Trust Policy

Plymouth Hospitals NHS Trust

Policy for the administration of subcutaneous medications via the McKinley Syringe Driver

Date	Version
July 2013	**2**

Purpose

Plymouth Hospitals NHS Trust battery operated syringe drivers will only be used within a consistent and evidence based framework that minimises hazards to patients and ensures that all staff are able to use them effectively and safely. This policy supports justification of need, clinical use, staff training and equipment management.

Who should read this document?

Nursing and medical staff

Key messages

This policy supports justification of need, clinical use, staff training and equipment management.

Accountabilities

Production	Team Leader Specialist Palliative Care Team and Junior Sister Oncology
Review and approval	Medical Devices Strategy Group
Ratification	Medical Director
Dissemination	Team Leader Specialist Palliative Care Team
Compliance	Team Leader Specialist Palliative Care Team

Links to other policies and procedures

PHNT Policy for medicines management (2012), PHNT Policy for reducing dosing errors with opioid medicines for adults (2012) Non medical prescribing policy (2012) Medical Device Training Policy (2012), Policy on the Management and Use of Medical Devices (2012), Standing Operating Procedure Medical Equipment Users Guide (2013),

Version History

Draft V1.1	May 2011	Approved by Nursing and Midwifery Board, Syringe Driver Committee and Pharmacy.
V2	July 2013	Reviewed and approved by Medical Devices Strategy Group

Last Approval	Due for Review
July 2013	July 2018

The Trust is committed to creating a fully inclusive and accessible service. By making equality and diversity an integral part of the business, it will enable us to enhance the services we deliver and better meet the needs of patients and staff. We will treat people with dignity and respect, promote equality and diversity and eliminate all forms of discrimination, regardless of (but not limited to) age, disability, gender reassignment, race, religion or belief, sex, sexual orientation, marriage/civil partnership and pregnancy/maternity.

An electronic version of this document is available on the Trust Documents. Larger text, Braille and Audio versions can be made available upon request.

Plymouth Hospitals NHS
NHS Trust

1 Introduction

It is the policy of Plymouth Hospitals NHS Trust battery operated syringe drivers will only be used within a consistent and evidence based framework that minimises hazards to patients and ensures that all staff are able to use them effectively and safely. This policy supports justification of need, clinical use, staff training and equipment management. This policy provides:

- A consistent and evidence based framework for the management of battery operated syringe drivers used by Plymouth Hospitals NHS Trust staff, minimising hazards to patients and ensuring that all staff are able to use them effectively and safely. This policy supports justification of need, clinical use, staff training and equipment management.
- The principles of management of syringe drivers and in the appendices it highlights clearly the standard operating procedures (SOP) for setting up the McKinley T34 syringe drivers currently used in Plymouth Hospitals NHS Trust practice (Appendix 1). The policy recognises that a number of different syringe drivers are used in the community and therefore, includes a framework, which has been agreed by Plymouth, Devon and Cornwall Community Services and St Luke's Hospice, Plymouth for the safe transfer of patients with syringe drivers between care settings (e.g. hospice, in the patient's home and other community settings).
- In exceptional circumstances where it is necessary to set up a syringe driver outside of the standard operating procedures in this policy, because of the volume of drugs/diluents, specialist drugs prescribed or different types of pumps used, an individual risk assessment must be completed. The risk assessment needs to evidence that all the options have been considered. This needs to be documented, completed and reviewed with the following relevant staff, specialist palliative care team, lead pharmacist and non medical prescribing lead/medicine practice facilitator.

2 Purpose, including legal or regulatory background

This policy references a number of Acts and Documented Guidance

- European Directive 2010/32/EU. Prevention of Sharps Injuries in the Hospital and Healthcare Sector.
- RCN guidance to support the Implementation of EU Directive 2010/32/EU. RCN 2011
- National Patient Safety Agency Rapid Response Alert (RRR19/2010) Safer ambulatory syringe drivers
- National Patient Safety Agency Rapid Response Alert (RRR05.2008) Reducing Dosing Errors with Opioid Medicines.

- NMC 2008, Standards of Conduct, Performance and Ethics for Nurses and Midwives. Nursing and Midwifery Council, London.
- NMC 2008, Standards for Medicines Management. Nursing and Midwifery Council, London.
- NMC 2007, Guidelines for Records and Record Keeping. Nursing and Midwifery Council, London.
- Local Area Joint Formularies
- St Luke's Hospice (2009) Palliative Care Handbook A Guide for Healthcare Professionals 2nd Edition
- NMC 2006 Standards of Proficiency for Nurses and Midwife Prescribers
- Mental Capacity Act 2007
- Medicines and Healthcare products Regulatory Agency (2006) Managing Medical devices
- DOH (2009) Deprivation of Liberty Safeguards A guide for hospital and care homes

3 Definitions

Ambulatory syringe drivers

An ambulatory syringe driver is a portable battery operated infusion pump, which delivers a measured volume of drugs at a predetermined rate via a subcutaneous route to patients for whom oral administration would be problematic. Use of syringe drivers is well-established practice in the care of patients with terminal illness, or with palliative care needs both in the acute and community settings.

4 Duties

PHNT is responsible for ensuring that all staff using medical devices receives appropriate training, instruction and supervision.

All registered nurses and support workers are personally responsible and accountable to ensure they receive training in the safe use and observation of any medical device they need to use (Medical device training policy 2008)

Only registered nursing staff will be involved in the setting up and replenishing of a syringe driver. They will have completed formal training and be assessed

as competent in the use of syringe drivers. All registered nurses must maintain competency and updates as required.

5 Key elements (determined from guidance, templates, exemplars etc)

5.1 Indications for use

Ambulatory syringe drivers are used for symptom control to prevent the need for regular injections when medication cannot be swallowed or absorbed, e.g.

- Nausea and Vomiting
- Impaired consciousness
- Clients concordance/confidence
- Oral medication not tolerated
- Dysphagia

Prior to commencing a syringe driver a full explanation about what a syringe driver is, how it works and why its use is indicated should be discussed with the patient and his/her carers and informed consent (written or recorded) gained. In the event of a patient who is unable to give consent the nurse will act in the best interests of a patient in conjunction with the Medical Practitioner and in line with the Mental Capacity Act (2007). Informed consent should be recorded in line with Trust policy. The patient/carer should be given the Plymouth Hospitals NHS Trust Syringe Driver information leaflet.

5.2 Prescription

The prescription should contain the following

- Date.
- Patient full name, address, date of birth and hospital number or NHS number.
- Generic name of the medicine(s) to be used in the driver, which should be legible and in capital letters.
- The pharmaceutical form of the medicine
- The dose in metric units avoiding use of the decimal point
- The appropriate diluents
- Route and duration of administration i.e. subcutaneous infusion by syringe driver over 24 hours.

- As required doses for anticipated symptom control
- Signature of prescriber

Important Points:

- All prescriptions for Controlled Drugs must comply with the requirements of the Misuse of Drugs Act 1971 (see BNF Guidance on Prescribing).
- A number of injectable medicines commonly administered by subcutaneous injection or infusion are not licensed by this route and the mixing of more than two drugs together produces an unlicensed product.
- If unsure of the compatibility of drugs prescribed check in the BNF or Palliative Care Formulary or contact either the Medicines Information Pharmacist or the Specialist Palliative Care Team

5.3 Equipment required to set up a syringe driver

Syringe driver kit boxes are obtained from Medical Equipment Library, MEMS Level 4, Derriford. The kit box contains the following items:

- A McKinley T34 Syringe Driver that has been serviced and is within its annual service. Holster (only if patient is mobile), lockbox and key.
- An appropriate subcutaneous infusion set (McKinley 100-172S) and needle safe cannula (such as the BD Saf-T-Intima FSP324 catheter.
- Battery, PP3: 9 volt alkaline/lithium. Plus spare battery as a new battery will last for approximately 3-4 days depending on use.
- Sterile Luer lock 20 ml BD syringes x 2.
- Instructions for setting up the McKinley T34 (Appendix 3)
- Information on drug compatibilities and diluents
- Drug additive label
- Transparent non-occlusive dressings for the infusion site, which enables the site to be observed.
- Decontamination label

Other items required:

- Sterile needle for drawing up medication.

- Prescribed drugs required and prescribed diluents

Please refer to the MEMS Medical Equipment User's Guide and the equipment manufacturer's instructions for full detail in the correct use of this medical equipment.

5.4 Required documentation

• Prescription Chart

• Syringe Driver Subcutaneous Medication Administration Record

5.5 Best practice points.

- The syringe driver is best commenced within 4 hours of prescribing
- A syringe driver may take 4 hours to deliver medication to the optimum therapeutic level
- As Required doses (subcutaneous): The Prescription Chart should Include "as required" doses of the medications which may be needed to palliate symptoms.

  Examples include:-

  Diamorphine and Morphine, 1/6th of the 24-hour dose – for breakthrough pain.
- Non Medical Independent /Supplementary Prescribers must comply with the above guidelines if writing a prescription for controlled drugs and only prescribe controlled drugs within their prescribing status that they are legally entitled to do and within their area of expertise and level of competence.

5.6 Monitoring of Infusions

The pump and syringe should be checked 1 hour after set-up and then every 4 hours using the criteria below and clearly documented on the Syringe Driver Subcutaneous Medication Administration Record is the minimum standard expected. The patient should be checked more often as directed by the patient's condition. In carrying out the checks the following should be reviewed and acted upon if necessary:

- Assess the patient's current status, effectiveness of symptom management and any side effects of medication.
- Check insertion site for signs of redness, leakage, hardness, swelling, pain and blood in the tube.
- Observe the syringe and infusion set for kinks in the tubing, leakage, precipitation or discolouration of medication.

- Check that the syringe is securely attached to the syringe driver.
- Check the infusion is running to time and record 4 hourly on the Syringe Driver Subcutaneous Medication Administration Record
- Check rate.

5.7 Ongoing assessments if symptoms are controlled.

Consider the patient's symptoms and response to medication (any as required doses given) to identify whether any changes to the prescription are required. If the skin site is satisfactory a new filled syringe should be attached to the infusion line every 24 hours. Sites can be left intact if satisfactory and changed according to the skin condition and if available the manufacturers guidelines for the infusion device. When re-sited, the infusion should be placed at least 3 cm from the previous sites and not near any other devices. The syringe and line should be completely changed when the medication prescription is altered or when a new site is required.

Note if prescription is changed the changes can take 4 hours for effect.

5.8 Removal of the syringe driver and disposal of the infusion set

The infusion set should be removed by a registered nurse.

The needle site if required should be covered with a clear non-occlusive dressing so the site can be observed for any redness, swelling etc.

If there is any medication remaining in the syringe this should be discarded in accordance with PHNT Medicines Management Policy (2010).

When the syringe driver is no longer required, the driver and lock box must be wiped using a damp cloth with soapy water and dried. The syringe driver, lockbox, key, the 'kit box' and any unused contents must then be returned to the Medical Equipment Library, MEMS, Level 4, Derriford.

In the event of an expected death and only after formal confirmation of death and checking that this is not a coroner's case can the syringe driver then be safely disconnected and guidelines used as above (see Plymouth hospitals NHS Trust Handling of Cadavers policy Latest version).

Do not get the syringe driver wet and if this occurs change the machine and return the original syringe driver to the Medical Equipment Library, MEMS, Level 4, Derriford, informing them of the incident.

5.9 Transferring patients with syringe drivers between care settings

- If a syringe driver is to be used for a patient transferring between care settings, it must be considered at an early stage of discharge planning. The patient and carers must be informed that the District Nurse, Hospice, Hospital or Care Home nurses may change the syringe driver to a different model following discharge.

- Syringe drivers must be clearly labelled with details of the service responsible for their servicing and maintenance.

- Telephone contact to the new care setting must be made to establish that the appropriate equipment is available and that staff are aware that the patient has a syringe driver and are trained in its use (for example transfers out of Derriford to a community setting the relevant Onward care team or District Nursing Service must be notified).

- The 'Kit box' should be sent back to MEMS with details of the new care setting where the patient has been sent.

- A completed Discharge and transfer checklist for patients with a syringe driver for subcutaneous use form (Appendix 2).

- Following the transfer of a patient from one care setting to another, the syringe driver must be replaced at the earliest opportunity by one belonging to the new care setting. The syringe driver and lockbox previously used for the patient must be cleaned and a decontamination label attached and returned to Medical Equipment Library, MEMS, Level 4, Derriford immediately, to avoid loss and to ensure continuity of servicing and maintenance.

- Patients transferred between care settings must have the following items with them

    - 7 days supply of medication and diluents for the syringe driver, including breakthrough requirements (unless the new care setting has the medication in stock). Medications and diluents must be prescribed on an electronic TTA and dispensed by Pharmacy.

    - For transfer to Community settings: a clearly written prescription chart, signed by the prescribing doctor, to be used as authority to administer the medication until the relevant Community prescription chart is instigated.

    - A syringe driver chart and transfer letter and checklist written by the nurse responsible for the patients care.

6 Overall Responsibility for the Document

Medical devices strategy group

7 Consultation and Ratification

The design and process of review and revision of this policy will comply with The Development and Management of Trust Wide Documents.

The review period for this document is set as default of five years from the date it was last ratified, or earlier if developments within or external to the Trust indicate the need for a significant revision to the procedures described.

This document will be approved by the Medical devices strategy group and ratified by the Executive Director.

Non-significant amendments to this document may be made, under delegated authority from the Executive Director, by the nominated author. These must be ratified by the Executive Director and should be reported, retrospectively, to the approving group or committee.

Significant reviews and revisions to this document will include a consultation with named groups, or grades across the Trust. For non-significant amendments, informal consultation will be restricted to named groups, or grades who are directly affected by the proposed changes

8 Dissemination and Implementation

Following approval and ratification, this policy will be published in the Trust's formal documents library and all staff will be notified through the Trust's normal notification process, currently the 'Vital Signs' electronic newsletter.

Document control arrangements will be in accordance with The Development and Management of Trust Wide Documents.

The document author(s) will be responsible for agreeing the training requirements associated with the newly ratified document with the named Executive Director and for working with the Trust's training function, if required, to arrange for the required training to be delivered.

9 Monitoring Compliance and Effectiveness

Compliance with this policy will be monitored by annual audits.

A record of registered nurses who have completed formal training and been assessed as competent in the use of syringe drivers will be held by the ward/department manager. All registered nurses must maintain competency and updates as required.

10 References and Associated Documentation

National Patient Safety Agency Patient Safety Alert 20 " Promoting safer use of injectable medicines" National Patient Safety Agency Patient Safety Alert 19 **"**Promoting safer measurement and administration of liquid medicines via oral and other enteral routes" National Patient Safety Agency Rapid Response Alert (RRR05.2008) Reducing Dosing Errors with Opioid Medicines. NMC 2008, Standards of Conduct, Performance and Ethics for Nurses and Midwives. Nursing and Midwifery Council, London. NMC 2008, Standards for Medicines Management. Nursing and Midwifery Council, London. NMC 2007, Guidelines for Records and Record Keeping. Nursing and Midwifery Council, London. Local Area Joint Formularies NMC 2006 Standards of Proficiency for Nurses and Midwife Prescribers Mental Capacity Act 2007 DOH (2009), Managing Medical devices, Medicines and Healthcare products Regulatory Agency (2006). National Patient Safety Agency/2010/RRR019

- Essential Standards of Quality and Safety externally reviewed by CQC – Relevant to standard(s):- C1a Patient safety, C4b Medical Devices C4e Clinical Waste Disposal, C5c Skills Updating, C9 Records Management, C10b Code of Professional Practice, C11a Training Records, C13b Consent, C16c Patients awareness of treatment Directorate:- Devon PCT Provider Service

Plymouth Hospitals NHS
NHS Trust

Dissemination Plan | Appendix 1

Core Information	
Document Title	Policy for the administration of subcutaneous medications via the McKinley Syringe Driver
Date Finalised	July 2013
Dissemination Lead	Barbara Carroll
Previous Documents	
Previous document in use?	No
Action to retrieve old copies.	N/a

Dissemination Plan

Recipient(s)	When	How	Responsibility	Progress update
All staff		Email	Document Control	
All Department Heads	TrustDocuments	Electronic	Barbara Carroll	

Review and Approval Checklist		Appendix 2
Review		
Title	Is the title clear and unambiguous?	Yes
	Is it clear whether the document is a policy, procedure, protocol, framework, APN or SOP?	Yes
	Does the style & format comply?	Yes
Rationale	Are reasons for development of the document stated?	Yes
Development Process	Is the method described in brief?	Yes
	Are people involved in the development identified?	Yes
	Has a reasonable attempt has been made to ensure relevant expertise has been used?	Yes
	Is there evidence of consultation with stakeholders and users?	Yes
Content	Is the objective of the document clear?	Yes
	Is the target population clear and unambiguous?	Yes
	Are the intended outcomes described?	Yes
	Are the statements clear and unambiguous?	Yes
Evidence Base	Is the type of evidence to support the document identified explicitly?	Yes
	Are key references cited and in full?	Yes
	Are supporting documents referenced?	Yes
Approval	Does the document identify which committee/group will review it?	Yes
	If appropriate have the joint Human Resources/staff side committee (or equivalent) approved the document?	Yes
	Does the document identify which Executive Director will ratify it?	Yes
Dissemination & Implementation	Is there an outline/plan to identify how this will be done?	Yes
	Does the plan include the necessary training/support to ensure compliance?	Yes
Document Control	Does the document identify where it will be held?	Yes
	Have archiving arrangements for superseded documents been addressed?	Yes
Monitoring Compliance & Effectiveness	Are there measurable standards or KPIs to support the monitoring of compliance with and effectiveness of the document?	Yes
	Is there a plan to review or audit compliance with the document?	Yes
Review Date	Is the review date identified?	Yes
	Is the frequency of review identified? If so is it acceptable?	Yes
Overall Responsibility	Is it clear who will be responsible for co-ordinating the dissemination, implementation and review of the document?	Yes

Plymouth Hospitals NHS
NHS Trust

Equalities and Human Rights Impact Assessment | Appendix 3

Core Information	
Manager	Barbara Carroll
Directorate	Oncology and Blood Services
Date	July 2013
Title	Syringe Driver Policy
What are the aims, objectives & projected outcomes?	It is the policy of Plymouth Hospitals NHS Trust battery operated syringe drivers will only be used within a consistent and evidence based framework that minimises hazards to patients and ensures that all staff are able to use them effectively and safely. This policy supports justification of need, clinical use, staff training and equipment management. This policy provides: • A consistent and evidence based framework for the management of battery operated syringe drivers used by Plymouth Hospitals NHS Trust staff, minimising hazards to patients and ensuring that all staff are able to use them effectively and safely. This policy supports justification of need, clinical use, staff training and equipment management. • The principles of management of syringe drivers and in the appendices it highlights clearly the standard operating procedures (SOP) for setting up the McKinley T34 syringe drivers currently used in Plymouth Hospitals NHS Trust practice (Appendix 1). The policy recognises that a number of different syringe drivers are used in the community and therefore, includes a framework, which has been agreed by Plymouth, Devon and Cornwall Community Services and St Luke's Hospice, Plymouth for the safe transfer of patients with syringe drivers between care settings (e.g. hospice, in the patient's home and other community settings).

Scope of the assessment
All protected characteristics have been considered when developing the policy. The following people have been involved in Equality& human Rights Impact Assessment Team Leader for Palliative Care Risk Manager Nursing and Midwifery Board Pharmacy Head of Clinical Technology

Collecting data	
Race	There is no evidence to suggest that there is a disproportionate impact on race regarding this policy
Religion	There is no evidence to suggest that there is a disproportionate impact on religion or belief regarding this policy

Disability	Consider environmental, social and attitudinal barriers; nature of barriers e.g. physical, mental, learning disabilities. Prior to commencing a syringe driver a full explanation about what a syringe driver is, how it works and why its use is indicated should be discussed with the patient and his/her carers and informed consent (written or recorded) gained. In the event of a patient who is unable to give consent the nurse will act in the best interests of a patient in conjunction with the Medical Practitioner and in line with the Mental Capacity Act (2007). Informed consent should be recorded in line with Trust policy. The patient/carer should be given the Plymouth Hospitals NHS Trust Syringe Driver information leaflet.
Sex	There is no evidence to suggest that there is a disproportionate impact on gender regarding this policy
Gender Identity	There is no evidence to suggest that there is a disproportionate impact on gender identity regarding this policy
Sexual Orientation	There is no evidence to suggest that there is a disproportionate impact on sexual orientation regarding this policy
Age	There is no evidence to suggest that there is a disproportionate impact on age regarding this policy
Socio-Economic	There is no evidence to suggest that there is a disproportionate impact on socio-economic regarding this policy
Human Rights	Prior to commencing a syringe driver a full explanation about what a syringe driver is, how it works and why its use is indicated should be discussed with the patient and his/her carers and informed consent (written or recorded) gained. In the event of a patient who is unable to give consent the nurse will act in the best interests of a patient in conjunction with the Medical Practitioner and in line with the Mental Capacity Act (2007). Informed consent should be recorded in line with Trust policy. The patient/carer should be given the Plymouth Hospitals NHS Trust Syringe Driver information leaflet.
What are the overall trends/patterns in the above data?	No tends or patterns identified
Specific issues and data gaps that may need to be addressed through consultation or further research	No data gaps that requires addressing
Involving and consulting stakeholders	
Internal involvement and consultation	Syringe driver committee including Head of Clinical technology, Associate Director of Nursing, Risk Assessment, specialist palliative care team, senior oncology nurses. Pharmacy and MEMS. Email to education leads for oncology, Director of Nursing and organisational development team.
External involvement and consultation	Devon, Cornwall and Plymouth PCT and St Luke's Hospice at several meetings. Frequent email contact with the above.

Impact Assessment	
Overall assessment and analysis of the evidence	Prior to commencing a syringe driver a full explanation about what a syringe driver is, how it works and why its use is indicated should be discussed with the patient and his/her carers and informed consent (written or recorded) gained. In the event of a patient who is unable to give consent the nurse will act in the best interests of a patient in conjunction with the Medical Practitioner and in line with the Mental Capacity Act (2007). Informed consent should be recorded in line with Trust policy. The patient/carer should be given the Plymouth Hospitals NHS Trust Syringe Driver information leaflet.

Action Plan

Action	Owner	Risks	Completion Date	Progress update

Standard Operating Procedure for use of Mckinley T34 Syringe Driver Pump for Palliative Patients	Appendix 4

Standard Operating Procedure for use of McKinley T34 syringe driver pump for palliative patients.

The McKinley T34 Syringe Pump

The McKinley T34 model is calibrated in ml per hour. All T34 pumps for palliative care are set up to deliver the syringe contents by continuous subcutaneous infusion over a 24 hour period only. Staff must check that the display shows 'Pall Care 24Hr' when switched on.

Choice of Syringe

The McKinley T34 pump may be used with most makes of syringes. The most commonly used syringes have been 10ml and 20ml, however it has been more recently advocated (Dickman 2005) that a 20ml syringe is the recommended minimum for several reasons: a larger dilution will reduce both the risks of adverse site reactions and incompatibility and it also accommodates large doses of drugs. It is therefore recommended that 20ml and 30ml syringes should be used and that they MUST have a luer lock facility in order to avoid leakage or accidental disconnection. The recommended make of syringe is Becton Dickinson (BD) and the pumps will be set to recognise this manufacturer only. Seek advice from MEMS level 4, Derriford if you do not have access to BD luer lock syringes.

Size of BD syringe	Maximum fill volume as stated in user manual	Suggested fill volume (if not priming line)*
20ml syringe	17ml	16ml

*If priming line, then add on priming volume to these figures

Reference: McKinley T34 Ambulatory Syringe Pump Operation Manual, March 2006

Procedure

Step 1 – Filling the syringe

- Use a luer lock 20ml BD syringe.
- It may not be possible to fill the syringe to full capacity (see above table).

Practice Point: Check that the syringe will fit securely in the pump.

Practice Point: Calculate the volume of the drug that needs to be drawn up from the concentration of the preparation you have and the prescribed dose (unless the drug comes in a powder formulation, do not count the number of ampoules as a final check, use the volume. Ampoules have an overage from the volume stated on the label and although there is a regulation minimum, there is no maximum)

- Draw up the prescribed medication, and then add diluent (usually water for injection for combinations of 2 or more drugs as less chance of precipitation but refer to compatibility charts) to appropriate volume, draw up a little air into the syringe, invert it gently several times to mix, and then expel the air. (Take care not to expel any of the medication.)

Note: If a drug is only available in a powdered form and the dose is less than the full amount in the ampoule, you will need to measure accurately the amount of water used for reconstitution, and calculate the volume of solution to be taken out to give the required dose.

Mixing drugs in the syringe pump

There are various problems associated with the mixing of drugs. These include:

- Degradation of the drug(s) which in turn can lead to decreased efficacy. The rate of degradation may be increased by other drugs which alter the pH of the mixture. Direct sunlight and heat can also cause degradation of the drugs.
- Crystallisation/precipitation. This can occur through formation of an insoluble product of drug interaction, or because a drug alters the pH of the solution rendering a second drug insoluble, or because of an interaction between drug and diluent.

Points to remember:

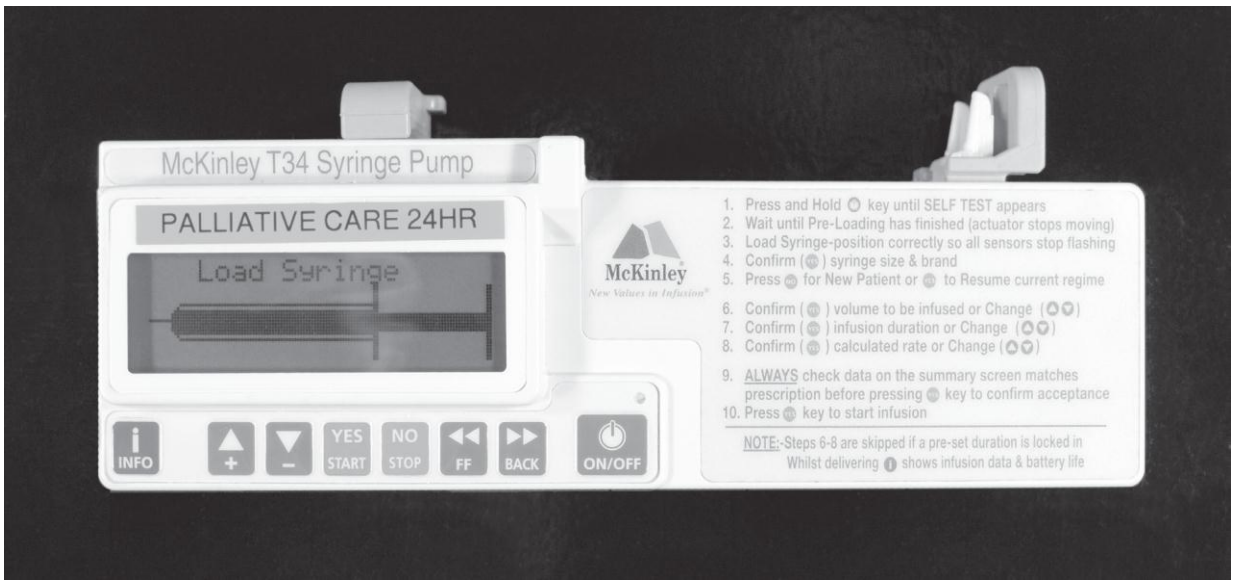
- Check compatibility charts
- Consider factors affecting choice of final volume (drug concentration and hence stability and irritation at site).
- Consider using an additional pump or an alternative route of drug administration.
- Inspect the mixture at the start and at the agreed monitoring frequency.
- Monitor the patient for any signs of decreased efficacy.

Practice Point: More than three drugs in the pump: this is not recommended routine practice in Plymouth Hospitals NHS Trust. Seek advice of palliative care specialist on alternative options.

Step 2 – Labelling

1. All syringes containing drug additives must be labelled.
2. If there is any doubt as to the contents of a syringe, the contents should be discarded. This is particularly important for continuity of care, especially where patients transfer from one care setting to another.
3. Complete the label details in ink or other indelible print.
4. The label requires to state:
    - The name of the patient for whom it is intended with Hospital Number.
    - The date and time of preparation.
    - The initials of the person preparing the contents.
    - The name and dose of all drugs e.g. morphine 15mg, haloperidol 5mg, etc.
    - The name of the diluent e.g. water for injection.
    - The total visual volume of the contents.
    - The intended route of infusion.
5. Attach label to the syringe. Ensure the label does not interfere with the mechanism of the infusion device, i.e. where there is contact with the barrel clamp arm. Flag the label at the tip end of the syringe, leaving the scale visible so that it can still be read.

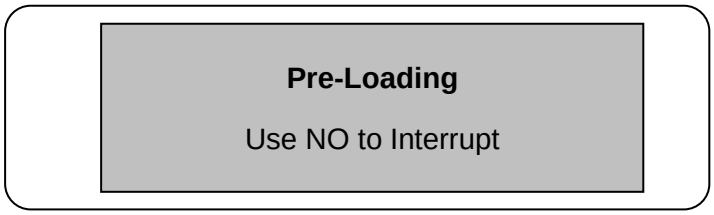
Step 3 - Prepare the McKinley T34 Syringe Pump



Pre-Loading and Syringe Placement

- Install the battery.
- Before placing the syringe into the pump ensure the barrel clamp arm is down then Press and hold the 'ON/OFF' key until the 'SELF TEST' screen appears. Check the display reads 'Pall Care 24Hr'

- The LCD display will read 'PRE-LOADING' and the actuator will start to move. Wait Until it stops moving and the syringe sensor detection screen (syringe graphic) appears.



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

Practice Point Checking the battery.

Press 'INFO' key repeatedly until the battery level appears on the screen and then press 'YES' to confirm.

Verify there is sufficient battery power for the programme. Discard the battery if less than 25% life remaining at the start of the infusion (if transferring the patient to another care setting discard if less than 40%). The average battery life, starting at 100%, is approximately 3-4 days depending on use. Always use an alkaline/lithium 9V battery. These can be identified by the international code 6LR61 on the battery or packaging.

If using batteries with less than 40% at the start of the infusion. It should be borne in mind when the battery may fail. i.e. during the night, which may result in the patient's sleep being disturbed.

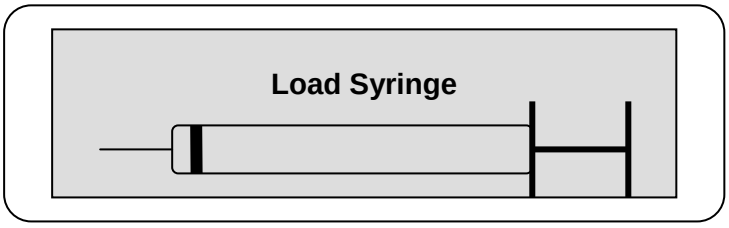
Step 4 - Connect infusion set to the syringe

- Connect the McKinley extension line securely to the syringe.
- If it is a new infusion set, gently depress the syringe plunger to manually prime the line.
- If the actuator is not in the correct position to accommodate the syringe, leave the barrel clamp arm down and use the “FF “or “BACK” buttons on the keypad to move the actuator. Forward movement of the actuator is limited, for safety; therefore repeated presses of the “FF” key may be required when moving the actuator forward. Backwards movement is not restricted.

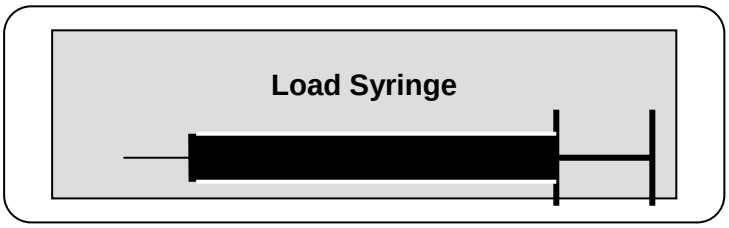
Step 5 - Fitting the syringe to the syringe pump

Practice Point For safety reasons, the syringe must be attached to the pump before connecting to the patient to avoid an inadvertent bolus dose.

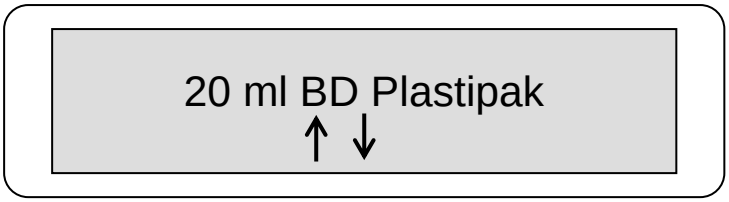
- Check the patient’s name (and wristband if used) against the prescription, according to medication policy.
- Lift and turn the barrel clamp arm.
- Seat the filled syringe collar/ear and plunger so the back of the collar/ear sits in the central rest (ensure correct placement). The syringe collar/ears should be vertical. Ensure that the scale on the syringe barrel is facing forward so that it can be easily read.
- Lower the barrel clamp arm.



NOTE: The syringe graphic on the screen ceases to flash when the syringe is correctly seated at all 3 points.



The syringe size and brand option will then be displayed as shown below.



Confirm that the syringe size and brand match the screen message. Press 'YES' to confirm. Next, connect the subcutaneous infusion device and cannula.

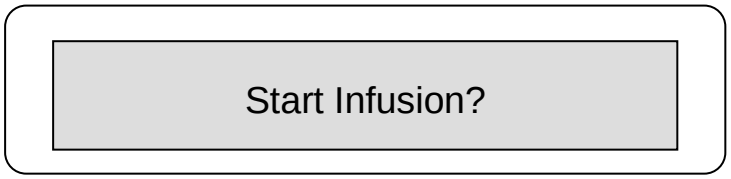
Step 6A – Starting the infusion (new syringe)

After the syringe confirmation, an example of the first screen that appears is shown below:

Volume	17 ml
Duration	24.00

The pump calculates and displays the deliverable volume, duration of infusion (24 hrs) and rate of infusion (mls per hour) – Press 'YES' to confirm or 'ON/OFF' to return to the syringe options.

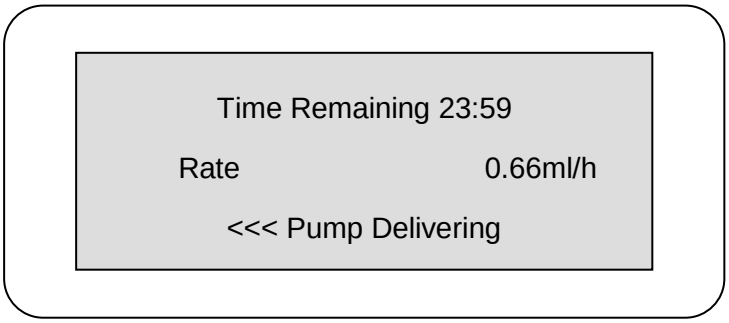
- Pump screen prompts 'Start Infusion'.



- Check the line is connected to the pump.

Step 6B - Start the syringe pump

- Check the line connection to the pump and press 'YES' to start infusion.
- When the pump is running the screen displays (example only):



- Green LED indicator flashes every 32 seconds.
- Ensure the patient and carers know that the syringe pump must NOT be placed at a level higher than the infusion site. (It is possible for the contents to siphon out).
- Never take a syringe that is not empty off the pump if it is still connected to the patient.

NOTE: It takes 4-6 hours for drugs to reach therapeutic blood plasma levels via the syringe pump, therefore, a breakthrough dose may require to be administered when the syringe pump is set up if the patient has unrelieved symptoms.

Practice Point

If the infusion has not been started and a button has not been pressed for more than two minutes, an alarm will sound and the message 'Pump Paused'

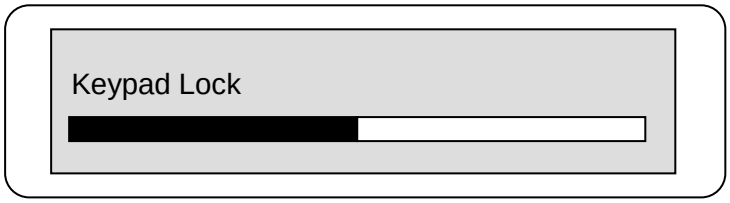
Too Long Confirm, Press 'YES' will show on the LCD display. To stop the alarm, press 'YES' and continue programming the infusion.

Step 7- Keypad lock

The T34 allows all users to lock the operation of the keypad during infusion. This function should be routinely used to prevent tampering with the device.

To activate the Keypad Lock:

With the pump infusing press and hold the 'INFO' key until a chart is displayed showing a "progress" bar moving from left to right. Hold the key until the bar has moved completely across the screen and a beep is heard to confirm the lock has been activated.



Practice Point Although the keypad lock is on, the following buttons are still active:

NO/STOP; YES/START; INFO.

To de-activate the Keypad Lock: (pump must be infusing)

Repeat the above procedure. The bar will now move from right (lock) to left (unlock) and a beep will be heard.

Step 8 – Lockboxes

Every T34 will be supplied with a lockbox. After starting the infusion, place the pump in the supplied lockbox except if using a syringe larger than 30ml. Universal keys will be supplied to each ward area/ community nurse. Replacement keys if required are the responsibility of the individual teams. If a key is lost complete an incident report form.

The lockbox supplied with the McKinley T34 Syringe Pump

Step 9 – Documentation and monitoring

Record details of preparation and commencement of infusion on recording chart.

Record:

- Date and Time
- Total visual volume of syringe contents (i.e. drug(s) and diluent)
- Drug name(s) and batch number(s)
- Diluent name and batch number(s)
- Medical physics reference number on syringe pump
- Signature(s) of person(s) preparing and checking
- Site used and appearance
- Battery level (%)
- Rate setting (ml per hour)

The operation of the pump should be checked:

- Within one hour of set-up and then 4 hourly
- Record the date and time of check.
- Check that the rate has not been altered.
- Check the volume remaining in the syringe and document the volume infused to assess whether pump is delivering medication at approximately the desired rate.
- Check the solution in the syringe and the line for cloudiness, precipitation or colour change, and presence of large air bubbles (tiny ones not significant).
- Check that the green LED light is flashing every 32 seconds and that the bottom line of the LCD display is alternating between '<<<< Pump Delivering' and make/size of syringe.
- Check that line is securely attached to syringe and not leaking, and line not kinked or trapped.

- Check infusion site for redness, swelling, discomfort/pain, leakage of fluid.
- Record location of infusion site when syringe set up and when line is changed

  (reduces discomfort to patient when monitoring).
- When site is changed, record reason.

The result of these checks should be documented on the recording chart, and signed by the person checking.

If any checks are not carried out, e.g. site check to prevent disturbing patient when asleep, record this and the reason.

Practice Point If any checks indicate a problem, e.g. the infusion is not running at the expected rate, you must take appropriate action. See section on problem solving.

Assess patient for efficacy and side-effects of the medication, and seek advice from the appropriate team member if needed.

If an infusion is discontinued before it is complete e.g. because of a change in dose or drug, document the amount remaining and destroyed (ml) on the recording chart.

Action points after monitoring checks

Action must be taken, and documented, in the event of:

- Significant discrepancies in the actual and expected infusion rate (see page 29).
- Signs of incompatibility.
- Blockage of infusion line.
- Damage to the syringe barrel or tip, or presence of large amount of air (may indicate cracked syringe barrel).
- Site reaction.

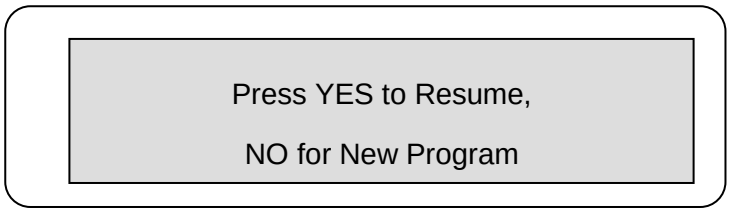
Step 10 – How to temporarily stop the infusion

This is not normal practice and should only be used in exceptional circumstances. This should not be used for priming a second line.

- Press ‘STOP’, disable the keypad lock and press and hold the ‘ON’ / ‘OFF’ button.
- Do NOT remove syringe from pump.

Resuming the Infusion

- Check that the prescription, syringe label and patient details match, to ensure that this is the correct syringe for this patient.
- Reconnect the line to the syringe on the pump if it has been disconnected.
- Press and hold the ‘ON’ button until a beep is heard. The screen will request confirmation of syringe size and syringe brand.
- Press ‘YES’ to confirm.
- The screen will display:



Press ‘YES’ to resume the previous program.

6. The screen will display: ‘Remaining volume, duration and rate of infusion’. Press ‘YES’ to confirm. Screen will display: ‘Start Infusion’. Press ‘YES’ to confirm.

Practice Point If you press ‘NO’ the pump interprets this as a completely new 24 hour period and the remaining contents of the syringe will be delivered over the next 24 hours from confirming ‘Start Infusion’.

Step 11 – How to stop the infusion and prime a new line after the infusion has started if using an administration that has the needle/cannula attached to line

- Press ‘STOP’ and disable the keypad lock. DO NOT switch the pump off.
- Disconnect the existing line from the syringe and remove the line from the patient.
- Remove the syringe from the pump. Attach and manually prime a new line.
- Resize the actuator and place the syringe in the pump.
- Confirm the size and make of the syringe.
- Insert the new line/cannula to a new site.
- Press ‘YES’ to resume the previous programme; the screen will display the volume,duration and rate. Press ‘YES’ to confirm and the screen will display ‘START INFUSION’. Press ‘YES’ to confirm.

The time remaining for the infusion will decrease to compensate for the solution that was used to prime the second line. The flow rate will remain the same. When carrying out the above procedure, nursing staff may be required to re-site infusions that they have not witnessed/personally prepared. This is considered acceptable practice within the health board for subcutaneous infusions. If there is any doubt or concern about the contents of the syringe, then a new syringe should be prepared.

Step 12 – How to change the battery when an infusion pump is running

- With the infusion still running, remove the old battery from the pump and replace with a new one.
- Switch the pump back on using the ‘ON/OFF ‘ button.
- Confirm the size and make of the syringe.
- Press ‘YES’ to resume infusion (see page 27).
- The screen will display : ‘REMAINING VOLUME, DURATION AND RATE OF INFUSION’. Press ‘YES’ to confirm. Screen will display ‘START INFUSION’. Press ‘YES’ to confirm.

Step 13 – Stopping the infusion and removing the syringe pump

- When the infusion is nearing completion, a warning will be shown on the LCD Display 15 minutes before the end of the infusion. When the infusion is complete and the syringe is empty, the pump will stop automatically and an alarm will sound.

- If the syringe pump is no longer required for the patient, press 'YES' to confirm the end of the infusion, disable the keypad lock and press and hold the 'ON/OFF' button to switch off the pump.

- If the infusion is to be stopped before the syringe is empty, it should also be disconnected at the syringe end from the patient for safety reasons before the syringe is taken off the pump. A syringe that is not empty must NEVER be taken off the pump while connected to the patient. If the infusion is to be stopped before the syringe is empty, disconnect the pump from the patient before the removing the syringe from the pump.

- Clean the pump and the lockbox as detailed (do not immerse pump in water). Dry and replace in packaging if no longer required for use.

Step 14 – What to do if the patient dies when the syringe pump is running

- Stop the pump only after death has been formally verified.

- Stop the pump by pressing the 'STOP' button and remove the needle/cannula as soon as possible. Switch off the pump by disabling the keypad lock and then press and hold the 'ON/OFF' button.

- Record on the SC infusion chart the date, time and amount of solution remaining in The syringe (mls) and destroyed. The signature(s) of the person(s) present and witness (if there is one).

Discharge Checklist — Appendix 5

Discharge and transfer checklist for patients with a syringe driver for subcutaneous use from Derriford Hospital

Patient name **NHS number**

The following should be sent with patients discharged with a syringe driver for subcutaneous use:

	Date & Sign
The patient and carers must be informed that the District Nurse, Hospice or Care Home nurses may change the syringe driver to a different type following discharge.	
Change the syringe driver battery if it has less than 40% life left.	
A telephone referral should be made to the area the patient being referred to, to include the type and time the syringe driver is due to be changed and to ensure that nursing staff have a key to unlock the lock box.	
A signed syringe driver prescription sheet, including prescribed stat doses.	
A copy of the syringe driver medication administration record form.	
7 days supply of drugs and diluents for the syringe driver on discharge from inpatient situation.	
A discharge letter giving the patients diagnosis and treatment details.	
Patient and their carer must be given a syringe driver patient information leaflet.	
Please return 'Kit box' to MEMS and complete the form stating the location where the patient and syringe driver have been sent.	

Date and time syringe driver changed ……..

Syringe driver to be returned to MEMS level 4 Derriford ……Date …….

Asset number of driver to be returned ……

Signature and name of member of staff returning driver

Signature ……Name …….