TRUST WIDE/DIVISIONAL DOCUMENT

Delete as appropriate	**Strategy/Policy/Standard Operating Procedure/Guideline/Clinical Guideline/Protocol**
DOCUMENT TITLE:	**Policy and Procedure for the T34 Ambulatory Syringe Pump in adults (Palliative Care)**
DOCUMENT NUMBER:	**ELHT/CP22 Version 6.2**
DOCUMENT REPLACES Which Version	**ELHT/CP22 Version 6.0**
LEAD EXECUTIVE DIRECTOR DGM	**Director of Nursing**
AUTHOR(S): Note should not include names	**Syringe Pump Policy Task and Finish Group chaired by Palliative Medicine Consultant**

TARGET AUDIENCE:	**Medical and Nursing Staff**
DOCUMENT PURPOSE:	1. To provide a clear governance framework to ensure a safe and consistent approach to the use of the T34 Ambulatory Syringe Pump. 2. To provide details of how to set up and administer medication by a T34 Ambulatory Syringe Pump. 3. To provide easily accessible information about the common medicines used in a Syringe Pump.

To be read in conjunction with (identify which internal documents)	Palliative Care Clinical Practice Summary. Guidance on consensus approaches to managing palliative care symptoms. Lancashire and South Cumbria consensus guidance – 2nd Edition, November 2021 CO64 V9 Medicines Management Policy IC24 V4.1 Aseptic non touch technique (ANTT) policy SOP115 V1.0 Procedure for setting up and using a T34 Ambulatory Syringe Pump 3rd edition SOP079 Version 2 Procedure for the Administration of Subcutaneous PRN Medication Using a Prescribed Range of Doses for Symptoms in the Last Days of Life
SUPPORTING REFERENCES	• Royal Pharmaceutical Society – Professional guidance on the safe and secure handling of medicine, Dec 2018 • Royal Pharmaceutical Society/Royal College of Nursing: Professional guidance on the administration of medicines in healthcare settings, Jan 2019 • Advisory guidance – administration of medicines by Nursing Associates – Health Education England, Dec 2017 • Dickman et al (2016) The Syringe Driver, 4th edition, Oxford Press • T. Mitten (2000) Subcutaneous drug infusions, a review of problems and solutions. International Journal of Palliative Nursing Vol 7 No. 2 • Palliative Care Formulary online, https://www.medicinescomplete.com/#/ accessed June 2021 • Twycross R., Wilcock A., (2001) Symptom Management in Advanced Cancer 3rd edition Radcliffe Medical Press Oxon • The Health and Safety (Sharp Instruments in Healthcare) Regulations 2013 • British National Formulary online, accessed June 2021

CONSULTATION		
	Committee/Group	**Date**
Consultation	Via Syringe Pump Policy Task and Finish Group, members available on request	July – December 2021
Approval Committee	TWQG ELMMB 19th January 2022 Nursing & Midwifery Leaders Forum 27th January 2022	
Ratification date at Policy Council:	May 2022	

NEXT REVIEW DATE:	Jul 2025
AMENDMENTS:	Full policy review – amendments recorded and submitted separately – available on request June 2022 – Parecoxib algorithm added to page 51. Approved at ELMMB

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1. Introduction

1.1. A Syringe Pump is a portable battery-operated device that is used to deliver a continuous subcutaneous infusion of medicines.

1.2. The Syringe Pump is a minimally invasive route of medicine administration commonly used in Palliative Care.

1.3. The T34 Ambulatory Syringe Pump is the mode recommended for use in Palliative Care. This policy applies only to the T34 Ambulatory Syringe Pump in adults.

1.4. A Syringe Pump can pose serious risk to human life if used incorrectly.

2. Purpose

2.1. To provide a clear governance framework to ensure a safe and consistent approach to the use of the T34 Ambulatory Syringe Pump in adults.

2.2. To provide details of how to set up and administer medication via a T34 Ambulatory Syringe Pump.

2.3. To provide easily accessible information about the common medicines used in a Syringe Pump.

3. Scope

3.1. All healthcare professionals in ELHT prescribing, setting up, administering or monitoring medicines being given by a T34 Ambulatory Syringe Pump to adults.

3.2. This policy can be used by other healthcare providers across Pennine Lancashire but each organisation is responsible for ensuring they have appropriate training and governance processes in place.

3.3. ELHT will not accept any liability or responsibility for care delivered by non-ELHT staff.

3.4. Information provided about individual medicines is for guidance purposes. It is not fully comprehensive and is subject to change.

3.5. Individual prescribers are responsible for ensuring they prescribe in line with the most up to date guidance available and have appropriate knowledge and understanding of the medicines they prescribe.

4. Roles and responsibilities (ELHT specific)

4.1. The Trust recognises that the T34 Ambulatory Syringe Pump is commonly used to deliver medicines to palliative care patients and that all staff using these Syringe Pumps need to have adequate knowledge and training to do so safely.

4.2. The Chief Executive and Trust Board

4.2.1. The Chief Executive is responsible for:

- Ensuring that this policy adheres to professional guidance.
- Ensuring this policy and supporting documentation is reviewed every three years.
- Ensuring appropriate leadership and governance arrangements are in place to enable staff to comply with this policy.
- Ensuring this policy is agreed and monitored by the organisation's governance process.

4.2.2. The Trust Board will receive a report at least once a year including audit results related to end of life care.

4.3. Divisional General Managers, Divisional Directors and Divisional Directors of Nursing and other Managers of Services

4.3.1. Directors and Managers are responsible for the care provided within their services.

4.3.2. They must ensure that:

- Staff are aware of the policy and how to access it.
- Staff are required and enabled to acquire and maintain necessary competencies to safely use a T34 Ambulatory Syringe Pump.
- Appropriate leadership and governance arrangements are in place to implement the policy and to monitor the safe use of the T34 Ambulatory Syringe Pump.
- Incidents that occur involving the T34 Ambulatory Syringe Pump are reported using the Datix incident reporting system.

4.4. All Health Care staff setting up, administering or monitoring the delivery of medication using a T34 Ambulatory Syringe Pump

4.4.1. The responsibility for the safe and effective use of a T34 Ambulatory Syringe Pump lies with the ward staff for patients in hospital, the GP and community staff for patients in community settings.

4.5. All Health Care staff prescribing medicines to be given by a T34 Ambulatory Syringe Pump

4.5.1. Must prescribe within their competence and experience.

4.5.2. Must seek advice from Pharmacy or the Specialist Palliative Care Team if required. A 24hour Specialist Palliative Care Advice Line is available for professionals; see 4.7.2.

4.5.3. All information provided around medication in this document is for guidance purposes only. The prescriber is responsible for ensuring prescribing is carried out in line with the most up to date guidance.

4.5.4. Whilst every effort has been made to ensure accuracy in this document responsibility remains with the prescriber.

4.5.5. Should understand that although the medicines in this policy have marketing authorisation (are licensed) their use within a Syringe Pump is often beyond the specifications of the marketing authorisation, also known as off-licence/off-label prescribing. See C064 Medicines Management Policy section on unlicensed and "off-label" medicines.

- The marketing authorisation regulates the marketing activities of the Pharmaceutical Industry, not the activities of the prescriber. Clinical experience may reveal other indications (i.e., off-label use).
- The use of medicines beyond and without marketing authorisation in palliative care is both necessary and common and should be seen as a legitimate aspect of clinical practice.
- Health Care Professionals involved in prescribing medicines beyond or without marketing authorisation should select those medicines that offer the best balance of benefit against harm for any given patient. Prescribers should use the resources available to ensure prescribing is evidence based.
- Choice of treatment requires partnership between patients and health professionals, and informed consent should be obtained, whenever possible. This should occur before prescribing any medicine but particularly when medicines are being prescribed which are beyond or without marketing authorisation.
- Patients should be offered accurate, clear, specific and appropriate information that meets their needs about the use medicines beyond or without a marketing authorisation in accordance with professional regulatory body guidance.

- The information needs of carers and other health professionals involved in the care of the patient should also be considered and met as appropriate. The use of information cards or leaflets may help with this. It is often unnecessary to take additional steps when recommending medicines beyond or without marketing authorisation.
- For further information see Palliative Care Formulary online, https://www.medicinescomplete.com/#/.

4.6. Pharmacy Team

4.6.1. The core service provided by the pharmacy team includes clinical pharmacy, medicines procurement, medicines information and counselling.

4.6.2. Pharmacy will advise on the prescription writing and compatibility of medicines in the Syringe Pump.

4.6.3. Ward pharmacists will carry out clinical checks for stability and compatibility of Syringe Pumps. This includes drug, diluent and final dose concentration checks.

4.6.4. Pharmacy will advise on the ordering, storage, administration, disposal and record keeping of medicines.

4.6.5. Pharmacy will ensure timely provision of medicine and help in assessing appropriateness of medicine orders.

4.6.6. Pharmacy offer a limited, centrally delivered aseptic additive service and emergency on-call service via hospital switchboard.

4.6.7. Contact details for Pharmacy:

Medicines Information	**Mon-Fri 08.30am-5.00pm**	**Telephone: 01282 803004/Ext. 13004**
Pharmacy Aseptic Unit	**Mon-Fri 08.00am–4.30pm Sat/Sun 09.00am–1.00pm**	**Telephone: 01254 734680/Ext. 84680**
Pharmacy Dispensary RBH	**Mon-Fri 08.30am-5.00pm**	**Telephone: 01254 733507/Ext. 83507**

	Sat/Sun 09.00am–4.00pm	
Pharmacy Dispensary BGH	**Mon-Fri 09.00am–5.00pm**	**Telephone: 01282 804338/Ext. 14338**

4.7. Specialist Palliative Care Team

4.7.1. The Specialist Palliative Care Team supports hospital and community staff with the use of the Syringe Pumps in palliative care. Health Care Staff should refer to the Specialist Palliative Care Team if:

- Advice is needed about symptom management in Palliative Care patients or when initial measures have failed to provide adequate relief within 24 hours.
- Advice is needed regarding the prescription of medicines to be given in a Syringe Pump.
- Advice is needed about the set up or monitoring of a Syringe Pump.

4.7.2. The Specialist Palliative Care Team work Mon-Fri excluding bank holidays and weekends. Specialist Palliative Care telephone advice is available 24 hours per day, 7 days per week.

Contact details for Specialist Palliative Care advice:

Hospital	**Mon-Fri**	**08.30-16.30**	**Ext 82316/82652**
Community	**Mon-Fri**	**08.30-16.30**	**Ext 86326/86428**
Out of Hours	**07730 639399 (advice line based at East Lancashire Hospice)**		

5. Training and Education

5.1. Staff using Syringe Pumps are responsible for ensuring that they develop and maintain the skills and knowledge required to fulfil their professional role.

5.2. All staff setting up and monitoring the administration of medicines by a Syringe Pump must have attended an initial training session.

5.3. All staff using Syringe Pumps must attend an annual update thereafter.

5.4. Training needs should be identified and met as part of personal development review/appraisal processes.

5.5. All Trust Divisions will enable and support staff to acquire and maintain necessary skills and competencies to ensure safe use of the T34 Ambulatory Syringe Pump.

5.6. The Trust provides Syringe Pump training and education sessions for nursing staff.

5.7. Training can be requested and organised for other groups such as medical staff by contacting the Specialist Palliative Care Team.

6. Monitoring and Audit

6.1. Audit of the safe and effective use of the T34 Ambulatory Syringe Pump will be undertaken at least biennially within the Trust. Results will be fed back to the ELHT end of Life Care Strategy Group and the nominated Trust Board members.

Monitoring Mechanism:

Measuring and monitoring compliance with the effective implementation of this procedural document is best practice and a key strand of its successful delivery. Hence, the author(s) of this procedural document has/have clearly set out how compliance with its appropriate implementation will be measured or monitored. This also includes the timescale, tool(s)/methodology and frequency as well as the responsible committee/group for monitoring its compliance and gaining assurance.

Aspect of compliance being measured or monitored.	Individual responsible for the monitoring	Tool and method of monitoring	Frequency of monitoring	Responsible Group or Committee for monitoring
Use of syringe pumps in practice	Specialist Palliative care team audit lead	Audit tool	Every 2 years	Specialist Palliative Care Directorate

Indications for use of a Syringe Pump in Palliative Care

Palliative care patients often experience multiple symptoms that require the use of more than one medicine. If a patient's condition changes so that the oral route is no longer available, the Syringe Pump can be used to support continued symptom control.

A Syringe Pump is the chosen method for the administration of medicines when other routes are inappropriate due to:

- Nausea and vomiting
- Dysphagia
- Severe weakness/cachexia
- Unconsciousness
- Gastrointestinal problems e.g. diarrhoea, bowel obstruction
- Inability to administer medication via oral route i.e. Head/neck cancers
- Malabsorption
- Care in the last days and hours of life – a Syringe Pump should only be started in the last hours or days of life if it is indicated for symptom management. Not all dying patients will require a syringe pump.

Many palliative care patients will require administration of 'as required' (prn) subcutaneous medication for symptom management.

If more than 2 or 3 doses of any 'as required' (prn) subcutaneous medication are required for symptom control over 24 hours, consider using a Syringe Pump.

In a patient with a Syringe Pump in place consider increasing the doses if more than 2 or 3 doses of any 'as required' (prn) medication is required for symptom control over 24 hours.

Advantages in the use of a subcutaneous Syringe Pump

- Increased patient comfort when oral route not available.
- Avoids repeated injections.
- Plasma concentration levels of medicines remain constant.
- Maintains patient's independence and mobility as pump is lightweight and portable.
- Ability to control multiple symptoms by infusing a combination of medicines.
- Accurate absorption.

Disadvantages in the use of a Syringe Pump

- Irritation, erythema or swelling can occur at the infusion site which may interfere with rate and absorption.
- Precipitation of medicines can occur. There is a lack of compatibility data for some mixtures.
- May be perceived as a 'terminal' event by patients and carers.

Guidance on prescribing opioid doses for a Syringe Pump and as required (prn)

Opioids given subcutaneously via a Syringe Pump are more potent than opioids administered orally. The dose of the opioid prescribed must therefore be adjusted when switching from oral to subcutaneous administration.

Different opioids also vary in their potency and therefore the dose prescribed must be adjusted when switching between different opioid medicines. For information on equivalent doses when changing the rout of administration or the opioid given please refer to page 8 of the **Lancashire and South Cumbria Consensus Guidance – Palliative Care Clinical Practice Summary August 2017**. For doses or drugs out with this guidance please contact the Specialist Palliative Care Team – see page 85 for contact details.

Additional 'as required' (prn) medication

In addition to the medication prescribed in a Syringe Pump it is often necessary to prescribe other subcutaneous medicines for symptoms management that are available if required.

For breakthrough pain

- It is best practice to prescribe additional subcutaneous doses of opioid analgesia equal to 1/6th of the total daily dose of opioid for breakthrough pain. Refer to opioid conversion charts on page 8 of the **Lancashire and South Cumbria Consensus Guidance – Palliative Care Clinical Practice Summary** for further details of recommended doses.

Other symptoms

- Please refer to the **Lancashire and South Cumbria Consensus Guidance – Palliative Care Clinical Practice Summary** for the management of symptoms in the last days of life for guidance on appropriate doses of other medicines
    - East Lancashire Health Economy Medicines Management Board Website Guidelines → Palliative Care & Syringe Pump Guidelines (http://www.elmmb.nhs.uk/guidelines/palliative-care/)
    - ELHT Intranet → Clinical Information → Palliative Care/EoLC → Symptom Control and Prescribing or Syringe Pump folder

Switching between other analgesic preparations and the Syringe Pump

1. Changing from twice daily modified release oral opioids to the Syringe Pump.

   The Syringe Pump can be started when the next dose of oral modified release opioid is due. In some circumstances it may be appropriate to start the pump sooner. Seek specialist advice.

2. Concomitant use of Fentanyl or Buprenorphine patches with opioids in a Syringe Pump.
   - If a patient has a Fentanyl or Buprenorphine patch in situ and additional analgesia is required by a Syringe Pump the patch should be left in situ.
   - Maintain the current patch strength.
   - Continue to change the patch at the recommended interval.
   - When calculating the 'as required' (prn) dose for patients on a Syringe Pump and a Fentanyl or Buprenorphine patch take into account both methods of opioid delivery.
   - Calculate the breakthrough dose of 'as required' (prn) subcutaneous analgesia by ADDING the amount required for the Fentanyl or Buprenorphine patch to the amount required for the opioid dose in the Syringe Pump.

For example:

Patient on a 25microgram/hour Fentanyl patch and receiving 30mg Morphine by a Syringe Pump over 24 hours.

To calculate breakthrough dose of subcutaneous Morphine:

For 25microgram/hour Fentanyl patch:

- Breakthrough dose from conversion charts = 10mg oral Morphine.
- Divide by 2 to calculate subcutaneous dose = 5mg subcutaneous Morphine

For 30mg Morphine in Syringe Pump:

- Breakthrough dose = 1/6 of total dose in Syringe Pump = Total dose = 30mg
- Divided by 6 = 5mg subcutaneous Morphine

Total dose for subcutaneous breakthrough Morphine

= 5mg + 5mg

= 10mg subcutaneous Morphine as required

Syringe Pump Prescribing and Medicines Information (Alphabetical)

All information provided on medicines in this document is for guidance purposes only. The prescriber is responsible for prescribing in line with the most up to date guidance. Please ensure that you have read sections 4.4 and 4.5 of the policy.

Prescribing a Syringe Pump

In community:

- An FP10 prescription needs to be issued for all medication prescribed.
- A T34 Ambulatory Syringe Pump prescription form with all required medicines must be completed.

In hospital:

- A Syringe Pump must be prescribed on the patient's inpatient prescription chart or electronic prescription as subcutaneous Syringe Pump over 24 hours.
- Individual medicines and doses for the Syringe Pump must be prescribed separately on the T34 Ambulatory Syringe Pump prescription form.

In community and hospital:

- Each medicine, dose, diluent and final volume must be clearly written on the prescription chart by the prescriber and signed.
- Doses of drugs **MUST** be written in words and figures.
- All medicines should be mixed with sterile water for injection unless known incompatibility or otherwise stated in drug monographs below. The final volume includes all prescribed medicines and diluent.
- The prescriber must complete the prescription in full and must indicate the time that the Syringe Pump needs to be commenced.
- If medicines are changed for any reason the previous prescription and authorisation must be discontinued by the prescriber and a new one written.
- When the patient's prescribed medicines are changed the changes should be commenced on the same day.
- The Saf-T giving set and the site should be changed at the same time.
- The Saf-T giving set and site should be changed after 7 days in one position.
- No more than 3 medicines are to be used in a single Syringe Pump.
- If more than 3 medicines are required consider the use of a second Syringe Pump.

- In exceptional circumstances, if more than 3 medicines are required, advice MUST be sought from the Specialist Palliative Care Team or Pharmacy.
- Medicine combinations should be reviewed on a regular basis to check efficacy and appropriateness of medicine and dose prescribed.
- The Syringe Pump giving set must not be used to give bolus doses of medication.
- If the total volume of medicines in a 20mL syringe exceeds 17mL it can be transferred into 30mL syringe and made up to 22mL. If the total volume exceeds 22mL in a 30mL syringe, discard medication and seek advice from Specialist Palliative Care or Pharmacy.
- Information on available medicine preparations is included on the reverse of the T34 Ambulatory Syringe Pump Prescription for information to help with volume calculations.

Mixing of medicines in a Syringe Pump and compatibility

In palliative care the administration of medication by continuous subcutaneous infusion using a Syringe Pump is common. Situations routinely arise that require combinations of two or more medicines in the same syringe, however evidence for this practice is lacking. Most combinations used in palliative care are clear, colourless and free from precipitation. However, this does not confer stability because unrecognised chemical reactions may occur. For example, Dexamethasone and Glycopyrronium mix to form a clear, colourless solution that is free from precipitation. However, at the molecular level, the Dexamethasone is reacting with and therefore deactivating the Glycopyrronium.

Compatibility of medicines in a Syringe Pump

Prescribers must ensure that any drug combinations prescribed are recognised to be compatible. Information is included on 2 drug compatibility in the drug monographs that follow.

Information on 3 drug combinations for those drugs used commonly in the last days of life: Morphine, Oxycodone, Alfentanil, Glycopyrronium, Levomepromazine and Midazolam is included below.

Further information on drug combinations not included in the information below, including other 3 drug compatibilities is available from:

- The Specialist Palliative Care Team, hospital based Pharmacists or Aseptics Unit (see page 81 for contact details).
- The Syringe Driver – Dickman et al. 4th edition 2016, Oxford University Press

www. Palliativedrugs.com>>SDSD section (free registration with the site is required to access this area).

Compatibilities must be checked for all drug combinations. If unfamiliar combinations or doses are involved advice MUST be sought from a hospital based pharmacist or the Specialist Palliative Care Team.

3 drug compatibility information for medicines commonly used in the last hours to days of life

Only the medicines recommended for first line use in the last hours to days of life in the Clinical Practice Summary Guidance are considered below.

These include: Morphine (or Oxycodone/Alfentanil if Morphine not suitable/tolerated), Midazolam, Levomepromazine, Glycopyrronium.

Morphine Sulfate combinations

Drug 1	Drug 2	Drug 3	Compatibility in water for injection
Morphine Sulfate	Midazolam	Levomepromazine	Compatible
Morphine Sulfate	Midazolam	Glycopyrronium	Compatible
Morphine Sulfate	Levomepromazine	Glycopyrronium	Limited data, watch for crystallisation*

Oxycodone hydrochloride (10mg/mL) combinations

Drug 1	Drug 2	Drug 3	Compatibility in water for injection
Oxycodone	Midazolam	Levomepromazine	Compatible
Oxycodone	Midazolam	Glycopyrronium	Compatible
Oxycodone	Levomepromazine	Glycopyrronium	Limited data, watch for crystallisation*

Alfentanil

Drug 1	Drug 2	Drug 3	Compatibility in water for injection
Alfentanil	Midazolam	Levomepromazine	Compatible
Alfentanil	Midazolam	Glycopyrronium	Compatible (extrapolated from 4 drug data)
Alfentanil	Levomepromazine	Glycopyrronium	Compatible if mixed with Sodium Chloride

Combination with no opioid

Drug 1	Drug 2	Drug 3	Compatibility in water for injection
Midazolam	Levomepromazine	Glycopyrronium	Compatible

*If crystallisation occurs:

- Stop infusion
- Seek immediate advice from Specialist Palliative Care Team, Pharmacy or 24 hour Advice Line (page 81)
- Contact Specialist Palliative Care Team to alert them to allow reporting and recording of the incompatibility

Resources assessed to update the drug monographs:

1) PCF online, June 2021, https://www.medicinescomplete.com/#/.
2) The Syringe Driver, Andrew Dickman and Jennifer Schneider, 4th Edition.
3) BNF online, June 2021.

Alfentanil

Usual dose:	**Starting dose will depend on previous opioid requirements (see table below) and patient factors, for example renal function – seek specialist advice** **There is no maximum dose of Alfentanil providing it is carefully titrated**
BE AWARE:	**It is 30 times more potent than oral Morphine**

Alfentanil must only be prescribed after discussion with a Consultant in Palliative Medicine or a specialist palliative care clinical nurse specialist with appropriate experience or, if unavailable out of hours, then with a Senior Hospice Physician.

Special instructions
Dilute with water for injection.
Sodium Chloride 0.9% may also be used.
Use an alternative opioid for breakthrough analgesia.

Indications for Use

- Pain in patients with renal failure or intolerable side effects from other opioids. It is an alternative to other opioids such a Morphine, Oxycodone and Diamorphine, particularly in patients with renal failure. It should only be used as a continuous subcutaneous infusion.

Mechanism of Action
Alfentanil is a strong opioid analgesic. It is a synthetic opioid with strong activity at mu opioid receptors. It has a rapid onset of action and a short duration of action.

Side effects
Refer to manufacturer's SPC for a detailed list of adverse effects.

Side effects are as for other strong opioids; nausea and vomiting, constipation, drowsiness, cognitive impairment, myoclonus, pruritus and many others (see BNF).

Opioid withdrawal symptoms can occur when switching from Morphine to Alfentanil, prn doses of the original opioid should help relieve symptoms.

Caution

- Renal impairment – dose adjustments not usually required.
- Hepatic impairment – a dose reduction may be needed – seek further advice.
- Accumulation can occur in elderly or obese patients.
- Drug interactions: Alfentanil is metabolised by CYP3A4 AND CYP3A5.
- The effect of Alfentanil may be increased by drugs including aprepitant (short term effect) azoles (e.g., Fluconazole, Voricanozole), Bicalutamide, Cimetidine, Diltiazem, Haloperidol, Macrolide antibiotics (e.g., Clarithromycin, Erythromycin) protease inhibitors (e.g., Indinavir, Nelfinavir, Ritonavir).
- The effect of Alfentanil may be reduced by discontinuing aprepitant (short term effect) Carbamazepine, high dose Dexamethasone, Efavirenz, Phenobarbital, Phenytoin, Rifampicin.
- Do not administer concurrently with MAOI's or within 2 weeks of their use.

Compatibilities: There is 2-drug compatibility data for Clonazepam, Glycopyrronium, Haloperidol, Hyoscine Butylbromide, Levomepromazine, Metoclopramide, Midazolam, Octreotide and Ondansetron.

Incompatibilities: Possible concentration dependent incompatibility with Cyclizine, no data on Hyoscine Hydrobromide.

Preparations
Alfentanil 1mg/25mL, 5mg/10mL, 5mg/mL ampoules
5mg/ml strength may have restricted availability to reduce risk of errors being made.

Dose conversion between s/c Morphine, s/c Oxycodone and Alfentanil

Morphine syringe pump s/c in 24 hours	4 hourly x/c morphine*	Oxycodone syringe pump s/c in 24 hours	4 hourly s/c oxycodone*	Alfentanil syringe pump s/c in 24 hours
10mg	2.5mg	5mg	1.25mg	500micrograms
20mg	2.5mg - 5mg	10mg	2.5mg	1mg
30mg	5mg	15mg	2.5-5mg	2mg
60mg	10mg	30mg	5mg	3mg
90mg	15mg	45mg	7.5mg	4mg
120mg	20mg	60mg	10mg	6mg
150mg	25mg	75mg	15mg	8mg
200mg	30mg	100mg	15mg	10mg
240mg	40mg	120mg	20mg	12mg

***Please note:** The most common reason for a patient requiring Alfentanil is severe renal impairment. In this instance the dose and frequency of administration of prn/breakthrough opioids may need to be adjusted to reduce the risk of accumulation and side effects. Seek further advice if needed.

Clonazepam

Usual dose: **500micrograms to 4mg over 24 hrs**

Clonazepam subcutaneously is only available as an unlicensed preparation. Patients, or if relevant, a relative with lasting power of attorney, should be informed of this and given an information leaflet. In cases where the patient is not able to consent and there is no relative with power of attorney, then it is appropriate for the Clinician to make the decision and take responsibility to treat the patient without informing them of the unlicensed status of the medicine or providing the leaflet.

The relevant information leaflet can be found on the ELHT hospital intranet or can be accessed by contacting pharmacy.

Special Instructions
Dilute with Water for injections.
Sodium Chloride 0.9% may also be used (the 1mg/mL injection of Clonazepam must be diluted with the supplied WFI prior to parenteral administration: Sodium Chloride 0.9% can be used to further dilute a Syringe Pump).

Indications for Use

- Terminal restlessness
- Neuropathic pain

Clonazepam is an alternative to Midazolam, but it is recommended to be reserved for the treatment of terminal restlessness associated with a previous history of neuropathic pain. Although there are no randomised trials supporting the use of Clonazepam in neuropathic pain, it is an accepted treatment in several centres.

Mechanism of Action
Clonazepam is a long-acting Benzodiazepine.

Side Effects
Refer to manufacturer's SPC for a detailed list of adverse effects.

- Dose-dependent adverse effects commonly reported include dizziness, drowsiness, fatigue and muscle weakness.
- Increased risk of falls and fracture in the elderly with Benzodiazepines.

Caution

- Use with caution in patients with chronic respiratory disease, renal impairment and hepatic impairment if possible, avoid in severe hepatic impairment and myasthenia gravis.
- Clonazepam is metabolised by CYP3A4 and is susceptible to drug interactions:
    - Clonazepam effect may be reduced by co-administration of enzyme inducers, such as Carbamazepine, Phenobarbitone and high dose Dexamethasone.

    - Clonazepam effect may be enhanced by co-administration of enzyme inhibitors, such as Bicalutamide, Erythromycin, high-dose Fluconazole and Haloperidol.
    - Effect on Clonazepam metabolism may persist for several days after cessation of these drugs.
- Use non-PVC giving sets as absorption into PVC infusion sets may occur.

Compatibilities

There are 2-drug compatibility data for Clonazepam in water for injection with Alfentanil, Diamorphine, Glycopyrronium, Haloperidol, Hyoscine Butylbromide, Hyoscine Hydrobromide, Morphine Sulphate and Oxycodone.

Preparations

Clonazepam 1mg/1mL in solvent ampoule, with 1mL Water for injection ampoule.

Cyclizine

Usual dose: 75 - 150mg over 24hrs

Special Instructions
Dilute with Water for injection.
Cyclizine is incompatible with 0.9% Sodium Chloride and will precipitate.

Indications for Use

- Nausea and vomiting due to:
  - Raised intracranial pressure (in conjunction with dexamethasone).
  - Bowel obstruction.

Vertigo due to vestibular cause (should be avoided long-term as they may inhibit compensatory mechanisms).

Mechanism of Action
Cyclizine has antihistamine and antimuscarinic activity.

Side Effects
Refer to manufacturer's SPC for a detailed list of adverse effects
Anti-muscarinic effects:

- CNS – drowsiness, cognitive impairment, delirium, restlessness, agitation.
- Visual - mydriasis, loss of accommodation causing blurred vision.
- Cardiovascular – tachycardia, palpitations, arrhythmias.
- Gastro-intestinal – dry mouth, heartburn (due to relaxation of lower oesophageal sphincter), constipation.
- Urinary tract – hesitancy of micturition, retention of urine.
- The elderly are more susceptible to sedative and antimuscarinic effects.
- Rarely movement disorders can occur e.g. tremor, dyskinesia and dystonia.

May occasionally cause irritation at the injection site.

Contra-indications
Narrow-angle glaucoma, acute porphyria.

Caution
Severe heart failure, acute myocardial infarction, glaucoma, epilepsy, myasthenia gravis, prostatic hypertrophy, urinary retention renal or hepatic impairment.
Anticholinergic medicines can directly interfere with the prokinetic action of Metoclopramide.
The combination of Cyclizine and Metoclopramide should be avoided.

Compatibilities
Cyclizine is implicated in many compatibility problems. To reduce the precipitation risk, dilute Cyclizine with Water for Injections before mixing.

There are 2-drug compatibility data for Cyclizine in water for injection with Haloperidol, Hyoscine Hydrobromide and Morphine Sulfate.

Incompatibilities
Concentration-dependent incompatibility occurs with Alfentanil, Dexamethasone, Diamorphine and Oxycodone.

Incompatibility has been reported with Clonazepam, Hyoscine Butylbromide, Ketorolac, Midazolam, and Octreotide.

Dexamethasone

Usual dose: 4mg to 16mg over 24hrs (3.3 to 13.2mg base over 24 hours)

Special Instructions

Dexamethasone should be diluted with Water for Injections. Also compatible with Sodium Chloride 0.9% as diluent if necessary.

If Dexamethasone is effective, consider reducing the dose after 5-7 days.

Indications for Use

- Nausea and vomiting (especially due to intestinal obstruction, raised intracranial pressure or associated with chemotherapy or radiotherapy). Dexamethasone is usually used in addition to other antiemetic for nausea and vomiting rather than used alone.
- For obstructive symptoms e.g. bowel obstruction, upper airway obstruction causing dyspnoea, superior vena cava obstruction.
- For symptoms relating to increased intracranial pressure (usually due to brain tumour/metastases).
- Cerebral oedema secondary to brain metastases.
- For patients established on long term Dexamethasone who need to continue this for symptomatic reasons.
- Pain (particularly if caused by nerve compression, liver capsule pain or bone pain).
- Metastatic spinal cord compression.

Consider prescribing

Consider prescribing gastro protective medicines if the patient is able to take oral medication (e.g.,, oral Omeprazole 20mg od) especially if high doses of steroids are being used, if an NSAID is co-prescribed or if there are other risk factors for gastric irritation (e.g. age, multiple recent courses of steroids, previous GI bleed).

Mechanism of Action

The main benefits of steroids in palliative care are due to their anti-inflammatory effects which are mediated by several different mechanisms. These anti-inflammatory effects can reduce peri-tumour oedema and so relieve compression and associated symptoms. There may also be other direct antiemetic effects. These various mechanisms make steroids very effective drugs, but also cause wide-ranging side effects, especially if used long-term.

Compared with other steroid drugs, Dexamethasone has high anti-inflammatory effects (due to being a highly potent glucocorticoid), with less fluid retention (due to having negligible mineralocorticoid effects). It is especially useful when high doses of steroids are needed and has a long duration of action, so once daily dosing is effective.

Side Effects

Refer to manufacturer's SPC for a detailed list of adverse effects.

Steroids have wide-ranging side effects, particularly if used long-term.

Common short-term side effects include:

- Insomnia – prescribe steroids to be given before 2pm to minimise this.
- Psychiatric effects including restlessness, depression, mania, psychosis and delirium.
- Peptic ulceration, especially if given with an NSAID.
- Hyperglycaemia (especially in the evening) and deterioration in diabetic control.

- Adrenal suppression with multiple or prolonged courses.
- Susceptibility to infection including candida infection.
- Cushingoid features – skin changes, susceptibility to bruising, proximal myopathy, truncal obesity.
- Osteopenia/osteoporosis (long term use/multiple courses).

Contra-indications and cautions

In general, if the patient is in the last days or weeks of life, there are no absolute contra-indications.
Potential benefits need to be weighed up against risks.
Caution in diabetes mellitus (risk of hyperglycaemia), psychotic illness (symptoms can emerge within a few days of starting steroids), other risk factors for gastric irritation (e.g. concurrent NSAID administration), hypokalaemia, can increase susceptibility to serious infections and mask their symptoms, prescribe cautiously if recent surgery.
Usually, contra-indicated if systemic infection is present (unless treatment not possible or appropriate and benefit of steroid outweighs risk).

Interactions

Refer to the BNF and the manufacturer's SPC for a detailed list of interactions.
Steroids reduce effect of insulin, oral hypoglycaemics, anti-hypertensives and diuretics.
Steroids can increase the INR of patients on Warfarin.
CYP3A4 is involved in metabolising Dexamethasone, so it is susceptible to drug interactions:

- Effect of Dexamethasone can be increased by enzyme inhibitors e.g. Itraconazole, Bicalutamide, Erythromycin
- Effect of Dexamethasone cab be reduced by enzyme inhibitors e.g. Carbamazepine, Phenobarbital, Phenytoin. Larger doses of Dexamethasone may be needed.
- Increases INR in patients taking Vitamin K antagonist (e.g., Warfarin) – increase frequency of INR monitoring.

Compatibilities

Dexamethasone often causes compatibility problems therefore, if it is to be mixed with other medicines, as much diluent as possible should be added ***before*** the addition of Dexamethasone. Dexamethasone should be the last constituent added. If precipitate remains in the mixture, it is incompatible.
Some centres always use a separate Syringe Pump for Dexamethasone due to its liability to precipitate with other medicines.
Consider a once or twice daily dose, no later than 2pm, rather than syringe pump administration if possible.

There is 2-drug compatibility data for Dexamethasone in water for injection with Morphine, Oxycodone, Ketamine, Ranitidine, Hyoscine Butylbromide and Metoclopramide.

Incompatibilities

Glycopyrronium may be inactivated by Dexamethasone, but no precipitate forms. Therefore ***avoid*** combination.
Incompatibility has been reported with Midazolam.
There is concentration-dependent incompatibility with Ondansetron, Haloperidol, Levomepromazine and Cyclizine. Use these combinations with caution and seek advice from the Specialist Palliative Care Team or Pharmacy.

Preparations

Dexamethasone 3.3mg/mL vials (as 4.3mg Dexamethasone Sodium Phosphate). This is equivalent to 4mg of oral Dexamethasone.

Also available as 6.6mg/2mL vials and 3.8mg/mL vials.

Diamorphine

Usual dose: **Starting dose of Diamorphine dependent of the patient's present opioid requirements (see table below) and patient factors, for example renal function – seek specialist advice if needed.**

There is no maximum dose of Diamorphine providing it is carefully titrated

Special instructions
Dilute with Water for Injections. Concentration dependent incompatibility can occur with 0.9% Sodium Chloride at higher doses or in combination with certain other drugs.

Usual dosage
A suitable starting dose for an opioid naïve patient would be 5mg to 10mg Diamorphine over 24 hours. For patients with uncontrolled opioid-responsive pain, who are tolerating Diamorphine, the Diamorphine should be increased by 30-50%. Rescue doses for breakthrough pain should be prescribed and are calculated to be one sixth of the total daily dose.
Although there is no maximum dose of Diamorphine, dosing should be titrated based upon a balance of analgesic effect versus undesirable effects.

Indications for Use

- Morphine is a similar drug and is usually used rather than Diamorphine. Diamorphine is useful if large doses of Morphine are needed, as it has better solubility and needs less volume for administration.
- Pain control
- Breathlessness

Mechanism of Action
Diamorphine is a derivative of Morphine. When given by subcutaneous injection it is rapidly absorbed and converted to the active metabolite, 6-monoacetylmorphine. This is then slowly converted to Morphine.

Side Effects
Refer to manufacturer's SPC for a detailed list of adverse effects.
Opioids tend to cause similar side effects.
Common side effects include nausea and vomiting, constipation, drowsiness, cognitive impairment, myoclonus, pruritus.

Additional adverse effects that can develop with deteriorating renal function and accumulation of metabolites include delirium, hallucinations, myoclonic jerks and nightmares. Consider switching opiates, e.g. to Alfentanil or Oxycodone if occurs. Seek specialist advice.

For all patients prescribed regular Diamorphine, consider also prescribing a regular laxative (if able to take) and an antiemetic, regularly/prn.

Caution
The same considerations as for Morphine apply to the use of Diamorphine in patients with renal or hepatic impairment, i.e. metabolites are likely to accumulate and so alternatives may be needed.
Seek specialist advice.

Compatibilities
There is 2-drug compatibility data for Diamorphine in water for injection with Clonazepam, Dexamethasone, Glycopyrronium, Hyoscine Butylbromide, Hyoscine Hydrobromide, Ketorolac, Levomepromazine, Metoclopramide, Midazolam, Octreotide and Ondansetron.

Incompatibilities
Concentration-dependent incompatibility occurs with Cyclizine and Haloperidol at higher concentrations.

Preparations
Diamorphine 5mg, 10mg, 30mg, 100mg and 500mg ampoules containing powder.

Dose conversion between s/c Morphine and Diamorphine

Morphine syringe pump s/c in 24 hours	PRN s/c Morphine	Diamorphine syringe pump s/c in 24 hours	PRN s/c diamorphine
7.5mg	1.25mg	5mg	1mg
15mg	2.5mg	10mg	2mg
30mg	5mg	20mg	3.5mg
45mg	7.5mg	30mg	5mg
60mg	10mg	40mg	7.5mg
90mg	15mg	60mg	10mg
120mg	20mg	80mg	12.5mg
135mg	20-25mg	90mg	15mg
150mg	25mg	100mg	17.5mg
180mg	30mg	120mg	20mg

Furosemide

Usual dose:	**20-140mg via Syringe Pump over 24 hours** **If converting from oral to subcutaneous Furosemide because of fluid overload, consider using a 1:1 conversion ratio (this will be an increase in dose).** **If converting because a patient is not able to take oral Furosemide in the last days of life, consider a 2:1 conversion ratio (a dose reduction).**

Furosemide via Syringe Pump must only be prescribed after discussion with a Consultant in Palliative Medicine or if a Consultant is unavailable out of hours, then with a Senior Hospice Physician.

Special Instructions

Dilute with 0.9% Sodium Chloride. Water for injection could also be used.
Furosemide is only available in 10mg/mL solution for injection. This volume means that SC doses are usually not practical, and a Syringe Pump needs to be used.

Indications for Use

If the patient is unable to swallow, consider a Syringe Pump containing Furosemide if needed for control of symptoms due to peripheral or pulmonary oedema or ascites. Titrate the dose until symptoms are managed.
Occasionally, Syringe Pump Furosemide may be used to manage decompensated congestive heart failure if intravenous therapy and/or hospital admission is not appropriate. Seek Specialist Palliative Care advice.

Mechanism of Action

Furosemide is a loop diuretic. It reduces the resorption of Sodium and therefore water within the kidney. It also increases urinary excretion of Potassium, Magnesium, Hydrogen and Chloride.

Side Effects

Refer to the manufacturer's SPC for a detailed list of adverse effects.

- Subcutaneous administration can cause pain and itching at the site of injection.
- Symptoms related to dehydration or electrolyte abnormalities (hypokalaemia, hyponatraemia, hypomagnesaemia) e.g. thirst, dizziness, weakness, muscle cramps.

Cautions

Refer to the manufacturer's SPC for detailed list of contraindications and precautions.
Usually contra-indicated in patients with:

- Hepatic encephalopathy.
- Anuric renal failure.
- Renal failure due to nephrotoxic or hepatotoxic drugs.
- Dehydration/hypovolaemia.
- Hypersensitivity to sulphonamides.
- Severe hypokalaemia or hyponatraemia.

For patients in the last days and weeks of life, the prescriber must consider these conditions, but they may not necessarily be a deterrent to use, provided the dose is carefully titrated.

Use with caution in patients with:

- Prostatic hypertrophy.
- Diabetes mellitus (glucose levels may increase).
- Hepatic impairment – monitor treatment closely and carefully titrate the dose to effect.
- Renal impairment – monitor treatment closely and carefully titrate the dose to effect.
- Other medications affecting QT interval e.g. Citalopram, Methadone – electrolyte disturbances caused by Furosemide increase the risk of cardiac effects from these medications.

If appropriate, ensure regular blood tests are performed to monitor electrolytes.

Compatibilities

Furosemide injection is alkaline and there is a high risk of incompatibility when mixed with acidic drugs. Because of this and the lack of compatibility date, Furosemide should not be mixed in the same syringe with any other drugs.

Preparations

10mg/mL solution for injection in 2mL, 4mL, 5mL, 25mL.

Glycopyrronium

Usual dose:	**600 micrograms to 1200micrograms over 24 hours**

Special Instructions
Glycopyrronium should be diluted with Water for Injections.
Can be diluted with Sodium Chloride 0.9%.

Indications for Use

- Excessive respiratory secretions. However, the development of terminal secretions must be anticipated because Glycopyrronium will not clear existing secretions.
- Bowel colic.
- May be of benefit in the treatment of large volume vomiting associated with bowel obstruction, possibly in combination with Octreotide.

Mechanism of Action
Glycopyrronium is a powerful anticholinergic causing inhibition of the parasympathetic autonomic system. It does not cross the blood brain barrier so is devoid of CNS effects such as paradoxical agitation and has less of an effect on the ocular and cardiovascular systems, at normal doses, than Hyoscine Hydrobromide.

Side Effects
Refer to the manufacturer's SPC for a detailed list of adverse effect.
The side effects of Glycopyrronium are dose related and are associated with its pharmacology. They include dry mouth, constipation and urinary retention.
Glycopyrronium may precipitate tachycardia.

Caution
The effect of Glycopyrronium accumulates in renal impairment and so dose adjustments may be necessary – check with medicines information for dosing.
Glycopyrronium should be avoided in patients with closed-angle glaucoma or paralytic ileus.
However, this is not a contraindication for patients with advanced disease.
Glycopyrronium may antagonise the prokinetic effects of Metoclopramide.

Compatibilities
There is 2-drug compatibility data for Glycopyrronium in water for injection with Alfentanil, Clonazepam, Diamorphine, Haloperidol, Levomepromazine, Metoclopramide, Midazolam, Morphine Sulfate, Oxycodone.

Limited 3 drug compatibility information can be found on pages 18-19.

Incompatibilities
Dexamethasone and Ketorolac. There may be a concentration-dependent incompatibility with Cyclizine.

Preparations
Glycopyrronium 200microgram/1mL ampoules
Glycopyrronium 600microgram/3mL ampoules

Haloperidol

Usual dose: 500micrograms to 5mg over 24hrs (antiemetic)

500micrograms to 10mg over 24 hrs (agitation)

Special Instructions
Dilute with Water for Injections.
Can be diluted with Sodium Chloride 0.9%.

Indications for Use

- Nausea and vomiting due to chemical causes i.e. medicines, biochemical disturbance. Sedation is minimal at the low doses used for nausea and vomiting.
- Agitation and Confusion. Higher doses are sedating and it can be used for agitation and confusion. However higher doses may produce extrapyramidal side effects therefore Levomepromazine should be used if sedation is required.
- Hiccups.

Mechanism of Action
Haloperidol is a central dopamine D_2 receptor antagonist with sedating properties.
When prescribing Haloperidol the subcutaneous dose should be lower than the corresponding oral dose (which undergoes significant first-pass metabolism).

Side Effects
Refer to manufacturer's SPC for a detailed list of adverse effects.
Extrapyramidal symptoms, especially if combined with other D_2 antagonists e.g., Metoclopramide, Levomepromazine.
Anticholinergic effects such as drowsiness/apathy, dry mouth, constipation, difficulty with micturition.

Cautions
Refer to manufacturer's SPC for a detailed list of contraindications and precautions.
Use with caution with concurrent use of CYP2D6 and/or CYP3A4 inhibitors/inducers (e.g., Carbamazepine, Phenobarbital, Phenytoin, Rifampicin, Itraconazole, Fluoxetine).
Exacerbates Parkinson's disease so use alternatives where possible.
No specific guidance available in hepatic impairment, however, since Haloperidol undergoes extensive first pass metabolism, the lowest effective dose should be used in hepatic impairment.
The active metabolites of Haloperidol may accumulate in renal failure – check with medicines information for dosing.

Compatibilities
There is 2-drug compatibility data for Haloperidol in water for injection with Alfentanil, Clonazepam, Cyclizine, Glycopyrronium, Hyoscine Butylbromide, Hyoscine Hydrobromide, Metoclopramide, Midazolam and Oxycodone.

Incompatibilities
Incompatible with Dexamethasone and Ketorolac.
Concentration dependent incompatibility occurs with Morphine Sulfate and Diamorphine.

Preparations
Haloperidol 5mg/mL ampoules.

Hyoscine Butylbromide (Buscopan)

Usual dose: 60mg to 120mg over 24 hrs

Special Instructions
Dilute with Water for Injections.
Sodium Chloride 0.9% may also be used.

Indications for Use

- Intestinal colic associated with bowel obstruction.
- Large volume vomiting associated with bowel obstruction (by reducing gastrointestinal secretions). Note: the maximum benefit may be seen only after three days.
- Spasm of the genito-urinary tract.
- Respiratory tract secretions.

Mechanism of Action
Hyoscine Butylbromide is an antimuscarinic.
Does not readily cross the blood brain barrier and so unlikely to cause sedation.
50% of the drug is excreted renally, unchanged.

Side Effects
Refer to manufacturer's SPC for a detailed list of adverse effects.
Anticholinergic effects including dry mouth, constipation, urinary retention, tachycardia, palpitations, heartburn, mydriasis.

Cautions
Avoid in closed angle glaucoma and paralytic ileus unless patient has advanced disease.
Use with caution in patients with congestive cardiac failure or those with renal impairment. (Use the lowest effective dose).
The anticholinergic effects of Hyoscine Butylbromide can be additive with other drugs and may precipitate delirium or cognitive impairment in susceptible patients.
May antagonise the prokinetic effects of Metoclopramide.

Compatibilities
There is 2-drug compatibility data for Hyoscine Butylbromide in water for injection with Alfentanil, Haloperidol, Levomepromazine, Midazolam, Morphine Sulfate and Oxycodone.

Incompatibilities
Not compatible with Cyclizine.

Preparations
Hyoscine Butylbromide 20mg/1mL ampoules.

Hyoscine Hydrobromide

Usual dose: 400micrograms to 2400micrograms over 24 hrs

Special Instructions
To be diluted with Water for Injections.
Sodium Chloride 0.9% may also be used.

Indications for Use

- Excessive respiratory tract secretions. However, the development of terminal secretions must be anticipated because Hyoscine Hydrobromide will not clear existing secretions.

Mechanism of Action
Hyoscine Hydrobromide is an antimuscarinic drug.

Side Effects
Refer to manufacturer's SPC for a detailed list of adverse effects.
Dry mouth, constipation, urinary retention, blurred vision, drowsiness, paradoxical agitation. It crosses the blood brain barrier and as such can result in possible sedation and delirium.

Cautions
Bradycardia.
Tachycardia.
Congestive cardiac failure.
Hepatic impairment.
Myasthenia gravis.
Paralytic ileus.
Renal impairment.
Increased risk of seizures in epileptic patients.
Avoid in closed angle glaucoma and paralytic ileus. However this is not a contra-indication with advanced disease.
May block the prokinetic effects of Metoclopramide.

Compatibilities
There is 2-drug compatibility data for Hyoscine Hydrobromide in water for injection with Cyclizine, Diamorphine, Haloperidol, Levomepromazine, Midazolam, Morphine Sulfate and Oxycodone.

Preparations
Hyoscine Hydrobromide 400microgram/1mL ampoules.

Ketamine

Usual dose:	**Starting Dose: 50-100mg/over 24 hours** **Increase by 50-100mg/24 hours until benefit achieved** **Usual maximum 500mg/24 hours**

To be used only on the recommendation of a Palliative Care Specialist for patients who have failed to obtain adequate relief from standard non-drug and drug treatments.

Special Instructions
As Ketamine is irritant it must be diluted with Sodium Chloride 0.9% w/v to the largest volume possible.

Ketamine can have an opioid sparing effect. If used concurrently with an opioid, consider a dose reduction of the opioid prior to initiating the Ketamine.

Indications for Use

- Pain unresponsive to standard analgesic treatments (including neuropathic, inflammatory, ischaemic limb and cancer related bone pain).

Concurrent Medicines
Consider the use of:

- Haloperidol (e.g. 2mg to 5mg/24hours) or Midazolam (e.g. 5-10mg/24hours) to treat dysphoria or hallucinations.
- Dexamethasone (500micrograms to 1mg/24hours) to reduce site toxicity.

Mechanism of Action
It is believed to produce an analgesic effect through antagonism of the N-methyl-D-aspartate (NMDA) receptor.

Side Effects
Refer to manufacturer's SPC for a detailed list.
The main side effects are:

- Psychotomimetic phenomena (including hallucinations, dysphoria and vivid dreams).
- Tachycardia, hypertension.
- Erythema and pain at the injection site.
- Urinary tract toxicity. Prescribers should consider discontinuing the Ketamine and seeking urology advice if patient develops urinary tract symptoms with no evidence of bacterial infection.

Cautions
Refer to manufacturer's SPC for a detailed list.
These include:
Cardiac failure, hypertension, cerebrovascular disease, ischaemic heart disease, raised intra-ocular pressure (glaucoma), epilepsy, current or past history of a psychiatric disorder. Concurrent opioid use my lead to opioid toxicity.

Contra-indications

Refer to manufacturer's SPC for a detailed list.
These include:
Raised intracranial pressure, severe cardiac disease, cerebrovascular accident or cerebral trauma or where a rise in blood pressure would pose a serious hazard.

Compatibilities

There is 2-drug compatibility data for: Haloperidol, Midazolam, low dose Dexamethasone, Diamorphine, Levomepromazine, Metoclopramide, Morphine Sulfate, Alfentanil, Clonazepam and Oxycodone.

Use a separate Syringe Pump from the opioids unless advised by a Palliative Medicine Consultant.

Preparations

Ketamine 10mg/mL – 20mL vial
Ketamine 50mg/mL – 10mL vial

Ketorolac

Starting dose:	**Usually 60mg over 24hours** **Increase by 15mg/24hours if necessary to 90mg/24 hours** **(60mg/24hours is the recommended maximum dose in those >65 years and/or <50kg)**

To be used only on the recommendation of a Palliative Care Specialist

Special Instructions
Dilute maximally with Sodium Chloride 0.9% (preferred diluent) to avoid irritation at the infusion site. (Also compatible with water for injections).
Concurrent opioid dose reduction should be considered and other NSAID's (if any) must be discontinued.

Indications for Use

- Short term management of cancer pain when the use of other NSAID's has been exhausted or is impractical. Use the minimum effective dose for the shortest duration necessary in order to reduce risk of serious and undesirable side effects.

Concurrent medicines
High potential to cause upper gastrointestinal bleeds/perforation. The concurrent use of a gastro-protective drug e.g. a proton pump inhibitor must be considered to minimise this risk to the patient.

Mechanism of Action
NSAID with anti-inflammatory, analgesic and antipyretic activity.

Side Effects
Refer to manufacturer's SPC for a detailed list.
Gastro-intestinal tract (ulceration, haemorrhage, perforation) and renal function (hypercalcaemia, uraemia, acute renal failure). Anaphylaxis, drowsiness, dizziness, headache, thrombocytopenia, skin reactions.

Of all NSAID's Ketorolac has the highest risk for gastritis, duodenitis and upper gastrointestinal complications.

Cautions
Refer to manufacturer's SPC for a detailed list.
Hypovolaemia from any cause (including those taking diuretics or the elderly). History of cardiac failure left ventricular dysfunction or hypertension. Renal, cardiac or hepatic impairment. Risk of bleeding increased if co-prescribed with antiplatelet drugs, corticosteroids or SSRI's.

Contra-indications
Refer to manufacturer's SPC for a detailed list
History of hypersensitivity to Aspirin or NSAID, Asthma, active peptic ulceration (or history of gastro-intestinal bleeding, ulceration or perforation). Renal impairment, dehydration, pregnancy, severe heart failure, severe hepatic impairment, coagulation/bleeding disorders or cerebrovascular bleeds. Concurrent treatment with Aspirin, NSAIDS, probenecid, Lithium salts or anticoagulants.

Compatibilities
2-drug compatibility data is available in Sodium Chloride 0.9% w/v for Diamorphine (dependent upon concentration), Oxycodone and Ranitidine.

Incompatibilities
May precipitate in solutions with low pH e.g. Midazolam, Haloperidol and Cyclizine.

Preparations
Ketorolac 30mg/mL 1mL ampoules.

Levetiracetam

Usual dose:	**As per oral dosing – will depend on previous oral requirements** **Use 1:1 oral subcutaneous conversion ratio** **Max 2g/24hours in one syringe due to volume constraints**

Levetiracetam must only be prescribed as a subcutaneous infusion after discussion with a Consultant in Palliative Medicine or, if a Consultant is unavailable out of hours, then with a Senior Hospice Physician.

Special Instructions
Dilute maximally with Water for Injection (i.e. to volume of 22mLs).
Sodium Chloride 0.9% w/v may also be used.
Administer in a separate Syringe Pump.
Higher doses may require 2 Syringe Pumps.

Indications for Use
- Levetiracetam is an antiepileptic which can be used to treat focal or generalised seizures. Its use subcutaneously (unlicensed) offers the possibility of maintaining seizure control when oral or intravenous routes of Levetiracetam administration are not possible and when increased sedation (from alternatives such as Midazolam) is undesirable.

Mechanism of Action
Levetiracetam binds to a synaptic vesicle protein and is presumed to interfere with the release of the neurotransmitter stored within the vesicle. It readily crosses the blood-brain barrier. It is effective for a broad range of seizure types.

Side effects
Refer to manufacturer's SPC for a detailed list of adverse effects.
Common or very common: Abdominal pain; aggression; anorexia; anxiety; convulsion; cough; depression; diarrhoea; dizziness; drowsiness; dyspepsia; headache; insomnia; irritability; malaise; nasopharyngitis; nausea; rash; tremor; vertigo; vomiting.

Uncommon: Agitation; alopecia; amnesia; ataxia; blurred vision; confusion; diplopia; eczema; impaired attention; leucopenia; myalgia; paraesthesia; pruritus; psychosis; suicidal ideation; thrombocytopenia; weight changes.

Rare: Agranulocytosis; choreoathetosis; drug reaction with eosinophilia and systemic symptoms (DRESS); dyskinesia; erythema multiforme; hepatic failure; hyponatraemia; hypersensitivity; neutropenia; pancreatitis; pancytopenia; Stevens-Johnson syndrome; toxic epidermal necrolysis.

Caution
Renal impairment – dose needs to be reduced – seek further advice.
Hepatic impairment – dose may need to be reduced in severe hepatic impairment if associated renal impairment – seek further advice
Stopping Levetiracetam – do not stop abruptly; reduce by maximum of 500mg bd every 2-4 weeks to avoid rebound seizures.

Compatibilities
Data not available – use a separate Syringe Pump.

Preparations
Levetiracetam 100mg/mL 5mL ampoules.

Levomepromazine

Usual dose: **5mg to 25mg/24hours (antiemetic)**
12.5mg to 200mg/24hours (agitation)

Special Instruction
To avoid infusion site reactions, dilute maximally with Sodium Chloride 0.9% where possible.
Water for Injections can also be used.
Protect infusions from light.

Indications for Use
- Levomepromazine is used at low doses to treat intractable nausea and vomiting. It is a broad spectrum antiemetic usually used as a second or third line drug for patients who do not respond to more specific antiemetics.
- At higher doses it can be used to manage agitation/terminal restlessness due to its antipsychotic and potent sedative action.

Mechanism of Action
Levomepromazine is a phenothiazine antipsychotic drug with a half-life of 15-30 hours. It acts on the main receptor sites involved in the vomiting pathway.

Side Effects
Refer to manufacturer's SPC for a detailed list of adverse effects.
Sedation, skin irritation at infusion site, dry mouth, postural hypotension, extra-pyramidal reactions. May also rarely cause prolongation of QT interval in cardiac disease and hypokalaemia.

Caution
Use with caution (i.e. low initial doses), especially in ambulatory patients with; concurrent antihypertensive medication, diabetes, epilepsy (lowers seizure threshold), liver dysfunction, Parkinson's disease or postural hypotension.
Avoid in patients with dementia unless patient at immediate risk of harm or severely distressed (increased mortality reported). Use lowest possible dose for shortest possible duration.

Irritation at infusion site may occur. For lower doses, a bolus subcutaneous injection can be given to overcome this problem (usually at night).

Compatibilities
There is 2-drug compatibility data for Morphine Sulfate, Oxycodone, Diamorphine, Glycopyrronium, Hyoscine Butylbromide, Hyoscine Hydrobromide, Ketamine, Metoclopramide, Midazolam, Octreotide and Ondansetron.

Limited 3 drug compatibility information can be found in the compatibility tables shown on pages 18-19.

Incompatibilities
Incompatibilities reported with Dexamethasone (concentration dependent), Ketorolac and Ranitidine.

Preparations
Levomepromazine 25mg/1mL ampoules.

Metoclopramide

Usual dose:	**30mg to 60mg over 24 hours**
	There is an increased risk of neurological adverse effects at doses higher than 30mg/24hours and if used for longer than 5 days

Special Instructions

Dilute with Water for Injections or Sodium Chloride 0.9%.
Must not be used if complete intestinal obstruction is present or if there is a risk of gastrointestinal perforation or haemorrhage. Should not be used within 4 days of gastrointestinal surgery.

Indications for Use (Maximum of 5 days)

- Nausea and vomiting caused by medicines
- Gastric stasis
- Partial outflow obstruction
- Hiccups

Mechanism of Action

Metoclopramide is a central dopamine D_2 receptor antagonist with non-sedating antiemetic and prokinetic properties.

Side Effects

Refer to manufacturer's SPC for detailed list of adverse effects.
Extrapyramidal reactions may occur especially if used concurrently with another D_2 antagonist, particularly in children and young adults.
Drowsiness.
Diarrhoea.
Serotonin toxicity when combined with SSRI antidepressants.

Caution

Refer to manufacturer's SPC for a detailed list of contraindications and cautions.
Avoid concurrent IV Ondansetron used as this can cause cardiac arrhythmias.
Can cause irritation at the site of injection.
Anticholinergic medicines can directly interfere with the prokinetic action of Metoclopramide.
The combination of Cyclizine and Metoclopramide should be avoided.
Metoclopramide antagonises the treatment of Parkinson's disease.
Metoclopramide may increase the rate of absorption of Morphine via increased gastric emptying.
Dose reduction of up to 75% may be necessary in moderate to severe renal impairment (refer to manufacturer's SPC for further details).

- Dose reduction of up to 50% may be necessary in patients with a significant degree of hepatic impairment.

Epilepsy – lowers seizure threshold.
Cardiac disease.

Compatibilities

There is 2-drug compatibility data for Metoclopramide in water for injection with Alfentanil, Diamorphine, Glycopyrronium, Haloperidol, Hydromorphone, Ketamine, Midazolam, Morphine Sulfate, Octreotide and Oxycodone. The injection should be discarded if it discolours. Sometimes compatible with Dexamethasone but may precipitate.

Incompatibilities

Metoclopramide may crystallise with Cyclizine. This combination should not be used routinely.

Preparations
Metoclopramide 10mg/2mL ampoules.

Midazolam

Usual dose:	**10mg to 30mg over 24 hours** **Higher doses may be used – seek Specialist Palliative Care advice for doses above 30mg**

Special Instructions
Dilute with Water for Injections or Sodium Chloride 0.9%.
Initial starting dose of Midazolam should be no more than 10mg per 24 hours. Higher doses may be used if required for seizure control. Specialist Palliative Care advice should be sought in this situation.

Indications for Use

- Terminal agitation
- Anticonvulsant
- Anxiety
- Breathlessness if patient already on regular opioids
- Myoclonus

Mechanism of Action
Midazolam is a Benzodiazepine.

Side effects
Refer to manufacturer's SPC for a detailed list of adverse effects.
Drowsiness, confusion, ataxia, amnesia, cognitive impairment.
In <10% of people it can contribute to increased agitation.

Caution
Refer to manufacturer's SPC for a detailed list of contraindications and cautions.
Dose reduction may be necessary in liver disease (main site of metabolism) and renal disease (accumulation of metabolite).
Elderly.

Compatibilities
There is 2-drug compatibility data for Midazolam in water for injection with Alfentanil, Diamorphine, Glycopyrronium, Haloperidol, Hyoscine Butylbromide, Hyoscine Hydrobromide, Levomepromazine, Metoclopramide, Morphine Sulfate and Oxycodone.

Limited 3 drug compatibility information can be found on pages 18-19.

Incompatibilities
Likely to cause precipitation if mixed with Dexamethasone or Ketorolac.

Preparations
Midazolam 10mg/2mL ampoules.

Morphine

Usual dose:	**Starting dose of Morphine is dependent on the patient's present opioid requirements and patient factors, for example renal function – seek advice if needed.** **There is no maximum dose of Morphine providing it is carefully titrated**

Special Instructions
Dilute with Water for Injections or Sodium Chloride 0.9%.

Usual Dosage
Morphine is the first line opioid of choice.
Although there is no maximum dose of Morphine, dosing should be titrated based upon a balance of analgesic effect versus undesirable effects.
The initial dose of Morphine is dependent on the patient's present opioid requirements. A suitable starting dose for an opioid naïve patient would be 10mg to 20mg Morphine over 24 hours. For patients with uncontrolled pain, the Morphine should be increased by 30-50%.
Additional 'as required' doses for breakthrough pain should be prescribed at a dose of one sixth of the total daily dose of the regular Morphine prescription.

- Conversion ratio for oral to subcutaneous Morphine = 2:1
  i.e. 60mg oral Morphine daily = 30mg subcutaneous Morphine in 24 hours.

Indications for use
- Pain control.
- Breathlessness.
- Cough.

Mechanism of Action
Morphine is a strong opioid and acts primarily via μ-opioid receptor.

Side Effects
Refer to manufacturer's SPC for a detailed list of adverse effects.
Adverse effects commonly include nausea and vomiting, constipation, drowsiness, cognitive impairment, myoclonus and pruritus.

Caution
Refer to manufacturer's SPC for a detailed list of contraindications and cautions.
The metabolites of Morphine are renally excreted, therefore patients with renal impairment are at risk of toxicity and may need a reduced dose of Morphine between 30-50% or an alternative drug e.g., Alfentanil. Seek specialist advice in these circumstances.

Compatibilities
There is 2-drug compatibility data for Morphine Sulfate in water for injection with Clonazepam, Cyclizine, Glycopyrronium, Hyoscine Butylbromide, Hyoscine Hydrobromide, Ketamine, Levomepromazine, Metoclopramide and Octreotide.

Incompatabilities
Morphine Sulfate is ***incompatible*** with Ketorolac and may be ***incompatible*** with higher concentrations of Haloperidol or Midazolam.

Limited 3 drug compatibility information can be found on pages 18-19.

Additional medicines
A regular laxative, or as required laxative and/or antiemetic may be necessary.

Preparations
Morphine 10mg/1mL ampoules.
Morphine 15mg/1mL ampoules.
Morphine 30mg/1mL ampoules.
Morphine 60mg/2mL ampoules.

Octreotide

Usual dose: 200micrograms to 600micrograms over 24 hours

Special Instructions

- Not to be used first line.
- To be used only on the recommendation of a Palliative Care Specialist.
- Dilute with Sodium Chloride 0.9% to the largest possible volume to reduce the likelihood of inflammatory reactions at the skin site.
- Avoid abrupt withdrawal after long-term treatment as this may precipitate biliary colic from gallstones or biliary sludge.

Indications for Use

- Anti-secretory effect.
- Ascites, bronchorrhoea, excessive diarrhoea, associated with for example, malignancy, chemotherapy or radiotherapy, malignant fistulae, large volume vomiting associated with inoperable bowel obstruction, malignancy related mucous secretion.
- Once control of symptoms is achieved it may be possible to reduce to a lower maintenance dose, maintaining control whilst minimising dose-dependent undesirable effects.

Mechanism of Action

Octreotide has various actions as a somatostatin analogue. For the anti-secretory effect, it acts by reducing intestinal secretions of water and Sodium, in addition to stimulating absorption of water and electrolytes from the gastrointestinal tract. It may also improve gastrointestinal motility.

Side Effects

Refer to manufacturer's SPC for a detailed list of adverse effects.
Commonly observed effects include - constipation/diarrhoea at the beginning of therapy, dry mouth, flatulence (reduce dose and increase slowly), anorexia, abdominal pain, abdominal bloating, nausea, steatorrhoea (>500microgram daily), gallstones (10-20% of patients on long term treatment), pancreatitis associated with gallstones, hypoglycaemia shortly after starting treatment and hyperglycaemia (with chronic administration), hyperkalaemia, dizziness, hair loss.

Caution

- In type 1 diabetes insulin requirements may be reduced by up to 50%.
- For type 2 diabetes insulin and oral/parenteral hypoglycaemic agents may need adjusting. Close blood glucose monitoring should guide these adjustments.
- Hepatic impairment (dose reduction may be necessary).
- Monitor thyroid function (risk of hypothyroidism on long term treatment).

Compatibilities/Incompatibilities

Due to complexities around drug compatibilities, including Octreotide, please liaise with the Specialist Palliative Care Team, ELHT Pharmacy Team of out of hours from the 24 hour Palliative Care Advice Line before considering 2-drug combinations.

Presentations

Octreotide 50microgram/mL 1mL ampoule.
Octreotide 100microgram/mL 1mL ampoule
Octreotide 500micrograms/mL 1mL ampoule

Ondansetron

Usual dose: 8mg to 24mg over 24 hours

Special Instructions
Dilute with Sodium Chloride 0.9% or Water for Injection.
To be used only on the recommendation of a Palliative Care Specialist.

Indications for Use
Use of Ondansetron in Palliative Care remains limited to intractable or challenging cases of nausea and vomiting when the situation suggests that Serotonin release is the cause of the nausea and vomiting such as:

- Chemotherapy.
- Radiation-induced damage of the GI mucosa.
- Intestinal distension.
- Leaky platelets in severe renal impairment.

Mechanism of Action
Ondansetron is a selective $5HT_3$ serotonin.

Side Effects
Refer to manufacturer's SPC for a detailed list of adverse effects.
Common: Headache, constipation, flushing, injection site reactions.

Caution/Drug Interactions
Dose should be reduced in moderate or severe hepatic impairment (max, 8mg daily).

Additive effect with other drugs that cause QT interval prolongation, for example Citalopram, Erythromycin, Haloperidol, Domperidone, Levomepromazine, Methadone.

Additive effect with other drugs that cause Serotonin toxicity, for example SSRIs, Fentanyl, Tramadol, Metoclopramide, Tricyclic Antidepressants, Venlafaxine, Duloxetine.

Contraindicated with Apomorphine – risk of severe hypotension.

Compatibilities
Please liaise with the Specialist Palliative Care Team, ELHT Pharmacy Team or out of hours the 24 hour Palliative Care Advice Line before considering 2-drug combinations.

Preparations
Ondansetron 2mg/mL 2mL ampoule (4mg/2mL ampoule).
Ondansetron 2mg/mL 4mL ampoule (8mg/4mL ampoule).

Oxycodone

Usual dose:	**The initial dose of Oxycodone is dependent on the patient's present opioid requirements and patient factors, for example renal function – seek advice if needed.** **There is no maximum dose of Oxycodone providing it is carefully titrated**

Special Instructions
Dilute with Water for Injection.
Sodium Chloride 0.9% may also be used.

Indications for Use
- Moderate to severe cancer and non-cancer pain. An alternative to other strong opioids in case of intolerance**.**

Mechanism of Action
Oxycodone is a strong opioid and acts primarily via μ-opioid receptor.

Side Effects
Refer to manufacturer's SPC for a detailed list of adverse effects.
Common: nausea and vomiting, constipation, drowsiness, dry mouth.
Less common: pruritus, sweating.
Neurotoxicity: hyperalgesia, allodynia, delirium, hallucinations, myoclonus – can develop with deteriorating renal function**.**

Caution
Dose reduction may be needed in patients with hepatic and/or renal impairment
- **Mild to moderate renal impairment** – start with lower dose and titrate cautiously/slowly.
- **Severe renal impairment** – increased risk of toxic side effects due to drug and metabolite accumulation. Use with caution and monitor on a regular basis, especially for symptoms of neurotoxicity (see above). Alternative opioid, such as Alfentanil might be preferable depending on circumstances. Please discuss with the Specialist Palliative Care Team, or out of hours with the 24 hour Palliative Care Advice Line.
- **Moderate to severe hepatic impairment** – avoid if possible. Please discuss with the Specialist Palliative Care Team or out of hours with the 24 hour Palliative Care Advice Line.

Preparations
Two strengths of injection are available, 10mg/mL and high strength 50mg/mL. The latter may be useful in situations where high doses cause volume difficulties in a Syringe Pump.

Syringe Pump compatabilities when using Oxycodone 10mg/mL
There is 2-drug compatibility data using Water for Injection as diluent with Glycopyrronium, Haloperidol, Hyoscine Butylbromide, Hyoscine Hydrobromide, Levomepromazine, Metoclopramide, and Midazolam.

Limited 3 drug compatibility information can be found on pages 18-19. For any other drug combinations please discuss with the Specialist Palliative Care Team, the ELHT Pharmacy Team or out of hours the 24 hour Palliative Care Advice Line.

Compatibilities when using Oxycodone 50mg/mL

Differences in compatibility with other drugs for the 10mg/mL and 50mg/mL formulations of Oxycodone have been reported. It is important not to extrapolate compatibility information from one formulation to the other. Please seek advice from Specialist Palliative Care or Pharmacy.

Incompatibilities

Concentration-dependent incompatibility may occur when mixed with Cyclizine.

Preparations

10mg/mL 1mL and 2mL ampoules.
50mg/1mL ampoule.

Parecoxib

Usual dose:	**40mg subcutaneously once daily, can be increased to twice daily** **Can be given via syringe pump if preferred (40-80mg over 24 hours)**

Parecoxib must only be prescribed after discussion with a Consultant in Palliative Medicine or, if a Consultant is unavailable out of hours, then with a Senior Hospice Physician.

Ensure 0.9% Sodium Chloride solution for injection ampoules are prescribed with Parecoxib to enable administration

Special Instructions

Parecoxib is supplied in a vial containing 40mg of powder, this must be reconstituted with 2mL 0.9% Sodium Chloride. This can then be given by subcutaneous injection or diluted further with 0.9% Sodium Chloride to be given via syringe pump.
Consider gastroprotection if able to take. Stop other NSAIDs.
Consider if once or twice daily SC injection is preferable to syringe pump.

Indications for Use

Pain not responding to other measures, if an anti-inflammatory analgesic is indicated and the oral route is not available. Seek Specialist Palliative Care advice.

Mechanism of Action

Parecoxib is a selective inhibitor of cyclo-oxygenase-2 (COX2). By inhibiting COX2, parecoxib reduces the production of inflammatory prostaglandins, and so reduces inflammation and pain.
Parecoxib is a non-steroidal anti-inflammatory drug (NSAID), but whereas non-selective NSAIDs inhibit COX1 and COX2, Parecoxib mainly only inhibits COX2, and so there are some differences in side effects.

Side Effects

Refer to manufacturer's SPC for a detailed list of adverse effects.
Parecoxib can cause similar side effects to other NSAIDs;

- Parecoxib has a lower risk of causing gastro-intestinal side effects and has less effect on platelets and bleeding risk compared to non-selective NSAIDs, but a higher risk of cardiovascular events.
- Severe skin reactions can occur but are uncommon or rare. Parecoxib should be discontinued at the first appearance of a skin rash, mucosal lesion or sign of hypersensitivity.
- Renal function can deteriorate – consider if monitoring is appropriate

Subcutaneous injection or syringe pump site reactions can occur.

Cautions

Refer to the manufacturer's SPC for a detailed list of contraindications and precautions.
Contra-indicated if hypersensitivity to aspirin, other NSAIDs or sulfonamides.

Usually contra-indicated in patients with:

- Established heart failure

- Severe hepatic impairment (serum albumin <25g/L or Child-Pugh score ≥10)
- Active peptic ulceration or recent GI bleeding
- Inflammatory bowel disease
- Established heart disease, peripheral arterial disease and/or cerebrovascular disease

For patients in the last days and weeks of life, the prescriber must consider these conditions, but they may not necessarily be a deterrent to use, provided the dose is carefully titrated.

Use with caution in patients with:

- Significant risk factors for cardiovascular events
- High risk of developing GI toxicity, or prior history of peptic ulceration and GI bleeding
- Hepatic impairment – if moderate impairment (Child-Pugh score 7-9) reduce initial dose to 20mg and maximum dose to 40mg
- Renal impairment – if severe impairment (creatinine clearance <30mL/min), reduce initial dose to 20mg. No dose adjustment is needed in mild to moderate renal impairment
- Elderly patients weighing less than 50kg – initial dose 20mg, maximum dose 40mg

Lower doses are recommended if the patient is also taking Fluconazole.

Compatibilities

Because the lack of compatibility data, *parecoxib should not be mixed in the same syringe with any other drugs.*

Consider if once or twice daily SC injection is preferable to syringe pump.

Preparations

40mg powder for solution for injection/ 40mg powder and solvent for injection (0.9% Sodium Chloride)

Phenobarbital

Usual dose:	**200 to 1,600mg over 24 hours (doses up to 3,800mg/24h have been used)**

Phenobarbital must only be prescribed after discussion with a Consultant in Palliative Medicine, or if a Consultant is unavailable out of hours, with a Senior Hospice Physician.

Special Instructions
Dilute with water for injection.
Sodium Chloride 0.9% may also be used.

Indications for use
- ***Terminal agitation*** – third-line for patients who failed to respond to the combined use of Midazolam and an antipsychotic.
- ***Status epilepticus*** – if other treatments have not been effective and admission to hospital or ICU is not appropriate given the patient's diagnosis and prognosis, i.e. in dying patients.
- ***Maintenance anti-epileptic in patients unable to swallow*** **and** where a Syringe Pump route is preferred over other routes – Phenobarbital is a third-line alternative to Midazolam or Levetiracetam.

Mechanism of Action
Enhances post-synaptic inhibitory action of GABA by prolonging the opening of the chloride channel in the GABA-receptor-channel complex.

Side Effects
Refer to manufacturer's SPC for a detailed list of adverse effects.
- Paradoxical excitement.
- Local necrosis following s/c injections – bolus/stat doses to be given by deep IM injection.

Caution
- Unless in the imminently dying, it is contraindicated in severe renal impairment or severe hepatic impairment.
- Use with caution in patients with severe respiratory depression, mild to moderate hepatic or renal impairment.
- Enzyme induction:
    - Phenobarbital is metabolised by CYP2C19 – clinical significance of co-administration with CYP2C19 inhibitors is unknown. The effect of Phenobarbital might be enhanced by Fluconazole, Fluoxetine and Omeprazole.
    - Phenobarbital is a potent inducer of CYP3A4. Enzyme induction may take up to 2 weeks to develop, so clinical significance when used in the last days of life is unknown. It may reduce the effect of the following drugs: Alfentanil, Clonazepam, Dexamethasone, Fentanyl, Haloperidol, Methadone, Midazolam, Ondansetron, Oxycodone and Tramadol.

Compatibilities/Incompatibilities
Phenobarbital should be administered by a separate Syringe Pump. Due to its alkaline pH, it is likely to be incompatible with most palliative care drugs.

Preparations

Phenobarbital (Phenobarbital Sodium) 200mg/mL ampoules.

Preparations with lower concentrations are available, but due to volume constraints the 200mg/mL strength should be used.

Ranitidine

Usual dose: 100mg to 200mg over 24 hours

Special Instructions
Ranitidine can be diluted with Water for Injection or Sodium Chloride 0.9%.
Ranitidine should be the last drug added to an already diluted combination of drugs.

Indications for Use
- Inoperable bowel obstruction to reduce volume of gastric secretions.

Mechanism of Action
H2 – receptor antagonist inhibits gastric acid secretion and reduces volume of gastric secretions.

Side Effects
Refer to the manufacturer's SPC for a detailed list of adverse effects.
Usually well tolerated.
Constipation, nausea.

Caution
Dose reduction required in renal and hepatic impairment – seek advice.
Dose reduction may be required in the elderly.
Avoid in patients with acute intermittent porphyria.

Compatibilities
Seek specialist advice.

Incompatibilities
Seek specialist advice.

Preparations
Ranitidine 50mg/2mL ampoules.

TRUST WIDE/DIVISIONAL DOCUMENT

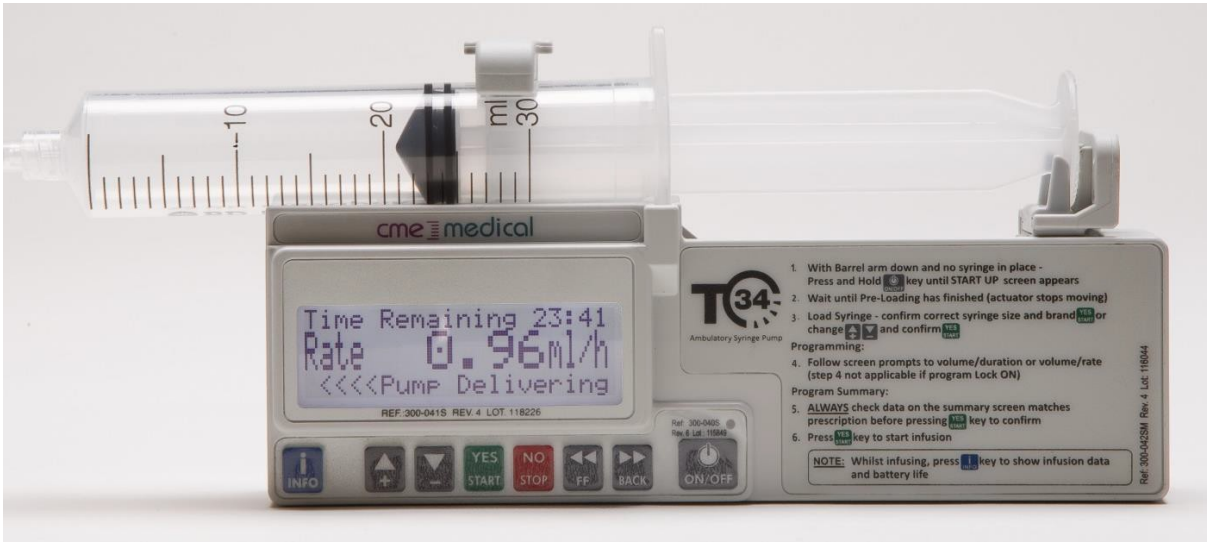
	Standard Operating Procedure
DOCUMENT TITLE:	**Procedure for setting up and using a T34 Ambulatory Syringe Pump 2nd Edition. For 3rd Edition T34 Pumps please see separate document**
DOCUMENT NUMBER:	**SOP115V1.1**
DOCUMENT REPLACES Which Version	**None**
LEAD EXECUTIVE DIRECTOR DGM	**Deputy Chief Nurse**
AUTHOR(S): Note should not include names	**Syringe Pump Policy Task and Finish Group, chaired by Palliative Medicine Consultant**

TARGET AUDIENCE:	All healthcare professionals in ELHT prescribing, setting up, administering or monitoring medicines being given by a T34 Ambulatory Syringe Pump to adults.
DOCUMENT PURPOSE:	To provide a framework for safe practice and guidance for Registered Nurses on the setting up and use of the T34 Syringe Pump. This is applicable to adult palliative patients in all ELHT settings.

To be read in conjunction with (identify which internal documents)	ELHT/CP22 Version 5.5 – Policy and Procedure for the T34 Ambulatory Syringe Pump (Palliative Care) C064 Medicine Management Policy SOP for procedure for the administration of subcutaneous PRN medication using a prescribed range of doses for symptoms in the last days of life (awaiting verification)
SUPPORTING REFERENCES	Lancashire and South Cumbria Strategic Clinical Network "Palliative Care Clinical Practice Summary: guidance on consensus approaches to managing Palliative Care Symptoms" 2nd Edition November 2021 NICE Guideline NG31 "Care of dying adults in the last days of life" Dec 2015 The Royal Marsden Manual of Clinical Nursing Procedure, Accessed online 17/12/21 Chapter 15-17 medication, subcutaneous injections Nursing and Midwifery Council (NMC)The Code: standards of conduct, performance and ethics for nurses and midwives (updated Oct 2018)

CONSULTATION		
	Committee/Group	**Date**
Consultation	Syringe Pump Task and Finish Group, members available on request	23.09.21
Approval Committee	Syringe Pump Task and Finish Group, members available on request	Dec 2021
Ratification date at Policy Council:	**06.04.22.**	
NEXT REVIEW DATE:	**Jul 2025**	
AMENDMENTS:		

GUIDELINES FOR THE USE OF T34 AMBULATORY SYRINGE PUMP 2nd EDITION FOR PALLIATIVE CARE PATIENTS



Materials and Equipment

- Dressing pack/blue tray.
- T34 Ambulatory Syringe Pump with lock box and key.
- Alkaline battery 9V must be PP3 6LR61 (to mitigate risk of unintended shutdown).
- 18Gx1.5in Blunt Fill Needle with 5 micron filter – only to be used for drawing up medication.
- 18Gx1.5in Blunt Fill Needle.
- BD Saf-T Intima
- Luer-Lok Syringe 20mL/30mL, where possible use BD Plastipak.
- Closed Luer Access Device.
- Extension Line.
- Transparent adhesive film dressing.
- Sterile alcohol wipes.
- Medicines and diluents.
- Syringe Pump Label.
- Syringe Pump documentation.
- Patient Information Leaflet.

Syringes and Final Volume

- A Luer-Lok Syringe must always be used.
- No less than a 20mL Luer-Lok Syringe should be used.
- A 20mL or 30mL Luer-Lok Syringe can be used.
- The prescriber must prescribe the final volume.
- Whichever brand of syringe used
    - 20mL Syringes should be made up to a final volume of 17mL.
    - 30mL Syringes should be made to a final volume of 22mL

If the final volume exceeds these amounts seek advice from the Specialist Palliative Care Team/Pharmacy. The final volume includes all prescribed medicines and diluent.

Batteries

- Always use a new battery every time a Syringe Pump is commenced.
- A 9V PP3 6LR61 Duracell alkaline battery MUST be used. No other battery type should be used.
- The average battery life starting at 100% is approx. 3-4 days.
- Due to the short battery life, always ensure spares are readily available.
- Check battery life at each syringe change. Discard battery if life remaining is 40% (community) 10% (hospital).
- Used batteries must be discarded.

Procedure

- Please refer to aseptic non-touch technique policy.
- Two registered nurses, one of which could be a nursing associate must set up the Syringe Pump.
- All ampoules/vial bungs must be swabbed with sterile alcohol and left to dry before opening/piercing.
- Calculate how many millilitres of volume medicines require e.g.

Metoclopramide 30mg	3x10mg/2mL ampoules	= 6mL	
			Total = 7mL
Morphine 30mg	1x30mg/1mL ampoule	= 1mL	

20mL Syringe	7mL medicine	10mL diluent	= Total Volume 17mL
30mL Syringe	7mL medicine	15mL diluent	= Total Volume 22mL

- Draw up prescribed diluent using an 18G1.5in Blunt Fill Needle with 5 micron filter into a 20mL or 30mL Luer
- -Lok Syringe.
- Draw medicine one into separate syringe using 18G x 1.5in Blunt fill Needle with 5 micron filter wasting any excess, add to the administration syringe using an 18G x 1.5in Blunt Fill Needle. Repeat this step until all medicines are added to the syringe.
- Fit a blind hub to the administration syringe and invert several times to mix contents.
- Check the solution for cloudiness, crystallisation, if present destroy solution in usual way, discard syringe and check compatibilities. Re-prepare the syringe with prescribed medication and diluent.
- Complete syringe label with details of additives, date and time. Attach to the syringe. Ensure syringe calibration markings are not obscured. Ensure that the label does not interfere with the mechanisms of the Syringe Pump.
- Attach Extension Line to BD Saf-T-Intima.

Administration and monitoring of T34 Ambulatory Syringe Pump

- Two registered nurses, one of which could be a nursing associate, are required to check medicines and set up a Syringe Pump (standard 8 NMC) and must be present for the whole procedure. If two registered nurses are not available a risk assessment must be made and an incident report completed.
- A T34 Ambulatory Syringe Pump Administration and Monitoring Form is required for each Syringe Pump prescribed.
- Each Administration and Monitoring Form can be used for 24 hours and then a new form must be commenced.
- One registered nurse should return within 4 hours of initially starting a Syringe Pump to ensure good symptom control.
- In hospital the Syringe Pump must be checked a minimum of 4 hourly.
- In community the Syringe Pump must be checked a minimum of twice daily. Any variance to this must be documented in the patient's notes.

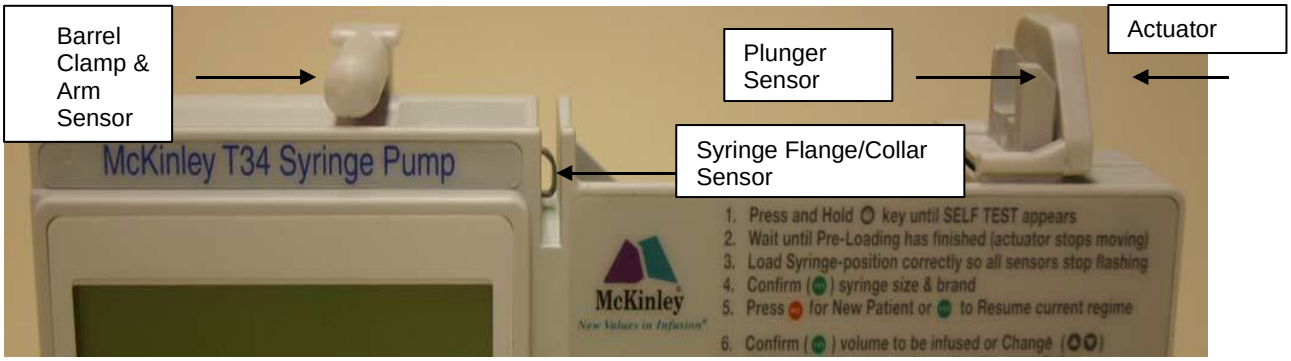
- It is the responsibility of the person completing the Administration and Monitoring Form to ensure the pump is working correctly and running to time.
- If the pump does not appear to be working or running correctly the person who identifies this must either replace the Syringe Pump or ask for advice.
- Serial number of Syringe Pump used must be documented on the T34 Ambulatory syringe Pump Administration and Monitoring Form.
- The Syringe must be changed every 24 hours because chemical stability of the medicines cannot be guaranteed after this time.
- When the patient's prescribed medicines are changed the changes should be commenced on the same day.
- It is considered good practice to change the giving set and use a fresh site when there is a change in prescribed medicines.
- Syringe Pumps must not be placed at a level higher than the infusion site to prevent siphoning of the syringe contents from the pump.
- Protect Syringe Pumps from direct sunlight, especially mixtures containing Levomepromazine. Levomepromazine can develop purple discolouration when exposed to light and should be discarded if this occurs.

Priming Lines

- The line should be primed prior to loading the syringe onto the device.
- When a site needs changing part way through a 24 hour infusion, unlock Syringe Pump panel press **NO/STOP** button do not switch off.
- Remove syringe, prime the new line and re-align the syringe using the **FF/BACK** button, replace syringe onto the pump.
- When changing the site part way through a 24 hour infusion it is only necessary to change the Saf-T Intima and not the extension line.
- Confirm the make of syringe, re-check prescription and attach line to the patient.
- The display will ask **YES/START TO RESUME**: do not press **NO** as this will re-set the 24 hour clock as for a new infusion.

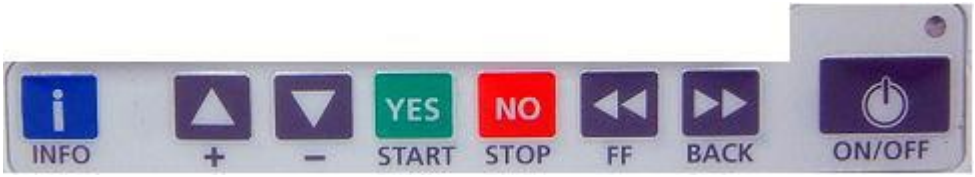
Preparing the T34 Ambulatory Syringe Pump

T34 Feature Recognition Syringe Loading



- Barrel clamp arm sensor – (detects syringe size/width of barrel, secures).
- Syringe ear/collar sensor (detects secure loading of syringe collar).
- Plunger sensor (detects secure loading of syringe plunger).
- Actuator.

T34 Feature Recognition Keypad



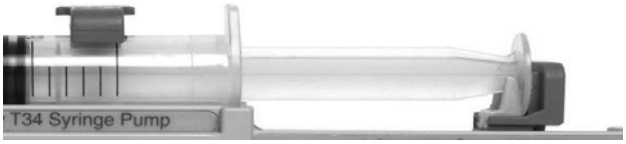
- **"INFO"** key – access event log/set up (code protected)/battery status.
- **"Up/Down"** arrow keys – increase/decrease parameters/scroll options.
- **"YES/START"** key – confirms selection/starts infusion.
- **"NO/STOP"** key – step back a screen/stops infusion.
- **"FF" (forward) key – moves actuator forward/purge facility.**
- **"BACK"** key – moves actuator back.
- **"ON/OFF"** key – power on/off.
- Install battery.

- Before placing the syringe onto the T34 Ambulatory Syringe Pump ensure the barrel clamp arm is down, press and hold the "**ON/OFF**" key until the "**SELF TEST**" screen appears.
- 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.

- During Pre-Loading the actuator always returns to the start position of the last infusion programmed.
- 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.
- Check the battery by pressing the "**INFO**" key repeatedly until the battery level appears on the screen and press "**YES** to confirm. Verify there is sufficient battery power. Discard the battery if there is less than 40% power remaining in community and 10% in hospital. Replace with a new battery to ensure the Syringe Pump will deliver for 24 hours.

- Ensure the giving set is not connected to the patient at this point as an accidental bolus of medication could be delivered.
- Wait for the screen to go back to load the syringe screen.

- Lift the barrel clamp arm.
- 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.
- Lower the barrel clamp arm.



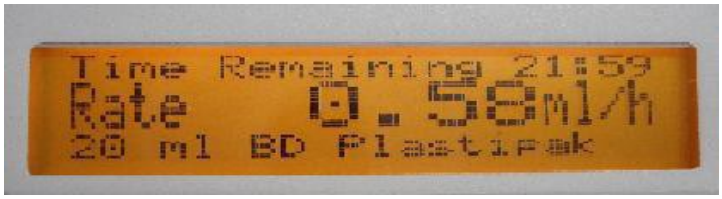
- Ensure the syringe label does not interfere with the mechanism of the infusion device e.g., if there is contact with the barrel clamp arm and sensor. The syringe graphic on the screen ceases to flash at each point as the syringe is correctly seated.
- Confirm that the syringe size and brand match the screen message. Press the "**YES**" key to confirm or scroll up (+) or down (-) keys to view the other syringe sizes, select correct syringe and size and press the "**YES**" key to confirm.

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

- The T34 Ambulatory 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?**"

- Cleanse the area of the skin and allow to dry.
- Grasp skin firmly and insert infusion set at a 45º angle. Release the skin and lay the wings against the skin securing with a sterile transparent dressing.

- Start the infusion by pressing the "**YES**" key.
- When the T34 Ambulatory Syringe Pump is running the screen displays:
    - Time remaining for current infusion
    - The infusion rate displayed in mL/hour
    - Alternates between syringe size and brand and also displays pump delivering **<< << <<"Pump Delivering**".
    - The light status indicator flashes green.



- The T34 Ambulatory 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.

- 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.
- Hold the key until the bar has moved completely across the screen and a beep is heard to confirm the lock has been activated.
- The "**STOP/NO**" and "**START/YES**" and "**INFO**" keys are still active.
- To turn off the lock, repeat the above procedure. The bar will now move from right (lock) to left (lock) and a beep will be heard.
- Complete all relevant documentation.
- The following should be observed at each visit:
    - Site viability
    - Volume in syringe reducing
    - Any crystallisation/precipitation present
    - Light is flashing (approximately every 30 seconds)

Discontinuing a Syringe Pump

- To avoid accidental bolus dose of medicines the infusion line must be disconnected from the syringe before it is removed from the Syringe Pump.

Temporary interruption of infusion

- Press "**STOP**" press and hold "**OFF**" button until a beep is heard. The screen will go blank.
- Do not remove syringe from the Syringe Pump.
- Disconnect the line from the syringe and cap the end of the line and syringe tip.
- Record on the monitoring chart, the length of time the infusion is stopped for.

Resuming the infusion

- Check that the prescription, syringe label and patient details match to ensure that this is the correct syringe for this patient.
- Remove the cap and reconnect the line to the syringe on the Syringe Pump.
- Press and hold the "**ON**" button until a beep is heard. The screen will request confirmation of syringe size and syringe brand.
- Press "**YES**" to resume. The screen will display "Remaining volume, duration and rate of infusion". Press "**YES**" to confirm.
- Do not press "**NO**" for new programme as this will reset the pump to deliver the existing syringe over the next 24 hours.

When a patient dies

- Press "**INFO**" and record the date, time and amount of solution remaining to be infused (in mLs).
- Stop the Syringe Pump and switch off.
- Do not remove the Syringe Pump until death has been verified.

Trouble Shooting

Syringe becomes dislodged

- The alarm will sound and the infusion light will turn **red**.
- "**Check Syringe Loaded Correctly**" window will be displayed.
- Replace syringe onto the Syringe Pump.

- The next screen will request confirmation of syringe size and syringe brand.
- Press "**YES**" if correct.
- The screen will display:
    - Press "**YES**" to resume previous programme.

WARNING: If you press "NO" the pump interprets this as a completely new 24 hour period and the remaining contents of the syringe would be delivered over the next 24 hours from confirming "**Start Infusion**". The patient would not therefore receive the prescribed dose. If "NO" has been pressed in error, discard the remainder of the syringe contents and prepare and set up a new syringe.

- The screen will display: "**Remaining volume, duration and rate of infusion**".
- Press "**YES**" to confirm if this is the correct prescription.
- Screen will display "**Start infusion**".
- Press "**YES**" to confirm.

T34 Ambulatory 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 pump will not start:

Problem	Solution
No battery present	Fit a battery
Battery inserted incorrectly	Re-align battery terminals
Battery is depleted/very low	Fit a new battery
Pump is faulty	Service required

Infusion Running Too Fast:

- If over-infusion occurs, stop infusion, check condition of patient and seek medical advice.
- Check rate setting for accuracy.
- Check for disconnection of line or needle.
- Check syringe securely attached to pump.
- Check box is locked and no tampering has occurred.
- Check no air present in syringe.
- If Syringe Pump could be faulty, return to Electronics and Biomedical Engineering Department (EBME).
- If safe to do so (following advice) begin process of setting up a new Syringe Pump using alternative site.
- Complete IR1.

Infusion Running Too Slow:

- Check patient, seek medical advice if required. Has symptom control been lost, does patient require PRN medication?
- Check the Syringe Pump light is **GREEN** and flashing.
- Check the battery level.
- Check the rate setting is correct.
- Check the correct syringe brand or size has been programmed.
- Check that the syringe is inserted correctly into Syringe Pump.
- Check if Syringe Pump has been stopped and re-started for any reason.
- Check contents of syringe/line is there any evidence of crystallisation/kinking of tubing?
- Check needle site if necessary.
- Consider further dilution of medicines to minimise irritation by setting up a fresh syringe.
- If Syringe Pump continues to run through too slowly, change entire pump and return to Electronics and Biomedical Engineering Department (EBME).
- Check rate of infusion at regular intervals.
- Complete IR1.

The Pump has stopped before emptying the syringe

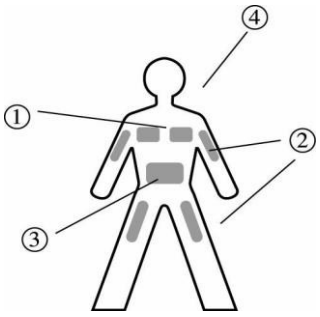
- Check battery has not exhausted. Fit a new battery, turn pump on, confirm syringe size and brand, select "**Resume**" to continue infusion.

WARNING – if you press "**NO**" the pump interprets this as a completely new 24 hour period and the remaining contents of the syringe would be delivered over the next 24 hours from confirming "**Start Infusion**". The patient would not therefore receive the prescribed dose. If "**NO**" has been pressed in error, discard the remainder of the syringe contents and prepare and set up a new syringe.

- Trapped/kinked infusion line. Free line or kink and resume infusion if appropriate.

Siting the infusion

If possible discuss with the patient the preferred infusion site.



Sites of choice include:

- Anterior aspect of upper arms and thighs (2).
- Anterior Abdominal Wall (3).
- Area over scapula (in confused or disorientated patients (4).
- Anterior Chest Wall (1).

Sites not to be used:

- Areas of inflammation.
- Areas of any broken skin.
- Bony prominences.
- Irradiated areas.
- Sites of tumour.
- Sites of infection.
- Skin folds or lymphoedema.

Avoid anterior chest wall in cachexic patients.

Guidelines for subcutaneous siting of the Saf-T Intima

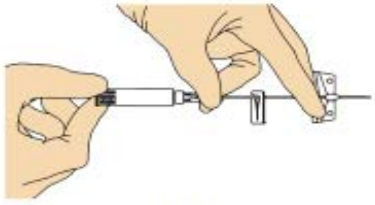
BD Saf-T-Intima™ Straight

For Subcutaneous infusion therapy

Points to practice

Before you start: Decontaminate hands and prep the skin of patient as per local hospital policy and guidelines.

Preparation



Hold as shown and rotate the safety shield to loosen the needle.

Check if the needle bevel is facing up and that the catheter is not over the bevel before insertion.

Insertion

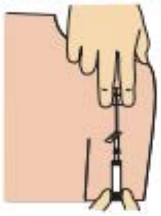
Grasp the textured sides of wings and bring them together, pinching firmly.

Insertion

Using thumb and index finger gently pinch the skin around selected site to identify the subcutaneous tissue.

Insert the full length of the catheter and needle through the skin, angle dependent on patient's skin structure.

Needle Removal



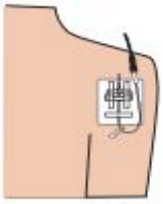
Make sure the cannula end is sitting well within the subcutaneous layer.

Lay the wings flat on the skin surface and hold firmly in place. Then pull the safety shield in a straight, continuous motion until the safety shield fully separates and activates the safety system.

Disposal

Discard the needle immediately in a sharps container.

Stabilisation



Secure the catheter and apply a sterile dressing per hospital policy. Attach needle free device as per hospital policy. Connect infusion line as needed.

BD

If site irritation occurs

- Change site using a new infusion set at least 3cm away from original site.
- Review medication in syringe (Cyclizine and Levomepromazine commonest causes).
- Use a larger syringe therefore increasing volume of diluent.
- For problematic site reactions, contact Specialist Palliative Care Team for advice.
- Sites may need to be changed every 3-4 days. Frequency of re-siting will in many cases be dictated by the onset of site reactions.
- To detect problems with the infusion site it should be checked a minimum of twice daily, any variance to this practice must be recorded in the patient's records.

LCD DISPLAY	ALERT/ALARM/ TYPE	POSSIBLE CAUSE	ACTION
Occlusion/Syringe Empty Check Line & Syringe Press **YES** to confirm	Alarm Audible and visual alarm	Occlusion Precipitation Line kinked Actuator has reached minimum travel position	New syringe & line required New syringe & line required Unkink consider renewing End of programme, turn pump OFF
Press **YES** to Resume **NO** for New Syringe	Alarm Audible and visual alarm Intermittent bleep	Something has occurred which has interrupted the current programme (e.g., syringe displaced/power failure) so the device is prompting the user to their attention	Pressing **YES** will continue current interrupted infusion Check/confirm infusion summary screens and press YES to resume the current infusion Pressing NO will programme a new infusion e.g., new syringe and/or new patient. The pump will calculate the volume of the syringe and based on duration required will start a new programme
Pump paused too long Confirm, press **YES**	Audible and visual alarm Intermittent bleep	Pump left in stop mode (on hold) for 2 minutes	Either start infusion, continue programming or switch off
Syringe nearly empty	Alert Audible and visual alarm Intermittent bleep	15 minutes from end of infusion	Prepare to change syringe or switch off
End Programme Press **YES** to confirm	Alert Audible and visual alarm Intermittent bleep	Infusion complete	Pump will alarm. Press **YES** to confirm end of programme and OFF to switch pump off.
Low Battery	Alert Visual alarm	Battery is almost depleted (15 minutes left)	Prepare to change battery and resume infusion
Battery End	Alert Visual alarm	Battery is depleted	Change battery and resume infusion
System Error. Press & hold **INFO** for details. If problem persists send pump for service	Alarm System error	Error has occurred	Pressing **INFO** key will display the reason for the alarm & give advice for correction, if applicable: If correction not possible: Remove pump from use & turn power off Return to Pharmacy who will send to Medical Physics for pump interrogation Complete medical equipment "Work Request Form"

Maintenance

- Syringe Pumps should be cleaned after each patient using a disposable cloth dampened with mild detergent. Do **NOT** use alcohol wipes.
- Syringe Pumps must be calibrated every 12 months by each service's engineering department.
- A recording system must be in place which clearly identifies the date, Syringe Pump number and person who calibrated the pump.
- Sticking labels to the actual pump is not recommended as this can cause problems with cleaning. Only maintenance labels are acceptable which clearly identify when last serviced.
- Ensure Syringe Pump is sent back to the appropriate department following use.

AMBULATORY SYRINGE PUMP PRESCRIPTION (ETS443)

AMBULATORY SYRINGE PUMP PRESCRIPTION (ETS443)

NHS
East Lancashire Hospitals
NHS Trust
A University Teaching Trust

Patient Name:		**Date of Birth:**	
NHS/RXR No:		**Patient Location:**	
Allergies:		**Consultant/GP:**	

Approved name of medicine (please delete unused lines)	Dose (IN WORDS AND FIGURES)	Route/ Rate	Indication
		SC/24hr	
		SC/24hr	
		SC/24hr	
Specialist advice **must** be sought if 4 drugs to be used		SC/24hr	

Pharmacist clinical check (Hospital only) **MUST BE COMPLETED**

Pharmacist Name: Signature: Date: Time:

Diluent required: Water for injection ☐ Sodium chloride 0.9% ☐	Final volume: 17mL ☐ 22mL ☐	Buprenorphine/Fentanyl patch (delete as appropriate) in use? Y ☐ N ☐ (If Y please continue & change as prescribed) Patch strength.....micrograms/hour This is equivalent to ..... mg subcutaneous Morphine/24 hrs

Prescriber name (print): Prescriber signature: Date: Time:	**The prescriber must ensure start date/time completed to authorise prescription** Start immediately ☐ Or specify time	Stop date: Time: Reason for discontinuing: Name (print): Signature:

Instructions for use:

- Use one prescription chart for each Ambulatory syringe pump
- Commence a new chart where there are changes to the contents of the syringe pump
- It is the responsibility of the prescriber to ensure all prescribed drugs are compatible
- If more than three medicines are required specialist advice **MUST** be sought
- All medication should be mixed with water for injection unless known incompatibility
- Final volume includes all prescribed medication and diluent, **if final volume exceeds 22mLs seek specialist advice**
- **On discharge:** Keep original prescription. Write a new prescription for community.
- **On admission:** Send prescription details with patient
- Patient information leaflet given Y ☐ N ☐

For advice on syringe pumps please contact:

Specialist Palliative Care Team:
Hospital: Mon–Fri 08:30-16:30 Tel: 01254 732316
Community: Mon–Fri 08:30- 16:30 Tel: 01254 736326
Hospice 24/7 out of hours advice line: 07730 639399

Pharmacy:
Medicines information Mon–Fri 08.30-17.00 Tel: 01282 803004. At all other times contact the on-call pharmacist via hospital switchboard.

Palliative care syringe pump compatibility ref.
www.pallcare.info/www.palliativedrugs.com

ETS443

AMBULATORY SYRINGE PUMP PRESCRIPTION (ETS443)

Medicine	Available concentrations
Alfentanil	1mg/ 2mL
	5mg/ 1mL
Cyclizine	50mg/ 1mL
Glycopyrronium	200microgram/ 1mL
Haloperidol	5mg/ 1mL
Hyoscine butylbromide	20mg/ 1mL
Levomepromazine	25mg/ 1mL
Metoclopramide	10mg/ 2mL
Midazolam	10mg/ 2mL
Morphine	10mg/ 1mL
	30mg/ 1mL
Oxycodone	10mg/ 1mL
	20mg/ 2mL
	50mg/ 1mL

AMBULATORY SYRINGE PUMP ADMINISTRATION AND MONITORING RECORD (ETS442)

East Lancashire Hospitals NHS Trust
A University Teaching Trust

Hospital No: RXR ..... NHS No: .....
First Name: ..... Last name: .....
DOB: ...../...../..... M / F: ..... Religion: .....
Address: .....
..... Tel No: .....
GP: .....

Date: ..... Time: ..... Completed By: .....

Date	Time	Patient location		Ambulatory pump serial no:	

Checks to be recorded:
- Inpatient 4hourly
- Outpatient twice daily

Syringe pump prescription:
- Must have all sections completed.
- If any information is missing please speak to medical staff before administration

Syringe pump set up by:	Medicine	Dose
Name:		
Signature:		
Checked by:		
Name:		
Signature:		

Diluent used: Water for injection ☐ Sodium Chloride 0.9% ☐

Prescription fully completed? Y ☐ N ☐

	0 Hr	+4 Hrs	+8 Hrs	+12Hrs	+16 Hrs	+20 Hrs
Time	:	:	:	:	:	:
Volume in syringe (mL)						
Time remaining of infusion						
Record rate of infusion (mL/hr)						
Is the pump running to time? (Y/N)						
Remaining battery power (%)						
Green LED flashing (Y/N)						
Syringe secure in pump (Y/N)						
Is the fluid clear (Y/N)						
Is keypad lock on (Y/N)						
Site position						
Site inflamed/ red (Y/N)						
Checked by: Name						
Signature						

ETS442

PALLIATIVE CARE COMMUNITY ANTICIPATORY/SUPPLEMENTARY SUBCUTANEOUS MEDICINES AUTHORISATION SHEET

PALLIATIVE CARE COMMUNITY ANTICIPATORY/SUPPLEMENTARY SUBCUTANEOUS MEDICINES AUTHORISATION SHEET

East Lancashire Hospitals NHS Trust
A University Teaching Trust

Patient Name:		Patient location:	
NHS/RXR No:		Date of Birth:	
Consultant/GP:		Ward/Community Nursing Team:	
Known allergies/alerts:		Hospital/Community prescription (please circle)	

Indication	Medicine	Dose	Frequency	Max 24 hr dose to be given PRN	Route	Prescriber Signature		Date/Time discontinued (inc. signature)
						Prescriber's Signature		
						Print Name	Date	
						Prescriber's Signature		
						Print Name	Date	
						Prescriber's Signature		
						Print Name	Date	
						Prescriber's Signature		
						Print Name	Date	
						Prescriber's Signature		
						Print Name	Date	
						Prescriber's Signature		
						Print Name	Date	

PALLIATIVE CARE COMMUNITY RECORD OF ANTICIPATORY/SUBCUTANEOUS SUPPLEMENTARY MEDICINES AND INJECTABLE MEDICINES STOCK RECORD

PALLIATIVE CARE COMMUNITY RECORD OF ANTICIPATORY/ SUBCUTANEOUS SUPPLEMENTARY MEDICINES AND INJECTABLE MEDICINES STOCK RECORD (ETS446)

East Lancashire Hospitals NHS Trust
A University Teaching Trust

Patient Name:	Date of Birth:	NHS Number:1`	Medicine & Strength:

Date & Time Given	Batch No./Expiry Date	Balance	Medicine	Dose	No. of Ampoules Used	Site – Subcut	Site – Syringe Pump	New Stock	Stock Balance	Signature and Print Name
										HCP 1
										HCP 2
										HCP 1
										HCP 2
										HCP 1
										HCP 2
										HCP 1
										HCP 2
										HCP 1
										HCP 2
										HCP 1
										HCP 2
										HCP 1
										HCP 2

THE USE OF AN ADDITIONAL SUBCUTANEOUS CANNULAE TO ADMINISTER PRN ANTICIPATORY MEDICATION

ANTICIPATORY MEDICATIONS MUST NEVER BE GIVEN DOWN THE SYRINGE PUMP LINE

An additional cannulae can be inserted for administration of PRN anticipatory subcutaneous medication if necessary

Please refer to the Procedure for the Administration of Subcutaneous PRN Medication Using a Prescribed Range of Doses for Symptoms in the Last Days of Life. SOP0729Version 2

Appendix 2 gives details about the use of subcutaneous cannulae to administer PRN anticipatory medication

PATIENT AND CARER INFORMATION LEAFLET FOR YOUR SYRINGE PUMP

For further information please contact the following:

Hospital Specialist Palliative Care Team

Tel: 01254 732652

Community Specialist Palliative Care Team

Tel: 01254 736326

If you require this document in an alternative format or language, please contact: Tel: 01254 732652

Polish
W celu otrzymania tego dokumentu w innym formacie lub języku, prosimy o kontakt z

Punjabi
jE VUhAn*< ieh dsVAvEz icsE h~r r<p j; BASA iv&C CAhIdA h~vE, V; icrpA crcE s*prc cr~

Urdu
اگر آپ کو اس دستاویز کی ایک متبادل شکل (فارمیٹ) یا زبان میں ضرورت ہے تو براہ مہربانی رابطہ کریں

Bengali
আপনি যদি এই প্রচারপত্রটি অন্য কোন আকারে বা অন্য ভাষায় চান, তাহলে যোগাযোগ করবেন

Romanian
Dacă aveţi nevoie de acest document într-un format sau limbă alternativă, vă rugăm să contactaţi

Lithuanian
Norint gauti šį dokumentą kitu formatu ar kita kalba, prašome susisiekti su mumis

Safe | Personal | Effective

Community and Integrated Care Division
East Lancashire Hospital Trust
Royal Blackburn Hospital
Haslingden Road
Blackburn
BB2 3HH

Healthier Pennine Lancashire

NHS
East Lancashire Hospitals
NHS Trust
A University Teaching Trust

Patient and Carer Information Leaflet for your Syringe Pump

Produced with the public of East Lancashire

Author of leaflet: Specialist Palliative Care Team
Version number: Version 5
Date of next review: June 2025
Doc ID – SPC-004-syringepump-2020

Safe | Personal | Effective

What is a Syringe Pump?

A Syringe Pump is a small portable battery operated pump containing your medicine holding a syringe. It allows medicines to be given steadily under the skin via a small needle over a 24 hour period. The pump will hopefully reduce the need for repeated injections

Why do I need one?

A Syringe Pump is used to give you your medicines in an alternative way for various reasons – for example:

- You may be struggling to swallow medicines
- You may have nausea/vomiting which can affect the way medicines are absorbed
- To control your symptoms more effectively

Your Nurse or Doctor will discuss the reasons for starting a Syringe Pump with you and your family/carer. A Syringe Pump can be used at any stage of your illness to control your symptoms and if you become able to take oral medicines it may be possible to discontinue the Syringe Pump.

Who looks after the Syringe Pump?

In the community your nursing team will reload the syringe with your medicines every 24 hours. The device will be checked every time you are seen by a nurse to ensure the pump is operating correctly.

In hospital your nurse is responsible for the operation of your Syringe Pump and will answe any questions you may have.

How do I know it is working?

- While the pump is running the indicator light will flash approximately every 30 seconds,
- If the alarm sounds contact the nurses involved in your care immediately to check the device.

Taking care of yourself with a Syringe Pump

- Tell your Nurse if you have any redness or soreness where the needle is placed.
- Contact your Nurse if the needle comes out or dislodges.

Side Effects:

Your Nurse or Doctor will explain possible side effects from the medicines in the syringe pump. All medicines have the potential to cause side effects. Please speak to your Nurse or Doctor if you have any concerns.

IN THE COMMUNITY

Do's ✓

- Check your medicines are stored safely away from children/pets
- Discuss bathing/showering needs with your Nurse
- Contact your Nurse if the medicines change colour or become cloudy

Don'ts ✗

- Do not interfere with the device
- Do not place the device near extremes of heat, e.g. hot water bottles
- Don't get the pump or needle site wet

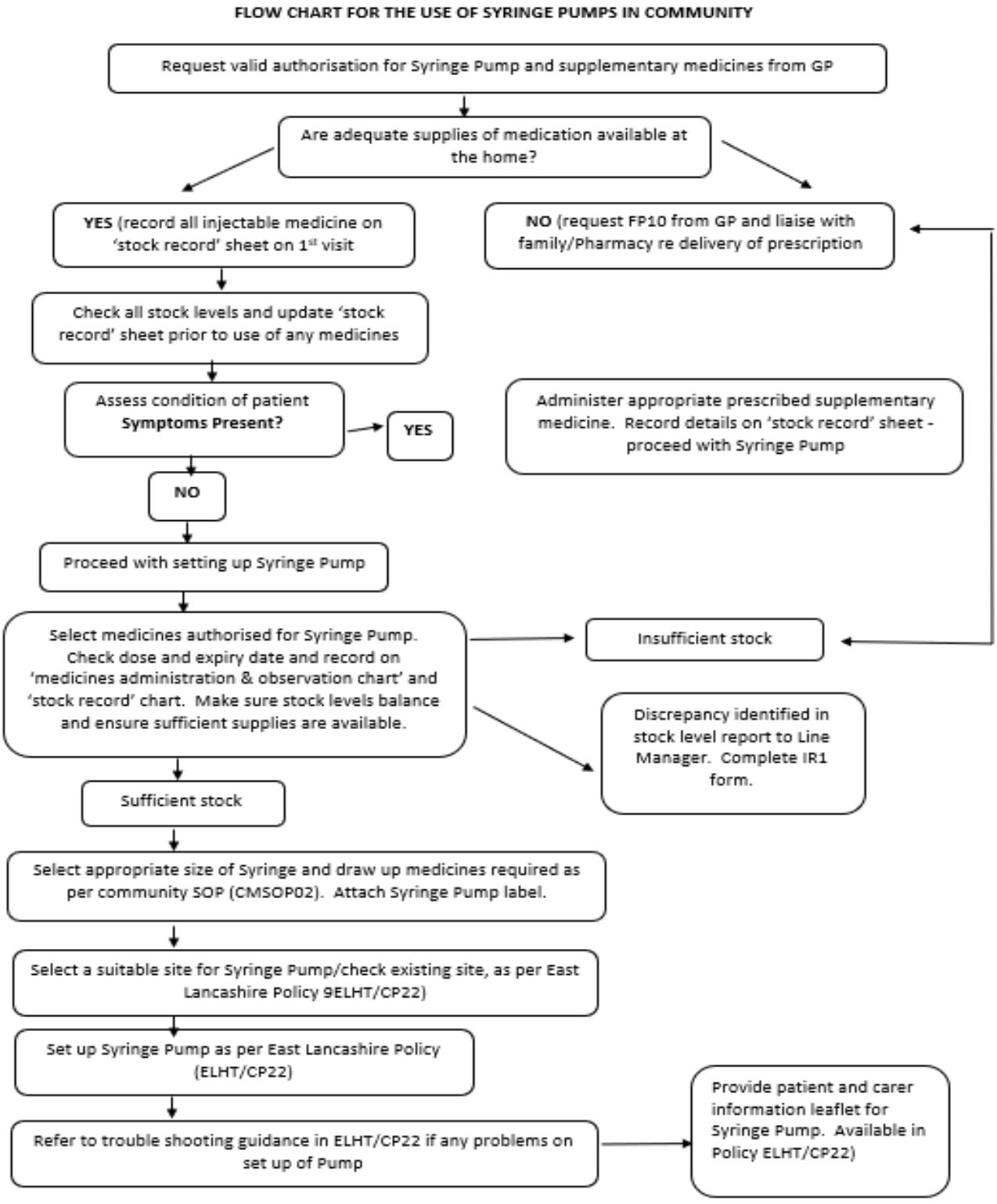
Please ensure the Syringe Pump is given to the District Nursing Team when no longer required

Contact Telephone Numbers:

Ward/Community Team: .....

GP/Doctor: .....

FLOW CHART FOR THE USE OF SYRINGE PUMPS IN COMMUNITY



Appendix 1 Equality Impact Assessment Screening Form

Department/Function	**Specialist Palliative Care/Syringe Pump Policy**			
Lead Assessor	**Syringe pump task and finish group chair**			
What is being assessed?	**Syringe Pump Policy**			
Date of assessment	**24/1/22**			
What groups have you consulted with? Include details of involvement in the Equality Impact Assessment process.	**Equality of Access to Health Group**	☐	**Staff Side Colleagues**	☐
	Service Users	☐	**Staff Inclusion Network/s**	☐
	Personal Fair Diverse Champions	☐	**Other (Inc. external orgs)**	☐
	Please give details: Syringe pump task and finish group			

1) **What is the impact on the following equality groups?**		
Positive: ➢ **Advance Equality of opportunity** ➢ **Foster good relations between different groups** ➢ **Address explicit needs of Equality target groups**	**Negative:** ➢ **Unlawful discrimination, harassment and victimisation** ➢ **Failure to address explicit needs of Equality target groups**	**Neutral:** ➢ **It is quite acceptable for the assessment to come out as Neutral Impact.** ➢ **Be sure you can justify this decision with clear reasons and evidence if you are challenged**

Equality Groups	**Impact** (Positive / Negative / Neutral)	**Comments** ➢ **Provide brief description of the positive / negative impact identified benefits to the equality group.** ➢ **Is any impact identified intended or legal?**
Race (All ethnic groups)	**Select**	**Neutral**
Disability (Including physical and mental impairments)	**Select**	**Neutral**
Sex	**Select**	**Neutral**
Gender reassignment	**Select**	**Neutral**
Religion or Belief	**Select**	**Neutral**
Sexual orientation	**Select**	**Neutral**
Age	**Select**	**Neutral**
Marriage and Civil Partnership	**Select**	**Neutral**
Pregnancy and maternity	**Select**	**Neutral**
Other (e.g. caring, human rights)	**Select**	**Neutral**

2) In what ways does any impact identified contribute to or hinder promoting equality and diversity across the organisation?	**Impact neutral**

3) If your assessment identifies a negative impact on Equality Groups you must develop an action plan to avoid discrimination and ensure opportunities for promoting equality diversity and inclusion are maximised. ➢ **This should include where it has been identified that further work will be undertaken to further explore** ➢ **the impact on equality groups** ➢ **This should be reviewed annually.**		
Action Plan Summary		
Action	**Lead**	**Timescale**

This form will be automatically be inserted as an appendix in all Policies and Procedures which are presented for ratification at the Policy Council. Please do not hesitate to contact the qualityandsafetyunit@elht.nhs.uk if you have any queries.

Appendix 2 Useful Telephone Numbers

Hospital Specialist Palliative Care Team ***(Monday-Friday 08.30-16.30)***	**01254 732652/** **01254 732316**	**Ext 82652** **Ext 82316**
Community Specialist Palliative Care Team ***(Monday – Friday 08.30-16.30)***	**01254 736326**	**Ext 86326**
Pendleside Hospice	**01282 440100**	
East Lancashire Hospice	**01254 965830**	
Specialist Palliative Care Out of Hours 24 Hour Advice Line ***(based at East Lancashire Hospice)***	**07730 639399**	
Medical Equipment Library	**01254 733660**	**Ext 83660**
Medicines Information ***(Monday – Friday 08.30 17.00)***	**01282 803004**	**Ext 13004**
Pharmacy Aseptic Unit ***(Monday – Friday 08.00 16.30*** ***Saturday-Sunday 09.00-13.00))***	**01254 734680**	**Ext 84680**
Pharmacy Dispensary RBH ***(Monday – Friday 08.30 17.00*** ***Saturday-Sunday 09.00-16.00)***	**01254 732252**	**Ext 82252**
Pharmacy Dispensary BGH ***(Monday – Friday 09.00 17.00)***	**01282 804338**	**Ext 14338**
North West Medicines Information Centre ***(wmedinfo@nhs.net)***	**0151 794 8113**	