East Cheshire NHS Trust

PROCEDURE FOR THE ADMINISTRATION OF MEDICATIONS VIA THE SUBCUTANEOUS ROUTE

Including use of McKinley T34 SYRINGE PUMP

Policy Title:	**PROCEDURE FOR THE ADMINISTRATION OF MEDICATIONS VIA THE SUBCUTANEOUS ROUTE** **Including use of McKinley T34 SYRINGE DRIVER**
Executive Summary:	East Cheshire NHS Trust is committed to the health safety and welfare of all of the patients it treats. This policy aims to promote the safe and effective administration of medicines for patients in the hospital and community setting who require medication for symptom management to be given via the subcutaneous route. It is for use of all staff who are involved in prescribing, administering or monitoring the use of subcutaneous medications via cannula and / or when using the McKinley T34 syringe pump as part of their duties as an employee of East Cheshire NHS Trust. East Cheshire NHS Trust
Supersedes:	(ref ECT1801) POLICY / PROCEDURE FOR THE USE OF THE McKinley T34 SYRINGE PUMP
Description of Amendment(s):	. Inclusion of Patient Information leaflet and Monitoring Form Provides broader guidance on use of procedure for the administration of medication via the subcutaneous route as well as the use of the McKinley T34 syringe pump Removal of recommended compatibility of drugs given in previous T34 Syringe pump policy Change in process to Syringe Pump being left in place on discharge from hospital setting to provide effective patient analgesia and continuity of care.
This policy will impact on: This policy will impact on: It is for use of all staff who are involved in prescribing, administering or monitoring the use of subcutaneous medications via cannula and / or when using the McKinley T34 syringe pump as part of their duties as an employee of East Cheshire NHS Trust	
Financial Implications:	

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1. Introduction

1.1 This policy aims to promote the safe and effective administration of medicines for patients in the hospital and community setting who require medication for symptom management to be given via the subcutaneous route. It is for use of all staff who are involved in prescribing, administering or monitoring the use of subcutaneous medications via cannulae and / or when using the McKinley T34 syringe pump as part of their duties as an employee of East Cheshire NHS Trust. All registered nurses will comply with this policy.

2. Purpose

2.1 The purpose of this policy and supporting guidelines is to provide a framework for the use and safe practice in the administration of medications via the subcutaneous route and continuous subcutaneous administration of medications via the McKinley T34 Syringe Pump within ECNHST.

- To assist and support practitioners in the administration of "as required" medication via a subcutaneous cannula to promote safe and effective care
- To promote procedural uniformity to assist practitioners when using the McKinley T34 Syringe Pump.
- To support safe and accountable practice when providing symptom relief for those patients where a McKinley T34 Syringe Pump is the preferred method of administration for prescribed medications.
- To clarify roles and responsibilities

3. Responsibilities

3.1The Chief Executive
Has overall responsibility for ensuring that the trust has appropriate policies and robust monitoring arrangements in place.

3.2 Medical Director
Has Trust Board responsibility for all aspects of medicines management. The Medical Director is responsible for reporting any medicines management issues identified to the Trust Board.

3.3 Chair of Medicines Management Group
Has responsibility for co-ordinating the activities of the Medicines Management Group to ensure that good practice relating to medicines becomes embedded in to everyday working practice across the Trust. The Chair will raise any medicines management issues at the SQS Committee.

3.4 Chair of the Risk Management Group

Incidents and risks associated with the use of medical devices will be raised at the Clinical Risk Management Group. The chair of this group will raise any relevant issues relating to these devices at the SQS Committee.

3.5 Service lines
It is the responsibility of the Clinical and Associate Directors of the service lines to ensure that this policy is used appropriately and that all staff are trained to carry out the tasks required of them in working under the guidance in this policy.

3.6 Medical Device Safety Officer
To ensure adequate training is provided to all appropriate staff and ensure incidents are reported to MHRA

3.7 Ward / Department Managers and Senior Healthcare Professionals.
Line managers must ensure that all practitioners who use the McKinley T34 Syringe Pump within their clinical areas have attended the appropriate training and are deemed competent in the use of the McKinley T34 Syringe Pump.

3.8 All staff
Are responsible for attending the required training and following guidance set out in this Policy.

4. Processes and Procedures

4.1 These guidelines have been developed with the following aims:
* To improve the standard of care provided to the patient.
* To increase confidence and raise awareness amongst nursing staff in the use of equipment including the use of subcutaneous cannula for the administration of as required medications.
* To ensure efficient and safe practice when using the McKinley T34 Syringe Pump.
* To optimise the use of resources through improved equipment management.

It is recommended that these guidelines are easily accessible at all times and a copy kept alongside syringe pump equipment. A copy of these guidelines will be available in the Palliative and End of life care resource folders which are available on all wards within the Trust.

These guidelines do not replace training in the use of the McKinley T34 Syringe Pump and the need for updates as per the Medical Devices Policy.

A continuous subcutaneous infusion achieves a steady plasma concentration of medicines that can be as effective as an intravenous infusion. It can remove the need for regular injections. It is important that the syringe pump is not seen just as the last resort but as an effective method of relieving certain symptoms.

The syringe pump in use within East Cheshire NHS Trust is the McKinley T34 Syringe Pump, a delivery system which meets all the safety features recommended by the National Patient Safety Agency within their Rapid Response Alert NPSA/2010/RRR019. It is a portable battery-operated infusion pump, which uses a PPS 9V alkaline battery international code 6LR61.

The McKinley T34 Syringe Pump is pre-set for 24-hour delivery and is calibrated in millilitres (ml) per hour.
Before setting up a syringe pump the reasons for its use and how it works should be discussed with the patients and their family/carers. There is a patient information leaflet available to support this (see Appendix 1)

4.2 Indications for bolus administration of medications via the subcutaneous route via subcutaneous cannula (butterfly)

- When the oral route is unavailable to patients the subcutaneous route is the preferred method of administration of medicines
- Patients refusing syringe pump who require frequent doses of breakthrough medication via the subcutaneous route to establish symptom control
- Patient choice
- Patients requiring single daily dose medication via the subcutaneous route
- Injectable formulation of drug suitable for bolus administration via subcutaneous route e.g. small volume and non-irritant

4.3 Contraindications

- Lymphoedema – choose site unaffected by lymphoedema
- Severe bleeding disorders

4.4 Consideration prior to bolus administration of "as required" medication via a subcutaneous cannula (butterfly)

If butterfly in situ prior to administering medication check site for signs of infection e.g. pain, redness, swelling

Saf-T-Intima cannula can remain in situ for up to 7 days

The administration of SC as required medication should not be a substitute for reviewing / adjusting the doses of medication given via CSCI

The administration of "as required" medication medicines may be indicated for symptom control when initially setting up a syringe pump before steady state is achieved.

The amount of flush required to prime or flush the line is 0.5ml.

4.5The indications for Continuous Subcutaneous Infusions (CSCI) via a syringe pump in the Palliative care and acute care settings include:

Inability to take oral medication effectively due to:

- Dysphagia
- Nausea (slowed gastro-intestinal transit times)
- Vomiting
- Malabsorption
- Inability to administer medication via oral route e.g. head/neck cancers
- Intestinal obstruction
- Profound weakness/cachexia
- Reduce numerous injections
- Impaired consciousness
- Confusion
- Patient choice e.g. dislike of oral preparations; dislike of alternative routes (e.g. rectal)
- Oral route not effective (e.g. ketorolac)
- End of life

- Where a reduced side-effect profile offered by the use of continuous infusion may be of benefit, e.g. continuous infusion diamorphine occasionally reduces side effects compared with oral morphine (avoids peaks and troughs).
-

Note that pain control is no better via the subcutaneous route than the oral route if the patient is able to swallow and absorb drug. A patient information leaflet regarding the use of syringe pumps is available for them and should be offered to all patients who have syringe pumps (see Appendix 1)

4.6 Contraindications:

- It may not be appropriate to use a syringe pump in very restless patients.
- Lymphoedema – choose site unaffected by lymphoedema.
- Severe bleeding disorders

Where the CSCI route of administration is not possible alternatives may need to be considered:
* rectal (eg NSAID)
* sublingual (eg lorazepam)
* transdermal (eg fentanyl patch)
* can drug be given effectively as a subcutaneous (SC) bolus once a day? (e.g. dexamethasone, haloperidol, levomepromazine)
* can an effective alternative drug be given by another route or SC once a day?

It is reasonable to use once daily SC medication as an alternative to the syringe pump, but not to give several 'once daily' drugs SC. However this may be considered, if drugs are not compatible in one syringe pump and syringe pumps are scarce, or the patient does not wish to carry two or more pumps, consider this alternative.

4.7 Prescribing of Drugs for Administration via CSCI

Full guidance of prescribing of medicines in East Cheshire NHS Trust (ECT) is provided in the Policy for Safe and Secure Handling of Drugs and the Policy for Safe and Secure Handling of Controlled Drugs. The principles must be adhered to. Nursing staff preparing the and administering the infusion should ensure the medicine combination to be infused is compatible. Pharmacy can advise on compatibility if needed. It is the responsibility of the nursing staff to ensure that they have up to date knowledge regarding the various medicines prescribed and ensure the prescription is appropriate for the patient. If in doubt, check with the patient's medical team or Specialist Palliative Care Team.

Continuous infusion via small volume subcutaneous pump in palliative care must be written on the designated area of the main drug chart, or appropriate community administration documents e.g. pink sheet or Symptom Control Prescription Drugs and Administration Record (blue palliative care booklet for end of life) for community and hospital discharges annotating the document with the drug(s), doses and diluent (usually water for injection) to be used.

NOTE: It is usual practice for patients who already have a transdermal opioid e.g. fentanyl patch in place to continue with this; and continue to change the patch at the usual frequency. The opioid patch needs to be taken account of when prescribing opioid in the CSCI and for the calculation of breakthrough doses. See blue booklet for further information and guidance.

4.8 Monitoring during use

It is recommended best practice in both the hospital and the community setting 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. Thereafter the syringe pump should be checked

for correct delivery of the medication in the syringe a minimum of every 4 hours in the hospital setting or on visiting in the community (at least once daily). Observations should be recorded on the Trust Syringe Pump monitoring form – Appendix 3) or on community administration record e.g. blue booklet.

The essential checks to include when monitoring:

i. Check the battery daily.(Must have at least 40% battery power left on commencement). Check this by pressing the "INFO" key twice. Also check that the batteries have adequate connection with the battery housing.

ii. Check the LCD display to ensure the McKinley T34 Syringe Pump is delivering correctly. This will display the time remaining and the infusion rate.

iii. The volume to be infused (VTBI) and the volume infused (VI) can be checked by pressing the "INFO" key once.

iv. Visually check the fluid remaining in the syringe at each check and compare this with the syringe pump display.

v. Check the contents of the syringe and infusion line for crystallisation, precipitation, cloudiness or colour change.

vi. Inspect the needle insertion site on the patient for evidence of redness, swelling or discomfort and any evidence of poor absorption. Re-site if necessary. This will require a new infusion to be prepared.

vii. Check the medication is adequately controlling the patient's symptoms.

viii. Inspect for leakage at the cannula site and the connection sites. The giving set should only be changed if there are site problems.

ix. Record the monitoring checks in the documentation.

x. Observations should be recorded on the Syringe Pump Monitoring Record Form/Blue Booklet.

4.9 Trouble Shooting

Breakthrough symptoms should be dealt with by extra stat doses of the appropriate drug (e.g. analgesic, antiemetic). The patient should be prescribed subcutaneous 'as needed' doses of analgesia of a 1/6th of total daily dose, to be repeated 2hrly if needed

a. If the infusion is running too fast (i.e. running more than 1 hour ahead of expected time):

i. Check the rate setting is correct.
ii. Change the entire syringe pump for a new one and send the original pump back to Medical engineering for servicing.
iii. Complete Incident form (DATIX)

b. If the infusion is running too slow (i.e. running more than 1 hour behind the expected time):

i. Check the rate setting is correct.
ii. Check the Infusion Light Status Indicator is green and flashing.
iii. Check the battery level and connections.

iv. Check the syringe is inserted correctly onto the syringe pump.
v. Check documentation to ascertain if the syringe pump has been stopped and restarted for any reason
vi. Check the contents of the syringe and line. Is there any evidence of crystallisation or kinking of the tubing?
vii. Check the needle site. Is this red/hard/lumpy/sore?
viii. Consider changing the site or further dilution of the drugs to minimise irritation by setting up a fresh syringe.
ix. Consider metal allergy from the needle.
x. If the infusion continues to run through too slowly, change the entire syringe pump and send to Medical Engineering for servicing.
xi. Complete Incident form (DATIX)

4.10 McKinley T34 Syringe Pump Alarm Conditions

When the syringe pump detects a problem four things occur:
* The infusion stops.
* An audible alarm is activated.
* A message appears on the display screen indicating the cause of the alarm.
* The Infusion Light Status Indicator turns red.

The following table indicates the appropriate actions should the syringe pump alarm.

. **Alarm**	**Possible cause**	**Action**
Occlusion or syringe empty.	Patient access device blocked, kinked, clamped, occluded. Actuator has reached minimum travel position.	Remove occlusion and restart. Flush or replace access device. Release clamp. End of program, switch off pump.
Syringe displaced.	Syringe has been removed or displaced.	Check and confirm syringe seated correctly and resume.
Pump unattended.	Pump left off. No key selected for 2 minutes.	Start infusion, continue programming or switch off.
Near end.	15 minutes from end of infusion.	Prepare to change syringe or switch off.
End program.	Infusion complete.	Pump will either default to KVO (keep vein open), await nurse or it will alarm in which case switch pump off.

Low battery.	Battery is almost depleted (30 minutes left).	Prepare to change battery.
End battery.	Battery is depleted.	Change battery.

If the site becomes inflamed the following should be considered:
a. infection
* re-site line
* observe the patient carefully, further treatment may be needed

b. irritation by drug (more common with some, e.g. cyclizine)
* consider alternative drug
* using a different diluent (sodium chloride 0.9% may reduce irritation, but check compatibility with palliative care team/pharmacy before changing from water for injection)

c. local allergy to drug
* change drug

d. local allergy to needle
* change to alternative giving set
* seek Palliative Care Team advice

If the needle / cannula appears to have become blocked:

a. check line is not kinked

b. check needle / cannula is not bent

c. look for crystallisation of drug(s) in syringe:
* consider water for injections in place of sodium chloride 0.9% if used (check with pharmacy)
* if 2 or more drugs are mixed in syringe, check for compatibility
* consider using separate pumps or alternative route for one or other drug

If the skin swells locally without inflammation, due to accumulation of injected fluid:

* try smaller volume in syringe

* change site more often

* seek Palliative Care Team advice

If the patient experiences local pain:

* check for local reaction as above

* check for local accumulation of injected fluid

* ensure patient is not using booster button

* ensure that rate has not been altered

* re-site giving set unless readily reversible cause found

If the syringe pump alarms and there is still a significant amount of contents left in the syringe, check the line and ensure the solution in the syringe has not crystallised – if this is the case the syringe should be discarded and a new syringe made up and commenced, please consider diluents and content of syringe if this happens.

If the site is red, inflamed or wet or if the line is kinked or damaged pause the pump and change the giving set and re-prime the line. The pump can then be recommenced using the same programme (as long as the pump has not entirely been switched off)

Always seek advice from Palliative Care Team if problems arise, or, if they cannot be contacted then consult East Cheshire Hospice for telephone advice

If a device is involved (or suspected of being involved) in an incident where patient harm has resulted, the device should be quarantined and the Medical Devices Facilitator should be contacted on the next working day. The device should not be decontaminated and all syringes and drugs should be retained

If applicable the Policy and Procedure on the Management of Serious Untoward Events should be followed.

4.11Transfer of patients across care settings

The syringe pump should be continued in situations where patients are being transferred to other care settings e.g. hospice, community. Syringe pumps should NOT be discontinued prior to the transfer. It is the responsibility for the nursing staff who are coordinating the discharge to ensure that the serial number of the syringe pump is recorded and a padded envelope with the address of the Medical Engineering department at MDGH is sent with the patient to allow the return of the syringe pump to the Trust. Once the patient has safely arrived in the other care setting, the syringe pump will be changed to a pump in use by that locality and it is the responsibility of the receiving team to return the syringe pump to the Medical Engineering Department at Macclesfield Hospital.

If the patient is being discharged into the community with a syringe driver in situ:

- Please refer to their District Nurse, both on the telephone and District Nurse referral form.
- Inform the District Nursing Evening/Night Service
- Ensure the syringe pump contents are written on the blue booklet prescription sheet/ community administration document and the drugs are prescribed in the TTO medications, including water for injection. (1 box of 10 x 10mls)

This will ensure that, even if a visit is not initially required, the relevant support staff are aware that the patient or family/carers may contact them for advice or assistance.

If the patient is being discharged notify

- Eastern Area - out of hours 01625 430906 (24hr answer phone).
- Central Area - out of hours 01270 275428

This will ensure that, even if a visit is not initially required, the relevant support staff are aware that the patient or family/ carers may contact them for advice or assistance.

4.12 Maintenance of the Syringe Pump

All syringe pumps have to be registered on the Trust's medical equipment database and given a unique equipment number to enable the device to be tracked for maintenance and safety alert purposes. The asset number is printed onto a label and affixed to the device.

This process is managed by the Medical Engineering Department, based at Macclesfield District General Hospital.
If the Syringe Pump you intend to use does not have an asset label as below you will need to contact Medical Engineering to register the device and arrange for it to be checked before it is used for the first time.

Example of an East Cheshire NHS Trust equipment asset number label

All of East Cheshire NHS Trust and the Clinical Commissioning Group syringe pumps are serviced and maintained by Medical Engineering. The syringe pumps are checked annually for correct performance. Users are contacted by the department at the appropriate time for this service. Medical Engineering can be contacted on 01625 661930 (extension 1930 from within the hospital). After undergoing any maintenance, Medical Engineering attaches two stickers to the pumps, one on the outside of the machine showing last service date and next service due and one showing next service date placed in the battery compartment.

A device should not be used if it has not been serviced within the last 12 months. At the very least the device should be removed from use and sent to Medical Engineering within 12 hours (to permit continuity of care and an alternative device to be found).

After each episode of use the surface of the syringe pump must be decontaminated according to the Trusts Disinfection Policy using a cloth moistened in neutral detergent and hot water. If it is possible that any fluids or solution may have seeped inside the casing of the syringe pump then it MUST be returned to the Medical Engineering Department for checking.

If at any time the syringe pump does not perform as expected, or it is dropped, gets wet or is damaged in any way, then remove it from use immediately. Mark it clearly as quarantined and arrange for Medical Engineering to investigate the apparent problem. Before sending it for repair, make sure that it has been surface cleaned with a damp cloth moistened with a solution of hot water and neutral detergent, as per the Trust's Disinfection Policy. Complete an incident report (DATIX).

4.13 Community Patients only

Actions when the patient has died:
Whilst awaiting verification and certification of death, the Syringe Pump and contents should be left in place, BUT the battery can be removed. Be meticulous not to alter settings.
If the District Nurse is trained and assessed as competent to VERIFY Death AND the GP has confirmed he/she will issue the death certificate without visiting the patient or referral to the coroner, the Syringe Pump may be removed.
In the event of an unexpected death or unexpected circumstance the GP should be contacted immediately and everything, including the Syringe Pump and contents, should be left in place untouched.

In addition if a device is involved (or suspected of being involved) in an incident where patient harm has resulted, the device should be quarantined and the Medical Devices coordinator should be contacted on the next working day. The device should not be decontaminated and all syringes and drugs should be retained

If applicable the Policy and Procedure on the Management of Serious Untoward Events should be followed.

If the death may be due to an industrial disease or related to the deceased's employment, e.g. Asbestosis or Mesothelioma, the nurse may verify the death but the GP will need to refer to the coroner.

Unused controlled drugs should be disposed of as per appendix in the safe and secure handling of controlled drugs policy.

4.14 Drugs used in syringe pumps
For further information, refer to the "Palliative Care Formulary" or "The Syringe Driver" - details at the end of these guidelines. Copies of these books are held in the Macclesfield Hospital Pharmacy, by the Palliative Care Team and in East Cheshire Hospice

This list is not all-inclusive, and occasionally other drugs may be recommended by the palliative care team. Details of administration would be given at the time and the drug suggested would be listed in one or both of the books above. There is also further information available on the blue booklet for end of life patients.

Cyclizine

- Used to treat nausea
- Usual dose 100mg -150mg over 24hours
- Diluent – MUST be water for injections (precipitates with Sodium Chloride 0.9%
- Avoid combining with hyosine butylbromide – causes crystallisation

Dexamethasone

- Used for many indications including as an anti-inflammatory, for e.g. raised intracranial pressure, some pains e.g. liver capsule pain, as an adjuvant anti-emetic, at a low dose of 1mg to reduce injection site reactions etc
- Usually given in a separate syringe driver as very incompatible with other medications
- May be given as single SC injection once daily as alternative to in a driver

Diamorphine

- Used for opioid responsive pain, dyspnoea, coughs etc
- Due to high solubility in small volumes of water for injection used when patients are on high dose opioids. Morphine is the first line choice of opioid
- Usual starting dose in opioid naïve patients 5-10mg over 24 hours. If patient has already been receiving opiates, see opiate dose conversion chart for guide to starting dose in a syringe pump
- As needed dose for breakthrough pain = 1/6 x 24 hour dose, usually 2 hourly if required.

Glycopyrronium

- Used for reducing the productions of excessive respiratory tract secretions in terminal stages (‘rattle’) if the patient is unconscious
- Give early as does not remove secretions already present
- Does not cross blood brain barrier so less CNS side-effects than hyoscine hydrobromide
- Usual dose range 600micrograms – 1200micrograms over 24 hours

Haloperidol

- Used for nausea due to drugs or biochemical disorders; agitated delirium, hiccough.
- Usual dose range 1.5mg - 5mg over 24 hours for nausea (may be higher if needed for agitation – seek specialist palliative care advice if requiring up to 10mg)
- Caution in Parkinson’s disease
- Replaces oral haloperidol – 3mg orally is equivalent to 1.5mg subcutaneously

Hyoscine Butylbromide

- Used to reduce fluid secretions into the bowel, thus relieving colic, pain and pressure from inoperable bowel obstruction. Infrequently used for reducing excessive respiratory tract secretions.
- Usual dose range 60mg-120mg over 24 hours

Hyoscine Hydrobromide

- Used for reducing the productions of excessive respiratory tract secretions in terminal stages (‘rattle’) if the patient is unconscious
- Glycopyrronium is the first line drug of choice in the management of respiratory tract secretions in East Cheshire locality
- Give early as does not remove secretions already present
- Usual dose range 600micrograms – 1200micrograms over 24 hours (higher doses can be used, please seek specialist advice regarding this)

Levomepromazine (Methotrimeprazine)

- Used for nausea and vomiting (useful for most causes of nausea) and terminal agitation
- Causes sedation especially at higher doses and postural hypotension
- Caution in parkinsons disease
- Replaces oral levomepromazine – 12.5mg oral is equivalent to 6.25mg subcutaneously
- Usual dose range 6.25-25mg for nausea/vomiting, 25-150mg over 24 hours for agitation
- Protect from ultraviolet light as this may cause solutions in the syringe to develop a purple hue – if this occurs discard the solution

Metoclopramide

- Used for nausea and vomiting due to delayed gastric emptying, biochemical disturbance or medication.

- Replaces oral Metoclopramide
- Usual dose range 30mg–80mg over 24 hours (may be higher on specialist advice)
- Caution in Parkinsons Disease, GI obstruction or perforation.

Midazolam

- Used for severe anxiety; terminal agitation; multiple myoclonus; control of seizures in epileptics where it is no longer possible to administer their usual antiepileptic medications; intractable hiccough; muscle spasm
- Replaces oral benzodiazepines; anticonvulsants (to varying degree)
- Usual dose range 10mg-60mg over 24 hours (may be higher with specialist advice)

Morphine

- First line opioid in syringe pumps
- Used for the same indications as diamorphine, but at high doses the large volume may be restrictive to use
- Usual starting dose for opioid naïve patients is 5mg-10mg over 24hours. If patient has already been receiving opiates, see opiate dose conversion chart for guide to starting dose in a syringe pump
- As needed dose for breakthrough pain = 1/6th of 24 hour dose which can be repeated every 2-4 hours if required.

Octreotide

- Vomiting due to inoperable bowel obstruction; pancreatic & enterocutaneous (malignant) fistulae; ascites with adenocarcinoma, bronchorrhoea; intractable diarrhoea; symptoms due to hormone secreting tumours
- Usual dose range 200microgram-1500microgram over 24 hours
- MUST be initiated under supervision of palliative care team.
- Irritant: dilute to maximal volume. Sodium chloride 0.9% may be preferred.

Ondansetron

- Nausea and vomiting after chemotherapy; second line anti-emetic for chemical, abdominal or cerebral causes; intractable itch in jaundice, uraemia
- Replaces oral Ondansetron, other 5HT3-anatagonists
- Causes constipation
- Usual dose range 4mg-16mg over 24 hours (higher doses on specialist advice)
- Advice from palliative care team recommended

Oxycodone

- Used for opiate responsive pain; dyspnoea; cough where patient is intolerant of/there is a contraindication to morphine/diamorphine
- Replaces oral oxycodone where patient is intolerant of/there is a contraindication to morphine/diamorphine – see opioid conversion charts or please call palliative care team/ pharmacy regarding advice for conversion
- As needed dose for breakthrough pain = 1/6 x 24 hour dose, can be repeated every 2-4 hours if required

Phenobarbitone

- Used for refractory terminal restlessness not responding to midazolam and levomepromazine/haloperidol; anticonvulsant if midazolam ineffective or excessively sedating
- Usual dose range 200mg-600mg/24h, higher doses have also been used
- Due to concerns regarding tissue necrosis, it has been recommended to dilute each 1 ml of (200mg/ml) solution with 10ml to give as a CSCI infusion e.g. 200mg dose using 200mg/ml solution would have a final volume of 11mls. However the Palliative Care Formulary (PCF) 6 suggests that doses <1600mg may be given in 17mls with water for injection or sodium chloride 0.9%. Dilute to maximal volume and monitor site carefully. It is recommended to discuss administration with the Specialist Palliative Care Team.
- Unlikely to be stable with other drugs, thus needs a separate syringe pump. (If in second pump, seek advice as to whether there are alternative ways of giving other drugs required).
- Advice from Palliative Care Team recommended

Compatibilities of drugs combined in the same syringe

During office hours pharmacy or the palliative care team may be contacted to check compatibilities as they hold the reference texts “The Syringe Driver” and the Syringe Driver Compatibility Charts found within “The Palliative Care Formulary”.
Out of hours, East Cheshire Hospice Advice Line 01625 666999 or the on-call pharmacist can be consulted.
Alternatively refer to Palliative medicines advised on website
http://book.pallcare.info/index.php?op=plugin&src=sdrivers

Other drugs, such as ketorolac, ketamine and methadone, may rarely be prescribed. This should only be done under the guidance of a Palliative Specialist or other professional with the appropriate expertise.

Appendix 2 – Preparation and use of the McKinley T34 Syringe Pump
Staff must have had training in the setting up and monitoring of syringe pumps before performing this task. Such staff should have read and understood the T34 Instruction Manual and be competent in the use of the pump.

If there is any doubt about how to operate the device, DO NOT ATTEMPT TO USE IT.
Ask your line manager for guidance. If not available contact the Medical Devices facilitator (on Bleep 9055)

5. Monitoring Compliance with the Document

5.1 monitoring and compliance

KPI	Responsible person	Frequency	Named Group
Audit of the adherence to the policy/procedure for the use of the McKinley T34 syringe driver	Trainers	3 yearly	MMG EOLG
Monitoring reports of problems with the use of T34 McKinley syringe drivers	Medical Device Safety Officer	ongoing	Medical Device Group

6. References

6.1 PCF5 Palliative Care Formulary. 5th Edition.

Twycross R, Wilcock A (Eds), Palliativedrugs.com Ltd, Nottingham 2011.

* Copies are held in the hospital pharmacy, library, by the palliative care team and in the hospice

“The Syringe Driver, Continuous Subcutaneous Infusions in Palliative Care”. 3rd Ed. Andrew Dickman and Jennifer Schneider (Oxford University Press 2011).

Copies are held in the hospital pharmacy, by the palliative care team and in the hospice.

Pain and Symptom Control Guidelines .Palliative Care. Greater Manchester Strategic Clinical Network Revised Final June 2015–.

This is available on the trust intranet by accessing the clinical guidelines page under palliative care or by following the website http://www.cheshire-epaige.nhs.uk

Policy and Procedure on the Management of Serious Untoward Events V1.0 - Policies East Cheshire NHS Trust Intranet site

Websites: http://book.pallcare.info/index.php?op=plugin&src=sdrivers

Gives access to the Syringe Driver database - click on Syringe Drivers in the menu on the left hand side and follow links. You can enter up to 5 drugs, and it will tell you if the combination has been reported as compatible or incompatible. A lot of other information, with a welsh focus.

Appendices

Appendix 1 – Patient information leaflet

SYRINGE PUMP
PATIENT INFORMATI

Appendix 2 –Preparation and Use of the Mc Kinley T34 Syringe Driver

Staff must have had training in the setting up and monitoring of syringe pumps before performing this task. Such staff should have read and understood the T34 Instruction Manual and be competent in the use of the pump.

If there is any doubt about how to operate the device, DO NOT ATTEMPT TO USE IT. Ask your line manager for guidance. If not available contact the Medical Devices facilitator (on Bleep 9055). Training on the use of this high risk device is every 3 years.

Equipment Required For Setting Up A McKinley T34 Syringe Pump

A Luer lock e.g. B D Plastipak syringe, 20ml or 30ml.	A 20ml syringe is recommended as this allows for a reasonable volume of diluent but only approximately 17mls can be delivered. If larger volumes of liquid are required a 30ml syringe may be used, but only approximately 22ml can be delivered.
1ml Syringe	Staff must use one ml syringe for measuring drug volumes less than 1ml. Insulin syringes must not be used as this may lead to drug errors.
Gloves and Aprons	Universal precautions.
Skin Cleanser e.g. Chloroprep one step	Effective skin prep and to ensure aseptic technique for insertion of subcutaneous administration line.
Needles green and blue or	For drawing up drugs

blunt safety needle	
Sharps box	For safe disposal of all sharps and ampoules. In community areas for disposal of volumes greater than 5mls in volume see DOOP Kit below.
Prescription and administration booklet and relevant syringe pump documentation.	For accurate recording of prescriptions, administration and stock levels.
Adhesive Syringe Pump label	To provide an accurate visible record of Syringe Pump contents.
Giving set	If patient thought to have a nickel allergy, do not use the standard infusion set but use a Mini med Sof-Set instead.
Clear adhesive film dressing	To cover and secure butterfly/needle, for example IV 3000.
New Alkaline 9v batteries Code 6LR61	Do not use re-chargeable batteries. A battery should have at least 40% life to ensure the infusion will last for 24 hours. In Community areas a spare battery is to be kept in the syringe pump box at all times
Prescribed medication.	
Water for injections as diluent	It should be noted that some drugs require dilution with sodium chloride intravenous infusion 0.9% – the practitioner preparing the infusion must check the diluent required.
All Patients	Lockable Boxes will be used.
Community Patients	
DOOP Kit (Destruction of Old Pharmaceuticals Kit)	To dispose of unused syringe pump contents and ampoules of above 5mls in volume

Preparing the Subcutaneous Infusion

Before setting up a syringe pump.

How the pump works and the reasons for its use should be discussed with the patient and family/carer. Education of the patient and family is important to enable them to report any problems, which may arise. When the patient is in the community, any reported incident must be followed up by a visit to the patient's home.

a. Although it is the responsibility of the prescriber to provide a prescription appropriate to the needs of the patient, the nurses preparing and administering the infusion should ensure the medicine combination to be infused is compatible. It is the responsibility of the nurses

involved to ensure that they have up to date knowledge regarding the various medicines prescribed and ensure the prescription is appropriate for the patient. If in doubt CHECK!

b. Check the patient's name, date of birth and NHS/Hospital Number and the signed prescription.

c. Good hand washing technique is essential.

d. Prescribed medicines must be checked prior to drawing up with the second checker being present whilst drawing up the medicines and for checking the patient in acute areas.

e. For multiple medicine mixtures, water for injections is the preferred diluent. However some mixtures recommend the use of sodium chloride intravenous infusion 0.9%. Please refer to compatibility section in this guideline.

f. The syringes to be used are luer lock BD Plastipak 20mL and 30 ml. Choose the appropriate size of syringe to accommodate the volume to be infused. It may not be possible to fill all sizes of syringe to full capacity, for instance only 22mL can be delivered from a 30mL BD syringe

g. Draw up the prescribed medicine(s) into the syringe and draw up the required amount of diluent to the prescribed volume.

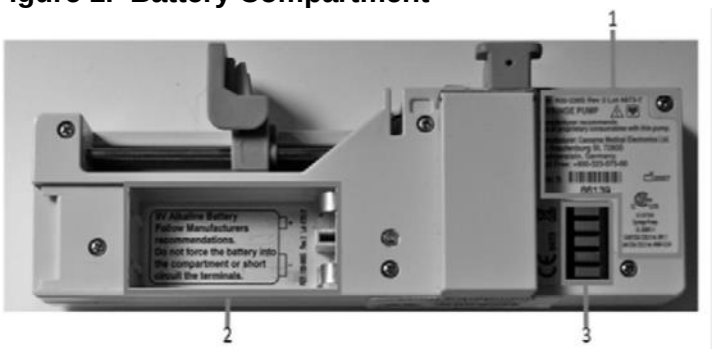
h. Complete the details on the drug additive label and attach to the syringe taking care not to occlude the contents.

Connecting the Infusion Set to the Syringe

Infusion set ordering codes
FSB034 Infusion Set – Graseby 01050-0029
FSB704 Infusion Set – softset– MMT-111 (Special requests only)
a. Connect it securely to the syringe.
b. If it is a new infusion set, gently depress the syringe plunger until the line is just full before fitting into pump or connecting to patient.

Preparing the McKinley T34 Syringe Pump
i. Install battery
9V alkaline battery international code 6LR61 should last approximately 2-3 days depending on use (CME McKinley UK Ltd). Caution: Battery sizes vary between brands. Do not force larger batteries into compartment. Use of smaller batteries may not provide good contact.

Figure 1. Battery Compartment



Preloading and Syringe Placement

ii. Before placing the syringe onto the McKinley T34 Syringe Pump ensure the barrel clamp arm is DOWN then press and hold the “ON/OFF” key until the “SELF TEST” screen appears.

iii. The LCD display will show “Pre-Loading” and the actuator will start to move. Wait until it stops moving and the syringe sensor detection screen appears

Figure 2. Preloading Indication Display

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

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

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

Figure 3. Battery Level Indicator Display

Fitting the Syringe to the McKinley T34 Syringe Pump

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

i. Lift the barrel clamp arm.

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

iii. Lower the barrel clamp arm.

iv. Ensure the syringe label does not interfere with the mechanism of the infusion device. The syringe graphic on the screen ceases to flash at each point as the syringe is correctly seated.

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

Connecting the Infusion to the Patient

a. Insert butterfly needle under skin

* select site – see diagram (next page)

* avoid oedematous areas, infected areas, inflamed or tumour-infiltrated areas, or broken skin

* clean skin with Alcohol swab 70% with 2% chlorhexidine gluconate

* insert needle using ANTT without touching it, by using the wings of the 'butterfly' holding it at an angle of 45°

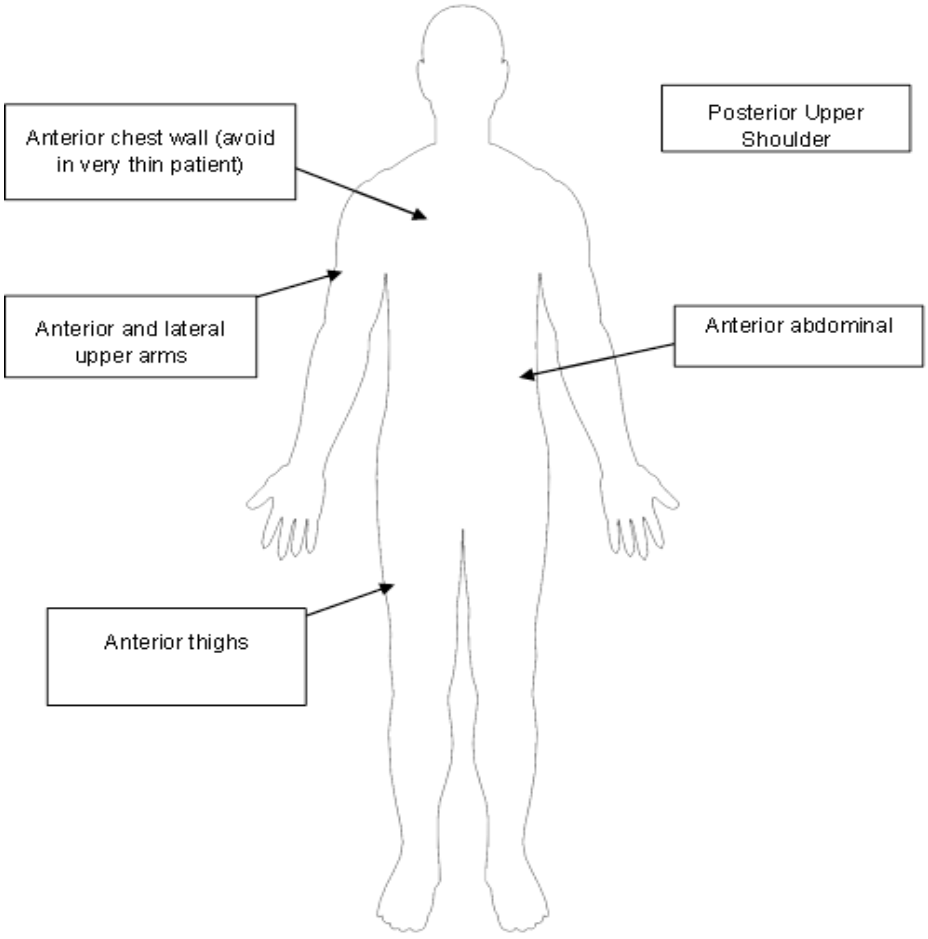
* lay needle flat

* apply clear adhesive dressing

* stick down a loop of tubing with adhesive tape to keep tension away from needle site.

If removing an incomplete infusion from the device, disconnect the line from the syringe and cap the end of the line and the syringe tip, to prevent accidental administration of the drug to the patient. (see Figure 4)

Figure 4



Commencing the Infusion

i. After the Syringe Confirmation Display, the first screen that appears is displayed below.

Figure 5. Volume, Duration and Rate Display

ii. The McKinley T34 Syringe Pump calculates and displays the deliverable volume, the duration of the infusion (24 hours) and the rate of the infusion (ml per hour). Press the “YES” key to confirm the details. The display screen prompts “Start Infusion?”

iii. Start the infusion by pressing the “YES” key.

iv. When the McKinley T34 Syringe Pump is running the screen displays:

· Top line –the time remaining for the current infusion.

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

· Bottom line – alternates between syringe size and brand and the message “<<<< Pump Delivering”.

· The Infusion Light Status Indicator flashes green.

Keypad Lock

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

Figure 6 Keypad Lock Display

i. To activate the keypad lock when the pump is infusing press and hold the “INFO” key until a chart is displayed showing a ‘progress’ bar moving from left to right.

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

iii. The “STOP/NO” and “START/YES” and “INFO” keys are still active.

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

Stopping the Infusion and Removing the Syringe Pump

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

ii. 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 the “ON/OFF” key and then remove the battery from the syringe pump.

iii. If the infusion is to be stopped before the syringe is empty, the syringe pump should be disconnected from the patient at the syringe end before the syringe is taken off the syringe pump. A syringe that is not empty must **NEVER** be taken off the pump while connected to the patient. `

iv. Clean the syringe pump and the cover with damp cloth. (Do not immerse the syringe pump in water and do not use alcohol). Dry and replace in packaging if no longer required for use.

Temporary Interruption of Infusion (e.g. for bathing)

i. Press the “STOP” key.

ii. Press and hold “ON/OFF” key until a beep is heard. The screen will go blank.

iii. Do not remove the syringe from the syringe pump.

iv. Disconnect the line from the syringe and cap the end of the line and the syringe tip.

v. Record on the monitoring chart, the length of time the infusion is stopped for.

Resuming the Infusion

Figure 7 Resume Program display

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

ii. Reconnect the line to the syringe on the syringe pump.

iii. Press and hold the “ON/OFF” key until a beep is heard. The screen will request confirmation of syringe size and the syringe brand.

iv. Press the “YES” key to resume. The screen will display “Remaining volume, duration and the rate of infusion”. Press the “YES” key to confirm.

v. The screen will also give the option to select “NO for New Program”. DO NOT select this as it will reset the 24-hour clock. This means that the remaining contents of the syringe will be delivered over the next 24 hours from confirming “Start Infusion?

Appendix 3. Regular observation charts for use in the Acute setting

SYRINGE PUMP MONITORING FORM.