controlled drugs.**
- **Patients should be encouraged, empowered and educated to administer their own medicines wherever it is safe for them to do so.**
- Nursing staff should only administer controlled drugs in line with a legally valid prescription, directive or medicines administration form (MAF), unambiguously completed by an appropriate medical or non-medical prescriber authorising their administration to the named patient.

Administration

- Controlled drugs must only be administered to conscious patients with capacity to consent or in line with an appropriate best interests decision.
- Normal hand hygiene measures should be followed before and after the procedure.
- In a domiciliary setting, administration may be carried out by a single registered nurse.
- The stock of controlled drugs must be checked before and after administration and the remaining balance recorded on the agreed controlled drugs record. .
- The administering nurse must, on each occasion, check the product and pharmacy label against the prescription or directive and confirm the following details are correct prior to administration:
    - *patient name;*
    - *drug name, form and strength;*
    - *dose and route of administration;*
    - *Frequency of, and interval between, doses.*
- Any discrepancies should be reported to the team leader or member of medicines management team and clarified **before** administration takes place (an incident form should be completed where necessary).
- The controlled drug record and nursing documentation should be completed to include details of drug administered, application site (if applicable), controlled drug balance and printed name and signature of nurse administering the drug.

Special considerations

As Required ('stat') injections

- 'Stat' doses to alleviate acute symptoms may only be administered when authorised by a prescriber following the process described above.

Syringe drivers

- Where drug(s) are to be administered by syringe driver, the appropriate procedure detailed in the Trust syringe driver policy must be followed.

Transdermal patches

- In the case of transdermal patches, the date of the last patch change must be determined and the old patch(es) removed before the new patch is applied.
- Patches should be applied to non-irritated and non-irradiated skin on a flat surface of the torso or upper arm – a non-hairy area should be selected if possible.
- A different skin site should be selected for application of the new patch after removal of the

previous transdermal patch. Several days should elapse before a new patch is applied to the same area of skin.

- If the site requires cleansing prior to application of the patch, this should be done with water. Soaps, oils, lotions or any other agent that might irritate the skin or alter its characteristics should be avoided. The skin should be completely dry before the patch is applied.
- Check patch prior to application and do not apply if cut, split, or damaged.
- Patches should be applied immediately after removal from their protective sleeve or backing - avoid touching the adhesive side of the patch.
- Following removal of the protective backing, the transdermal patch should be pressed firmly in place, making sure the contact is complete, especially around the edges.
- Wash hands with water after application of the patch.

Advice required

- Remind patient (and carers as appropriate) of precautions for use and storage of controlled drugs as necessary and document advice where given.
- Provide advice on who to contact if concerned about symptom control, response to treatment or adverse effects – document this advice when given.
- Issue syringe driver leaflet if applicable.

For patients treated with fentanyl patches:

- Counsel patients to avoid exposing application site to external heat (for example, a hot bath) as this may increase absorption (absorption may also be increased in the presence of fever)
- Counsel patient to remove patch immediately and seek prompt medical attention if signs and symptoms of opioid overdosage develop (including breathing difficulties, marked drowsiness, confusion, dizziness, or impaired speech) – side effects may persist for 24 hours after patch removal.

Appendix 9

Administration Record - Community

Sandwell and West Birmingham Hospitals NHS
NHS Trust

Surname		Reg no
Forename	Sex	Date of birth
Address		Cons
		Ward/Dept
		Hosp

Name of Drug/Diluent.....(One Chart Per Drug)

Date	Time	Stock Balance on Arrival	Batch Number/ Expiry Date	Drug Strength/ Diluent (e.g. Midazolam 10mg/2ml)	Dose Given	Dose Wasted	Stat	Syringe Driver	Site	Stock Balance Remaining	Signature
							Route (Tick)				

MF4694

Appendix 10

T34 Syringe Driver Observation Chart - Community

Sandwell and West Birmingham Hospitals NHS
NHS Trust

Surname | Reg no
Forename | Sex | Date of birth
Address | Cons
Ward/Dept
Hosp

Condition (Tick)

Date	Syringe ID Number	Time	Rate Set (MLS/24Hrs)	Volume to be Infused (MLS)	Clear Fluid in Syringe (Tick)	Site	Condition (Tick)	Light Flashing (Tick)	Keypad Locked	Battery %	Signature

MF4693

Appendix 11

Standard Operating Procedure - Destruction of Controlled Drugs in a Patient's Home

Identification

- The procedure may only be followed following an *expected* death.
- Only drugs prescribed for the named patient may be destroyed – this procedure does **not** apply to stock drugs.
- The patient's family/representatives should be encouraged to return unwanted medicines to a community pharmacy for disposal unless there is a genuine reason not to do so.
- *Where practical*, the decision to destroy drugs in a patient's home should be discussed with medicines management prior to the destruction process.
- The destruction must be done by two registered healthcare professionals and the name and professional details of both should be recorded in the destruction record (family members may wish to observe the destruction process but this should not be used to replace the second professional check).
- Neither of the health professionals involved in the destruction process should have been involved in the original prescribing of the drugs to the patient.

Destruction

- The agreement of the patient's representative must be sought and documented before the drugs are destroyed.
- If the representative is not in agreement, **nurses must not place themselves at risk** but should report this refusal to medicines management and the local security specialist who will decide on any further action necessary.
- The balance of stock should be checked against the controlled drug record *prior* to destruction commencing to ensure there are no discrepancies – **any discrepancy must be reported to medicines management before destruction takes place.**
- The CD destruction must take place using an approved disposal kit to denature the controlled drugs (further supplies may be obtained by contacting the Head of Medicines Management on 07896 669 128).
- CDs should be added to the denaturing kit according to the process below.
- ***Order of adding products to kit:***
  i. Solid oral dose forms (e.g. tablets/capsules), powder containing injection vials/ampoules and transdermal patches
  ii. Small volume liquids (e.g. injection ampoules/vials)
  iii. Large volume liquids (e.g. oral liquids, larger volume injection vials) – these should be added 'all at the same time'

Preparing products before adding to kit (gloves should be worn in all cases):

- **Tablets and capsules** should be removed from all packaging. *Best practice* is to grind or crush the solid dose formulation before adding to the CD denaturing kit to ensure that whole tablets or capsules are not readily recoverable but this may not be practical in a domiciliary setting.
- **Injection ampoules/vials** should be opened and the contents *and* glass added to the granules. Ampoules containing the CD in a powder form can be opened, water added to dissolve the powder and the resultant mixture poured into the CD denaturing kit.
- **Transdermal patches** should have the backing removed and the patch should be folded over on itself or cut in two and then placed in the CD denaturing kit. If scissors are used, these must be washed after cutting patches.
- Once ALL products being destroyed have been added to the kit, water should be added, as necessary, in accordance with the kit manufacturer's directions.

The record should include the drug, form, strength and quantity of the product destroyed and must be recorded in the correct documentation *at the time of destruction* and retained in the patient notes.

Disposal

Filled disposal kits should be returned to a local pharmacy for safe storage and disposal at the earliest opportunity.

Appendix 12

Standard Operating Procedure
Management of Controlled Drugs in the Patient's Own Home

Purpose	To ensure that controlled drugs are managed safely by all registered nurses
Scope	All community nurses

	Instruction	Extra information
1.	All documentation must be kept together in a folder, including a stock count sheet and medicines administrations form.	Please record the stock balance on system one. *Patient information leaflet must be given to the patient/family (working on this)*
2.	All new supplies of controlled drugs must be recorded within 24 hours of dispensing both in patients' notes and System one. Any drugs in a sealed box must be left sealed until used.	Do not open sealed boxes of controlled drugs until used.
3.	All drugs must be kept in the drug storage box supplied.	Will source plastic boxes and use red sticker to identify for CD storage.
4.	All controlled drugs must be checked a registered nurse to ensure that the correct drug, dose and balance are recorded.	Stock balance to be recorded on system one. Should be completed as soon as possible when stat doses given. Must be same day to ensure records current.
5.	Any discrepancies must be fully investigated immediately. This will include checking the stock balance history and the documentation. Complete an incident form and document on System one	The police must be contacted if there are any suspicious conditions. The patient must be made aware of this via leaflet as above.
6.	All stocks of controlled drugs that are no longer required must be returned to the chemist by the family.	

Appendix 13 - CME Operating Procedure

Alert and alarm conditions

When an ALERT is activated:

1. The infusion continues
2. 2/3 beeps are heard approximately every 3 to 4 minutes
3. A screen message indicating the cause of the alert displays intermittently with the infusion running screen

Alert activates approximately 15 minutes prior to infusion end

When an ALARM is activated:

1. The infusion stops
2. A continuous audible alarm activates (this will continue until either the YES key is pressed to mute or the problem is rectified)
3. A screen message displays to indicate the cause of the alarm
4. The infusion status indicator (LED) turns red

Troubleshooting

Screen	Description	Implication/Action
Low Battery	Alert: Battery is almost depleted	Prepare to change battery
Program Nearly Complete	Alert: Infusion will end soon	Prepare to change syringe or turn pump off
Pump Paused Too Long	Alarm: Pump has been left in STOP mode (on hold) for 2 minutes	Either start the infusion, continue pause or turn the pump off
End Battery	Alarm: Battery is depleted	Change battery
End Program	Alarm: Infusion is complete	Close down or start new infusion
Syringe Displaced, Check Syringe	Alarm: One or more of the syringe detection sensors is not detecting	Check screen messages for assistance Check the syringe and re-seat as necessary
Occlusion Check Line & Syringe	Alarm: Pt access device is either blocked, occluded, clamped or kinked	Flush/replace access device, release the clamp or un-kink tubing

Technical problem/error and failure identification

Two examples of system failure screen messages are shown here:

The pump alarms if an internal system fault has been detected and the unit will be inoperative.

- Power the pump off and then power on again.
- If the problem cannot be rectified, power off the pump and remove from patient use.

Follow local policy and/or contact your authorised Medical Engineering Department for advice if necessary.

(If possible, record the code number and a summary of the fault).

System Error. Press & Hold INFO for Details
If problem persists send pump for service.

ERROR
Startup MotMov Fail
If problem persists send pump for service.

NOTE: Screen information is representative only
Refer to Operating Manual for details on Keypad Lock

CME Medical UK Ltd
Kincraig Business Park,
Kincraig Road,
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Doc Ref: T34 QUGDNL-FW/May 2011

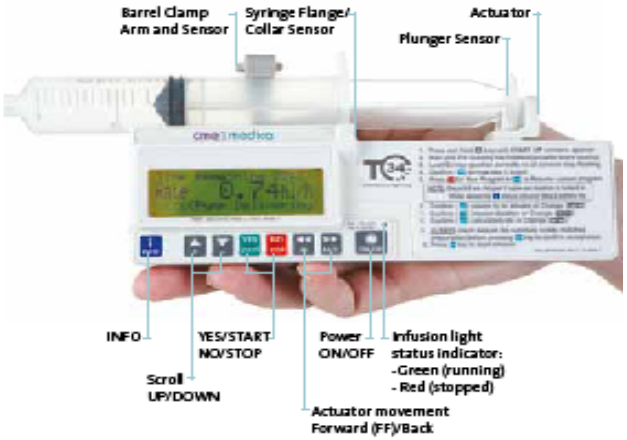
Ambulatory Syringe Pump

LOCK ON (Load and Prime)

Quick user guide

T34

Feature recognition



CME Medical Device Training is RCN Accredited

The information contained in this guide is a summary only, based on default settings. Refer to Operating Manual for full operating instructions. Users must have undertaken training before operating this device.

Screen information is representative only and some text wording/screen information may vary slightly with different software versions. You must refer to local policy and procedures for specific guidance on pump settings/set-up and use of accessories (e.g. cannula and administration lines).

Always follow screen prompts. Before pressing keys to proceed, ensure selections made correspond with what is required.

Starting an infusion Lock ON (Load and Prime)

Scenario

Pump settings: Lock ON, default duration 24 hours

Syringe: Using a 20ml BD Plastipak syringe

Infusion required: Deliver syringe contents (12ml) over 24 hours
Decrease syringe delivery time to account for priming volume of 0.5ml

1. Ensure barrel clamp arm is down and no syringe in place

2. Press ON/OFF key to power up *The actuator moves (pre-loading) and the first four screens display automatically*

3. Software version and pump identification displays

- The actuator is moving to the position of the syringe that was in place at the start of the previous infusion

- Pump default settings display

- Check battery level: press INFO key then YES
  Load the syringe

(If necessary, align syringe to sensors and use the FF/BACK keys to move the actuator for syringe placement)

4. If the syringe size/brand displayed matches the one used, confirm by pressing YES

(Use ↑↓ keys to select the matching syringe if necessary)

5. Infusion summary displays. DO NOT CONFIRM, remove syringe

6. Manually prime the line

7. Reload the syringe, use the FF key to adjust actuator

8. If the syringe size/brand displayed matches the one used, confirm by pressing YES

(Use ↑↓ keys to select the matching syringe if necessary)

9. Press YES to resume (to decrease delivery infusion)

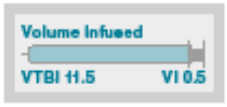
10. Check all settings and confirm by pressing YES. *(If purging, press FF key before pressing YES and follow screen prompts)*

11. Press YES to start the infusion when ready to do so

12. Infusion running

Monitoring whilst infusion is running

Press INFO key *once:*



Press INFO key *twice:*

Pump features and functions

Purge option (if enabled)

To reduce or eliminate slack (visible spaces at the syringe collar and plunger loading points) and ensure a faster start-up time (time to reach the programmed infusion rate), the user can purge the system (once only) up to a configured volume limit.

Accessing the Info menu

With *no* infusion running, press the INFO key.

Options for viewing are:

- Battery Level / Exit / Rate Setting / Event Log / Change Set-up
- Scroll menu using ↑↓ keys and press "YES" to view the option selected

Pre-Loading and Automatic Actuator Movement

- Pre-Loading and automatic actuator movement commences when the pump is powered up with the barrel clamp arm down and no syringe is in place. NOTE: *These sequences will not occur if the barrel clamp arm is raised when the pump is powered on.*
- During Pre-Loading, the display screens displays pump information and the actuator moves automatically.
- These simultaneous sequences clear a programme if still in the pump memory.
- At the end of Pre-Loading the actuator returns to the start position of the last infusion programmed.

Programme Protection: Resume or New Syringe?

Programme protection applies specifically to the ml/hour rate

This screen prompt displays if the programme is interrupted by alarm activation (e.g. syringe displacement, occlusion) the pump is powered off for any reason and powered on with a syringe in place and on completion of purge:

Pressing "YES to Resume" retains the current programme (ml/hr rate)

Pressing "NO for New Syringe" deletes the current programme enabling a new programme to be calculated using the syringe volume at that time.

The important feature to remember is that "Resume" protects the calculated infusion rate for the current syringe.

- If you increase the syringe volume and resume the programme, the duration of delivery will increase
- If you decrease the syringe volume and resume the programme, the duration of delivery will decrease

Appendix 14 – Neria Soft 90 fact card

neria™ soft 90 infusion sets

The neria™ soft 90 infusion set is a soft cannula infusion set inserted at a 90 degree angle (straight in). The product features a disconnect option for more flexibility and the introducer needle can be secured after use for increased needle safety.

Product Specifications

Cannula:	Soft	**Soft cannula diameter:**	0.68 mm
Insertion angle:	90 degrees (straight in)	**Adhesive:**	Built-in, skin friendly[1] non-woven polyester, acrylic adhesive
Disconnection:	Yes at site		
Introducer needle gauge:	G27	**Needle safety:**	Yes, active needle safety system

Soft cannula lengths	Tubing lengths	Priming volumes
6 and 8 mm	30, 60 and 110 cm	30 cm – 0.05 ml 60 cm – 0.10 ml 110 cm – 0.15 ml

The neria™ soft 90 infusion sets are sold in boxes containing 10 sets. Soft cannulae and tubing are also sold separately – in boxes containing 10 pcs/box.

Reference: [1] Biological Safety Testing, October 2011, Data on File, Unomedical a/s.

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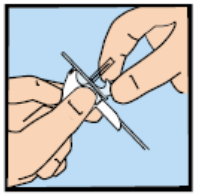
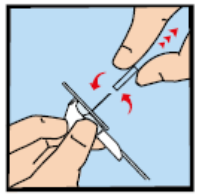
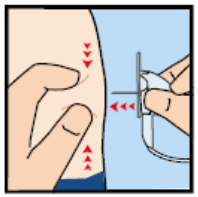
neria™ soft 90 infusion sets user steps



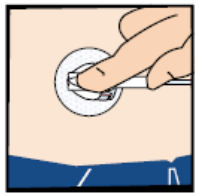
1. Prime the tubing according to the pump manufacturer's instructions. Pull gently to remove the adhesive backing paper.



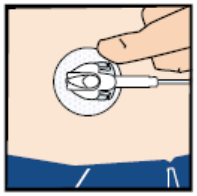
2. Gently twist and pull to remove the needle guard.*



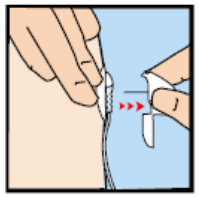
3. Pinch the skin and insert the neria™ soft 90 infusion set at a 90 degree angle (straight in). Insert as illustrated with one finger on top of the insertion handle.*



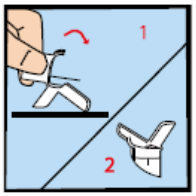
4. Push gently on top of the insertion handle to secure complete insertion of the soft cannula.



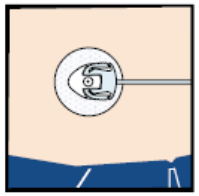
5. Press the adhesive onto the skin.



6. Place two fingers on the adhesive and remove the introducer needle by gently pulling the insertion handle straight out.



7. Secure the introducer needle by closing the insertion handle against a hard surface to cover the needle.



8. Check the infusion site frequently.

*Caution: Be careful not to pull the cannula housing out of the insertion handle. Make sure there is no gap between the cannula housing and the insertion handle.

Please note that this guide only illustrates some of the steps to follow when inserting the neria™ soft 90 infusion sets and it is not a substitute for reading the instructions for use which comes with the product.

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Appendix 15 – Neria Guard fact card

neria™ guard infusion sets

neria™ guard is a soft cannula infusion set with an integrated insertion device for simple insertions by the touch of a button. A retractable needle may eliminate accidental needle sticks and increase insertion technique comfort.

Product Specifications

Cannula:	Soft	**Adhesive:**	Built-in, skin friendly non-woven polyester, acrylic adhesive
Insertion angle:	90 degrees (straight in)		
Disconnection:	Yes, at site	**Needle safety:**	Yes, passive (Needle not visible before, during and after insertion)
Introducer needle gauge:	G27		
Soft cannula diameter:	0.68 mm (≈ G23)	**Insertion device:**	Yes, incorporated in the product

Soft cannula lengths	Tubing lengths	Priming volumes
6 and 9 mm	12, 60, 80 and 110 cm	12 cm – 0.04 ml 60 cm – 0.10 ml 80 cm – 0.12 ml 110 cm – 0.15 ml

The neria™ guard infusion sets are sold in boxes containing 10 pieces. Separate cannulae and tubing parts are available in boxes containing 10pcs/box.

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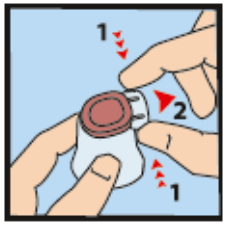
neria™ guard infusion set user steps

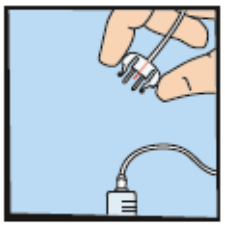
1. Pull gently to remove the paper from the adhesive tape.



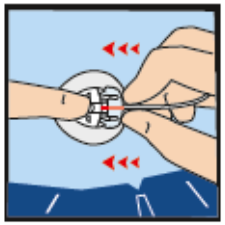
2. Remove the safeguard from the insertion device by gently squeezing the sides of the safeguard and pulling it straight out.

3. Position the insertion device on the skin and press the red activation button completely down to insert the infusion set.

4. Press the adhesive tape onto the skin.



5. Connect to the pump and prime the tubing according to instructions provided by the pump manufacturer.



6. Place a finger on the cannula housing while pushing the site connector straight in until you hear a "click".

Please note that this guide only illustrates some of the steps to follow when inserting the neria™ guard infusion sets and it is not a substitute for reading the instructions for use which comes with the product.

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