



Lincolnshire Community Health Services NHS Trust
United Lincolnshire Hospitals NHS Trust
St Barnabas Lincolnshire Hospice

Working in partnership

Policy and Procedure for the use of the CME MEDICAL McKinley T34 Syringe Driver for Adults in Palliative Care

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Name of authors:	Anna Chippendale Pringle, Macmillan Palliative Care CNS United Lincolnshire Hospital Trust (ULHT), Lyn Wilkinson Macmillan Palliative Care CNS Lincolnshire Community Health Services (LCHS), Carol Gent, Macmillan Palliative Care CNS LCHS, Elaine Wilkins , Macmillan Palliative Care CNS LHCS, Jill Edwards, Specialist Nurse Practitioner, St. Barnabas, Kerriane Lawson Deputy Sister St Barnabas
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CONTRIBUTORS

Countywide Macmillan Palliative Care Nurse Specialist Group
Jackie Rizan Macmillan Palliative CNS
Dr G Keenleyside, Consultant in Palliative Medicine, Lincolnshire
Sam Lewis Specialist Nurse Practitioner, St Barnabas
Jayne Unwin Marie Curie
LCHS Adult Integrated Governance and Risk Forum
ULHT Practice and Quality Group
Clinical Engineering, ULHT

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- McKinley T34 Ambulatory Syringe Pump Operation Manual (2011)
- NHS Education for Scotland Guidelines for the use of the CME McKinley T34 Syringe Pump for Adults in Palliative Care (2011)
- Lincolnshire Policy for the usage of Syringe Drivers MS16A and MS26 in Palliative Care (2010)
- St Barnabas Lincolnshire Hospice Policy and Protocol for the usage of the T34 McKinley Syringe Pump for subcutaneous Infusions (2010)

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CME Medical UK Ltd
Kincraig Business Park
Kincraig road
Blackpool
FY2 0PJ
Tel. 01253 894646
www.cme-mckinley.co.uk

Ginina Atkinson, Clinical Support Specialist
gatkinson@cmemedical.co.uk

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SECTION 1 - POLICY FOR THE USE OF CME MEDICAL MCKINLEY T34 SYRINGE DRIVER

1 INTRODUCTION

This policy applies to the use of the CME McKinley T34 Syringe driver for subcutaneous infusions for adults within palliative care. Administration of medications via other routes and use in paediatrics are outside the scope of this policy.

The aims of this policy are: to ensure efficient and safe practice across Lincolnshire in the use of the battery operated McKinley T34 syringe driver; to improve the standard of care provided to patients; and to minimise hazards.

The McKinley T34 syringe driver is a portable, battery operated device for delivering medication by continuous subcutaneous infusion.

The policy provides the rationale for the use of the McKinley T34 syringe driver and guidelines to support staff training and management of associated equipment.

This policy is not a stand alone document and is intended to be used in conjunction with the Protocol and Training Pack for this device. This policy should be read in conjunction with policies and guidelines on medicines management, medical devices management, infection prevention and consent in addition to the following:

- MHRA-Infusion Systems (2013)
- The Code: Standards of conduct, performance and ethics for nurses and midwives (NMC 2015)
- Standards for medicines management (NMC 2015)
- CME Medical McKinley T34 Operation Manual Revision 1.6.(2014)

2 PURPOSE

Syringe drivers are used for the continuous delivery of medication into the subcutaneous tissue of adults for whom oral administration would be problematic. It is well-established practice in the care of adults with palliative and end of life care needs, to use syringe drivers in the control of symptoms, in a variety of settings. The effective use of syringe drivers can enhance the quality of life.

3 SCOPE

- This guidance can only be implemented once staff have completed the theoretical workbook and have received face to face theory and practical skills training in the operation of the McKinley T34 syringe driver
- Nursing staff administering medication via the syringe driver must have current registration and participate in mandatory updates

- The NMC accepts that registered nurses keep their knowledge and skills up to date taking part in appropriate and regular learning and professional development activities that aim to maintain and develop competence and improve performance(NMC 2015)
- This policy is relevant to all adult patients receiving care in Lincolnshire.

4 RESPONSIBILITIES

- 4.1 Employers are responsible for ensuring that all staff using medical devices are appropriately trained. All health care professionals and support workers have a personal responsibility and accountability to ensure they receive training in the safe use/observation of any medical devices they need to use (MHRA 2013).
- 4.2 It is the responsibility of managers to ensure that user training is received by the appropriate staff and documented. Comprehensive records of procedure and medical device training must be kept in a central register.
- 4.3 Professionals undertaking the setting up and replenishing of syringe drivers, or providing care to patients with syringe drivers, must ensure that they are competent and confident and have the required level of knowledge and skills. Professionals should record any training received within a training log (revalidation) recording learning objectives and outcomes.
- 4.4 Staff who use these devices must be competent in undertaking the management and use of syringe drivers and will be provided with practical instruction and training within the organisations covering both practical and technical matters (MHRA 2015), and are required to attend training updates as appropriate.
- 4.5 Following training, staff will be expected to demonstrate the following competencies in the use of the syringe driver and to maintain these competencies keeping up to date with current practice:
- The ability to communicate the rationale for the use effectively with patients, carers and other professionals
 - The selection of appropriate equipment and the ability to explain the rationale for doing so
 - A knowledge of drugs and drug combinations that can be used and their possible side effects and knowledge of where to access additional advice
 - Local practices relating to the prescribing, storing and documenting of the specific drugs to be used
 - The indications for use of a syringe driver
 - Advantages and disadvantages of use
 - Contraindications
 - Skin sites, selection and care
 - Identification of problems and solutions
 - Effective hand hygiene
 - Safe disposal of waste (including pharmaceutical waste)
 - The maintenance and cleaning of equipment

4.6 When teams plan to use a syringe driver they should ensure that the appropriate pharmacy or dispensing practice is aware and has the necessary medicines available for continuing the driver.

4.7 All staff will have access to and knowledge of this policy and any revision will be disseminated by managers to the appropriate team members.

5 CME MEDICAL McKINLEY T34 SYRINGE DRIVER

The T34 is a small, lightweight, robust, battery operated ambulatory syringe driver designed to deliver medication by continuous subcutaneous infusion. The T34 offers 3 point syringe detection enabling the driver to identify all commonly used (or programmed) syringe brands. This feature also enables the driver to calculate the syringe volume and deliver the contents as mls per hour (ml/hour) therefore minimising the risk of programme error. The sensors also activate an alarm if the syringe is removed or partially displaced during infusion.

The driver is configured and locked to the following mode of operation: **LOCK ON** delivering the contents of a syringe over a fixed duration of 24 hours. The driver automatically calculates the ml/hour rate based on the fixed duration (24 hours) and the confirmed deliverable volume. A lead screw drives the driver actuator and syringe plunger forward at a controlled rate.

The size and weight of the T34 makes it ideal for ambulatory use in all settings. The driver can be easily concealed beneath clothing in a shoulder holster and combination belt. When in use a compact lock box protects the driver from damage and/or tampering with the driver or displacement of the syringe (CME Medical T34 Operation Manual 2014).

6 RATIONALE FOR USE

The McKinley T34 Syringe driver has been introduced because it has:

- Rate setting in millilitres (ml) per hour
- Mechanisms to stop infusion if the syringe is not properly and securely fitted
- Effective alarm systems alert to occlusions, end of infusions, near end of battery and syringe displacement if a syringe is removed or partially displaced during an infusion
- Lock-box covers and lock-out controlled by password
- Provision of internal log memory to record all driver events

These features comply with MHRA (2015), IEC standards (2012) and NPSA (2010) requirements to ensure the safety of infusion drivers.

In addition the McKinley T34:

- Reduces the risk of programming error and prevents confusion in driver selection. The driver offers a 3 point detection system enabling identification of all common (or programmed) syringe brands. This feature ensures the

- driver can make volume and rate calculations minimising the risk of user programming errors
- Has a delivery system allowing a larger volume of drug to be infused which facilitates greater flexibility of drug dose and drug combinations

7 INDICATIONS FOR USE OF A SYRINGE DRIVER

Subcutaneous drug infusion using portable syringe drivers has had a positive impact on patient comfort in palliative care. It permits the continuous delivery of a range of drug therapies at a predetermined rate via the subcutaneous route at any stage during the disease pathway.

“Palliative care is an approach that improves the quality of life of patients and their families facing the problem associated with life-threatening illness, through the prevention and relief of suffering by means of early identification and impeccable assessment and treatment of pain and other problems, physical, psychosocial and spiritual.” WHO (2016)

The decision to administer medication via a syringe driver needs to be taken by the multi-professional team in consultation with the patient and / or carer. Other methods of administration should be considered prior to choosing the subcutaneous route, e.g. transdermal, rectal or sublingual and may be considered as part of ongoing therapy with a syringe driver.

A syringe driver may be indicated in the following circumstances:

- Intractable nausea and vomiting not controllable by other means
- Dysphagia and the inability to swallow oral medication
- Intestinal obstruction
- Oesophageal obstruction, due to internal/external compression
- Malabsorption of drugs
- Head and neck lesions/surgery which may cause difficulties in taking medication
- Semi or unconscious state

Contraindication – Thrombocytopenia (Seek Specialist Palliative Care Advice)

Cautions - Heparin and warfarin therapies and areas of oedema

The following factors need to be considered when deciding to use a syringe driver:

Benefits

- Maintains stable blood plasma serum levels of medication
- Avoids peaks and troughs of episodic administration
- Reduces need for repeated injections
- Permits appropriate control of symptoms, without toxic effects of the peaks and troughs of episodic administration
- The ability to infuse a larger volume or combination of drugs via one route
- Usually reloaded every 24hrs
- Accurate infusion times

- Portable, lightweight and compact, allows mobility and independence

Disadvantages/Risks

- Patients may become psychologically dependent on the device
- Inflammation or infection may occur at the site of the cannula insertion and may impede absorption and rate of delivery of drugs
- Drug/patient and drug/diluent incompatibility
- The barrel clamp arm could be vulnerable to damage if handled incorrectly.
- Potential cross infection risk if device not cleaned properly
- Planning for the next 24 hours can be restrictive
- Syringe Driver failure

When a decision is made to use a syringe driver, it will take some time for medication to reach therapeutic level, therefore break through doses will need to be considered (Twycross, Wilcock and Howard, 2014).

8 COMMUNICATION WITH PATIENTS

Prior to starting a syringe driver its use should be fully discussed with the patient and/ or their family/carers. Verbal and written information should be provided detailing:

- Name of device
- Operation and control of the device
- Recognition of faults or failures and appropriate action to be taken
- Telephone number of who to contact in an emergency, including out of hours □

Advice should also be given regarding care and appropriate handling of the syringe driver e.g. what to do if the syringe driver is dropped or damaged, to keep the device dry and away from heat or direct sunlight etc.(MHRA, 2016)

The benefits and risks of syringe drivers should be explained and informed consent for administration sought (Mitten 2001). Use in conjunction with the organisation's consent policy, professional guidelines (NMC 2015) and the Mental Capacity Act (2005).

It must be remembered that setting up a syringe driver may be routine for the clinician, but it may be a frightening new experience for patients and their carers Offer the Mckinley T34 Syringe Driver Leaflet (Appendix 1)

9 TRAINING FOR STAFF

Training to achieve competence in the management and use of the device must be completed in line with each organisations learning beyond registration theoretical and practical skills. A pack designed for the training of syringe driver management in palliative care must be completed in accordance with organisational requirements.

It is the responsibility of each individual registered nurse to ensure they keep up to date with their competency. Maintenance of skills and competence should be reviewed as part of the annual appraisal process. A mandatory face:face update

training session should be attended every 2 years or more frequently if the need is identified

The e-learning training programme is available as an additional resource for staff:- <http://www.cme-medical.co.uk>

Flowchart for accessing syringe driver training in palliative care - see Appendix 2

Staff already experienced who are competent and confident in the procedure through current training systems will be required to submit evidence of training and will be required to have their competence confirmed. (Appendix 3 Training for use of CME MEDICAL Mckinley T34 Syringe driver for adults in Palliative Care and Appendix 4 Confirmation of completion of two yearly update)

An up to date record of training must be maintained centrally within each organisation.

10 INCIDENT REPORTING

An incident is an untoward or adverse event that gives rise to, or has the potential to produce, unexpected or unwanted effects which could be detrimental to the safety of service users, other persons, staff or the Trust (refer to local incident reporting and learning policy).

An adverse incident is an event that causes, or has the potential to cause, unexpected or unwanted effects involving the safety of patients, users or other persons. (MHRA 2015, pp11)

It does not have to relate to a failure of a medical device, but can arise from shortcomings in the device, its accessories, its operating instructions, user practice, servicing and maintenance and conditions of use.

All adverse incidents or near misses involving the device or the procedure must be reported and managed as described in the organisations incident reporting policy (MHRA Devices Bulletin DB2010(01)).

Incidents involving the McKinley T34 syringe driver should be reported internally using the Incident Reporting system (DATIX) as per local policy.

In addition, all adverse incidents will be monitored by the appropriate person/group identified within the organisation and any trends identified. Audits of this information, along with audit against the standards for the use of syringe drivers assists in identifying training needs.

11 SYRINGE DRIVER MAINTENANCE

The driver is designed for ambulatory use and should withstand everyday handling. If the driver is dropped onto a hard surface, or is suspected of being dropped/damaged, subjected to excessive moisture, humidity or high temperature, the driver should be removed from service and returned to Clinical Engineering to allow the operation and calibration to be checked.

All syringe drivers must be serviced at least annually to ensure their function is maintained. A service record for each syringe driver must be completed according to local policy.

12 CLEANING AND DECONTAMINATION

Cleaning and decontamination of the syringe driver and lockbox should be carried out as required and / or between each patient use in adherence with local policy. CME Medical recommend the use of a lint free cloth lightly dampened with warm water and mild detergent. Lockboxes should not be cleaned with alcohol based products as extended use could result in the lock box becoming brittle and susceptible to damage (Operation Manual 2014).

13 POLICY MONITORING AND REVIEW

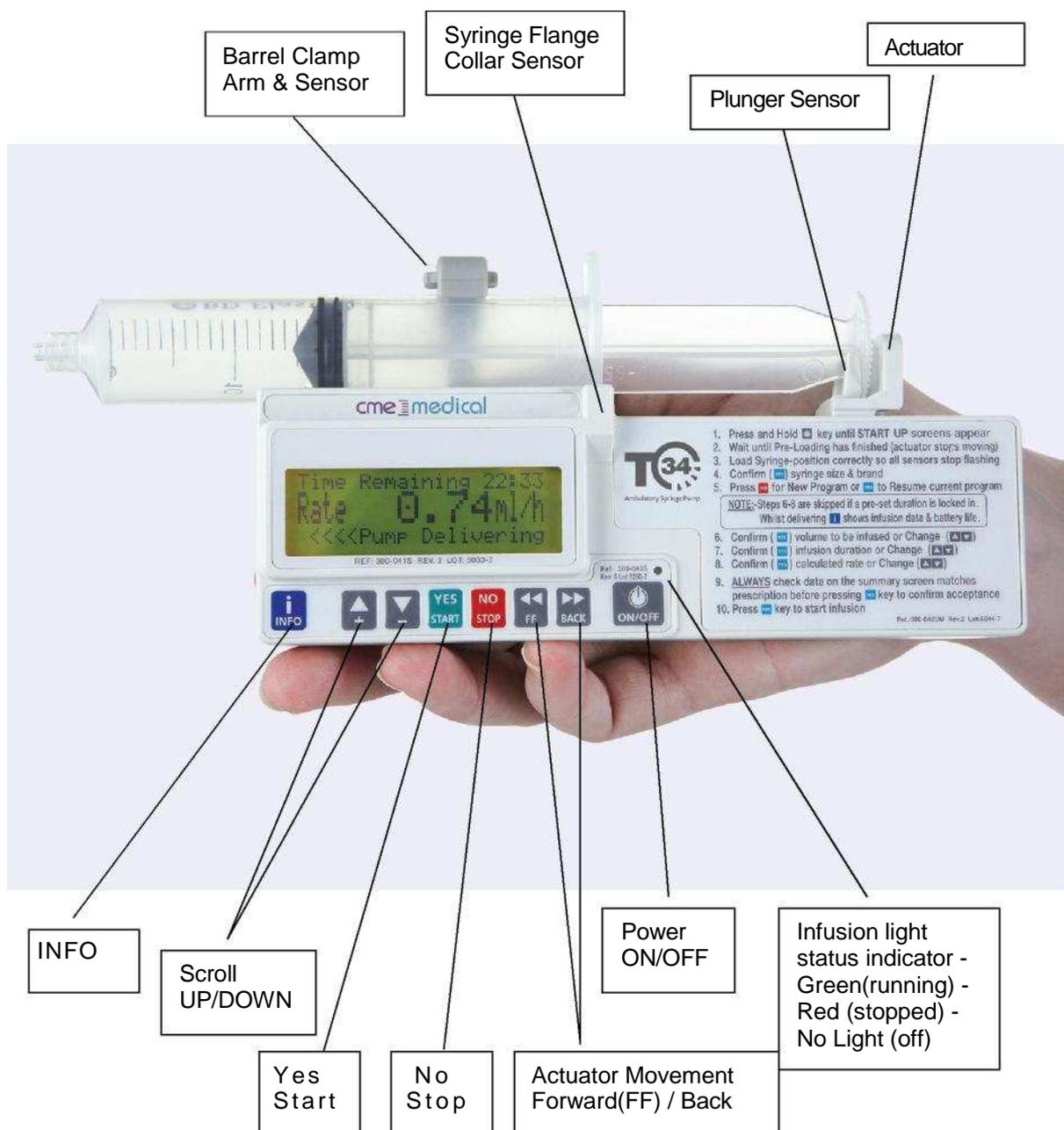
This policy and procedure will be reviewed every two years or at any such time that there are relevant changes to working practices, or from feedback through audit/learning/ incidents or from legal or statutory requirements.

SECTION 2 – PROCEDURE FOR THE USE OF THE MCKINLEY T34 SYRINGE DRIVER

1 CME MEDICAL- MCKINLEY T34 SYRINGE DRIVER

This protocol is not a stand alone document and is intended to be used in conjunction with the policy and the training pack for this device and in conjunction with other organisational policies. The setting up of the syringe driver should only be undertaken by, or under the supervision of, appropriately trained personnel.

1.1 Component parts of the McKinleyT34 Syringe driver



1.2 Set up parameters

The McKinley T34 is calibrated in **ml per hour**. The standard delivery period for a continuous subcutaneous infusion in palliative care is 24 hours. The McKinley T34 drivers are programmed for use in adult palliative care across Lincolnshire to deliver the 'delivery volume' as displayed by the driver **over 24 hours**. The duration is locked therefore the user cannot change it. This simplifies use and reduces the risk of errors. The driver calculates the volume, applies the pre set duration (24 hours) and calculates the appropriate rate of the infusion.

A user code is required to change 'set up' mode and prevent unauthorised access. In normal use the user will not see this or be prompted for access codes.

The 'purge option' is not available on this device.

The event log displays a complete time and date stamped record of events along with a record of driver status (volume infused, rate etc.) at the time of the event. Event logs cannot be deleted or altered.

2 EQUIPMENT REQUIRED

A 9 volt alkaline Varta industrial or Duracell Procell battery must be used. Never try to force a battery into battery compartment as this may damage the battery contacts. Rechargeable batteries must not be used. **Organisations are responsible for procurement of the correct battery and provision of and adequate supply.**

- McKinley T34 syringe driver and plastic lock box. The driver must be checked before use and be clean, free from damage and serviced within the last 12 months
- Sterile administration set (100cm with anti-siphon valve and female luer lock) with small (0.5ml) prime volume. Inspect packaging and contents/expiry dates before use. Do not use if any evidence of damage or the sterility of packets has been compromised
- Saf-T-Intima cannula - Blue 22G/Yellow 24G
- Clear sterile semi-permeable dressing for infusion site Sterile 20ml or 30ml BD Plastipak or B Braun Omnifix luer lock syringe
- Additive label
- Subcutaneous infusion monitoring chart / record
- Valid patient prescription
- Prescribed medications and diluents (either sterile Water for Injection or sterile Sodium Chloride 0.9%, depending on the drugs used - see section 5 Diluents)
- Sharps receptacle compliant to local organisational policy
- Written patient information specific to McKinley T34 syringe driver

For ULHT and LCHS

The equipment required should be contained within a suitable rigid, wipeable, lidded storage box. The box should be stored securely, in a cool dry place, where it can be readily accessed. (The box should be labelled with directions to return and should remain with the syringe driver).

Syringe selection

The T34 driver is calibrated to operate with the most commonly used luer lock syringe brands: BD Plastipak and B Braun Omnifix. The syringe MUST have a luer lock facility in order to avoid leakage or accidental disconnection. The correct brand and size to be used MUST be selected during set up. A 20ml or 30ml syringe is used to allow a greater dilution of medication to reduce the risk of adverse site reaction. The fill volume of a 20 ml syringe is approximately 17mls; the fill volume of a 30ml syringe is approximately 22mls. (CME Medical, 2014. PANG, 2011)

3 INFECTION PREVENTION

- Good hand washing and drying techniques are essential before and after the procedure
- The need for the use of Personal Protective Equipment (PPE) should be assessed. Gloves should be worn to protect hands from contamination if necessary
- Adherence to non-touch aseptic technique must be applied throughout
- Used needles should always be discarded directly into an approved sharps receptacle without being re-sheathed.

Staff should refer to their organisation's Infection Prevention Policy and associated guidelines for further guidance.

4 PREPARING MEDICATION FOR THE SYRINGE DRIVER

When preparing medicines, the Medicines Act 1986, NMC Standards of Medicines Management (2015) and local medicines management policies regarding the administration of medicines including controlled drugs, and infection control precautions must be adhered to.

Best practice recommends that two competent members of staff are involved in the checking and setting up of the syringe driver, and it is best practice to ensure that wherever possible two competent members of staff are involved in the administration of all controlled drugs. (Refer to organisational policy for medicines management)

Staff must not check or administer medicines unless they are competent and confident to do so and they are acting within their sphere of professional practice.

5 DILUENTS

Sterile Water for Injection (WFI) which is hypotonic and Sterile 0.9% Sodium Chloride (NaCl) which is isotonic can be used as diluents within syringe drivers. Either diluent may be used provided it is compatible with the drug(s) that it is being used to dilute (Dickman & Schneider, 2011).

Certain drugs require specific diluents as there is potential for interactions between drugs and diluents when mixed together. Please contact pharmacy or the prescriber. The Palliative Care Formulary (PCF) can be accessed online to retrieve the latest drug and diluents compatibility data (<http://www.palliativedrugs.com>). (PANG,2011)

The Palliative Care Formulary (Twycross, Wilcock & Howard, 2014) provides information relating to combinations of drugs in a syringe driver, as the number of drugs increases, there is a greater potential for compatibility issues and cannula site reactions. Up to 3 drugs can be added to a syringe driver or if there are known compatibility issues, it may be necessary to consider using more than one syringe driver. (There may be occasion when more drugs need to be considered however this must only be under direction of the Specialist Palliative Care Team).

6 LABELLING THE SYRINGE

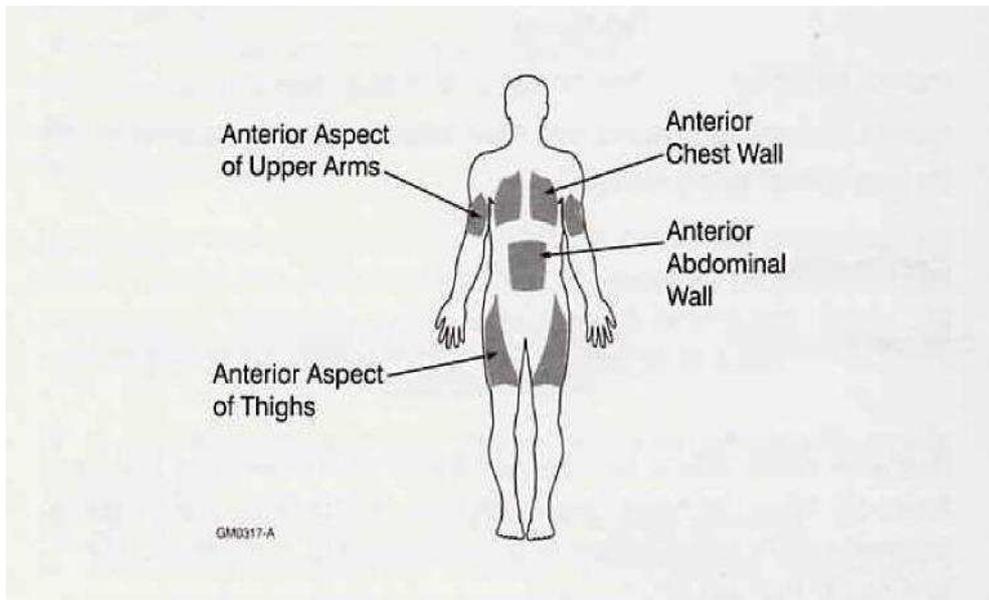
Ensure the label does not interfere with the mechanism of the syringe driver i.e. where there is contact with the barrel clamp arm. When attaching the label, ensure it does not obscure the visual scales on the syringe which may require to be viewed during the infusion. The following details are required on the label

- Patient name, date of birth, NHS number
- Medicine name(s) and batch number(s)
- Dose of each medicine
- Diluent name
- Date and time prepared
- Initials of individual(s) preparing the syringe

7 CHOOSING A SUITABLE INFUSION SITE

Where possible, involve the patient in the choice of a suitable site. Both the outer arm and upper thigh are commonly used. Areas suitable for subcutaneous infusion include those with a good depth of subcutaneous fat, towards the trunk of the body particularly if the patients peripheral circulation is compromised

Acceptable SC cannula insertion sites are shown below:



(Dickman & Schneider,2011)

For confused patients insertion into a suitable area on the patients back may be considered.

The following sites should be avoided:

- Oedematous areas including lymphoedema/ascites (poor drug absorption and increased risk of infection/exacerbation of oedema)
- Bony prominences (poor absorption and discomfort)
- Joints/skin folds (movement may displace cannula, discomfort)
- Areas of irradiated skin (may have poor perfusion and hence poor drug absorption)
- Sites of tumour
- Sites of broken skin/ previous scarring
- Areas of inflammation
- Be aware of areas in bedbound patients who require frequent repositioning
- The chest wall in cachectic patients due to the risk of causing a pneumothorax.

8 BATTERY TEST/INSERTION

When setting up the driver always check that there is enough charge in the battery to cover the infusion.

1. To fit the battery slide back the compartment cover at the back of the driver. Push the battery into the compartment taking care to ensure that the +/- contacts are aligned as shown on the label inside the compartment.
2. Slide the cover back on.
3. Switch on the driver, pre-loading will commence. Summary screen will then display battery status. Press **INFO** key and select battery level. Press **YES** to confirm.

4. Check summary screen display and verify level of battery charge (the average battery life is 3-5 days depending on use).
5. For community patients and patients on discharge from hospital if the charge is below 40% at the start of the infusion then replace with a new battery. In the inpatient setting, the battery should be changed if the charge is below 15% at the start of the infusion.
6. During an infusion press **INFO** key twice to check battery level.
7. In the inpatient setting, the battery level should be confirmed at the start of each shift.
8. The battery should be removed from the syringe driver when not in

use. **9 CONNECTING AND LOADING THE SYRINGE**

Use the CME Medical McKinley syringe extension set with anti-siphon valve and luer lock.

If a new infusion set is required use the prime and load procedure i.e. Draw medications/diluent to approximately 17mls in a 20ml syringe, or to approximately 22mls in a 30ml syringe. This is the maximum fill volume that the syringe driver can accommodate.
Connect infusion line. Prime the infusion line.
The syringe is now ready to load into the driver.

9.1 Pre Loading

- Install battery
- Before loading syringe ensure barrel clamp arm is down
- Press **ON/OFF** key to power up driver. The screen will display self test showing:
 - driver model name
 - software version
 - driver ID
- The display will then indicate **PRE-LOADING**
- The actuator will start to move, when it stops moving the **LOAD SYRINGE** screen appears
- During **PRE LOADING** a set up parameters screen is displayed showing key locked parameters:
 - occlusion
 - max rate
 - program lock
 - battery status

NOTE

The actuator during pre-loading always returns to the start position of the last infusion programmed. If the user regularly uses the same syringe/brand/size fill

volume the actuator should return to the correct position and not require adjustment. **The actuator cannot be moved manually.** Do not force the actuator to move manually as this could damage the device.

If the actuator is not in the correct position to accommodate the syringe, leave barrel clamp arm down and **FF** or **BACK** buttons on the keypad to move actuator to fit the syringe.

NOTE

Hold the syringe above the device to gauge correct location. Forward movement of the actuator is limited so repeated pressing of the **FF** key may be required. Backwards movement is not restricted. Automatic actuator movement deletes any previous programme in the pump memory.

9.2 To Load the Syringe

The syringe graphic on the display flashes in 3 places. Lift the barrel clamp arm and load the syringe into position.

Position flange/collar and plunger first. Finally lower barrel clamp arm on top of the syringe. If correctly loaded the graphic will become solid. The screen will then display size/brand of syringe detected.

If the driver has correctly identified the syringe brand and size press **YES/START** to confirm. If the syringe brand is not correct press **UP/DOWN** keys to scroll through the list until the correct syringe brand is found.

(If the driver was stopped and turned off before the end of a previous infusion, the **RESUME** prompt will appear. Press **NO** to commence new infusion.)

When the syringe/size/brand are confirmed the driver will calculate and display the volume to be infused.

Variance (between visual reading and computer display)

At the start of each new infusion a visual check must be made of volume to be infused against the computer display of deliverable volume and recorded on the monitoring chart / patient record or electronic record.

WARNING: If the volume displayed after loading the syringe is significantly different (more than +/- 0.5ml) than the volume visually confirmed on the syringe scale, remove the syringe, turn off the driver and then try reloading the syringe. If the problem persists, remove the driver from use and return to Clinical Engineering for inspection, testing and re-calibration.

Ensure the summary screen details match the prescription before starting the infusion i.e. Volume to be infused / Duration.

Press **YES** to confirm acceptance of pre-set program infusion parameters.

Start infusion prompt will be displayed.

Note: Clamp must be locked on Saf-T-Intima line before connection of syringe driver to patient.

Site the Saf-T-Intima cannula as per policy.(This does not require priming)
Connect giving set to Saf-T-Intima cannula.

When ready to commence infusion, release clamp and press **YES** to start infusion.
Press and hold **INFO** key until display denotes **keypad locked**.
(To de-activate keypad lock press and hold until display denotes key pad lock is off).

Note:

It may be necessary to administer anticipatory/ breakthrough medication to relieve symptoms in the interim until the medication achieves a therapeutic level. This should be based on patient assessment and clinical judgement.

Secure driver in lock box.

9.3 Temporary interruption to infusion / Resuming the Infusion

E.g if the driver is stopped for any reason e.g. showering/bathing.

It is recommended practice for all stages to be verified by a second trained nurse :

- Press **STOP** – unlock key pad and turn driver **OFF**
- Clamp Saf-T-Intima cannula line – disconnect driver. **DO NOT REMOVE SYRINGE FROM DRIVER.**
- Cap cannula and infusion line top to minimise cross infection. Maintain an aseptic non touch technique.
- Document time infusion stopped and reason why
- In the in-patient setting, store driver securely in locked CD cupboard until required
- When ready to recommence carefully check prescription, syringe label, verify correct patient/correct infusion and infusion is running to prescribed time.
Note: stopping the infusion will delay the end time of infusion (which should be over 24 hours)
- Reconnect syringe driver/line to cannula maintaining asepsis
- Press and hold **ON** button
- The screen will request confirmation of syringe size/brand
- Press **YES** to confirm
- Screen will display **YES** resume programme, **NO** new infusion
- Press **YES** to resume programme – screen will display remaining volume/duration/rate of infusion. Ensure all information is per prescription
Note: If **NO** new infusion is pressed this will reset the remaining infusion to deliver over 24 hrs at a different rate and the infusion will then be incorrect
- Press **YES** to confirm
- Unclamp line
- Press **YES** to start infusion
- Document time infusion commenced
Note: This will extend time of infusion by however long the infusion was stopped for

- Press and hold **INFO** key to lock keypad
- Replace lock box

9.4 Replenishing of an Infusion (new syringe when re-siting of Saf-T-Intima line is not required)

- Prepare new syringe and contents as per policy
- Press **STOP**
- Press and hold **INFO** key to deactivate key pad lock
- Switch driver **OFF**
- Clamp Saf-T-Intima cannula
- Both nurses (where appropriate) to verify patient identity and confirm prescription/label/monitoring form
- Remove old syringe
- Switch driver on
- As section 9.1 and 9.2 – preloading/loading of syringe
- If there is a significant change in medication prescribed consider changing the giving set

NOTE: Do not connect syringe to patient until secured in syringe driver and line clamp on. Only release clamp when ready to commence infusion.

9.5 Stopping the Infusion and removing the syringe driver /Unused medication

If the syringe driver is to be discontinued, this must be done by appropriately trained staff.

- Press **STOP** – unlock key pad and turn driver **OFF**
- Clamp line – disconnect driver
- Remove cannula if appropriate or insert new cannula

Any unused medication must be disposed of as per policy.

Note: In the event of stopping an infusion with some medication remaining, and there is a variance between visual volume and the computer display of volume remaining, the computer display figure should be the one used for recording wastage in the controlled drug register/drug stock sheet and on the syringe driver monitoring chart. Professional judgement must be exercised if there is a significant difference between the two figures (i.e more than the hourly rate) and the cause investigated/incident form completed and the driver returned to clinical engineering if the driver delivery appears faulty.

The reason for discontinuation of the driver must also be documented. Review the overall prescription and check it has infused as prescribed. Any discrepancies must be investigated and actioned. Significant anomalies must be reported via an incident form and incident reporting procedure.

Clean syringe driver, remove the battery and return to store on completion of infusion. If any concerns regarding the efficacy of the syringe driver it must be isolated and returned to Clinical Engineering.

9.6 Changing a battery during an infusion

- Press **STOP** and apply clamp
- Insert new battery
- Restart driver
- Reconfirm syringe size and brand
- Press **YES** to resume
- Reconfirm volume and duration and release clamp
- Press **YES** to recommence infusion
- Lock Keypad

9.7 In the Event of a Patient's Death

As in section 9.5 above.

If there are any doubts about the circumstances of the patients death DO NOT remove the driver, seek advise from doctor / coroner and if advised quarantine syringe driver securely, complete with the syringe and line. Cap and leave cannula in situ. Document all relevant details. Inform line manager immediately.

If the syringe driver is no longer required, clean driver, remove the battery and return to stock. Store carefully until next required.

9.8 Cleaning the Syringe Driver

After use the syringe driver must be cleaned thoroughly with a slightly damp lint free cloth and detergent and dried. The driver screw and guide rods should be gently brushed to remove any dust/debris. A single use brush should be used e.g. soft toothbrush. This should be either decontaminated or discarded after use.

Cleaning and decontamination should be carried out according to local policy and the operation manual. However CME Medical McKinley does not recommend the use of alcohol sprays and wipes when decontamination of the lockbox is required as extended use could result in the lock box becoming brittle and susceptible to damage. The pump or any part must not be immersed in water or any other solution as this may damage the components.

If heavily contaminated excess debris should be cleaned from the driver and then carefully sealed and labelled contaminated and returned for cleaning with details of contamination to Clinical Engineering. (Refer to local Infection Prevention Policy)

9.9 If the infusion line snaps

If the infusion line snaps during an infusion the infusion will have to be completely renewed (repriming and continuing with the same infusion will reduce the volume and affect prescribed delivery rate and end time of infusion).

9.10 Event Log

The McKinley T34 provides an event log which shows a record of pump status (volume infused, rate etc.).

Press **INFO** key and scroll to event log.

Press **YES** to select.

The screen will now show the most current event alarm date, time etc. Use **UP/DOWN** keys to scroll through events to find events of interest.

Press **INFO** on any chosen event displays further data regarding the event.

A full history of events can be downloaded by Clinical Engineering for reference if there is an area of concern.

10 DRIVER ALARMS

When the driver detects a problem four things happen:

1. The infusion stops (unless the event is an ALERT# see table below)
2. The LED indicator turns red
3. An audible alarm is activated (this will continue until either the YES key is pressed to mute or the problem is rectified).
4. A message appears on the display screen indicating the cause

The following table indicates appropriate actions to be taken:

Alarm	Possible Cause	Action
Occlusion or Syringe Empty	Patient access device blocked, kinked, clamped or occluded	Flush/replace access device, release the clamp or clear the occlusion then resume the infusion
	Actuator has reached minimum travel position	End of program, switch driver off
Syringe Displaced	Syringe has been removed or displaced (one or more of the syringe detection sensors is not detecting)	Check screen message for assistance. Check the syringe placement and re-seat as necessary
Driver paused too long	Driver has been left in STOP mode (on hold) for 2 minutes	Start infusion, continue pause or switch off
Near End #	15 minutes from end of infusion	Prepare to change syringe or switch off
End Program/syringe	Infusion complete	Close down or start new infusion (Driver will default to keep vein open (KVO) if set)
Low Battery #	Battery is almost depleted (30 minutes left)	Prepare to change battery
End Battery	Battery is depleted	Change battery
System error. Press and hold INFO for details	System error	Remove driver from use and return to Clinical Engineering. Document error number and description of the problem

11 MONITORING DURING THE INFUSION

It is recommended best practice, when a syringe driver is set-up, reloaded or re-sited to observe the syringe driver during the first 15 minutes to ensure it is functioning correctly. Further monitoring checks should be carried out:

- A minimum of 4 hourly within in-patient settings
- At each visit by a nurse in the community setting – the frequency of this depends on factors such as other nursing needs of the patient, the willingness or ability of the patient/carer to assist in monitoring, and the risk of instability of the medicine mixture

Press **INFO** key once to check infusion summary on the screen which will display:

- Volume to be infused
- Volume infused

After a few seconds the display will return to the main infusion screen which will indicate:

- Display screen states that syringe brand is same as syringe used
- Time remaining
- Rate ml/hr
- Chevrons will flash to show driver delivery
- Green light will flash

Comprehensive records must be kept in patients notes of:

- Date and time of administration
- Site of administration
- Name, dosage and volume of medication
- Signature of clinician
- Either device identification number or serial number of the driver/device (Clothier report 1994)

The following monitoring checks should be carried out and documented, as follows:

- record the time the syringe driver is checked
- record the location of the infusion site when the syringe driver is set up and when the infusion line is changed
- check the infusion site for:
 - redness
 - swelling
 - discomfort/pain
 - leakage of fluid
- check the medication is controlling the patient's symptoms

check for signs of opiate toxicity/intolerance if in the syringe driver

- check the solution in the syringe and the infusion line for cloudiness, presence of large air bubbles (small ones not significant), precipitation or colour change
- record the flow rate and check it is correct
- record the volume of solution to be infused and the volume infused and check from this information that the syringe driver is delivering the medication at the

desired rate (compare the fluid remaining in the syringe with the driver reading/display)

- check the battery light is flashing. There is no need to record the battery percentage as this has been carried out already as part of the daily set up
- when the infusion site is changed, record the reason in the notes
- at each check inspect the SC infusion line to ensure that it is securely attached to both the syringe and the patient and that it is not leaking, kinked or trapped. If there are any problems, then they must be documented and appropriate action taken.

The individual carrying out the monitoring checks should document and sign (on monitoring record). If any checks are not carried out e.g. site check to prevent disturbing the patient whilst asleep, record this and the reason on the monitoring chart. **If any checks indicate a problem e.g. the infusion is not running at the expected rate, the appropriate action must be taken and documented in the notes.**

Completion of the infusion

The end of an infusion either planned or early replenishment e.g. due to a prescription change, must be documented and the monitoring chart fully completed.

The chart must be reviewed in the relation to the 24 hour period to ensure the driver has run to the prescribed time and within parameters. Any discrepancies must be investigated and actioned. Professional judgement must be exercised and if discrepancy significant an incident form must be completed and reported as per policy.

12 TROUBLESHOOTING

See section 10 Driver Alarms.

IF FAST – more than 1 hour (displayed rate) ahead of expected time (there is no tolerance to a syringedriver running fast):

- Inform Doctor, review patients clinical condition, document
- Check the rate setting is correct
- Check the correct syringe brand or size has been selected
- Change the driver
- Complete an incident form
- Send the faulty driver to Clinical Engineering, include a copy of the incident form and syringe driver log and any other relevant information

IF SLOW – more than 1 hour behind expected time:

- Inform Doctor, review patients condition, document
- Check rate setting is correct
- Check the syringe driver light is GREEN and flashing

- Check battery level
- Check the correct syringe size and brand has been selected
- Check the syringe is correctly inserted into the syringe driver
- Check whether the driver has been stopped/started for any reason e.g. showering or occlusion
- Check contents of syringe at line for indications or precipitation/cloudiness/kinking of tubing/clamp left on
- Check cannula site for redness/soreness/leakage/change if necessary
- If driver significantly slow, more than 1 hour, send to Clinical Engineering

Residual Volume

There may be an occasion where there is a small residual volume remaining at the end of the infusion. This may be due to site resistance, potentially due to oedema/pressure/reduced absorption, however, the pressure may not be enough to trigger the occlusion alarm.

Residual volume may also result from initial variance when the driver was commenced (see Section 9.2).

This is acceptable if the volume equates to approximately the hourly rate (e.g. approximately 1 hour slow).

In this instance the site should be checked for efficacy. If any doubts about potency/absorption the cannula should be re-sited.

The subsequent infusion must be monitored closely for accuracy of infusion time/delivery. If it continues to run slow the driver should be replaced and sent for servicing with full details of the problem.

If the residual volume is more than the hourly rate (more than 1 hour slow) the driver should be replaced and sent with full details of the problem for servicing.

Any residual volume should be disposed of as per policy and clearly as “residual volume not infused”. All documentation should be signed/dated (see Section 9.6 Stopping an infusion and unused medication).

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What else should I look out

for? You may notice that:

- the needle site has become red, swollen or sore, or is leaking/wet
- the driver appears to be running too fast or too slowly

If any of the above occur, or if your symptoms are not controlled, please contact the team on one of the phone numbers below, or in an inpatient setting the team looking after you.

How will it affect my life?

As the syringe driver is portable, you can continue normal activities. However, the syringe driver is **not waterproof**, so you should take care when bathing or showering to keep the syringe driver dry. The cannula site should also be kept dry and is covered with a waterproof dressing. The medication in the syringe is usually renewed every 24 hours by a nurse. If you go on holiday, we can arrange for a nurse to call at your holiday destination (in the UK).

Contact details if you have any concerns

Name: _____

Telephone: _____

Name: __

Telephone:



**McKinley T34
Syringe Driver**
Information for patients
In Lincolnshire

Aim of the leaflet

This leaflet aims to tell you what a McKinley syringe driver is, why you are using it, how it works and how to care for it. It also provides advice for people using a syringe driver at home.

What is a syringe driver?

A syringe driver is a small battery-powered pump which delivers a continuous flow of medication from a syringe to just beneath the surface of your skin, via a thin tube and small needle. It is small enough for you to carry in a pouch or pocket.

Why do I need a syringe driver?

Syringe drivers are used for the following reasons:

- when you find it difficult or impossible to take medication by mouth, for example, because it is hard to swallow
- when you are not successfully absorbing medication taken by mouth, for example, because you are being sick

A syringe driver reduces the need for repeated injections and gives a constant level of medication. We will talk to you about why it might be helpful for you to have a syringe drivers, and about the medications we would put in it. Then you can decide whether you think a syringe driver would be suitable for you.

How does it work?

A nurse or doctor inserts a small needle less cannula just under the skin. A thin tube connects the needle to the syringe, and the syringe attaches to the syringe driver. The driver has a battery-driven motor. The motor slowly pushes a plunger into the syringe barrel and so pushes the contents of the syringe into the line and through the needle. You should not feel this at the needle site, as only a tiny amount of liquid is delivered each time the plunger moves.

A green flashing light on the front of the syringe driver tells you that the driver is working and the medication is being delivered. The nurses will re-fill the syringe when it is due each day and will check

that the machine is functioning properly. They will use medications according to your doctor's prescription. The doctor will finalise the prescription after talking with you and making sure that the

medication is working. If you develop symptoms, the doctor will adjust your medication.

You can put the syringe driver in a pouch that you can carry over your shoulder or attach around your waist, or you can put it in a pyjama pocket or shirt pocket.

The needle is usually positioned on your upper arm, upper thigh, upper chest or tummy, but occasionally the upper back is used. It is held in place by a clear dressing which keeps the needle site clean and dry. Once it is inserted, you should not feel any discomfort from the site, and often the needle can stay in place for many days.

How do I look after my syringe driver?

There are three key things to remember:

1. Do **not** get it wet as it is not waterproof.
2. Be careful not to drop the syringe driver
3. Keep it out of direct sunlight and away from heat.

There is a small risk of mobile phones interfering with the syringe driver. To reduce this risk, mobile phones should not be used within one metre of the driver. It is best to switch off your mobile phone when not in use, or kept it at least one metre away from the driver. If you need to use the phone, hold it in the hand opposite the side where the driver is situated.

What if the alarm sounds?

Syringe drivers normally work well but occasionally problems do occur. An alarm will sound if a problem is detected. If you are in hospital or in the hospice, the nurse will check the driver regularly.

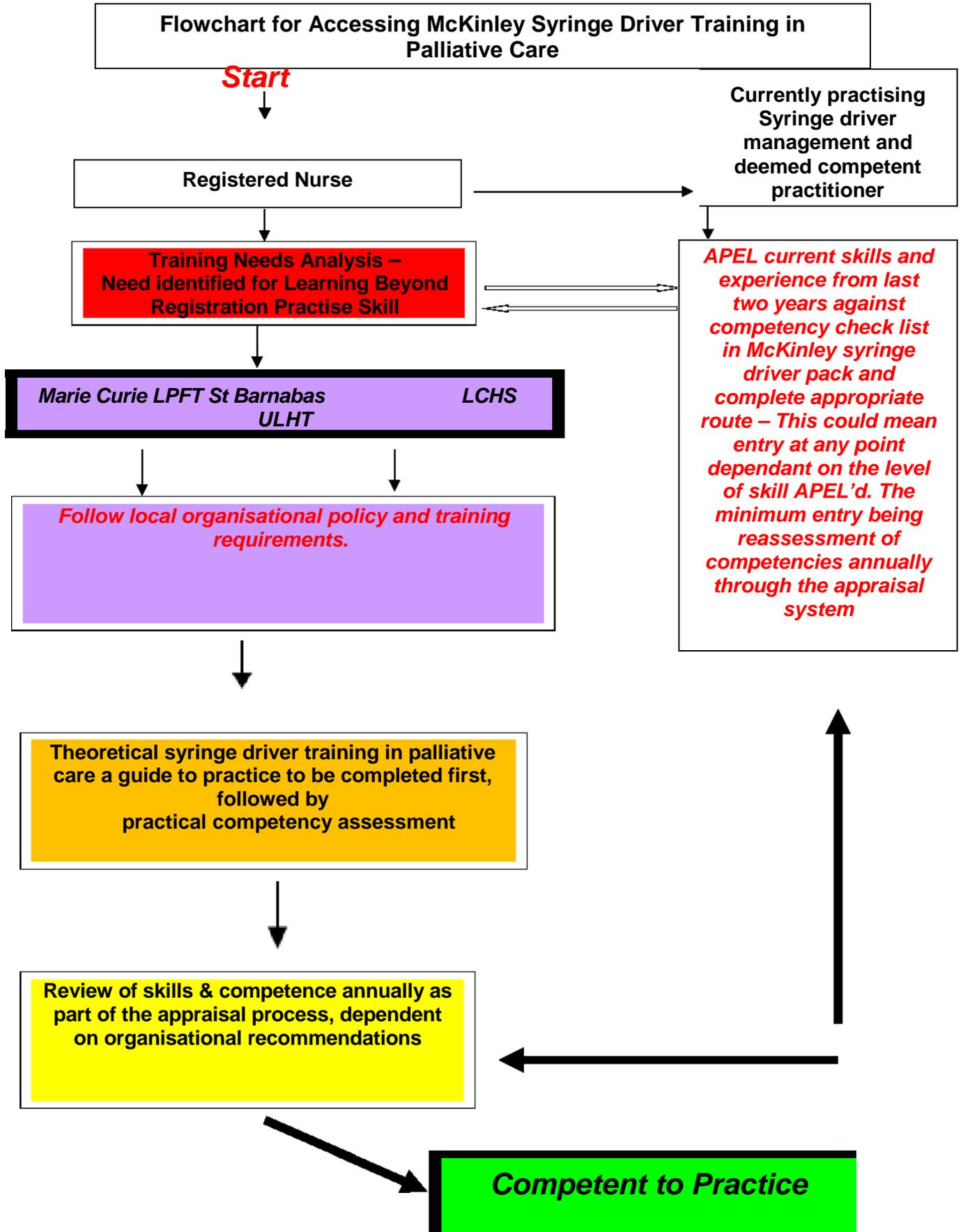
The pump has an alarm which will sound if the syringe driver detects a problem or if the battery is low.

It is normal for the alarm to sound 15 minutes before it is due to end.

Do not panic. If the alarm is sounding, you should contact

the nurse for advice unless you are expecting the nurse to visit within the next 15 minutes to change the syringe. Do not attempt to change the battery yourself.

Appendix 2



Version History Log
This table should detail the

Version	Date Implemented	Details of key changes
1.6	Oct 2014	<p>Front page logo update</p> <p>pg6 4.4 remove “through identified trainers”</p> <p>pg.8 remove paragraph under Caution titled “Graseby Syringe Drivers”</p> <p>pg.9 7 Add “Relative” to Contraindications, remove the “s”, add “seek Specialist Palliative Care Advice” pg.9 under Disadvantages/Risks remove “prescriptive errors” and “medication errors relating to drug or dose”</p> <p>pg.9 8. Replace “Their” with “The patient and carer”</p> <p>pg.10 8 Remove paragraph starting “Patients should be aware that there is a small risk of mobile</p> <p>pg10 9 insert http://www.cme-medical.co.uk/online-training/</p> <p>Change “Flowchart Appendix 2 to 1.</p> <p>pg13/14 2. Highlighting of section for LCHS staff only. Add “ULHT - All batteries must be supplied by Ward Managers.”</p> <p>pg.16 6. Identification of the labelling of the syringe for each Trust, ULHT /LCHS.</p> <p>Pg.22 9.8 Add “does not” to the phrase “However CME McKinley does not recommend the use of alcohol.....”</p> <p>Removal of Appendix 1 – “For teams not trained in the use of McKinley T34 syringe drivers”</p> <p>Pg. 30 New Appendix 1. “Flowchart for Accessing McKinley Syringe Driver Training in Palliative Care”. Removal of box “Generic section a guide to practice to be completed. <i>Pack to be completed first.</i>” On the ULHT Route of the Flow Chart.</p> <p>Appendix 2. Changes to the Patient Information Leaflet Putting the word “silicone” in front of needle, paragraph 5 and 7. Adding, in What is a syringe driver “A compact lock box protects the driver from damage or displacement of the syringe.” Add “The following is for the use of a syringe driver at home only” in bold print, after “The alarm will also sound 15 minutes before all the medication is delivered.” Remove the paragraph “There is a small risk of mobile phones.....” on pg 2.</p>
2	December 2016	<p>Minor changes throughout to update references and make current and ensure Lincoln wide collaborative approach.</p> <p>Addition of training pack</p>
3	July 2017	Review and update