### CLINICAL PROCEDURE FOR MCKINLEY T34 SYRINGE DRIVER

<table>
<thead>
<tr>
<th>Issue History</th>
<th>Issue Version</th>
<th>Purpose of Issue/Description of Change</th>
<th>Planned Review Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two</td>
<td>Two</td>
<td>To assist and support community practitioners in the use and management of syringe drivers when administering palliative care medicines</td>
<td>2014</td>
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</tbody>
</table>

**Named Responsible Officer:-**
- Quality and Governance Service

**Approved by**
- Quality, Patient Experience and Risk Group

**Date**
- August 2013

**Section:- Medicines Management**
- MMSOP 04

**Target Audience**
- Community Nursing

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*UNLESS THIS VERSION HAS BEEN TAKEN DIRECTLY FROM TRUST WEB SITE THERE IS NO ASSURANCE THIS IS THE CORRECT VERSION*
### CONTROL RECORD

<table>
<thead>
<tr>
<th><strong>Title</strong></th>
<th>Clinical Procedure for McKinley T34 Syringe driver</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Purpose</strong></td>
<td>To assist and support community practitioners in the use and management of McKinley T34 syringe drivers when administering palliative care medicines</td>
</tr>
<tr>
<td><strong>Author</strong></td>
<td>Quality and Governance Service (QGS)</td>
</tr>
<tr>
<td><strong>Equality Assessment</strong></td>
<td>Integrated into procedure</td>
</tr>
<tr>
<td><strong>Subject Experts</strong></td>
<td>Lisa Knight/Annie Baker</td>
</tr>
<tr>
<td><strong>Document Librarian</strong></td>
<td>QGS</td>
</tr>
<tr>
<td><strong>Groups consulted with :-</strong></td>
<td>Medicines Management Group</td>
</tr>
<tr>
<td><strong>Infection Control Approved</strong></td>
<td>30 May 2012</td>
</tr>
<tr>
<td><strong>Date formally approved by Quality, Patient Experience and Risk Group</strong></td>
<td>7th June 2012</td>
</tr>
<tr>
<td><strong>Method of distribution</strong></td>
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<td><strong>Archived</strong></td>
<td>Date</td>
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<tr>
<td><strong>Access</strong></td>
<td>Via QGS</td>
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### VERSION CONTROL RECORD

<table>
<thead>
<tr>
<th><strong>Version Number</strong></th>
<th><strong>Author</strong></th>
<th><strong>Status</strong></th>
<th><strong>Changes / Comments</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Version 1</td>
<td></td>
<td>N</td>
<td>New procedure to support the implementation of McKinley syringe drivers</td>
</tr>
<tr>
<td>Version 2</td>
<td>A Baker</td>
<td>R</td>
<td>To change name of Liverpool Care Pathway to Wirral End of Life Care Plan as advised by NHS England (NHS England, 16th July 2013)</td>
</tr>
</tbody>
</table>

Status – New / Revised / Trust Change
PROCEDURE FOR MCKINLEY T34 SYRINGE DRIVER

INTRODUCTION

The Trust is committed to providing high quality, services to all patients requiring medication subcutaneously via a McKinley T34 syringe driver to promote best practice and reduce risk of medication errors. Nursing staff will be competent in the setting up, reloading and taking down the syringe driver including management of complications.

This current revision is in response to changes in national policy, practice development and to meet safety requirements for infusion devices National Patient Safety Agency Rapid Response Report RRR019 (NPSA, 2011).

TARGET GROUP

The procedures applies to all Registered Nurses employed by the Trust who are required to provide the administration of medicines via this route.

TRAINING

Clinical staff need to comply with mandatory training as specified in the Trust’s Training Matrix and the bespoke Service Mandatory Training Matrix, which includes competency requirements.

The training and the competency may need to be repeated if the practitioner:-
- has been on long term absence from work e.g. over 6 months
- has had this topic identified as a developmental need following a clinical incident investigation or Root Cause Analysis

Online Training

On line support is available for the use of McKinley Syringe Driver interactive training via the website below.

Visit the training area at http://www.mckinleymed.co.uk/online-training/.

Register using organisation’s log in and complete registration form, contact Community Nursing Office for organisation log in details

SECOND CHECKER – Registered Nurses Registered nurses who have not completed the syringe driver competency, including those who are working towards the competency which is mandatory for all nurses can only be a second checker.

SECOND CHECKER – Auxiliary Nurses Auxiliary nurses can be a second checker following completion of a ‘second checker’ competency which is assessed by a registered nurse.
RELATED POLICIES: - Please refer to relevant Trust policies and procedures

INDICATIONS

A McKinley T34 syringe driver is a small portable battery operated infusion device for administering medication. It is used for the administration of medicines via the subcutaneous route over a calculated period of time, particularly for symptom control when other routes of medication administration are not appropriate.

INDICATIONS FOR USING A SYRINGE DRIVER IN PALLIATIVE CARE

Following the assessment of the patient the registered nurse in partnership with the medical practitioner must be satisfied that it is in the best interests of the patient to have the administration of medications subcutaneously via a syringe driver. This may be for the following reasons:

• Persistent nausea and vomiting
• Dysphagia; intermittent or continuous
• Oral or pharyngeal lesions
• Intestinal obstruction
• Patient too weak to swallow oral medication
• Diminishing level of consciousness
• Malabsorption of oral medication
• Rectal route inappropriate or unavailable

ADVANTAGES

• Avoids the need for four hourly injections
• Provides stable plasma levels of analgesics/medication that may be required for current symptom management
• Patients can retain mobility and independence

SAFETY CHECKS FOR USE OF TRUST SYRINGE DRIVERS

• Check syringe driver is within service date, the service date is recorded on the syringe driver, all syringe drivers must be serviced at least every 12 months.
• All teams must have a system in place to check the syringe driver has not recently been involved in a clinical incident which requires the syringe driver to be serviced or repaired
• Do not use re-chargeable batteries. Batteries must be changed as per manufacturer’s instructions. Spare new batteries x 3 must be kept in syringe driver box
• Lockable boxes are available for each syringe driver and the key for the lockable box must be kept in the envopak

DECONTAMINATION The syringe driver must be decontaminated between individual use, prior to service, inspection or repair and as part of good housekeeping; if contaminated during use decontaminate in line with manufacturer’s instructions.

SAFE STORAGE OF MEDICINES Envopaks are available in community nursing for the safe storage of medicines with the use of numbered tags to secure the contents of the bag between nursing visits. Additional tags are to be stored in the Envopak bag. All medicines prescribed for syringe drivers must be stored in the Envopak, transdermal patches to be stored in Envopak.
only if nurses are applying the patch. When counting medicines there is no need to open
manufacturer’s sealed boxes to count all ampoules, only count ampoules in opened boxes and
record number of ampoules in sealed boxes as per the manufacturer’s packaging

CONSENT

Valid consent must be given voluntarily by an appropriately informed person prior to any
procedure or intervention. No one can give consent on behalf of another adult who is deemed
to lack capacity regardless of whether the impairment is temporary or permanent. However
such patients can be treated if it is deemed to be within their best interest. This must be
recorded within the patient’s health records with a clear rationale stated at all times. Refer to
Trust Consent Policy for further information and guidance.

MCKINLEY SYRINGE DRIVER PUMP

The McKinley T34 syringe driver is calibrated in mls per hour. All McKinley T34 pumps for
palliative care are set up to deliver the contents of the syringe by continuous infusion over a 24
hour period. The McKinley pump will be pre-set to use:

- Plastipak BD 30ml Luer lock syringes (maximum volume 23 mls, if the contents of the
  syringe exceeds 23mls, a second syringe driver will be required)
- To be pre set for 24 hour infusion
- To be configured for Prime and Load start up sequence

CANNULA AND EXTENSION SETS

The Saf-T-Intima cannula is a needle free device that can remain in place for up to seven days;
although licensed for intravenous use the cannula can be used subcutaneously

The extension set can remain in place for up to seven days

SETTING UP AND USE OF SYRINGE DRIVER

EQUIPMENT

- Single use disposable sterile dressing pack or single use disposable apron
- Point of Use Disposal System (POUDS) tray
- Disposable non-sterile gloves
- A McKinley T34 Syringe driver pump and protective box
- New Alkaline 9v batteries
- Relevant medication and diluent
- Needles (Green)
- Sharps container
- Saf-T-Intima cannula - 24Gauge
- Extension set
- Gauze
- Single use disposable scissors (If required)
- Alcohol wipe with 2% chlorhexidine and 70% alcohol (unless contra indicated)
• Clear adhesive film dressing (e.g. Tegaderm)
• Doop kit.
• Patient’s own electric razor or scissors (for hair removal if necessary)
• A luer lock B D Plastipak 30ml syringe must only be used.

Staff must use a **1ml syringe** for measuring medication volumes less than 1ml
When drawing up medication, use a separate syringe for each medication added

**Insulin syringes must not be used as this may lead to drug errors**

• The Patient Medicines Administration Chart for 24 hour syringe driver
• Patient Medicines Administration for “as required” medication must be available in the patient’s home

Relevant syringe driver documentation:
• Record of Administration of Medication for 24 hour Syringe Driver - **Pink**
• Record of Administration for As Required Medication – **Yellow**
• Record of Administration for Transdermal Opioid Patch – **Yellow**
• Stock Control Sheet for use with Syringe Drivers, Transdermal Patches and as Required medication – **Green**
• Syringe driver check list
• Green adhesive syringe driver label

**PROCEDURE**

**THIS PROCEDURE FOLLOWS THE PRIME AND LOAD SEQUENCE**

Note it takes 4-6 hours for drugs to reach therapeutic blood plasma levels via syringe pump, therefore, a breakthrough dose of medication may be required to be administered when the syringe pump is set up for symptom management.

It is recommended best practice when a syringe pump is set-up, reloaded or re-sited to observe the syringe pump for the first **15 minutes** to check that it is working correctly.

<table>
<thead>
<tr>
<th>ACTION</th>
<th>RATIONALE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verbally confirm the identity of the patient by asking for their full name and date of birth. If the patient is unable to confirm, check identity with family/carer</td>
<td>To avoid mistaken identity</td>
</tr>
<tr>
<td>Introduce yourself as a staff member and any colleagues involved at the contact</td>
<td>To promote mutual respect and put patient at their ease</td>
</tr>
<tr>
<td>Wear identity badge which includes name status and designation</td>
<td>For patients to know who they are seeing and to promote mutual respect</td>
</tr>
<tr>
<td>Ensure verbal consent for the presence of any other third party is obtained</td>
<td>Students for example, as the patient has the choice to refuse</td>
</tr>
<tr>
<td>Explain procedure to patient including risks and benefits and gain valid consent.</td>
<td>To ensure patient understands procedure and relevant risks</td>
</tr>
</tbody>
</table>
| Ensure Patient Medicines Administration Chart is:  
  - clearly written  
  - unambiguous  
  - signed by the prescriber and the date prescribed is | To comply with prescribing legislation and the procedure for the administration of medicines To obtain clarification from the prescriber if there |
<table>
<thead>
<tr>
<th>Action</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>recorded on the chart</td>
<td>is any ambiguity about the medication on the Patient Medicine Administration Chart</td>
</tr>
<tr>
<td>• allergy status of patient is stated</td>
<td></td>
</tr>
<tr>
<td>Check the name of the medicine, the strength, the formulation on the manufacturer’s packaging corresponds to the pharmacy label</td>
<td>To check the correct medicine has been dispensed</td>
</tr>
<tr>
<td>For each medicine prescribed, check the pharmacy label on the container issued by the pharmacist against the Patient Medicines Administration Chart checking:</td>
<td>To check the Patient Medicines Administration Chart is written in accordance with the prescribed medication</td>
</tr>
<tr>
<td>• name of the medicine</td>
<td></td>
</tr>
<tr>
<td>• form of medicine</td>
<td></td>
</tr>
<tr>
<td>• strength of the medicine</td>
<td></td>
</tr>
<tr>
<td>• dose of the medicine</td>
<td></td>
</tr>
<tr>
<td>Where a sliding scale has been prescribed, start at the lowest dose unless otherwise advised by GP or Integrated Specialist Palliative Care Team</td>
<td>To prevent an overdose</td>
</tr>
<tr>
<td></td>
<td>To protect patients who may be opioid naive</td>
</tr>
<tr>
<td>If any calculations are required ensure two appropriately trained staff members check the calculation and document appropriately</td>
<td>To comply with Trust policy</td>
</tr>
<tr>
<td>Check batch number and expiry date and record in patient records on appropriate syringe driver documentation</td>
<td>To provide an audit trail of batch numbers used To reduce the risk of out of date medicines being given</td>
</tr>
<tr>
<td>Two staff are required to be present when setting up and re-priming a syringe driver. One must be a registered nurse and one of the staff can be an unregistered nurse who has successfully completed the second checker syringe driver competency.</td>
<td>To minimise medication errors</td>
</tr>
<tr>
<td>In the event of two registered nurses setting up or re-priming a syringe driver one nurse must take lead responsibility for drawing up the medication, attaching the syringe to the driver, completing and signing all necessary documentation The second nurse will take responsibility for checking the medication and signing in the ‘checked by’ column</td>
<td>To reduce medication errors bank staff cannot take on role of a lead nurse</td>
</tr>
<tr>
<td>Gather all equipment required for the procedure and place onto a clean area i.e. POU DS tray or if used, open sterile single use dressing pack and place all sterile single use equipment required within the field</td>
<td>To prevent contamination of key parts</td>
</tr>
<tr>
<td>Decontaminate hands prior to procedure</td>
<td>To reduce the risk of transfer of transient micro-organisms on the healthcare worker’s hands</td>
</tr>
<tr>
<td>Apply single use disposable plastic apron and put on single use disposable gloves</td>
<td>To reduce the risk of microbial contamination and prevent the spread of infection</td>
</tr>
<tr>
<td>Medication must only be administered to the patient by the person who prepared the syringe</td>
<td>To follow NMC Guidelines</td>
</tr>
<tr>
<td>Draw up the prescribed medication and diluent to a maximum of 23mls in a luer lock B D Plastipak 30ml syringe</td>
<td>The maximum volume for a 30 ml BD Plastipak syringe is 23 ml</td>
</tr>
<tr>
<td>Complete the drug additive label details, the label requires:</td>
<td></td>
</tr>
<tr>
<td>• The full name of the patient</td>
<td></td>
</tr>
<tr>
<td>• The date and time of preparation</td>
<td></td>
</tr>
<tr>
<td>• The initials of the person preparing the contents</td>
<td></td>
</tr>
<tr>
<td>• The name and quantity of all drugs</td>
<td></td>
</tr>
</tbody>
</table>
- The name and amount of the diluent
- The total volume of contents
- The intended route of infusion

Attach the label to the syringe horizontally. Ensure the label is flush to the syringe but does not occlude the visual scales on the syringe which may require to be viewed during the infusion.

Ensure the label does not interfere with the mechanism of the infusion device, i.e. where there is contact with the barrel clamp arm.

Remove small clear plastic cap from the “Y” junction of the cannula and attach luer lock end of extension line to this junction.

Using a non touch technique attach the prepared syringe to the other end of the extension line and prime the line and cannula to the tip of the cannula. Clamp the line.

Check the pump: Ensure the device is clean and visually intact.

Insert battery using alkaline or lithium 9V battery (this can be identified by the international code 6LR61 on the battery or packaging). Average battery life is 3-4 days, starting at 100% Change battery at near end of battery alert or ensure a minimum of 40% battery life at the start of the infusion to cover for 24 hour period in the community.

**Power on and Preloading**
Press and hold down the ‘ON/OFF’ key until the screen illuminates

This screen displays when no syringe is in place and the barrel clamp arm is down.

The automatic actuator movement will delete any previous programme in the pump memory.

The LCD display will show ‘Pre-loading’ and the actuator will start to move. Wait until the actuator stops moving and the syringe sensor detection screen (Load syringe) appears.

**Warning:** Do not use force to try to move actuator manually, this could cause damage to the device and/or affect calibration.

If a foreign object is trapped in front of, or behind the actuator (during Pre-loading or when manually adjusting the actuator) the user must:
- Power the pump off
- Raise barrel clamp arm
- Power on
- Lower barrel clamp arm and use either the ‘FF’ or ‘Back’ key to release the object.

At the end of the pre-loading the actuator always returns to the
Verify sufficient battery power for the programme. Check the battery by pressing the ‘INFO’ key to display ‘battery level’ press ‘YES’ to view battery meter and confirm sufficient battery power. Wait a few seconds for the “Load Syringe” screen to display start position of the last infusion programmed.

<table>
<thead>
<tr>
<th>Verify there is sufficient battery power for the programme (If less than 40% change the battery)</th>
</tr>
</thead>
</table>

Check if manual adjustment of the syringe is required by holding the syringe above the device to align the collar sensor to the syringe collar and plunger sensor to the syringe plunger, 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/back as necessary so the syringe will fit.

<table>
<thead>
<tr>
<th>Forward movement of the actuator is limited, for safety; therefore repeated presses of the ‘FF’ key may be required when moving the actuator forward. Backward movement is not restricted</th>
</tr>
</thead>
</table>

The screen prompt “load syringe” will continue to flash until the syringe is correctly seated.

<table>
<thead>
<tr>
<th>This will avoid an inadvertent bolus dose</th>
</tr>
</thead>
</table>

**For safety reasons, the syringe must be attached to the pump before connecting to the patient**

Lift the barrel clamp arm as far as it will go and turn it (left or right) 90 degrees. Place the prepared syringe and set into pump collar and plunger slots fully and return the barrel clamp arm to the down position to secure it on top of the syringe. Ensure the scale on the syringe barrel is facing forward so that it can be easily read.

<table>
<thead>
<tr>
<th>To ensure correct placement</th>
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</thead>
</table>

The syringe size and brand option will then be displayed, to confirm the syringe size and brand of syringe i.e. 30ml BD Plastipak syringe press ‘YES’ to confirm.

<table>
<thead>
<tr>
<th>(Note; the syringe graphic on the screen ceases to flash at each point when the syringe is correctly seated in all three points)</th>
</tr>
</thead>
</table>

After the syringe confirmation, the pump calculates and displays the deliverable volume, duration of infusion (24 hours) and the rate of infusion (mls per hour).

<table>
<thead>
<tr>
<th>To review the infusion summary to check the parameters displayed match the prescription: Visually check the volume in the syringe matches the volume displayed</th>
</tr>
</thead>
</table>

To confirm infusion details, Press “Yes”

The screen will display start infusion, check duration displayed is the duration required for the infusion (24 hours).

Check the rate displayed is the syringe volume divided by the duration required e.g. 22.5mls divided by 24 hours = 0.94 mls per hour.

<table>
<thead>
<tr>
<th>To ensure dressing adheres to patient skin and reduce the risk of causing pain or discomfort when removing the dressing</th>
</tr>
</thead>
</table>

If a new patient requires a syringe driver; the patient will require insertion of Saf-T-Intima cannula.

**Insertion of cannula**

Choose an appropriate site in consultation with patient (See Appendix 2 for choice of site)

<table>
<thead>
<tr>
<th>Patient may wish to express a personal preference</th>
</tr>
</thead>
</table>

Trim excess hair from selected site (if required) using single use disposable scissors.

<table>
<thead>
<tr>
<th>To ensure dressing adheres to patient skin and reduce the risk of causing pain or discomfort when removing the dressing</th>
</tr>
</thead>
</table>

Clean the skin with 2% chlorhexidine and 70% alcohol (unless |

<table>
<thead>
<tr>
<th>To reduce the risk of transfer of any</th>
</tr>
</thead>
<tbody>
<tr>
<td>Action</td>
</tr>
<tr>
<td>--------</td>
</tr>
<tr>
<td><strong>CONTRA INDICATED</strong></td>
</tr>
<tr>
<td>Grasp ridged yellow side wings of the cannula between thumb and index finger, Remove needle sheath from Saf-T-Intima cannula making sure the eye of the needle is facing upwards at the sharpest point to enter the skin. Insert BD Saf-T-Intima cannula at 45° angle, cover the cannula and wings only with transparent dressing. Hold wings of cannula firmly and pull back on the introducer until you see four distinct parts (needle encasements, wire and white introducer. Grip “Y” connection with one hand and the yellow needle encasement with the other hand With a gentle pulling action, pull the needle encasement away from the “Y” connection. This should leave a injectable bung in place (this is not utilised for this procedure), pull the needle encasement away and dispose in sharps container</td>
</tr>
<tr>
<td>Consider using gauze beneath the Saf-T-Intima cannula “Y” connector for patient comfort to prevent pressure damage to the skin</td>
</tr>
<tr>
<td><strong>THE PUMP SCREEN WILL PROMPT ‘START INFUSION’</strong></td>
</tr>
<tr>
<td>Check the extension line connection to the pump and release the clamp press “Yes” to start infusion.</td>
</tr>
<tr>
<td><strong>CHANGING SYRINGE ONLY</strong></td>
</tr>
<tr>
<td>Visually check that:</td>
</tr>
<tr>
<td>- the infusion running screen is visible and ‘pump delivering’ displays</td>
</tr>
<tr>
<td>- the green LED light flashes intermittently every 32 seconds</td>
</tr>
<tr>
<td>Apply McKinley key pad lock to lock the pump</td>
</tr>
<tr>
<td>To activate the keypad lock press and hold the ‘INFO’ key until the chart is displayed showing ‘Progress bar’ moving from left to right. Hold the key until the bar has moved completely across the screen from left to right and a bleep is heard to confirm the lock has been activated. To deactivate the keypad lock (pump must be infusing), repeat the above procedure, the bar will move from ‘right’ (lock) to ‘left’ (unlock) and a beep will be heard</td>
</tr>
<tr>
<td>Do not release the ‘Info’ key until the bleep is heard</td>
</tr>
</tbody>
</table>
Ensure the patient and carers know that the syringe pump must not be placed at a level higher than the infusion site. (It may be possible for the contents to siphon out).  
This is a precaution even with an anti-siphon set as they may not be 100% reliable.

**Note:** if the infusion has not been started and a button has not been pressed for more than 2 minutes, an alarm will sound and the message ‘pump paused too long will appear. To confirm press ‘Yes’ on the LCD display.

To stop automatically and the alarm will sound.

To ensure appropriate amounts of transient and resident skin flora that may have built up under gloves and possible contamination following removal of PPE

**PAUSING THE INFUSION**

Pausing the infusion is not normal practice and should only be carried out in exceptional circumstances following the completion of a risk assessment and the care discussed with Community Nurse Managers for each patient.

**STOPPING THE INFUSION AND REMOVING THE SYRINGE PUMP**

When the infusion is complete and the syringe is empty, it will stop automatically and the alarm will sound.

If the syringe pump is no longer required for the patient, press "OFF" and then remove the battery from the syringe pump.

If the infusion is to be stopped before the syringe is empty, it should 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

Decontaminate the syringe driver and cover using a Trust approved cleaning wipe in line with Infection Control policy

Decontamination of medical equipment is essential for the effective delivery of patient care.

Disconnect the existing line from the syringe and remove the line from the patient.

Dispose of sharps in approved container in line with Trust policy

**CHANGING BATTERY MID INFUSION**

Press the stop button to stop infusion, remove old battery from
TROUBLE SHOOTING

Complete syringe driver check list when monitoring the McKinley syringe driver pump while in use.

<table>
<thead>
<tr>
<th>WHAT TO DO IF THE PATIENT DIES WHILST THE SYRINGE PUMP IS IN SITU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stop the syringe pump.</td>
</tr>
<tr>
<td>Press the ‘INFO’ key and record the date, time and amount of</td>
</tr>
<tr>
<td>solution remaining to be infused in the syringe</td>
</tr>
<tr>
<td>Stop the pump by pressing the ‘Stop’ button and remove the</td>
</tr>
<tr>
<td>cannula.</td>
</tr>
<tr>
<td>Switch off the pump by disabling the keypad lock and then</td>
</tr>
<tr>
<td>press and hold the ‘On/Off’ button.</td>
</tr>
<tr>
<td>Remove the syringe from the syringe pump, destroy the</td>
</tr>
<tr>
<td>contents using a Doop Kit and ensure this is appropriately</td>
</tr>
<tr>
<td>witnessed and documented, record the details on the syringe</td>
</tr>
<tr>
<td>driver documentation and record in health records.</td>
</tr>
<tr>
<td>Remove the battery from the pump and the needle/cannula as</td>
</tr>
<tr>
<td>soon as possible.</td>
</tr>
<tr>
<td>Clean the syringe pump using a Trust approved cleaning wipe</td>
</tr>
<tr>
<td>in line with Infection Control policy</td>
</tr>
<tr>
<td>Decontamination of medical equipment is essential for the</td>
</tr>
<tr>
<td>effective delivery of patient care</td>
</tr>
</tbody>
</table>

MONITORING THE MCKINLEY T34 SYRINGE PUMP WHILE IN USE

Complete syringe driver check list when monitoring the McKinley syringe driver pump while in use.

TROUBLE SHOOTING

IF THE INFUSION IS RUNNING TOO FAST (i.e. running more than 1 hour ahead of expected time):

If major over-infusion, stop infusion, check condition of patient and seek medical advice. Report the incident using Trust Incident Reporting system.

Check for disconnection of line or cannula.

Check the rate setting is correct.

Check the pump has not been placed above the height of the patient (siphonage could have occurred).

Change the entire syringe pump for a new one, complete medical device inspection, servicing and repair form and send the original pump back to Electronic Bio-Medical Equipment (EBME) for servicing or repair.

Any incident relating to this procedure would need to be reported on Trust’s Incident Reporting System.

IF THE INFUSION IS RUNNING TOO SLOW (i.e. running more than 1 hour behind the expected time):

Check the rate setting is correct.

Check the Infusion Light Status Indicator is **green** and flashing.

Check the battery level.
Check the syringe is inserted correctly onto the syringe pump.

Ascertained if the syringe pump has been stopped and restarted for any reason.

Check the syringe and line.

Is there any evidence of crystallisation or kinking of the tubing?

Check the cannula site - for any redness/hard/lumpy/sore.

Consider changing the site and setting up a new syringe over 24 hours.

If continues to run too slow change the entire syringe pump for a new one, complete medical device inspection, servicing and repair form and send the original pump back to EBME for servicing.

Any incident relating to this procedure would need to be reported using the Trust’s Incident Reporting System

<table>
<thead>
<tr>
<th>MCK INLEY T34 SYRINGE  PUMP ALARM CONDITIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>When the syringe pump detects a problem four things occur:</td>
</tr>
<tr>
<td>- The infusion stops.</td>
</tr>
<tr>
<td>- An audible alarm is activated.</td>
</tr>
<tr>
<td>- A message appears on the display screen indicating the cause of the alarm.</td>
</tr>
<tr>
<td>- The Infusion Light Status Indicator turns red.</td>
</tr>
</tbody>
</table>

The alarm will sound for the following reasons:

<table>
<thead>
<tr>
<th>Alarm</th>
<th>Alarm type</th>
<th>Possible cause</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Occlusion or syringe empty.</td>
<td>Audible and visual alarm</td>
<td>Patient cannula/line blocked, kinked Occlusion. Infusion has finished.</td>
<td>Replace, resite and prime new cannula and extension line and restart syringe driver. End of program, switch off pump.</td>
</tr>
<tr>
<td>Syringe displaced.</td>
<td>Audible and visual alarm</td>
<td>Syringe has been removed or displaced.</td>
<td>Check and confirm syringe seated correctly and resume infusion. Syringe flange needs to be in the vertical position at all times.</td>
</tr>
<tr>
<td></td>
<td>Intermittent bleep</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pump Paused too long.</td>
<td>Audible and visual alarm</td>
<td>Pump left or no key selected for 2 minutes.</td>
<td>Start infusion, continue programming or switch off.</td>
</tr>
<tr>
<td></td>
<td>Intermittent bleep</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Near end.</td>
<td>Audible and visual alarm</td>
<td>15 minutes from end of infusion.</td>
<td>Prepare to change syringe or switch off.</td>
</tr>
<tr>
<td></td>
<td>Intermittent bleep</td>
<td></td>
<td></td>
</tr>
<tr>
<td>End program.</td>
<td>Audible and visual alarm</td>
<td>Infusion complete.</td>
<td>Pump will alarm. Press ‘Yes’ to confirm end of program and ‘Off’ to switch pump off.</td>
</tr>
<tr>
<td></td>
<td>Intermittent bleep</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low battery.</td>
<td>Visual alarm</td>
<td>Battery is almost depleted (30 minutes left).</td>
<td>Prepare to change battery and resume infusion.</td>
</tr>
<tr>
<td>End battery.</td>
<td>Visual alarm</td>
<td>Battery is depleted.</td>
<td>Change battery and resume infusion.</td>
</tr>
</tbody>
</table>
ALERTS

McKinley T34 Syringe Pump Alert Conditions

When the McKinley alert is activated the infusion continues and 2/3 beeps are heard approximately every 3-4 minutes. A screen message will indicate the cause of the alert and displays intermittently with the infusion running screen.

An alert will activate approximately 15/30 minutes prior to:

• End of infusion
• End of battery life

CLEANING AND DECONTAMINATION

McKinley pump

Cleaning should be carried out using a Trust approved cleaning wipe in line with Infection Control policy and following manufacturer’s instructions paying particular attention when cleaning actuator, plunger sensor and barrel clamp arm. Dry thoroughly.

Lockable box
Cleaning should be carried out using a Trust approved cleaning wipe in line with Infection Control policy and following manufacturer’s instructions paying particular attention when cleaning around barrel lock. Dry thoroughly.
If grossly contaminated dispose and replace with new lockable box.

SYRINGE DRIVER CHECKLIST

The syringe driver checklist must be completed at each visit by the registered nurse. This is essential to prevent any delay in the patient receiving prescribed medication.
• Syringe driver sites should be changed as required
• If more than one syringe driver is being used, a separate syringe driver / Patient Medicines Administration Chart is to be used for each syringe driver and clearly numbered on the green labels attached to each syringe barrel
• Due to the changes made to the check list following learning from experience the most up to date version is kept on the Trust intranet

SERVICING OR REPAIR OF SYRINGE DRIVER

Syringe drivers are serviced by the Electronic Bio-Medical Equipment (EBME) department at Wirral University Teaching Hospital. Complete a Medical Device, Inspection, Servicing and Repair Form and send with syringe driver to EBME for yearly servicing. The syringe driver must be decontaminated prior to servicing. To reduce the risk of equipment loss all syringe drivers need to be hand delivered.

REPAIRS
• If problems or faults arise with a syringe driver, return syringe driver to EBME describing what the fault is on the Medical Device, Inspection, Servicing and Repair Form, stating the equipment number of the syringe driver
• The incident involving faulty equipment would need to be reported using the Trust’s Incident Reporting System recording what the fault is, action taken and record the equipment number of the syringe
driver. The medical device form is available from the Quality and Governance Service web site under Palliative Documentation

**MEDICINES**

**a) Starting doses of medicines in syringe drivers**

Practitioners are advised to refer to the current Care of the Dying Clinical Guidelines for non-renal patients or severe renal failure patients for appropriate starting doses. For example for non-renal strong opioid naïve patients when pain is present a stat dose of morphine sulphate 2.5mg to 5mg subcutaneously (s/c) should be given and a syringe driver commenced with morphine sulphate 5mg to 10mg and haloperidol 2.5mg to 5mg s/c over 24 hours. This is appropriate for patients who have already received weak opioids e.g. codeine or dihydrocodeine. The exception to this is patients, who are receiving maximum doses of oral tramadol. For example a patient taking 400mg tramadol orally over 24 hours, the approximate conversion to oral morphine is 10:1 which equates to 40mg of oral morphine Therefore the equivalent s/c morphine sulphate dose is 40mg ÷ 2 = 20mg. Therefore for these patients a starting dose of 20mg morphine sulphate s/c in the syringe driver over 24 hours may be appropriate.

**ALFENTANIL – HIGH RISK MEDICATION** For renal patients refer to the Severe Renal Failure Care of the Dying Guidelines, renal patients may be prescribed Alfentanil for pain relief. **Always** seek specialist advice as Alfentanil is not on a dose conversion chart and Alfentanil must not be administered as a medication for breakthrough pain due to the strength of the medication and its short half life. Extreme care is needed as equivalent opioid doses are approximate and there is considerable patient variability. Dosages must therefore be tailored to meet individual patient needs

**b) Medicines should be diluted in sodium chloride 0.9% when making up a syringe driver except:**
- Cyclizine (alone or in combination with other medicines) should be diluted with water for injection
- Diamorphine in concentrations greater than 40mg/ml should be diluted with water for injections; see example below:
  - If there is more than 920mg diamorphine you must use water for injection as the diluent. (The required volume is 23ml which would correspond to 23ml x 40mg/ml = 920mg)

If in any doubt about the concentration of diamorphine you are using, use water for injections as your diluent.

**c) The following medication should be used in a syringe driver only as single agents:**
- Ketorolac
- Ketamine
- Phenobarbital
- Diclofenac - this is not a non-steroidal anti-inflammatory medication (NSAID) of choice for use in syringe drivers
- Dexamethasone - when Dexamethasone 1mg is used for site preservation it may be mixed with other medication (Reymond, L. 2003). The Dexamethasone should be added last to the driver to reduce the risk of incompatibility.

**d) If medications are combined in a syringe driver it is important that they are compatible. If a combination of 4 or more medicines is considered, If further information is needed contact Specialist Palliative Care Advice lines as detailed in section “where to get advice from”**

**e) Do not use the combination of cyclizine plus hyoscine butylbromide in a syringe driver as there is risk of crystallisation**
f) It is not usually appropriate to mix cyclizine with oxycodone due to incompatibility at therapeutic doses.

g) Ensure where there is an increase in the dose of an opioid analgesic that the calculated dose is safe for the patient i.e. not normally more than 50% higher than the previous dose (NPSA 2008/RRR05). Also be aware the patient may be receiving opioids by other routes and equivalent dosages need to be considered. If further information is needed contact Specialist Palliative Care Advice lines as detailed in section “where to get advice from”

h) When setting up a syringe driver nurses need to be aware of anticipatory prescribing and only include medicines that are required for current symptom management into the syringe driver

i) Examples of more irritant medicines when given subcutaneously include chlorpromazine, diazepam, prochlorperazine, diclofenac, ketamine, ketorolac, levomepromazine, methadone, octreotide, ondansetron, phenobarbital and promethazine

ADVICE TO PATIENTS / FAMILY / CARERS
When a syringe driver is commenced the patient/family must be issued with a Syringe Driver Information Leaflet for Patient’s Families and Carers (available from the Community Nursing Office), when the leaflet is given this needs to be documented in the patient’s record.

Additional advice re position and care of a syringe driver –
• Do not open
• Do not clean with strong household detergents or solvents
• Do not position syringe driver above needle entry site
• Ensure line is not trapped
• Prevent syringe driver from being dropped
• Advise patient not to take a shower or bath when syringe driver in use
• Advise how to arrange return of equipment

TRANSDERMAL CONTROLLED DRUGS If the patient is currently using a transdermal buprenorphine or fentanyl patch treatment they should continue with this formulation, unless the prescriber has given clear instructions to remove the patch. Breakthrough pain should be treated with equivalent ‘as required’ doses of subcutaneous opioids. If further information is needed contact Specialist Palliative Care Advice lines as detailed in section “where to get advice from”
The total daily ‘as required’ medication is then given as a continuous subcutaneous infusion via a syringe driver. Continue to change the patch as prescribed:-
• If two or more doses of breakthrough analgesia are required for breakthrough pain, not incident pain (i.e. agitation or pain on movement) consider a continuous infusion via a syringe driver.
• Total up ‘as required’ doses of breakthrough analgesia over 24 hr periods.
  e.g. 4 ‘as required’ doses × 10mg diamorphine administered subcutaneously over 24hrs = 40mg diamorphine to be infused via a syringe driver over 24hrs.

SWITCHING MEDICATIONS TO SUBCUTANEOUS (sc) ROUTE (Where the administration via the original route e.g. oral, is to stop) Where symptoms are controlled, start the syringe driver 1-2 hours before the effects of the drugs which you are switching the route to sc are due to wear off. For example, a patient who took their last zomorph® (morphine) capsule at 10pm last night should have their morphine syringe driver set up at 8-9am the next morning. If symptoms are uncontrolled, set up the syringe driver immediately with stat doses of the same medication. In this case take care not to overdose the patient with the same medication via different routes. Take advice if unsure from the prescriber or Integrated Specialist Palliative Care Team.
CARE HOME FUNDED NURSING CARE PROVISION

Care Homes funded for the nursing care of palliative care patients are responsible for providing medication via a syringe driver; it is the nursing homes responsibility to obtain equipment and medication independently. Should a Care Home contact community nursing services reporting they do not have either the equipment or skills and knowledge to set up a syringe driver the relevant Community Nursing Team will set up the syringe driver in the patients’ best interests for symptom management. Community nurses will be responsible for re priming the syringe driver as it is the property of Wirral Community NHS Trust.

Please note some nursing homes may have their own McKinley syringe drivers

CARE HOME INCIDENT REPORTS

Any community nursing involvement in the administration of medicines via a syringe driver or problems relating to syringe drivers in Care Homes that are funded for nursing care must be reported using a Trust Incident Reporting System, this is essential to monitor trends in nursing home activity. This includes setting up the syringe driver.

FUNDED RESIDENTIAL CARE HOME

Patients living in a Care Home who are funded for residential care may require nursing care from the Community Nursing Service and this clinical procedure will apply.

CARE HOMES – RECORD OF ADMINISTRATION AND SAFETY OF MEDICINES

When caring for patients in Care Homes, all controlled drugs must be stored in a locked control drug cabinet and recorded in a controlled drug register. Community nurses will need to sign the register to ensure an audit trail of controlled drugs used. All community nurses administering medicines in Care Homes including drugs for syringe drivers must record administration on a Medicines Administration Record (MAR) chart.

TROUBLE SHOOTING SYRINGE DRIVER NOT FUNCTIONING

A series of clinical incidents have shown that if nursing teams try and resolve the cause of the problems with the malfunctioning of a syringe driver, this can lead to poor symptom control for palliative patients and best practice is to change the syringe driver and site. This will require a complete change of medication as:-

• There is no guarantee the same lead nurse will be available to change the syringe driver as nurses cannot use a medicines drawn up in advance by another practitioner

CANNULA REPLACEMENT – Sat-T-Intima

The cannula can remain in place for up to 7 days and the cannula should be re-sited if any of the following occur:

• Patient complains of pain at the administration site
• Skin is red, inflamed or bruised
• Skin is white and/or hard
• Blood is present in the line or cannula
• Cannula becomes dislodged
- Presence of exudate

**MEDICATION ERRORS**
If a medication error has occurred staff must report the error using the Trust’s Incident Reporting System.
The Community Night Nursing Service must be informed as they may need to monitor any potential impact on the patient. If a medication administration error does occur the relevant line manager and General Practitioner is to be informed within the same span of duty where feasible, or the On Call Duty Manager out of hours.

**TRANSFER OF PATIENTS BETWEEN HOSPITAL AND COMMUNITY**
When a patient is discharged home a community syringe driver should be attached as soon as possible and the hospital syringe driver taken back to the appropriate discharge facility, i.e. Wirral University Teaching Hospital or to St John’s Hospice. When a patient is admitted to any hospital / hospice setting community staff must ensure safe return of the Trust’s community syringe driver. If a patient is being admitted into secondary care the ‘Policy for the Transfer of Patients into an Acute Setting’ must be followed and a transfer document/summary be completed for the acute care setting.

**DEATH OF A PATIENT ON THE WIRRAL END OF LIFE CARE PLAN**
In the event of an expected death of a patient in the community, with no untoward circumstances, nursing staff can remove equipment from the deceased. In the event of a sudden death within the community, the scene must be left undisturbed and the Sudden Death Procedure followed. If a patient lives in a Care Home all drugs including controlled drugs must be kept by the Care Home for seven days following a death, destruction of the medicines remain the responsibility of the Care Home. Please refer to the Safe Handling and Administration of Medicines Policy.

**DISCHARGE PLANNING**
It is essential that the following are in place:
- Appropriate equipment in place (if feasible)
- Correct discharge details
- Patient Medicines Administration Chart – signed and dated by medical practitioner, clearly labelled with patient’s name, address, NHS Number and date of birth
- Supply of prescribed medicines – 14 days’ supply. In the event of a palliative discharge enough medication will be prescribed to last until after the following weekend.
- Contents of syringe driver documented, time of when last re-primed/set up
- Time and type of any ‘as required’ medications given

For any discharges which have a detrimental impact on patient care would need to be reported using the Trust’s Incident Reporting System.

**CHILDREN’S SERVICES**
The needs of the dying patient must be safely met at all times. Advanced joint care planning should be in place as in some cases community nursing staff may be asked to be the second checker, each case needs to be discussed with the Service Manager, as further guidance and support may be required. Community nurses can support the clinical needs of children aged 16-18, with the support of Specialist Centre’s such as Alder Hey, within a specified care plan. The Specialist Palliative Care Nurses based at Alder hey Hospital provide a 24hour Palliative Care Service, they can be contacted on 0151-228-4811 and ask switchboard to ‘bleep’ the specialist palliative care nurse on-call. Out of Hours - If a child is in pain and there is any anticipated delay in getting specialist advice, staff must refer to GP Out of Hours.
If staff are aware of any problems in delivering timely services to children, staff must report the incident using the Trust’s Incident Reporting System and discuss with their line manager for further advice, 9 -5pm or contact the ‘on call duty manager’ Out of Hours via switch at Wirral University Teaching Hospital NHS Foundation Trust - 0151 678 5111.

WHERE TO GET ADVICE FROM:
Wirral Community Trust. Palliative Advice and Information Line 7 days a week 09.00 – 17.00 hours 0151-328-0481
Wirral Hospice St John’s Palliative Advice and Information Line 7 nights a week 17.00 – 09.00 hours 0151-343-9529 Integrated Specialist Palliative Care Team
Marie Curie website www.mariecurie.org.uk Specialist Palliative Care Nurses based at Alder Hey Hospital 24hour service 0151-228-4481 and ask switchboard to ‘bleep’ the Macmillan Nurse on call

For medicines advice contact the North West Medicines Information Centre – this is an NHS funded resource for all doctors, nurses and allied health professionals
0151 794 8117 8.30am – 5.00pm Monday – Friday
nwmedinfo@nhs.net

EQUALITY ASSESSMENT
During the development of this procedure the Trust has considered the clinical needs of each protected characteristic (age, disability, gender, gender reassignment, pregnancy and maternity, race, religion or belief, sexual orientation). There is no evidence of exclusion of these named groups. A children’s service is commissioned via a specialist centre based in Liverpool, who provide an outreach service.
If staff become aware of any clinical exclusions that impact on the delivery of care the incident would need to be reported using the Trust’s Incident Reporting System and an appropriate action plan put in place.

REFERENCES


Medicines Healthcare Products Regulatory Agency (MHRA) www.yellowcard.gov.uk


Reymond, L; Charles, M; Bowmen, J; Tresten, P; (2003), The Effect of Dexamethasone on the Longevity of Syringe Driver Subcutaneous Sites in Palliative Care Patients, The Medical Journal of Australia, Vol. 178, Pg. 486-489.

BIBLIOGRAPHY
British National Formulary (BNF) www.bnf.org.uk


Wirral Guidelines for Care of the Dying Patient 2010 and locally adapted version of the Wirral End of Life care Plan available on the Trust intranet

Wirral Guidelines for Care of the Dying Patient: Management in Severe Renal Failure 2010 and available on the Trust intranet

Palliative Care Formulary textbook is available free online following registration with the website: www.palliativedrugs.com
Appendix Two

SUBCUTANEOUS INSERTION SITES

Shaded areas that can be used to insert a McKinley giving set for a subcutaneous site.

UPPER BACK (Scapula region)
Use when:
- other sites are unsuitable
Patient confused/distressed to reduce chances of accidental removal

ABDOMEN – Avoid in presence of tense abdominal distension

SUBCLAVICULAR AREA
Ensure caution is taken when using the subclavicular space as the insertion site. In a cachetic individual there may be a small amount of tissue between the chest wall and the underlying lung, which results in the risk of pneumothorax. To decrease the risk, pull the skin away from the chest wall and insert the needle at a shallow angle or choose a different site for insertion.

The following areas should be avoided when inserting a subcutaneous needle:
- Areas with Lymphoedema or oedema
- Areas that have too little subcutaneous tissue
- Areas with broken skin or scar tissue
- Skin sites that have recently been irradiated
- Sites with infection or inflammation present
- Area with bony prominences
- Near a joint
- Tumour sites
- Skin folds
- Radiotherapy sites
- Breast
- Upper arm/outer thigh in bedbound patients who require turning