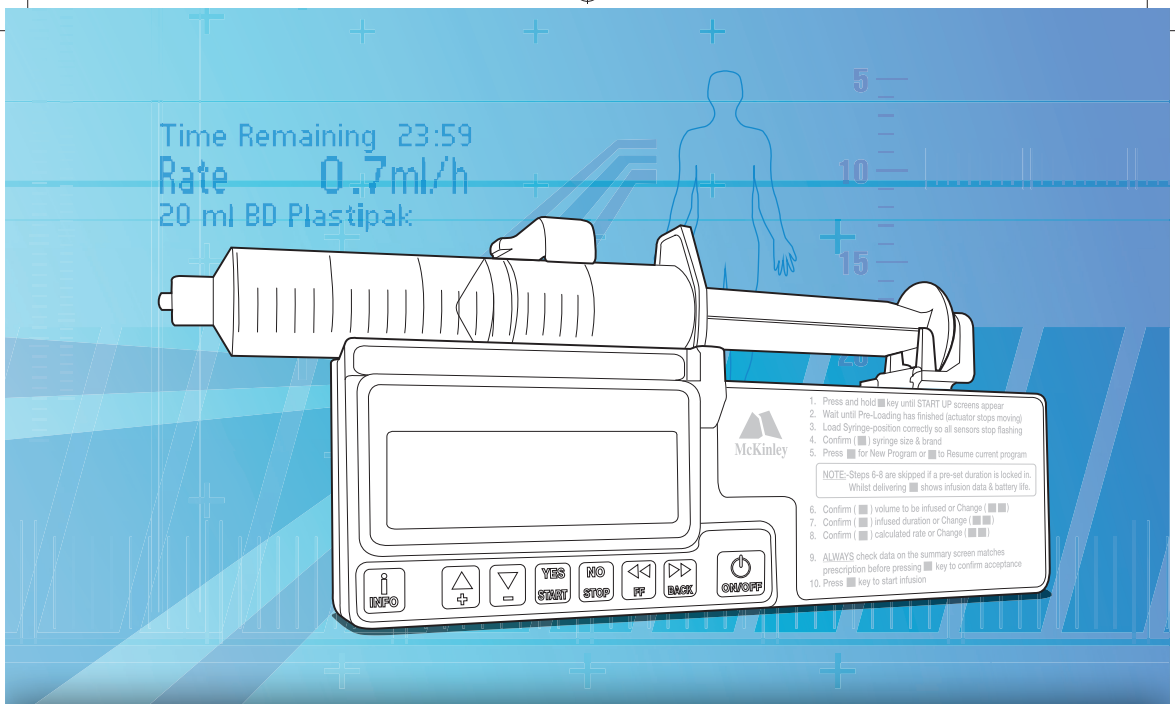


Subcutaneous Infusion by CME McKinley T34 Ambulatory Syringe Pump for Symptom Control in Palliative Care (Version 2)

Adults, Children and Young People

Date effective from: 1/6/2018 **Review date:** 1/6/2021

Author/s: NHSL McKinley T34 Working Group

Executive Lead: Dr Tracy Gilles, Medical Director

Target Audience: Clinicians; Medical Physics; Pharmacy

Supersedes: Subcutaneous infusion by McKinley Syringe Pump for Symptom Control in Palliative care (Adults) 2010 and Subcutaneous Infusion by McKinley Syringe Pump for Symptom Control in Palliative care (Children & Young People) 2014

Keywords (min. 5): Ambulatory syringe pump; CME McKinley; T34: Palliative, end of life, symptom; medication; subcutaneous; infusion

Marie Curie
Care and support through terminal illness

St Columba's Hospice
CARE AND COMPASSION

NHS Lothian

Contents

Document History

Date	Author	Change	Version No.
Jan 2014	Lothian McKinley T34 Working Group	Review of content: no changes required.	1,b
Dec 2016	Lothian McKinley T34 Working Group	Revision of wording to key requirements & responsibilities in areas of infrequent use; Scottish Palliative Care Guidelines publication	1.c
July 2017 - Jan 2018	Lothian McKinley T34 Working Group	Revision of wording to apply to Adults, Children & Young Peoples Services; Clarification re Roles and responsibilities in areas where T34 syringe are used infrequently/via visiting service; Education requirements for staff in line with Scottish Government (2017) Palliative & End of Life Care Education framework; Manufacturers Operating Manual 100-090SM Rev.02; Safety Alerts & Field Safety Notices incl. FSN2016-004, IA211-19820; MDA-2018-010. Additional procedural and practice changes in pgs 4-33 following audit and evaluation.	2

Section 1: Introduction

1.1 Background

These guidelines apply to the setting up, monitoring and troubleshooting of continuous subcutaneous infusions for symptom management in palliative care using the CME McKinley T34 ambulatory syringe pump. The utility and portability of the T34 syringe pump means this device is used within across care settings and can stay with the patient on transfer or discharge.

The research base regarding the syringe pump in palliative care may be limited however use in practice is well established. The content of this guideline amalgamates a review of available evidence, audit, feedback from patients and carers, the manufacturers operating manual, related best practice guidelines and expert consensus.

This guidance must be read in conjunction with:

- 'McKinley T34 Syringe Pump Policy v2 2018.'
- The Scottish Palliative Care Guidelines; essential information for clinical staff regarding the compatibility and stability of medication combinations and diluent administered in the same syringe via McKinley T34.

  The individual guidelines for managing pain and other common symptoms can help inform choice of medication(s), dosage, conversion between different opioid preparations and use for end of life care for adults.

  Access via the intranet ~ healthcare A-Z~ palliative care guidelines or http://www.palliativecareguidelines.scot.nhs.uk/

  Selected guidelines are available as a mobile app for iPhone and Android- follow the link on the guidelines homepage to download.

- For children and young people: also refer to the Basic Symptom Control in Paediatric Palliative Care – The Rainbows Children Hospice Guidelines current edition.

1.2 Aim of the guidance

To support the delivery of safe, effective and person-centred care for patients requiring a continuous subcutaneous infusion of medication via CME McKinley T34 Ambulatory Syringe Pump in Lothian.

1.3 Key objectives

- To outline the procedure for setting up, monitoring and managing infusions via CME McKinley T34 syringe pump.
- To support a consistent approach to identifying, managing and reporting risk involving clinical use of the CME McKinley T34 syringe pump across settings.

1.4 Scope of the guidance

This guideline applies to the palliative care of patients within hospitals, hospices and community settings in Lothian for Adults, Children and Young People. In Lothian our CME McKinley T34 pumps are specifically configured for palliative care delivery.

This guideline does not cover the use of the CME McKinley T34 for other purposes and any service considering this should contact Medical Physics for advice: a risk assessment is required and separate policy and guideline development may be needed.

Section 2: important practice requirements

2.1 Supporting documentation

The following documentation has been produced to support safe and consistent practice. Documents may be accessed via the intranet Clinical Guidance page.

- NHSL McKinley T34 Set Up & Monitoring Chart Hospital
- NHSL McKinley T34 Set Up & Monitoring Chart Community
- Hospice CME T34 Subcutaneous Infusion Prescription, Set up and Monitoring Chart
- McKinley T34 Medical Physics Service Request Form
- Transfer of Patient with CME McKinley T34 Syringe Pump: Request for Pump Return to allocated area
- Loan of McKinley T34 Syringe Pump to Care Homes
- McKinley T34 Syringe Pump Information Leaflet for Patients and carers.

2.2 Adverse event reporting & review

All adverse events and near misses involving syringe pumps which may compromise patient safety or comfort should be reported using the NHS Lothian Datix or Hospice reporting systems as appropriate. Examples include

- Administration of incorrect medication, dose or diluent
- Device failure
- Undue delay in setting up a pump
- Leakage
- Infusions running fast or carrying on beyond intended time of completion without a planned cause e.g. stopping for an MRI (carrying on for > 1 hour late, assuming a 24 hour infusion, that is approximately 5% or more late)
- Device not alarming during an alarm condition.

Any device and / or equipment involved in an adverse adverse event must be quarantined, labelled 'do not use' and returned to Medical Physics with the Datix/ report number stated on the McKinley T34 Medical Physics Service Request Form. The battery should be removed and sent with the pump; this prevents inadvertent operation of the pump during transport. The syringe and infusion set should be returned with the pump but the medications should be destroyed, in accordance with local policies for controlled drugs where appropriate. No cannula or sharps should be sent. If in doubt contact Medical Physics/Pharmacy for advice (contact no. page 36).

2.3 Maintenance of the CME McKinley T34

All pumps must be returned to Medical Physics for servicing at least every 12 months whether used or not, to ensure continued safe functional performance. If a pump has been dropped, submerged in water or there is any doubt as to its functional integrity, it must be labelled 'do not use' and returned to the Medical Physics department with a completed McKinley T34 Medical Physics Service Request Form.

2.4 Cleaning and decontamination

Turn the pump off and remove the battery before cleaning. The syringe pump and box should be cleaned with a dampened (not dripping) disposable cloth (use warm water and general purpose detergent). Dry thoroughly.

If the patient has a known alert organism (such as MRSA, Clostridium difficile) the outer casing should be cleaned with a solution of combined chlorine releasing detergent/ disinfectant to 1000 parts per million available chlorine e.g. ChlorClean.

Where there is contamination with body fluids or cleaning of the threads of the screws the actuator moves along, the pump should be double bagged in clear bags; the McKinley T34 Medical Physics Service Request Form completed; then Medical Physics contacted

who will collect the equipment for appropriate cleaning and decontamination. Do not use chemicals such as Xylene, acetone/ similar solvents or Cliniwipes as this will damage components, plastic box and labels.

The syringe pump must not get wet. If this occurs, the pump must be withdrawn from use immediately and returned to Medical Physics as per section 2.3.

Section 3: CME McKinley T34 indications for use

Continuous subcutaneous infusions of medications administered by syringe pump are used to manage symptoms such as pain, nausea, vomiting in palliative and end of life care. This route achieves stable levels of medication, avoiding the peaks and troughs of intermittent dosing. Use is indicated when regular medications are required and the patient has difficulty taking or absorbing these via the oral route e.g. due to persistent nausea/vomiting, gastro-intestinal obstruction or impaired consciousness. Syringe pumps may be used throughout the palliative phase of a life-limiting illness and for short or extended periods. Use can support quality of life and when the person is irreversibly dying, administer medications they need for comfort and dignity.

Up to three medications may be given within a single syringe and infusion. The prescription can be reviewed and adjusted daily in assessing the patient's symptoms and response, any requirement for anticipatory PRN medications and any side effects. This means the syringe pump is more flexible when managing unstable symptoms than patch and transdermal routes of drug administration e.g. fentanyl patch for pain.

Lothian CME McKinley T34's are pre-set for a 24hr delivery period and calibrated in millilitres per hour (ml/hr).

Section 4: Setting up the CME McKinley T34

4.1 Equipment

- CME McKinley T34 ambulatory pump and clear plastic box
- 9V 6LR6 Alkaline battery for immediate use and ensure a spare battery is available. **Do Not use Rechargeable or 6LP3 batteries which have a shorter life and affect pump functionality**
- BD Plastipak Luer-Lok syringe: 20ml or 30ml (see 'Choice of Syringe' below)
- Adult patients- Becton Dickinson (BD) Saf-T-Intima® 24 Gauge single port cannula / Children & Young People - Medtronic Silhoulette cannula
- CME Syringe Extension Set Admin Integrated anti-syphon Valve 100-172SX
- syringes and needles to prepare medication(s)
- prescribed medicines including correct diluent
- syringe pump additive label
- skin cleansing agent- single use application of 2% chlorhexidine in 70% isopropyl alcohol
- transparent dressing
- McKinley T34 Subcutaneous Infusion Monitoring Chart
- A protective carry pouch or similar receptacle must be used for transporting the pump and protecting the casing and medicines from light.

4.2 Choice of syringe

Use only BD Plastipak Luer-Lok syringes.

Within Lothian CME McKinley T34s are calibrated to BD Plastipak Luer-Lok syringes only. Syringe brands from other manufacturers may have different barrel sizes in relation to the volume of medication and should not be used, as the flow rate determined by the McKinley T34 will be inaccurate. Other Health Boards may calibrate their pumps to use different syringe brands. The Luer-Lok is important to avoid leakage or accidental disconnection.

Size of syringe: **10ml syringes should not be used**. 20ml or 30ml syringes allow greater dilution of medications to reduce skin irritation at the cannula site, support drug compatibility and to accommodate larger doses. The maximum volumes which will fit in the T34 syringe pump are:

- 17ml in a 20ml syringe
- 22ml in a 30ml syringe

In exceptional circumstances and with guidance from Specialist Palliative Care Services/ Pharmacy, 50ml syringes may be used to allow up to 34ml to be administered. Note that the clear plastic box holds a maximum size 30ml syringe, requiring assessment of risk for the individual patient.

4.3 Prescription

Should state:

- Patient identification: name, CHI number
- Date of prescription
- The generic name of the medications for infusion

- Dose
- Route & duration of infusion: continuous subcutaneous infusion over 24hrs
- Prescribers signature

In addition to the medications prescribed for continuous infusion by syringe pump, anticipatory medications should also be prescribed for PRN use and available to control any breakthrough symptoms.

For adults refer to; the Scottish Palliative Care Guidelines (Adults).

For children & young adults refer to; Basic Symptom Control in Paediatric Palliative Care – The Rainbows Children Hospice Guidelines current edition.

4.4 Procedure

Staff should follow local policies regarding standard infection control precautions and the disposal of sharps and waste.

Step 1: Pre- set up

1. Discuss the use of the CME McKinley T34 syringe pump and medications with the patient in the context of their care goals, the practicalities of daily life with the pump and a shared treatment plan. Gain and document informed consent. Consider appropriate involvement of those important to the patient including any Power of Attorney, family, carers, Welfare Guardian. Where the adult patient does not have capacity to consent the Adults with Incapacity (Scotland) Act 2000 applies including the need for a section 47 Medical Treatment certificate.
2. Verify patient details with prescription and documentation.

3. Check the compatibility of the prescribed medication(s) and diluents with the Scottish Palliative Care Guidelines Syringe Pump Compatibility and Stability tables for subcutaneous infusion / Pharmacy or Specialist Palliative Care services. In Lothian the CME McKinley T34 is the only pump used for subcutaneous infusions for palliative care- when referring to the Scottish Palliative Care Guidelines Syringe Pump Compatibility and Stability tables for subcutaneous infusion ensure you refer to the columns specifically for the CME T34 Ambulatory pump.

4 Note that Specialist Palliative Care Services may occasionally advise use of medication combinations out with those listed in the Scottish Palliative Care Guidelines Medication Compatibility tables. This advice should be clearly documented in the clinical record.

5. Check the CME McKinley T34 pump is intact, with no parts damaged or missing and the label on the casing indicates the pump has been serviced within the last year.

Step 2: Prepare the syringe and infusion line

6. Draw up the prescribed medication(s) and compatible diluent in the syringe. Syringes should be made up immediately prior to administration. The medications listed within the Scottish Palliative Care Guidelines compatibility tables are stable for 24hrs.

7. Invert the syringe gently several times to mix the solution thoroughly. Observe for cloudiness, discolouration or precipitation. Discard if this occurs and seek advice. Expel any air from the syringe.

8. Complete and attach the syringe pump additive label. Ensure that the label does not obscure visual inspection of the syringe for monitoring purposes or interfere with the mechanism of the device i.e. contact with the barrel clamp arm.

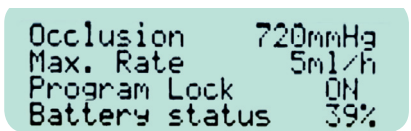
9. Aseptically connect the infusion set to the syringe and prime the line.

Step 3: Pre-loading: before placing the syringe onto the pump

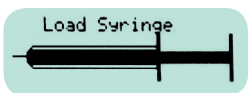
10. Insert the battery as shown on the pump's battery compartment diagram. Ensure the battery fits well and is not loose to avoid unintended shutdown or damage to the pump from movement.

11. Ensure the barrel clamp arm is down, then press and hold the ON/OFF key. The pump's identity should appear on the LCD display screen, followed by PRE-LOADING during which the actuator will start to move.

    Whilst the actuator is moving, the self test screen is briefly displayed. This shows the pump's configuration.



    Wait until the actuator stops moving and appears on the screen.



Note that during pre-loading the actuator always returns to the position of the last infusion programmed. Use FF BACK keys to move the actuator to the position required for loading the new syringe. It is important to correctly position the actuator at this point to enable the syringe to be loaded correctly later.

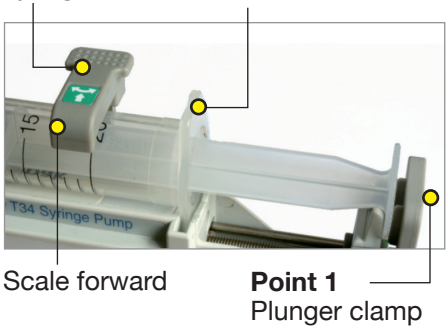
    Safety reasons limit forward movement of the actuator to short steps; thus repeated depressions of the FF key may be required to move the actuator forward. Backwards movement is not restricted. The barrel clamp arm has to be down for actuator movement.

12. Before loading the syringe, check the battery power: press the key INFO repeatedly until the battery level appears on screen and then press YES START to confirm. In the community discard the battery if less than 40% power to ensure the infusion will continue for 24hrs. Average battery life starting at 100% is approx. 3-4 days, depending on use.

Step 4: Place the syringe on to the pump

Ensure the infusion line is not connected to the patient at this point.

13. Lift and turn the barrel clamp arm
14. Seat the filled syringe into the plunger (point 1 on picture) and collar (point 2) sensors simultaneously. To click the syringe plunger in place securely may require slight pressure. The syringe collar should be vertical and the scale on the syringe barrel facing forward.
15. Turn and lower the barrel clamp arm to secure the syringe. (Point 3 on picture)



16. The 'Load Syringe' graphic on the screen ceases to flash when the syringe is correctly seated at all 3 points.

Uncontrolled flow of medication may occur if the syringe is not correctly or securely fitted to the syringe pump.

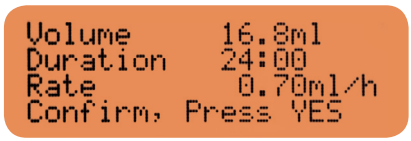
Correct placement reduces the start up time when a new infusion is commenced.

To avoid the inadvertent administration of a bolus dose, the syringe must be seated and secured to the pump before being connected to the patient.

Step 5: Programme the infusion

17. The pump should recognise the brand and size of syringe. Press YES START if correct or scroll ▲+ ▼− to select the correct size and brand of syringe.

18. After syringe confirmation, the pump automatically calculates and displays the deliverable volume (in ml), duration of infusion (24hrs) and rate of infusion (in ml per hour).



Check the details on the display screen are correct. Press YES START to confirm.

If the infusion details are not correct press ON/OFF to switch off the pump. Switch the pump back on, reload the syringe. If the details are still not correct return the pump to Medical Physics for checking .

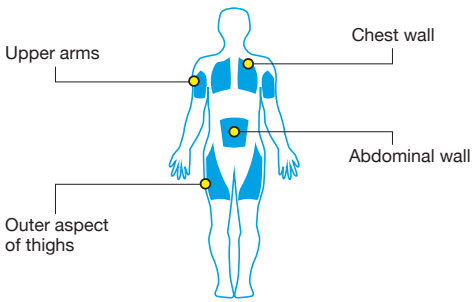
19. The pump screen should then prompt 

but first - site the cannula and connect the infusion line to the patient.

Step 6: Site the cannula

20. Select an appropriate infusion site with adequate subcutaneous tissue to support an infusion.

    Consider mobility, comfort, care needs, and access for monitoring.



Avoid broken, irradiated or oedematous skin due to risk of infection and as absorption of medications will be affected. Avoid skin folds, bony areas or joints and the upper chest wall in thin / frail patients - risk of causing pneumothorax.

The scapula may be considered for confused patients who may pull on the line – advise patient.

Note that the soft material of the cannula can occlude if the patient lies directly on the insertion site.

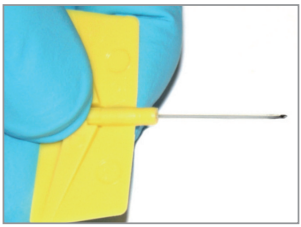
21. Clip excess hair from the selected site if appropriate. Decontaminate the skin with a single use application of 2% chlorhexidine in 70% isopropyl alcohol and allow to air dry.

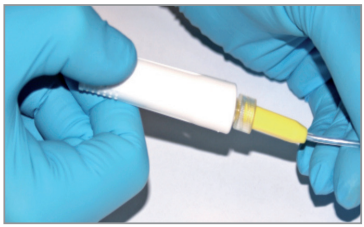
CHILDREN & YOUNG ADULTS ONLY
– Go To page 16 follow steps 30-34

ADULT PATIENTS ONLY
– follow steps 22- 29 below

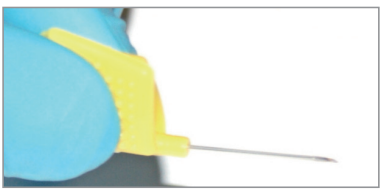
22. When inserting the BD Saf-T-Intima® cannula the side with the multiple bumps on the wings should be face down to the skin. Remove the small clamp & discard.

23. The needle should be bevel side up, sharp side down. To turn the needle gently hold the yellow connector and rotate the white needle introducer.

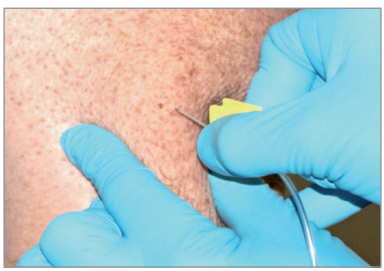




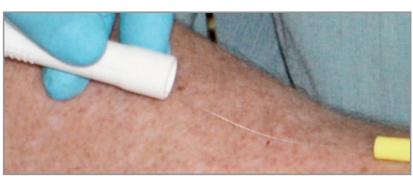
24. Pinch the wings to lock the needle in place.



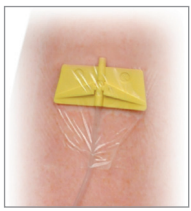
25. Pinch subcutaneous tissue and insert the cannula at a 30-45° angle, bevel side up and sharp side down.



26. Gently press the wings to the patient's skin and withdraw the introducer in a smooth single movement - the needle will be automatically secured within the telescopic chamber. The telescopic introducer must be disposed of in a sharps container.



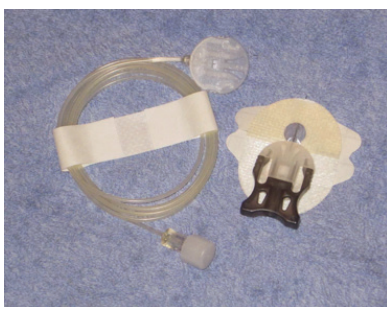
27. Secure using a transparent dressing. Write the date cannula inserted on the dressing. If the site remains intact, the cannula can be left insitu for up to 7 days.



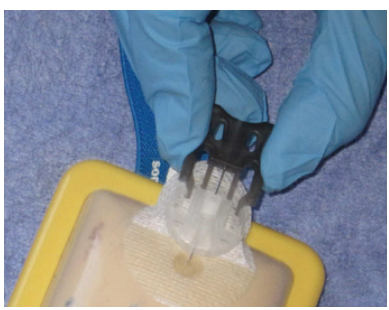
28. Connect the primed infusion line to the cannula. Ensure the connection is tightened to avoid potential leakage.
29. If at any point blood is visible in the cannula, this must be removed. Insert a new cannula at least 3cm away from previous site.

CHILDREN & YOUNG ADULTS ONLY: Medtronic Silhouette cannula

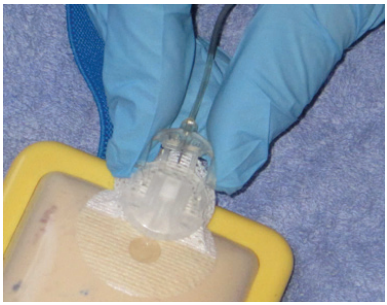
30. When inserting the Medtronic Silhouette cannula ensure the sticky side of the attached dressing is against the skin.



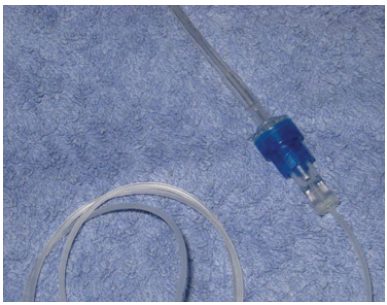
31. The needle should be bevel side down, sharp side up. The needle is inserted at a 30-45 degree angle. The backing is removed from the white adhesive dressing and the dressing pressed gently onto the skin. Once inserted the black topped needle is removed by gently squeezing the two black prongs as illustrated. The needle is then disposed of in the sharps bin.



32. Once the black needle is removed the PRIMED extension set (0.2mls) should be attached to the cannula. The clear needle protector is removed by squeezing the two clear wings on the extension set.



33. The primed line can now be clipped into the end of the inserted cannula. A primed CME Syringe Extension set Admin Integrated antisyphon valve should also be in place. The connection between the line and cannula must be tight otherwise there is a risk of leakage.



If at any point blood is visible in the cannula, remove and insert new cannula at least 3cm away from the previous site.

34. Write the date cannula inserted on the dressing. If the site remains intact, the cannula can be left insitu for up to 7 days.

Step 7: All Patients: Start the Infusion

With the cannula inserted and the line connected to the cannula the pump can be started.

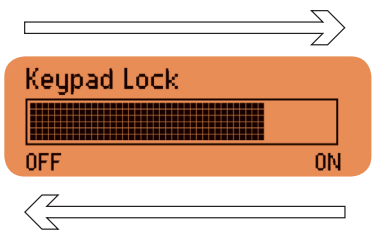
36. The pump screen should prompt 

Press to YES START commence the infusion.

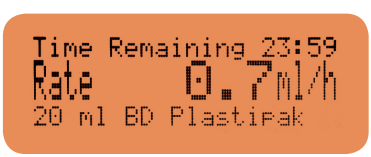
37. Keypad lock: this should be used routinely to prevent tampering during the infusion.

    NB: the YES START NO STOP keys will still remain active when the keypad lock is on.

    To activate the keypad lock: press and hold the INFO until the progress bar appears and has moved completely across the screen from left (off= unlocked) to right (on=locked) and a beep is heard.

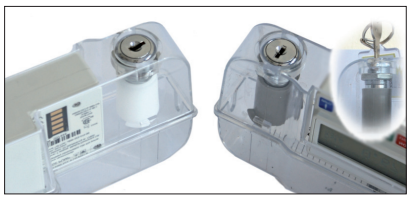


    To deactivate: repeat the above procedure. The progress bar will reverse from right (on=locked) to left (off=unlocked) and a beep will be heard once complete.

38. The screen should now display 

    The LED display light flashes every 30-40 secs. The lower line of the display alternates between the syringe size and “pump delivering”.

39. Secure the syringe pump in the clear plastic syringe pump box. Individual patient assessment is required as to whether a key-operated lockbox should be used or, whether a plastic box that does not require a key, but can be closed firmly with a coin/ card/paperclip will suffice.



40. Protect the CME McKinley T34 from direct light and heat which can adversely affect the stability of medications in the syringe.

Direct sunlight on the CME T34 casing can cause the pump to alarm, administer a bolus of up to 10% of the syringe contents, and then stop infusing. See page 29 for action should this occur.

The manufacturer's disposable pouch or similar receptacle should be used. The need to keep this away from direct heat and flame due to risk of fire should be explained to the patient and /or carer.

41. Assess the information and education needs of the patient, family, any Power of Attorney or Welfare Guardian. Ensure understanding re; a) maintaining safety and integrity of the infusion b) potential risks including protecting the pump from light and the pouch or similar receptacle from direct heat and flame, any issues specific to the individual as assessed by staff c) troubleshooting instructions, recognising and reporting side effects d) the availability and role of anticipatory PRN medications and how to use these. The leaflet 'Important

Information About Your McKinley T34 Syringe Pump' available from the intranet can support discussion and any written information specific to the individual provided see section 8.

42. Complete documentation. Include a plan for addressing any further education or information needs. The clinical decision and rationale for use of the McKinley T34 pump for the individual patient should be documented.

Safe Practice Points: Manage Risk!

- **The syringe pump should not be placed >75cm above the infusion site** to reduce the risk of syphonage.
- **The syringe should be disconnected from the patient before removing it from the pump** in order to avoid inadvertent bolus of medication.
- **Never add another medication to an infusion which is already in progress.** Make up a new syringe for use. If the patient experiences breakthrough symptoms: use PRN medications.
- **Breakthrough symptoms:** use anticipatory PRN medications. Consider the most appropriate route of administration for the individual patient. For adult patients refer to the Scottish Palliative Care Guidelines (Adults). For Children & Young Adults refer to Basic Symptom Control in Paediatric Palliative Care – The Rainbows Children Hospice Guidelines current edition".

  Anticipatory PRN medications should never be administered via the cannula used for the continuous infusion via T34.This is a drug administration error. Administration into the same cannula may

compromise the site, compatibility/stability with the medications in the continuous infusion and delay absorption of the prn medications.

A separate cannula can be inserted for intermittent subcutaneous injection. Follow the procedure for inserting the cannula detailed above. Instead of connecting an infusion line - attach a sterile cap, Smartsite or equivalent to the cannula port (the Silhouette comes with its own cap in the pack). The cannula should be gently flushed with a diluent compatible with the PRN medications prior to and after administration. Complete clinical documentation.

Section 5: Monitoring the infusion

5.1 Frequency

Check the infusion 15 minutes after set up to ensure the infusion is progressing. Thereafter a minimum of 4 hourly within in-patient settings and at each nursing visit in the community.

More frequent monitoring is necessary where problems have occurred or are specifically anticipated for that patient during the infusion. Where problems are identified prompt action must be taken.

5.2 CHECKS

☑	1 The patient	Are symptoms controlled? Is PRN medication required? Is the patient experiencing any side effects from the medications?
☑	2 Cannula site	Check for inflammation, leakage, swelling, hardness or blood. This affects absorption of medications and increases risk of infection- change site as soon as detected.
☑	3 Infusion line	Check for security, kinking, leakage, patient lying on line.
☑	4 Syringe	Check for cloudiness, discolouration, or precipitation. Stop immediately. See pg 32 Troubleshooting. Check syringe is securely placed on the syringe pump.

☑	5 Syringe pump	Check the time remaining and the flow rate displayed on the screen is correct. Press INFO once to show infusion summary. Record the volume infused and the volume remaining to check that the syringe pump is running to time. Confirm by visual inspection & calculation.
☑	6 Documentation	Record checks on the McKinley T34 Set Up & Monitoring chart. Any issues must also be documented in the patient's notes & adverse events reported via Datix/ Hospice reporting. Any checks not carried out e.g. cannula site not checked to avoid disturbing the patient's sleep/ patient out of ward, should be recorded as such on the McKinley T34 Set Up & Monitoring chart

Battery

Checks are not routinely required as the battery % is checked and recorded at infusion set up, however if this is required when troubleshooting press INFO twice. The screen should display the level of remaining power.

5.3 Changing the Cannula/Infusion Line

- The BD Saf-T-Intima® single port cannula (Adults) and Medtronic Silhouette (Children & Young People) can remain in situ for up to 7 days if the site is intact with no leakage, hardness, inflammation, swelling or discomfort. When re-sited the new cannula should be placed at least 3cm from previous sites. A new infusion line should also be used. Used cannula should be disposed of in a sharps container.
- The infusion line and cannula should be changed when the prescribed medications are changed, to avoid the risk of incompatibility between current and new prescriptions. If there is only an increase or decrease in the dose of the current medications then the cannula can remain in situ and only the infusion line changed, with anticipatory PRN medications available until the new prescription takes effect.

6: Renewing/stopping/restarting the infusion

6.1 When the 24hr Infusion has Completed

1. Prior to completion identify whether any changes to prescription are required. Consider the patient's symptoms and their response to the medications which have been administered by continuous infusion + PRN.
2. A warning will be shown on the display screen 15 minutes prior to completion. When the infusion is complete, the pump will stop and the alarm sound. Press YES START to confirm end of infusion and then deactivate the keypad lock (p18).
3. If no further infusion is to be administered: press and hold ON/OFF until a beep is heard. Ensure the pump is switched off. Remove cannula and dispose of in sharps container. Remove syringe, replace barrel arm. Remove battery. Complete documentation.

If the infusion is to be discontinued before the syringe is empty, the syringe and line should be disconnected from the patient before removing from the pump, to avoid the risk of inadvertently administering a bolus of medication.

The volume of any medication discarded must be documented on the monitoring chart.

4. When the infusion is to be renewed: if the cannula site is satisfactory and the prescribed medications have not changed, a new filled syringe can be attached to the existing infusion line.

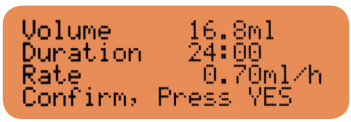
   The recommended procedure is to press NO STOP to stop the infusion. Press ON/OFF to turn off the pump. Disconnect the current syringe from the infusion line before removing the syringe from the pump. Ensure the barrel clamp arm is fully in the down position. Follow the start up procedure omitting siting the cannula. Ensure new syringe is securely placed in the T34 before connecting to the infusion line.

6.2 When stopping the pump during the 24hr infusion to prime a new infusion line

1. Press NO STOP. Disable the keypad lock. Do not switch off the pump.
2. Disconnect the existing line from the syringe and remove the line from the patient.
3. Remove the syringe from the pump then attach and prime a new line.
4. Follow the procedure for loading the syringe pg 10. Confirm the syringe brand and size by pressing YES START
5. Attach the new line to the BD Saf T intima cannula/ Medtronic Cannula.

6. The screen should prompt

Press YES START to resume the programme: the screen will display the volume and rate. Check if details are correct and if correct.



Press YES START to confirm and the screen will display

press YES START again to confirm.

The time remaining for the infusion will decrease to compensate for the solution that was used for priming the second line; the flow rate will remain the same.

7. Activate the keypad lock pg 18. Fit the pump into plastic box and record details of re-priming on the monitoring chart.

6.3 WHEN TEMPORARILY STOPPING THE INFUSION

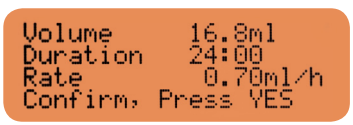
This is not routine practice but may be required for example, when undergoing procedures such as MRI scan.

1. Press NO STOP
2. Turn off the keypad lock page 18. Press and hold ON/OFF . The screen will go blank.
3. Do not remove the syringe from the pump. Disconnect line from the cannula. Attach cap to infusion line and Smartsite or equivalent to cannula port.
4. Document time stopped and reason why on the monitoring chart.

To resume;

5. Check the prescription, syringe label and patient's details match.
6. Reconnect the infusion line to the cannula, checking the fluid in the line is intact.
7. Press and hold ON/OFF until a beep is heard.
8. Confirm the syringe brand and size.
9. The screen will display

10. Press YES START to resume the existing programme: the screen will display



Visually check details and if correct press YES START to confirm.

11. The screen will then display 

, press to YES START confirm.
12. Document the time the infusion restarted on the McKinley T34 Set Up & Monitoring chart.

When resuming an infusion after temporarily stopping or priming:

If NO STOP is pressed, the syringe pump interprets this as a completely new infusion and the remaining contents of the syringe would be delivered over the next 24 hours. The patient would not therefore receive the prescribed dose of medication.

If the NO STOP is pressed in error, the reminder of the syringe contents should be discarded and a new syringe prepared and set up.

Section 7: Alarms and troubleshooting

When an alarm is activated an audible repetitive bleep sounds. The screen turns red and displays a message and instructions to help identify/ resolve problems. Before troubleshooting, press YES START to acknowledge and silence the alarm.

7.1 Alarm LED display

Display	Cause/Action
Pump paused too long	Left in stopped or program mode for 2 minutes. Start infusion, continue programming or switch pump off.
Occlusion	Check for trapping or kinking of the infusion line. Check cannula and that the patient is not lying on the cannula insertion site. When satisfied press YES START Check if the pump has been placed lower than cannula site which can increase the risk of alarming. If not resolved re-site cannula. Then if not resolved complete a McKinley T34 Service Request Form and send to Medical Physics for checking
Syringe displaced	Syringe not correctly fitted/ displaced. On screen message identifies which sensor to check.
Near End	Infusion nearly complete. Infusion does not stop. Prepare to change syringe.
End programme	Infusion complete. Change syringe or remove infusion if pump discontinued.

Syringe empty	Infusion stops. Check intended time for completion. Change syringe.
Low battery	To alert user- the infusion does not stop. Change battery, resume infusion.
End battery	Battery depleted. Infusion stops. Change battery and resume infusion
SYSTEM ERROR and display asks user to press the INFO button	Indicates that the CME T34 casing has been exposed to direct sunlight and has malfunctioned. When user presses INFO it will read – 'Startup Motmove fail' and instruct the user to switch the pump off and ON. The pump should be removed, quarantined and returned to Medical Physics. Assess the patient and take appropriate action e.g. discuss with medical staff the effect on the patient, the additional medication administered in relation to the 24hr prescription and any action needed before restarting the infusion with a new T34 pump. Assess requirement for PRN medication if the infusion has been stopped and the patient is experiencing breakthrough symptoms. Report via Datix/ Hospice reporting system.

7.2 Troubleshooting

Problem	Possible cause (s)	Action
Pump will not start.	No battery present.	Fit a battery.
	Battery inserted incorrectly.	Fit battery correctly.
	Battery is depleted.	Fit a new battery.
	Pump is faulty.	Send for servicing.
Infusion ended early/ infusing too quickly.	All causes	Assess patient. Stop infusion and discuss with medical staff.
	Disconnection of syringe, line or cannula	Check placement of syringe, line, cannula
	Wrong syringe brand confirmed during set up/ incorrect volume measured by pump.	Set up a fresh infusion. If user error- seek training.
	Syringe pump placed >75cm above cannula site	
	Air is present in the syringe- could indicate the barrel is cracked	Check and replace syringe as appropriate. Datix/hospital incident report
	Pump faulty/ incorrectly calibrated.	Send for servicing.

Problem	Possible cause (s)	Action
The Infusion is running slow	Infusion stopped at any point? Cannula site needs changed Pressure/kinking on the line or cannula Disconnection of syringe, line or cannula. Wrong syringe brand / size confirmed during set up/ incorrect volume detected by pump Battery discharged Pump is faulty	Assess patient: PRN medication required? Set up a fresh infusion. Check placement of syringe, line, cannula If user error- seek training. Send pump for servicing Replace battery. Send for servicing.
The pump has stopped before the syringe has emptied.	Depleted battery. Pump is faulty. Pump casing exposed to direct sunlight?	Check battery power. Insert new battery, turn pump on, confirm syringe size and resume infusion. Return to Medical Physics. Datix/hospital incident report

Problem	Possible cause (s)	Action
Alarm caused by occlusion. When the occlusion is resolved and the same infusion is restarted- the display shows volume to be infused (VTBI) has increased and volume infused (VI) has decreased.	The CME T34 has a Post Occlusion Bolus feature. This is activated by pressure downstream in the infusion line/ cannula / site due to an occlusion. The pump then reverses the operation of the motor and moves the syringe actuator backwards and stops, otherwise the pressure build up could cause a surge of fluid to be administered when the occlusion is released. If after releasing the occlusion, the user when restarting YES START the infusion presses to resume, the VTBI on the display increases and the VI decreases in line with the pump 'backing off'. This feature also protects the original ml/ hr rate setting.	
Cannula sites require frequent changes	Irritation from the medications.	Use a larger syringe & more dilute solution. Check diluent and potential alternatives for prescribing with pharmacist/ specialist palliative care.
	Cannula insertion technique	User error- seek training
Discolouration/ crystalisation of solution in the syringe	Incompatability /stability of medications	Stop immediately. Check compatibility of prescribed medications Seek advice from pharmacist/ specialist palliative care. Report incident

Section 8: Support for people requiring a T34 syringe pump and important others

The information needs of the patient, and important others where appropriate, should be individually assessed. Verbal information and discussion should be supported by written information. The patient and important others may be involved in managing the pump; not all may be able or willing to be involved, some will. Preparation, information and support needs required should be assessed and care planned accordingly.

Historically, a misconception has been that use of the syringe pump means the patient is imminently dying, particularly where the infusion contains morphine and other controlled medications, seen as a step towards hastening death. This can cause distress and affect compliance. It is important to assess for and address any fears and false beliefs regarding the purpose and use of the pump.

Prior to discharge home and in the community setting, clear guidance must be given re;

- A review of the reasons for use of the CME McKinley T34 and medications in relation to their care goals and future anticipatory care plan.
- Contact details for key professional(s) for support in and out of hours.
- Troubleshooting according to their degree of involvement with the pump and which issues to report e.g. if the alarms sounds or the pump stops working.
- Safety and care of the syringe pump e.g. avoid exposure to direct light, use of pouch or similar receptacle, keeping the pump and pouch away from direct flame and heat to avoid fire risk, not dropping or getting the pump wet & what to do if this happens.
- Recognising and reporting any medication side effects and how to manage any breakthrough symptoms.

Section 9: Transferring patients between clinical areas/care settings

Planning for transfer is important in advance. This includes ensuring that the receiving area is able to make any arrangements needed to safely manage the McKinley T34 where this is not used routinely and time to ensure adequate supplies of required medications and equipment.

Information must be shared with the receiving area/ care setting prior to transfer regarding;

- Medications prescribed via subcutaneous infusion and PRN, plus any specific issues relating to symptom control for the individual patient during the current episode of care. This is vital to ensure continuity of care and that the receiving area has time to order stock of the required medications.
- The time the infusion is due to complete. There must be an adequate volume remaining in the syringe to allow the syringe to be renewed following transfer and to avoid interrupting the delivery of medication. Patients being discharged home from an in-patient setting should have the syringe renewed just prior to discharge and staff should ensure the battery has at least 40% battery life remaining.
- Arrangements for returning the syringe pump to the lending area. The receiving area/ setting should replace with their own CME McKinley T34 pump at the next set up and return immediately.
- Patients discharged from in-patient setting: information should be provided for the GP, District Nursing, HBCCC, Care Home Teams, as appropriate, prior to discharge. Updates re medication and relevant information from hospital stay should be communicated to the GP via the Immediate Discharge Letter, with telephone contact as appropriate. Anticipatory information should be included in the electronic Key Information Summary eKIS.

- Patients in the home setting requiring a T34 should have a Key Information Summary completed, with their permission, by the GP which contains an anticipatory care plan.
- Specific planning is required for patients who will return to a custodial environment and who have been receiving a continuous infusion by syringe driver for symptom management. Nursing/ Medical staff should communicate in a timely manner with the Nursing Leads within the custodial environment to discuss this further and how the patients needs can be met. Specialist palliative care services can be contacted for advice when planning for transfer.

If a patient is transferred into Lothian with a different syringe pump then the infusion should be reviewed and the device changed to a Lothian CME McKinley T34 syringe pump as a priority. CME McKinley T34 pumps from other health boards may be configured differently and therefore should not be used whilst the patient is within a care setting in Lothian.

Section 10: Sources of help and advice

Medical Physics	
West Lothian SJH & Community: 0131 536 4400 Opt 4	All other Lothian Hospitals, Hospices & Community RIE: 0131 536 4400 Opt 2 WGH: 0131 536 4400 Opt 3

Pharmacy		
RIE 0131 242 2911/12/15 internal 22911/ 22912 /22915	WGH 0131 537 1210 or 0131 537 2334 internal 31210 or 32335	West Lothian 01506 522034 internal 52034 bleep 3918
RHSC Main Pharmacy enquiry: Monday to Friday 0131 536 0322 (internal 20322) Out of Hours advice: main switchboard 0131 536 0000 and ask for the On Call Pharmacist to be bleeped)		
Marie Curie Hospice, Edinburgh Tel: 0131 470 2201	St Columba's Hospice Pharmacist 0131 551 1381 Ask reception to radiopage	

Specialist Palliative Care Services (Adults): Hospital Teams		
RIE: 0131 242 1993 Internal 21993 / bleep 5715	WGH: 0131 537 2243 Internal 32243/ bleep #6410	SJH: 01506 522010/ internal 52010/ bleep 3863

Specialist Palliative Care Services (Adults): Community

Lothian: via hospices Marie Curie: 0131 470 2201 St Columba's: 0131 551 1381	East Lothian 0131 536 8332	West Lothian Palliative Care Services: 01506 523531 ext 53531

Specialist Palliative Care Advisory Service out of hours and weekends for all Lothian care settings

Marie Curie Hospice, Edinburgh: 0131 470 2201/ St Columba's Hospice: 0131 551 1381

Specialist Palliative Care Services (Children & Young Adult Services): Hospital

Pain Management Service: RHSC 07.30 – 1900hrs, Monday-Friday. 0800 – 1400hrs. Saturdays Contact: switchboard 0131 536 0000 internal 20605 ask for bleep 9240

NHS Lothian Palliative Care – Nurse Specialist Children & Young Adult Services Monday – Friday 09.00 – 17.00 0131 536 0318 Internal 20318

Specialist Palliative Care Services (Children & Young Adult Services): Community

Community Children's Nursing Team: across Lothian Community settings Monday to Friday – 08.30 – 16.30 0131 312 2336

Clinical Education Team in NHS Lothian

CME McKinley T34 Syringe pump training via HR Online; training requirements to be discussed with your manager. Course information and booking details are accessible via the staff intranet, or email: Lothian.applications@nhs.net

Consultation and Distribution Record

Contributing Author(s):

Lothian McKinley T34 Syringe Pump Group

Chair: Malcolm Phillips, Head of Medical Equipment Management NHS Lothian. **Email: malcolm.phillips@nhslothian.scot.nhs.uk**

Patricia Brooks Young, Lead Nurse Palliative Care
Email: patricia.brooksyoung@nhslothian.scot.nhs.uk

Consultation Stakeholders:

Separate document-pan-Lothian and multiple source: services, multi professional, patient feedback: 3 rounds plus consultation zone

Distribution:

NHS Lothian intranet and NHS Lothian internet

CME McKinley T34 Guidelines Version 2 Review: 1/6/2021

Marie Curie
Care and support through terminal illness

St Columba's Hospice
CARE AND COMPASSION

NHS Lothian