

# **Policy for the use of subcutaneous infusions in adults and children with Palliative Care needs**

## **To be read with:**

Medicines Policy

Policy for the Administration of Intravenous Drugs and Management of Intravenous Devices in the Community

Medical Devices Policy

Resuscitation Policy

Anaphylaxis in Community and Primary Care

Infection Control Policy

Hand Hygiene Policy

Controlled Drugs in Primary care: The Law, Probity and Good Practice. Policy for tPCT salaried GP services and a guide for independent contractors.

Consent to examination and Treatment Policy

Protection of Vulnerable Adults Policy

Scope of Professional Practice

## Document Reference Information

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2.0	Added 3 more policies under 'To be read with' pg 1  Added guidelines on removal of the syringe driver on patient's death pg 14	Changes requested by PEC chair	Hedy Lehman	12/06/2009

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## **1. Introduction**

- 1.1 This policy has been developed to provide assurance to the Trust Board and Trust management that processes used within the organisation are robust, reflect best practice, and comply with NHS requirements and legislation.
- 1.2 The syringe driver is a portable battery operated medical device designed to deliver drugs over 24 hours via a subcutaneous cannula. Subcutaneous infusion of drugs by a syringe driver can provide good control of symptoms and is the route of choice for palliative care patients when oral medication is not possible or appropriate.
- 1.3 This is a practical document and includes the guidelines and proforma of the West London Supportive and Palliative Care Network approved for use across the network area which was prepared by the West London Supportive and Palliative Care Network (WLSPCN) syringe driver working group.

## **2. Purpose**

### **2.1 Rationale for development:**

- To provide evidence-based best practice guidance
- To reduce clinical risk
- To ensure consistency of practice

### **2.2 Objective:**

To ensure safe practice in the delivery of subcutaneous medication via a syringe driver to patients with palliative care needs

## **3. Duties and Responsibilities**

- 3.1 This document is applicable to all community adult & paediatric nursing staff, doctors and pharmacists.
- 3.2 All healthcare professionals involved in caring for patients with palliative care needs need to be familiar with this policy. All those involved in the use of syringe drivers must comply with this policy document and attend an annual training update.
- 3.3 In the district nursing service the competencies of staff and delegation of administration of medication via a syringe driver lies with the Team Leader. Clinical Leads are responsible for planning the training to meet the needs of their staff and are responsible for arranging servicing of the syringe drivers in line with the Medical Devices Policy
- 3.4 It is expected that all NHS Brent Health Care professionals will use the MS 26 (green) syringe driver only. If a patient is transferred home a MS16 (blue) syringe driver it should be discontinued at the earliest opportunity and treatment continued using the MS26 (green) syringe driver.

3.5 The Specialist Palliative Care Centres are responsible for delivering training, commissioned through Strategic Local Agreements (SLA, 2009).

#### 4. Syringe driver core policy and rationale with supporting references

##### 4.1 Policy

Policy	Rationale
Core policy requirements	<p>To reduce clinical risk            To ensure consistency of practice            To provide evidence-based best practice guidance</p>
Aims and Objectives	<p>To ensure consistency of practice across the West London Supportive and Palliative Care Network            To ensure safe practice in the delivery of subcutaneous medication via a syringe driver to patients with palliative care needs</p>
Using the subcutaneous route for administration of medication	<p>Many drugs are well absorbed subcutaneously and this route removes the need for intravenous cannulation (1)</p> <p>Subcutaneous (SC) infusion of drugs using a portable syringe driver can provide good control of symptoms and is the route of choice for palliative care patients with:</p> <p>Nausea / vomiting, dysphagia, malabsorption, gastro-intestinal obstruction, intolerance of oral medication, reduced level of consciousness / severe weakness, poor compliance with oral medication (2)</p>
Advantages of using syringe drivers for continuous subcutaneous infusion	<p>Continuous infusion allows blood plasma levels of the drug to be constant therefore improves control of symptoms (2)</p> <p>Removes need for intravenous cannulation (1)</p> <p>Reduces need for repeated injections (2)</p> <p>Patient comfort (2)</p> <p>Allows patient to remain independent and mobile (2)</p> <p>The syringe needs to be reloaded only once in every 24 hours (2)</p> <p>Combinations of drugs can be used to control multiple symptoms (2)</p>

## 4.2 Equipment for setting up a syringe driver

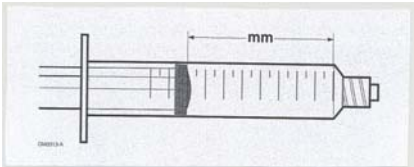
Equipment	Rationale
<p><b>MS26 (green) syringe driver set at 48mm per 24hours</b> or <b>MS16A (blue) syringe driver set at 02mm per hour</b></p> <p>Within 1 year of annual service date</p>	<p>To ensure consistency across the West London Supportive and Palliative Care Network and reduce risk of administration errors</p> <p>To ensure performance standard (3)</p>
Duracell MN 1604 9 volt alkaline battery	Recommended by Graseby the manufacturer of the syringe driver (3)
<p><b>For Community Services:</b> FP10 prescription for medication, community nursing drug authorisation and administration record signed by an authorised prescriber, a syringe driver monitoring record and controlled drug record where appropriate</p> <p><b>For Bedded Services (inpatients in hospitals or hospices and residents in nursing homes):</b> medication, inpatient prescription chart signed by an authorised prescriber and syringe driver monitoring record</p> <p><b>Willesden Community Bedded Wards</b> will follow the North West London Trust Policy.</p>	<p>Legal requirement (4,5)</p> <p>Record keeping (6)</p>
<ul style="list-style-type: none"> <li>• Graseby Flo-safer winged infusion set with butterfly needle (NHS logistics catalogue code FSB034)</li> </ul> <p>or</p> <ul style="list-style-type: none"> <li>• Saf-T-intima (FSP324) or Abbocath paediatric cannula 26fg (FSP199)</li> </ul> <p>and</p> <p>100cm infusion line with maximum width of 1mm (FSB868)</p>	<p>Recommended by Graseby (3)</p> <p>Use of non-metal cannula is preferable to reduce the risk of needle stick injury (7,8) and site reactions (8, 9,10,11,).</p> <p>Recommended by Graseby (3)</p> <p>To minimise volume in line (3,12)</p>
Plastic cover for syringe driver placed in correct position	To prevent accidental infusion rate change and to prevent damage to syringe driver (3)
Tegaderm (Transparent, semi-occlusive dressing)	To keep needle / cannula in place and to observe site (3)
<p>20ml / 30ml Luer lock syringe</p> <p>10ml Luer lock syringe in exceptional circumstances eg paediatric or very cachectic patients</p>	<p>To prevent disconnection of infusion line from syringe (3,13)</p> <p>To enable as large a volume as possible to reduce risk of drug incompatibility, impact of priming the line and site skin reactions (14)</p>



#### 4.2 Equipment for setting up a syringe driver (continued)

Equipment	Rationale
Blue/Green needles	To draw up drugs
<b>Diluent</b> Sodium Chloride 0.9% for all drugs <b>except</b> Cyclizine or Diamorphine at concentrations of more than 40mg in 1ml where Water for Injection should be used	To improve patient comfort and reduce site reactions (14,15)
Drug additive label in use locally	To identify drug combination, doses, diluent, date and time of commencement of infusion and nurse signature
Red rate adjusting key	To ensure accurate rate setting Recommended by Graseby (3)
Ruler	To measure length of volume in the barrel of the syringe in millimetres (mm)

### 4.3 Setting Up and Administration

Setting up and Administration	Rationale
Go to the patient, explain the procedure and confirm consent	Preparation of the patient
Measure the barrel of the syringe along scale <ul style="list-style-type: none"> <li>• To 48mm for the MS26 (green)</li> <li>• To 48mm for the MS16A (blue)</li> </ul>	To assess volume in millilitres (ml) required  To ensure consistency of practice  To ensure 24 hour delivery period at set rate of 02mm per hour
Draw up drugs and appropriate diluent to required volume If there are volume issues, then the use of 2 syringe drivers should be considered Contact the Palliative Care team for advice on alternative medicine choice	To ensure correct infusion dose To ensure accuracy of measurement  To reduce volume if possible
Recheck against scale/ruler to ensure length is correct. Measure the distance in mm from the empty (0) line on the syringe's scale up to the line where the plunger piston is <div style="text-align: center;">  </div>	Accurate dose over prescribed time
Prime the line when an infusion is first started or if there is a dose or drug change (the infusion will run through 1-2 hours earlier)	Accurate dose over prescribed time (14, 16)
Complete drug additive label, sign and position on the syringe without obscuring syringe calibration marks	To allow easy identification of medication in the syringe
Ensure battery is in place, light is flashing and battery cover is on	To ensure safe delivery of infusion
Select an appropriate site for cannula / needle insertion. Avoid areas of tissue damage, oedema, bruising, bony prominences, radiotherapy sites or lymphoedema	To maximise absorption of medicine by patient To allow patient preference To reduce risk of infection
Pinch skin firmly at cannula / needle insertion site	To elevate the subcutaneous tissue when inserting the cannula / needle

### 4.3 Setting up and administration (continued)

Setting up and Administration	Rationale
<p>Ensure the bevel (the slanted opening at the end of the needle) is up when inserting into skin for Graseby infusion and butterfly sets</p> <p>Insert the infusion needle / cannula into the skin at a low angle (45°)</p> <p>Release the grasped skin and lay the needle flat against the skin</p>	<p>To ease insertion and decrease drag on skin</p> <p>For true subcutaneous administration Less than 45° angle may shorten the life of the infusion set (17)</p> <p>Manufacturer's recommendation (3,7)</p>
<p>Loop the tubing near the site of entry into the skin but avoid the area covering the cannula / needle</p>	<p>To prevent the cannula / needle being pulled out or displaced</p> <p>To avoid traction and cannula / needle and line occlusion (2,3,13)</p>
<p>Fix the infusion set firmly to the skin using transparent semi-occlusive dressing (Tegaderm)</p>	<p>To allow observation of the infusion site and maintain the correct position of the cannula / needle (2,3,13)</p>
<p>Connect the syringe to the syringe driver</p>	<p>To commence infusion</p>
<p>Ensure plastic cover is correctly fitted over the syringe driver by lining up the START button with the hole in the front of the cover</p>	<p>To ensure safe delivery of infusion</p> <p>To ensure protection of syringe driver</p>
<p>Dispose of all waste according to local Medicines policy and Clinical Waste Policy</p>	<p>To ensure safe disposal of all waste</p> <p>In the community patients and relatives should be advised to return any unwanted controlled drugs to their local Pharmacy for destruction and the syringe driver to the named organisation recorded on the equipment</p> <p>Dispose of batteries safely</p>

**If a patient requires extra symptom control medication, the boost facility on the MS26 (green) daily rate syringe driver MUST NOT be used as**

- Each boost advances the syringe only 0.23mm
- Multiple boosts would be required for an appropriate breakthrough dose
- If there are other drugs present in the syringe they will also be given with each boost

The appropriate dose of required breakthrough medication should be calculated and given as a subcutaneous as required injection. This allows for more accurate dosing (2, 14).

#### 4.4 Monitoring

Monitoring	Rationale
Check all syringe drivers and infusion insertion sites <b>For bedded services:</b> every 4 hours (2,18) <b>For community services:</b> on each visit to the patient's home by the community nurse (17,18)	To ensure the syringe driver is working and accurately delivering medication To detect any potential problems with the infusion To detect any insertion site skin reactions
Check that the light is flashing on the syringe driver	This indicates that the syringe driver is working (3)
Check connection of syringe to infusion line	To ensure accurate delivery of medication (3)
Check that the syringe driver is running to time	To ensure accurate delivery of medication and as an aid to assessment of faulty equipment (3)
Check that there are no signs of drug incompatibility in the syringe or line e.g. cloudiness, precipitation, crystal formation	To ensure compatibility of medicines To ensure delivery of medication (3)
Check for kinking of infusion line and cannula	To ensure accurate delivery of medication (3)
Check the infusion site for signs of inflammation, discomfort, oedema, leaking or tenderness	To ensure accurate delivery of medication To determine when cannula site change is required (3,17)
Discuss with patient; comfort of syringe driver, line and cannula / needle	To minimise patient discomfort
Complete the monitoring record	To ensure record of infusion is maintained (6,18)
Ensure contact number is available to patient, relatives or carers	To allow contact in case of a problem

#### 4.5 Stopping the syringe driver

Stopping the syringe driver	Rationale
When the syringe is empty the syringe driver will stop automatically and the alarm will sound for 15 seconds	To alert that the syringe is empty (3)
To stop the syringe driver, take out the battery	There is no off switch (3)
Once the syringe driver is stopped, remove cannula / needle from patient	Removes risk of medication reaching the patient (3)
Keep cannula / needle, line and syringe intact	Minimises risk to staff
Remove syringe from syringe driver and dispose of cannula / needle, line and syringe according to local policy	Safe practice
Following the death of the patient stop the syringe driver by taking out the battery. Leave the cannula and line in situ until the Dr has been to certify the patient's death.	This is especially important if the death was unexpected, in case the death needs to be investigated further.

#### 5. Prescribing and administration of Off-label and Unlicensed medicines via syringe driver

- 5.1 The administration of many of the injections for symptom control in patients with palliative care needs by continuous subcutaneous infusion is an off-label/off-licence route of administration, falling outside of the manufacturer's product licence.
- 5.2 Mixing two licensed medicines, where one is not a vehicle for the administration of the other, falls within the definition of manufacture and results in a new, unlicensed product being administered (4).
- 5.3 The Medicines and Healthcare Products Regulatory Agency (MHRA) states that under medicines legislation, independent nurse and pharmacist prescribers, are allowed to prescribe any licensed medicine for any medical condition but are not authorised to prescribe unlicensed medicines.
- 5.4 The MHRA has however issued new guidance on non-medical prescribing and mixing medicines in palliative care. The guidance clarifies the law in relation to non-medical prescribers prescribing two or more medicines for administration via a syringe driver. The guidance advises that the palliative care practice of administering a mixture of licensed medication using a syringe driver, with the mixing and administration being undertaken by the prescriber or by another person - usually a nurse, working under the direction of the of the prescriber, is safe and effective.

- 5.5 The MHRA advise they will not take enforcement action for breaches of medicines legislation by a nurse independent prescriber who prescribes and administers (and provides directions to others to administer) a mixture of licensed medication via a single injection or a syringe driver unless it would be in the public interest to do so (19).

## **6. Infection control issues**

- 6.1 Observations of standard infection control precautions and product sterility are required in infusion procedures (Infection Control Policy).
- 6.2 Hand washing should be performed both before and immediately after clinical procedures and before putting on and after removing gloves (Hand Hygiene Policy).
- 6.3 Gloves must be used and non-touch technique maintained when performing infusion procedures.
- 6.4 Disposable plastic aprons should be worn during the performance of infusion procedures.

## **7. Training**

- 7.1 Training programmes and practical sessions will be available throughout the year commissioned via the SLA and the Training and Developing Department.
- 7.2 All staff involved in the use of syringe drivers must attend an annual update.

## **8. Competency**

- 8.1 All staff involved in the use of syringe drivers must undertake training and practice in accordance with the Nursing and Midwifery Council Code of Conduct (2008) and all Brent policies.
- 8.2 All staff must show evidence of competency by completing the Graseby competency document (Appendix J).

## **9. Servicing**

- 9.1 All syringe drivers must be serviced annually. If a problem is identified, the syringe driver must also be sent for servicing.
- 9.2 The responsibility for arranging the servicing lies with the line managers.

## **10. Access to syringe drivers**

10.1 A central database of all medical devices is held by Brent PCT. This includes all the syringe drivers within the PCT.  
For information on location of syringe drivers, see appendix H

## 11. National Patient Safety Agency (NPSA)

11.1 The NPSA has produced various alerts regarding injections:

Safer Practice Notice: Ensuring safer practice with high dose ampoules of Morphine and Diamorphine (May 2006)

Rapid Response Report: Reducing dosage errors with opioid medicines (July 2008)

Patient Safety Alert: Promoting safer use of injectable medicines (Mar 2007)

For a template standard operating procedure for prescribing, preparing and administering injectable medicines in clinical areas see Appendix I.

11.2 The NPSA recommends that a risk assessment of injectable medicines products and procedures is carried out at least once a year. The NPSA has developed a risk assessment tool for this process (Appendix J).

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## **MS26 (green) daily rate syringe driver**

### **Guidance charts**

- A.1 Equipment required to set up a Graseby MS26 daily rate syringe driver**
- A.2 Setting up and administration**
  - A.2.1 Setting up
  - A.2.2 Fitting the syringe to the driver
  - A.2.3 Fitting the cover
  - A.2.4 Administration
- A.3 Monitoring**
- A.4 Trouble shooting**

# MS26

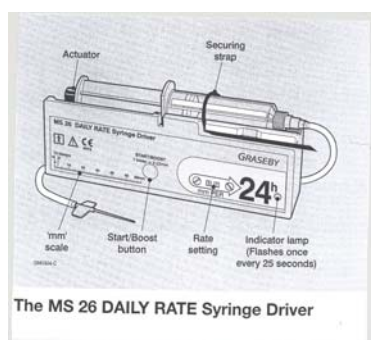
# GREEN

# MS26

## Guidance Chart A.1

### Equipment required to set up a Graseby MS26 (green) daily rate Syringe Driver

- MS26 (Green) daily rate syringe driver set at 48mm per 24 hours
- Duracell MN1604 9 volt alkaline battery  
*(Community staff, please ensure there is a spare battery available)*
- **For Community Services:** FP10 Prescription for medication, community nursing drug authorisation and administration record signed by an authorised prescriber, syringe driver monitoring record and controlled drug record where appropriate
- **For Bedded Services (inpatients in hospital or hospice and residents in nursing homes):** medication, inpatient prescription chart signed by an authorised prescriber and syringe driver monitoring record
- Butterfly needle / cannula and infusion line maximum 100cm length.  
eg. Graseby Flo-safer winged infusion set with butterfly (NHS logistics catalogue code FSB034)  
**OR**  
Saf-T-intima (FSP324) or Abbot cath paediatric cannula 26fg (FSP199) and 100cm infusion line with maximum width 1mm (FSB868)
- Plastic cover for syringe driver and optional carrying holster (cleaned between patients to infection control standards)
- Transparent, semi-occlusive dressing eg Tegaderm
- 20ml / 30ml Luer lock syringe
- Blue / Green needles and diluent
- Drug additive label in use locally
- Ruler
- Red rate adjusting key

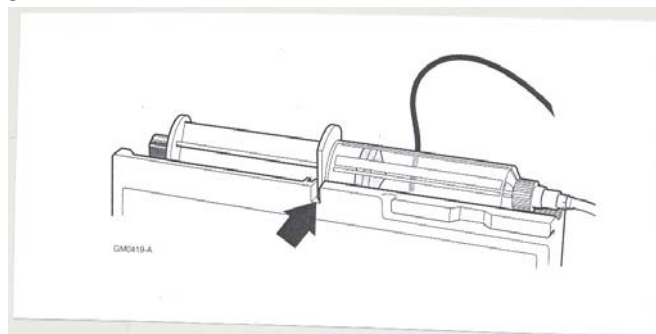


**Guidance Chart A.2 Setting Up and Administration****A.2.1 Setting Up**

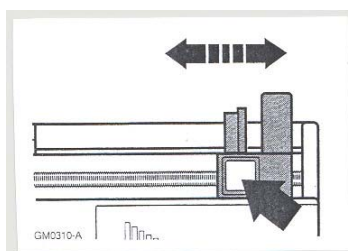
- Check rate is set at 48mm per 24 hours  
Rate over 24 hours = length in millimetres (mm) of liquid
  - Dummy run using empty syringe: pull back the plunger in the empty syringe to 48mm and measure the volume in millilitres (ml) required
  - Draw up the drugs to the volume required using appropriate diluent  
Observe for any reactions such as cloudiness, precipitation, crystal formation  
(If there are volume issues, then the use of 2 syringe drivers should be considered. Contact the Palliative Care team for advice on alternative medicine choice)
  - Ensure air is expelled from syringe
  - Ensure connection between syringe and infusion line is secure
  - Check that the length of the volume in the barrel of the syringe is 48mm, then prime the line
  - Complete drug additive label
  - Attach drug additive label to syringe without covering the graduation marks on the syringe
  - Put battery into battery compartment of syringe driver
  - Press and hold down the START button  
The motor will turn and you will hear a whirring noise which will stop after 10 seconds
  - The alarm will sound  
This will continue for about 15 seconds longer if the START button is not released
  - Releasing the button starts the syringe driver  
Watch for light to flash to ensure it is working. The indicator light will flash once every 25 seconds
  - If there is no alarm or flashing light, change battery and recheck syringe driver
- NB The battery lasts approximately 50 syringes or 1 month of continuous use

**Guidance chart A.2 Setting up and administration (continued)****A.2.2 Fitting the Syringe to the Driver**

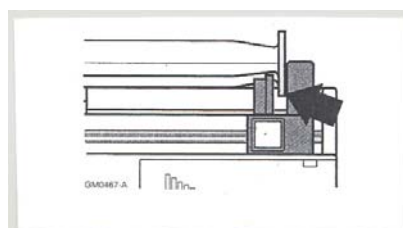
- Put the syringe on top of the syringe driver with its barrel in the shallow V-shaped recess. The finger grip on the syringe barrel must be be in the slot in the case



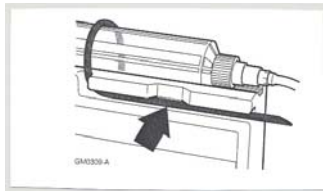
- Move the actuator up to the syringe plunger, by pressing and holding in the white square button on the side and sliding it along



- The end of the plunger of the syringe must be fitted in the slot in the actuator.  
Be careful not to push the plunger forwards



- Put the rubber securing strap over the syringe barrel and pull it tight. Hook and then press it into the groove in the side of the case



**MS26**

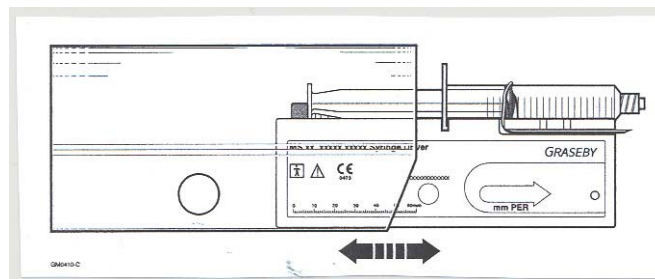
**GREEN**

**MS26**

**Guidance Chart A.2 Setting Up and Administration (continued)**

**A.2.3 Fitting the Cover**

- Slide the syringe driver into one of the open ends of the cover with the front facing the side of the cover with the hole in it. **Never** put the syringe driver in facing the other way



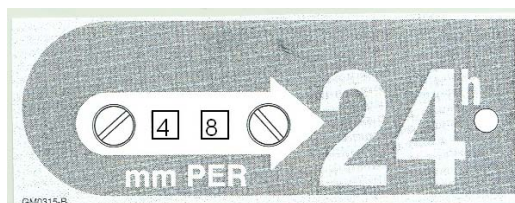
- Push the syringe driver in until the START button lines up with the hole. The peg on the inside back of the cover goes into the hole in the middle of the back of the syringe driver. It is now held in the cover

# MS26 GREEN MS26

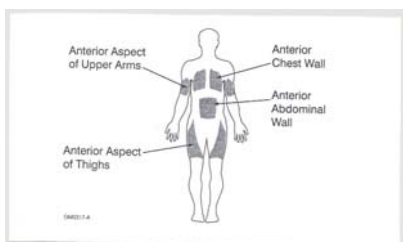
## Guidance Chart A.2 Setting Up and Administration (continued)

### A.2.4 Administration

- Go to the patient and use this opportunity to confirm consent and give any explanations requested
- Ensure rate set as per policy (48mm per 24hours)



- Choose the most appropriate insertion site for the subcutaneous cannula, determining which sites are available and acceptable to the patient: eg upper arm or thigh (preferable in children), abdomen, anterior chest below clavicle. Avoid any areas of tissue damage, oedema, bruising, bony prominences, radiotherapy sites or lymphoedema



- Insert the cannula through the skin, bevel up, into the subcutaneous tissue as per the manufacturer's instructions (For Graseby infusion set, butterfly needle, Abbocath paediatric cannula or Saf-t-intima at a 45° angle)
- Loop the tubing near the site of entry into the skin but avoid the area covering the cannula
- Cover the site with a transparent, semi-occlusive dressing eg Tegaderm
- The inpatient prescription chart (for bedded services) or the community nursing drug authorisation and administration record (for community staff) must be completed and signed by the nurse once the syringe driver has been checked and is running at the appropriate rate. The controlled drug record must be completed where appropriate.
- Ensure syringe is protected from light and placed under a pillow or clothes or in the specially designed holster (cleaned between patients to infection control standards)

**Guidance Chart A.3      Monitoring**

- Check syringe driver and infusion site

**For bedded services:**      every 4 hours

**For community services:** on each visit to the patient's home by the community nurse

- Check rate set is correct value 48mm per 24 hours
- Check that the light on the syringe driver is flashing
- Check that the syringe driver is running to time

**To calculate the hourly reduction rate:**

**Length in millimetres (mm) of solution x number of hours since set up**  
Number of hours to be given over

eg  $48\text{mm} \div 24 \times 4 = 8\text{mm}$

So for every 4 hours, it should move by approximately 8mm

- Check that there are no signs of drug incompatibility in the syringe or infusion line  
ie cloudiness, precipitation, crystal formation
- Check connection between syringe and infusion line is secure
- Check for kinking of infusion line or cannula
- Check the infusion insertion site  
If there are signs of inflammation, discomfort, oedema, leaking or tenderness; STOP infusion, remove cannula, change the insertion site and set up a new infusion
- Ensure the syringe driver monitoring record is completed

**Guidance Chart A.4 Troubleshooting**

If the Syringe Driver does not perform as expected, is dropped, gets wet or is damaged in any way, then remove it from use immediately and send for service.

<b>Problem</b>	<b>Possible Causes</b>	<b>Action</b>
The syringe driver will not start	<p>The START button has not been pressed in enough</p> <p>There is no battery</p> <p>The battery is in the wrong way round</p> <p>The battery is flat</p> <p>The syringe driver is faulty</p>	<p>Press again</p> <p>Fit battery</p> <p>Refit battery</p> <p>Fit a new battery</p> <p>Service needed</p>
The infusion is going too quickly or has ended early	<p>Rate set incorrectly</p> <p>Syringe not fitted correctly to syringe driver</p> <p>Length of liquid in syringe measured incorrectly</p> <p>Boost button has been used</p>	<p>Check rate setting and complete incident report</p> <p>Correct error</p> <p>Stop, discard and start again</p> <p><b>Do NOT use Boost Button</b> Give as required medication at correct dosage</p>
The infusion is going too slowly or has not ended when anticipated	<p>Rate set incorrectly</p> <p>Plunger position measured wrongly</p> <p>Problem with infusion insertion site</p> <p>Drug combination incompatible</p>	<p>Check rate setting and complete incident report</p> <p>Stop, discard and start again</p> <p>Resite infusion line, consider non-metal cannula, check compatibility and change drug combination</p> <p>Check compatibility and change combination</p>

## Guidance Chart A.4 Trouble Shooting (continued)

Fault	Possible Causes	Action
The syringe driver has stopped before emptying the syringe	Flat battery Trapped or kinked infusion line Blockage in the line	Fit new battery Release line Change the line, check compatibility and change drug combination
The syringe driver has stopped with the light still flashing	The mechanism for pushing the plunger has worn out. Syringe empty	Remove syringe driver from service and send for repair Check if infusion has finished
The indicator light is no longer flashing but the motor runs	Flat battery	Battery needs replacing
The syringe driver is alarming (This occurs normally when START button is held down for 10 seconds)	End of infusion Blocked line Solution too viscous due to drug incompatibility When the battery is first inserted	Renew infusion Change line and check compatibility of drug combination Check compatibility and change drug combination To show it is working
Site reaction	Duration of cannula Concentrated solution Metal cannula Choice of diluent (hypotonicity with water for injection) Drug combination	Change site and cannula Increase the volume Use a non-metal cannula Change to sodium chloride 0.9% if appropriate or compatible Change drug combination

For further information, contact the Specialist Palliative Care team

## **MS16A (blue) hourly rate syringe driver**

### **Guidance charts**

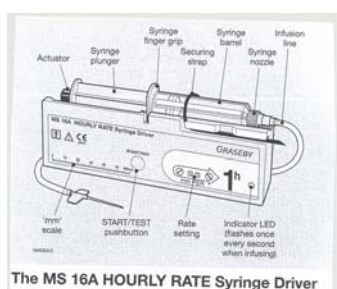
- B.1 Equipment required to set up a Graseby MS16A hourly rate Syringe driver**
- B.2 Setting up and administration**
  - B.2.1 Setting up
  - B.2.2 Fitting the syringe to the driver
  - B.2.3 Fitting the cover
  - B.2.4 Administration
- B.3 Monitoring**
- B.4 Trouble shooting**

# MS16A BLUE MS16A

## Guidance Chart B.1

### Equipment required to set up a Graseby MS16A hourly rate Syringe Driver

- MS16A (blue) hourly rate syringe driver set at 02 mm per hour
- Duracell MN1604 9 volt alkaline battery  
*(Community staff, please ensure there is a spare battery available)*
- **For Community Services:** FP10 Prescription for medication, community nursing drug authorisation and administration record signed by an authorised prescriber, syringe driver monitoring record and controlled drug record where appropriate
- **For Bedded Services (inpatients in hospital or hospice and residents in nursing homes):** medication, inpatient prescription chart signed by an authorised prescriber and syringe driver monitoring record
- Butterfly needle / Cannula and infusion line maximum 100cm length.  
eg. Graseby Flo-safer winged infusion set with butterfly needle (NHS logistics catalogue code FSB034)  
**OR**  
Saf-T-intima (FSP324) or Abbocath paediatric cannula 26fg (FSP199) and 100cm infusion line with maximum width 1mm (FSB868)
- Plastic cover for syringe driver and optional carrying holster (cleaned between patients to infection control standards)
- Transparent, semi-occlusive dressing eg Tegaderm
- 20ml / 30ml Luer lock syringe
- Blue / Green needles and diluent
- Drug additive label in use locally
- Ruler
- Red rate adjusting key



# MS16A BLUE MS16A

## Guidance Chart B2 Setting Up and Administration

### B.2.1 Setting Up

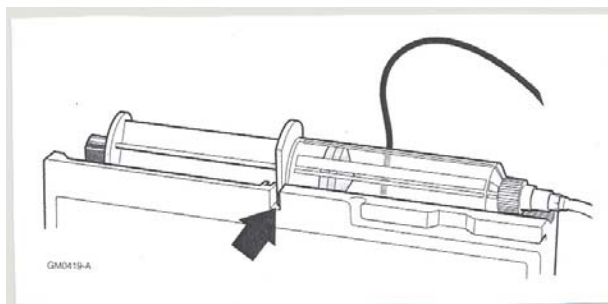
- Check rate is set at 02mm per hour  
Rate =  $\frac{\text{length in mm of liquid}}{\text{delivery time in hours}} = \frac{48}{24} = 02\text{mm per hour}$
- Dummy run using empty syringe: pull back the plunger in the empty syringe to 48mm and measure the volume in millilitres (ml) required
- Draw up the drugs to the volume required using appropriate diluent  
Observe for any reactions such as cloudiness, precipitation or crystallisation
- Ensure air is expelled from syringe
- Ensure connection between syringe and infusion line is secure
- Check that the length of volume in the barrel of the syringe is 48mm, then prime the line
- Complete drug additive label
- Attach drug additive label to syringe without covering the graduation marks on the syringe
- Put battery into battery compartment of the syringe driver
- Press and hold down the START button  
The motor will turn and you will hear a whirring noise which will stop after 5 seconds
- The alarm will sound  
This will continue for about 15 seconds longer if the START button is not released
- Releasing the START button starts the Syringe Driver  
The indicator light will flash once a second
- If there is no alarm or flashing light, change battery and recheck syringe driver  
NB The battery lasts approximately 50 syringes or 1 month of continuous use

# MS16A BLUE MS16A

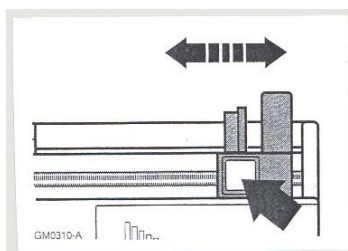
## Guidance Chart B.2 Setting Up and Administration (continued)

### B2.2 Fitting the Syringe to the Driver

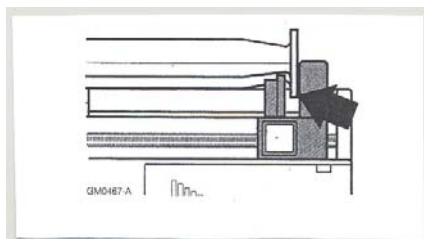
- Put the syringe on top of the syringe driver with its barrel in the shallow V-shaped recess. The finger grip on the syringe barrel must be be in the slot in the case



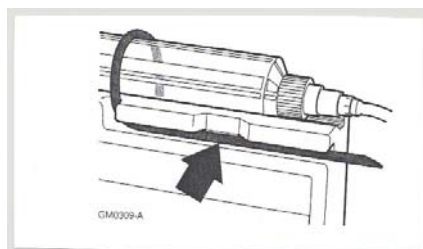
- Move the actuator up to the syringe plunger, by pressing and holding in the white square button on the side and sliding it along



- The end of the plunger of the syringe must be fitted in the slot in the actuator. Be careful not to push the plunger forwards



- Put the rubber securing strap over the syringe barrel and pull it tight. Hook and then press it into the groove in the side of the case

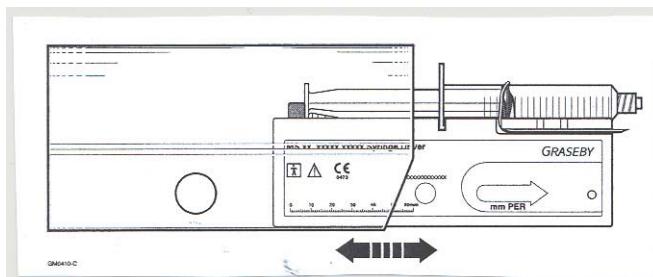


# MS16A BLUE MS16A

## Guidance Chart B.2 Setting up and Administration

### B.2.3 Fitting the Cover

- Slide the syringe driver into one of the open ends of the cover with the front facing the side of the cover with the hole in it. **Never** put the syringe driver in facing the other way



- Push the syringe driver in until the START button lines up with the hole. The peg on the inside back of the cover goes into the hole in the middle of the back of the syringe driver. It is now held in the cover

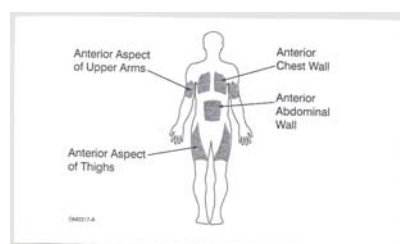
**Guidance Chart B.2 Setting Up and Administration (continued)****B.2.4 Administration**

- Go to the patient and use this opportunity to confirm consent and give any explanations requested
- Ensure rate set as per policy (02mm per hour)



- Choose the most appropriate insertion site for the subcutaneous cannula, determining which sites are available and acceptable to the patient eg upper arm or thigh (preferable in children), abdomen or anterior chest below clavicle.

Avoid any areas of tissue damage, oedema, bruising, bony prominences, radiotherapy or lymphoedema



- Insert the cannula through the skin, bevel up, into the subcutaneous tissue as per the manufacturers instructions (For Graseby infusion set, butterfly needle, Abbot cath paediatric cannula or Saf-T-intima at a 45° angle)
- Loop the tubing near the site of entry into the skin but avoid the area covering the cannula
- Cover the site with a transparent semi-occlusive dressing eg Tegaderm
- The inpatient prescription chart (for bedded services) or the community nursing drug authorisation and administration record (for community services) must be completed and signed by the nurse once the syringe driver has been set up and is running at the appropriate rate. The controlled drug record must also be completed where appropriate.
- Ensure syringe is protected from light and placed under a pillow or clothes or in the specially designed holster (cleaned between patients to infection control standards)

# MS16A BLUE MS16A

## Guidance Chart B.3 Monitoring

- Check syringe driver and infusion insertion site

**For bedded services:** every 4 hours

**For community services:** on each visit to the patient's home by the community nurse

- Check rate set is correct value 02mm per hour
- Check that the light on the syringe driver is flashing
- Check that the syringe driver is running to time

**To calculate the hourly reduction rate:**

$$\frac{\text{length in millimetres (mm) of the solution}}{\text{number of hours to be given over}} \times \text{number of hours since set up}$$

eg  $48\text{mm} \div 24 \times 4 = 8\text{mm}$

so for every 4 hours, it should move by approximately 8mm

- Check that there are no signs of drug incompatibility in the syringe or infusion line ie. cloudiness, precipitation, crystal formation
- Check connection between syringe and infusion line is secure
- Check for kinking of infusion line and cannula
- Check the infusion insertion site  
If there are signs of inflammation, discomfort, oedema, leaking or tenderness; STOP infusion, remove cannula, change the infusion site and set up new infusion
- Ensure the syringe driver monitoring record is completed

# MS16A

# BLUE

# MS16A

## Guidance Chart B.4 Trouble Shooting

If the syringe driver does not perform as expected, is dropped, gets wet or is damaged in any way, then remove it from use immediately and send for service.

Problem	Possible Causes	Action
The syringe driver will not start	The START button has not been pressed in enough There is no battery The battery is in the wrong way round The battery is flat The syringe driver is faulty	Press again Fit battery Refit battery Fit a new battery Service needed
The infusion is going too quickly or has ended early	Rate set incorrectly Syringe not fitted correctly to syringe driver Length of liquid in syringe measured incorrectly	Check rate setting and complete incident report Correct error Stop, discard and start again
The infusion is going too slowly or has not ended when anticipated	Rate set incorrectly Plunger position measured wrongly Problem with infusion insertion site Drug combination incompatible	Check rate setting and complete incident report Stop, discard and start again Resite infusion line, consider non-metal cannula, check compatibility and change drug combination Check compatibility and change combination
The syringe driver has stopped before emptying the syringe	Flat battery Trapped or kinked infusion line	Fit new battery Release line

	Blockage in the line	Change the line, check compatibility and change drug combination
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**MS16A**

**BLUE**

**MS16A**

**Guidance Chart B.4 Trouble Shooting (continued)**

<b>Problem</b>	<b>Possible Causes</b>	<b>Action</b>
The syringe driver has stopped with the light still flashing	The mechanism for pushing the plunger has worn out.  Syringe empty	Remove syringe driver from service and send for repair  Check if infusion has finished
The indicator light is no longer flashing but the motor runs	Flat battery	Battery needs replacing
The syringe driver is alarming (This occurs normally when START button is held down for 5 seconds)	End of infusion  Blocked line  Solution too viscous due to drug incompatibility  When the battery is first inserted	Renew infusion  Change line and check compatibility of drug combination  Check compatibility and change drug combination  To show it is working
Site reaction	Duration of cannula  Concentrated solution  Metal cannula  Choice of diluent (hypotonicity with Water for Injections)  Drug combination	Change site and cannula  Increase the volume in the syringe by adding more diluent when reloading syringe  Using a non-metal cannula  Change to Sodium Chloride 0.9% if appropriate or compatible  Change drug combination

**For further information, contact the Specialist Palliative Care team**

## Appendix C

### DRUGS USED FOR CONTINUOUS SUBCUTANEOUS INFUSION BY SYRINGE DRIVER (Adult Doses)

Drug	Action	Use	24 hour dose	Incompatibility	Diluent
<b>Alfentanil *</b>	Analgesic	Pain relief in renal impairment	500mcg – no ceiling dose	Incompatible with Cyclizine, Dexamethasone, Phenobarbital	Sodium Chloride 0.9%
<b>Cyclizine *</b>	Anti-emetic	Nausea and vomiting due to mechanical bowel obstruction, raised intracranial pressure or vestibular disorders	50 – 150mg	Incompatible with Alfentanil, Dexamethasone, Hyoscine butylbromide, Oxycodone, Sodium Chloride 0.9%, Phenobarbital May precipitate at concentrations >10mg/ml in the presence of Diamorphine	Water for Injection
<b>Dexamethasone *</b>	Anti-inflammatory Anti-emetic	Raised intracranial pressure, breathlessness Nausea and vomiting due to mechanical bowel obstruction, raised intracranial pressure or chemotherapy	8 – 24 mg	<b>Incompatible with all drugs Use separate syringe driver or give by subcutaneous injection</b>	Sodium Chloride 0.9%
<b>Diamorphine *</b>	Analgesic	Pain relief	5 – no ceiling dose	Incompatible with Cyclizine if Diamorphine concentration > 20mg/ml Incompatible with Sodium Chloride 0.9% at concentration > 40mg/ml Maximum concentration 250mg / ml Incompatible with Dexamethasone, Phenobarbital	Sodium Chloride 0/9%
<b>Furosemide *</b>	Diuretic	Congestive heart failure Ascites	20 – 160mg	<b>Incompatible with all drugs Use separate syringe driver</b>	Sodium Chloride 0.9%
<b>Glycopyrronium *</b>	Anti-secretory	Reduces bronchial secretions and death rattle	600 – 1200 micrograms	Incompatible with Cyclizine, Dexamethasone, Phenobarbital	Sodium Chloride 0.9%
<b>Haloperidol *</b>	Anti-emetic	Nausea and vomiting due to opioids, hypercalcaemia or renal failure	5 – 10mg	May precipitate at concentrations >2mg/ml in the presence of Diamorphine Incompatible with Dexamethasone, Phenobarbital	Sodium Chloride 0/9%
<b>Hyoscine butylbromide *</b>	Anti-spasmodic Anti-secretory	Mechanical bowel obstruction	20 – 200mg	Incompatible with Cyclizine, Dexamethasone, Phenobarbital	Sodium Chloride 0/9%
<b>Ketamine *</b>	Analgesic	Neuropathic pain	100 – 500mg	Incompatible with Dexamethasone, Phenobarbital	Sodium Chloride 0.9%

\*Off-licence route of administration, but accepted practice in Palliative Care. Liability for problems arising from use lies with the prescriber

### DRUGS USED FOR CONTINUOUS SUBCUTANEOUS INFUSION BY SYRINGE DRIVER (Adult Doses) - continued

Drug	Action	Use	24 hour dose	Incompatibility	Diluent
<b>Ketorolac *</b>	Anti-inflammatory Analgesic	Pain relief	30 – 90mg	Incompatible with all drugs except Diamorphine	Sodium Chloride 0.9%
<b>Levomepromazine (Methotrimeprazine)</b>	Anti-emetic Sedative	Nausea and vomiting of unknown origin or treatment failure Terminal restlessness and agitation	6.25 – 50mg 50 – 200mg	Incompatible with Dexamethasone, Phenobarbital	Sodium Chloride 0.9%
<b>Methadone *</b>	Analgesic	Pain relief	5mg – no ceiling dose	Incompatible with Cyclizine, Dexamethasone, Phenobarbital	Sodium Chloride 0.9%
<b>Metoclopramide *</b>	Anti-emetic	Nausea and vomiting due to gastric stasis	30 – 100 mg	Incompatible with Cyclizine, Dexamethasone, Phenobarbital	Sodium Chloride 0.9%
<b>Midazolam *</b>	Anti-convulsant Anxiolytic Sedative Muscle relaxant	Prevents fits Reduces anxiety, agitation and stiffness	10 – 100mg	Incompatible with Dexamethasone, Phenobarbital	Sodium Chloride 0.9%
<b>Morphine</b>	Analgesic	Pain relief	5mg – no ceiling dose	Incompatible with Ketorolac, Dexamethasone, Phenobarbital Incompatible with high concentrations of Haloperidol and Midazolam	Sodium Chloride 0.9%
<b>Octreotide *</b>	Anti-secretory	Intractable nausea and vomiting due to complete bowel obstruction	300 – 600 micrograms	Incompatible with Cyclizine, Dexamethasone, Phenobarbital	Sodium Chloride 0.9%
<b>Ondansetron *</b>	Anti-emetic	Nausea and vomiting due to chemotherapy, radiotherapy, bowel distension and renal failure	8 – 24mg	Incompatible with Dexamethasone, Phenobarbital	Sodium Chloride 0.9%
<b>Oxycodone</b>	Analgesic	Pain relief	5mg – no ceiling dose	Incompatible with Cyclizine, Dexamethasone, Phenobarbital	Sodium Chloride 0.9%
<b>Phenobarbital *</b>	Anticonvulsant Sedative	Treats status epilepticus Prevents fits Refractory terminal restlessness	200mg – 600mg	Incompatible with all drugs Use separate syringe driver	Sodium Chloride 0.9%

\*Off-licence route of administration, but accepted practice in Palliative Care. Liability for problems arising from use lies with the prescriber

## Appendix D

### DRUGS USED FOR CONTINUOUS SUBCUTANEOUS INFUSION BY SYRINGE DRIVER (Paediatric Doses)

Drug	Action	Use	24 hour dose	incompatibility	Diluent
<b>Cyclizine (1,2)</b>	Anti-emetic	Nausea and vomiting due to mechanical bowel obstruction, raised intracranial pressure or vestibular disorders	1 month – 2 yrs: 3mg/kg 2 – 5 yrs: 50mg 6 – 12 yrs: 75mg 12 – 18 yrs: 150mg	Incompatible with Alfentanil, Dexamethasone, Hyoscine butylbromide, Oxycodone, Sodium chloride 0.9% May precipitate at concentrations >10mg/ml in the presence of Diamorphine	Water for Injection
<b>Dexamethasone (1)</b>	Anti-emetic Anti-inflammatory	Raised intracranial pressure, breathlessness, nausea and vomiting due to bowel obstruction, or chemotherapy	1 month – 2 yrs: 500mcg 2 – 12 yrs: 2mg	<b>Incompatible with all drugs</b> <b>Use separate syringe driver or give by subcutaneous injection</b>	Sodium Chloride 0.9%
<b>Diamorphine (1)</b>	Analgesic	Pain relief	1/3 of 24 hour oral morphine dose	Incompatible with Cyclizine if Diamorphine concentration > 20mg/ml Incompatible with Sodium Chloride 0.9% at concentration > 40mg/ml Maximum concentration 250mg/ml Incompatible with Dexamethasone, Pheno	Sodium Chloride 0.9%
<b>Furosemide (1)</b>	Diuretic	Congestive heart failure Ascites	1 month – 18 yrs: 0.1 – 2mg/kg/hour	<b>Incompatible with all drugs</b> <b>Use separate syringe driver</b>	Sodium Chloride 0.9%
<b>Glycopyrronium (1)</b>	Antisecretory	Reduces excessive respiratory secretions	25 micrograms/kg	Incompatible with Cyclizine, Dexamethasone	Sodium Chloride 0.9%
<b>Haloperidol (1,2)</b>	Anti-emetic	Nausea and vomiting due to opioids, hypercalcaemia or renal failure	1month – 12 yrs: 25 – 85 micrograms/kg 12 – 18 years: 1.5 – 5mg	May precipitate at concentrations > 2mg/ml in the presence of Diamorphine Incompatible with Dexamethasone	Sodium Chloride 0.9%
<b>Hyoscine butylbromide (1, 2)</b>	Anti-secretory Anti-spasmodic	Reduces excessive respiratory secretions Bowel colic	1 month – 2 yrs: 1.5mg/kg 2 – 5 yrs: 15mg 6 – 12 yrs: 30mg	Incompatible with Cyclizine, Dexamethasone	Sodium Chloride 0.9%
<b>Hyoscine hydrobromide (1)</b>	Anti-secretory	Reduces bronchial secretions and death rattle	40 – 60 micrograms/kg	Incompatible with Dexamethasone	Sodium Chloride 0.9%

1 Off-licence route of administration, but accepted practice in Palliative Care

2 Unlicensed in children

3 Unlicensed in children < 6 years

Liability for problems arising from use lies with the prescriber

### DRUGS USED FOR CONTINUOUS SUBCUTANEOUS INFUSION BY SYRINGE DRIVER (Paediatric Doses) – continued

Drug	Action	Use	24 hour dose	Incompatibility	Diluent
<b>Levomepromazine (Methotrimeprazine)</b>	Anti-emetic Sedative	Nausea and Vomiting of unknown origin or treatment failure  Terminal restlessness and agitation	1 month – 12 yrs: 100 – 400micrograms/kg 12 – 18 years: 5 – 25mg  1 – 12 yrs: 0.35-3mg/kg 12 – 18 yrs: 12.5–200mg	Incompatible with Dexamethasone	Sodium chloride 0.9%
<b>Metoclopramide</b>	Anti-emetic	Nausea and vomiting due to gastric stasis	1 month – 1 yr and bodyweight up to 10kg: 200 micrograms/kg (max 1mg) 1 – 3 yrs, bodyweight 10 –14kg: 2 – 3mg 3 – 5 yrs, bodyweight 15 – 19kg: 4 – 6mg 5 – 9 yrs, bodyweight 20 – 29kg: 7.5mg	Incompatible with Cyclizine, Dexamethasone	Sodium Chloride 0.9%
<b>Midazolam (1)</b>	Anti-convulsant Anxiolytic Sedative Muscle relaxant	Prevents fits Reduces anxiety, agitation and stiffness	> 1 month: 1mg/kg/kg, titrating upwards according to response	Incompatible with Dexamethasone	Sodium Chloride 0.9%
<b>Morphine</b>	Analgesic	Pain relief	1 – 3 months: 10micrograms/kg/hour 3months to 18 yrs: 20 micrograms/kg/hour	Incompatible with high concentrations of Haloperidol and Midazolam Incompatible with Dexamethasone	Sodium Chloride 0.95
<b>Ondansetron (1,4)</b>	Anti-emetic	Nausea and vomiting due to chemotherapy, radiotherapy, bowel distension and renal failure	1 – 12 yrs: 8 – 12 mg 12 – 18 yrs: 16 – 24mg	Incompatible with Dexamethasone	Sodium Chloride 0.9%
<b>Oxycodone (1)</b>	Analgesic	Pain relief	1 month – 12 yrs: 400 – 600micrograms/kg (up to 15mg) 12 – 18 years: 10mg – no ceiling dose	Incompatible with Cyclizine, Dexamethasone	Sodium Chloride 0.9%

1 Off-licence route of administration, but accepted practice in Palliative Care

2 Not licensed in children

3 Not licensed in children < 6 years

4 Not licensed in children < 2 years

Liability for problems arising from use lies with the prescriber

## **Guidance notes on how to convert oral/transdermal drugs to continuous subcutaneous infusion (CSCI) by syringe driver**

E.1	How to convert oral opioid doses to continuous subcutaneous infusion by syringe driver and how to calculate breakthrough (rescue) doses
E.2	Management of patients on transdermal opioids (Fentanyl / Buprenorphine) converting to CSCI opioids
E.3	How to convert oral anti-emetic doses to CSCI by syringe driver
E.4	Conversion from other oral agents for symptom control to CSCI by syringe driver

**E.1 How to convert oral opioid doses to continuous subcutaneous infusion by syringe driver and how to calculate breakthrough (rescue) doses**

- Stop oral opioid
- Start syringe driver of opioid immediately
- Ensure breakthrough analgesia is prescribed and given as needed
- If patient is in pain consider the length of time since the last oral dose and give a subcutaneous injection of opioid at the equivalent breakthrough dose

<b>Oral Morphine to CSCI Morphine</b>
Oral Morphine 24 hour dose $\div$ 2 = CSCI Morphine 24 hour dose Breakthrough dose = CSCI Morphine 24 hour dose $\div$ 6
<b>eg Conversion of oral Morphine to CSCI Morphine</b> Oral Morphine SR 60mg twice daily = 120mg in 24 hours 120mg $\div$ 2 = 60mg Morphine by CSCI over 24 hours
<b>Calculation of breakthrough dose:</b> Morphine 60mg by CSCI over 24 hours $\div$ 6 = 10mg For Morphine SC injection 10mg when required (prn)
<b>Final prescription:</b> Morphine 60mg by CSCI over 24 hours Morphine 10mg by SC injection when required (prn)

### Oral Morphine to CSCI Diamorphine

Oral morphine 24 hour dose  $\div$  3 = CSCI Diamorphine 24 hour dose

**Breakthrough dose = CSCI Diamorphine 24 hour dose  $\div$  6**

#### eg Conversion of oral Morphine to CSCI Diamorphine:

Oral Morphine SR 60mg twice daily = 120mg in 24 hours  
 $120\text{mg} \div 3 = 40\text{mg}$  Diamorphine by CSCI over 24 hours

#### Calculation of breakthrough dose:

Diamorphine 40mg by CSCI over 24 hours  $\div$  6 = 6.6mg (for 5 – 10mg)  
For Diamorphine SC injection 5 – 10mg when required (PRN)

#### Final prescription:

Diamorphine 40mg by CSCI over 24 hours  
Diamorphine 5 – 10mg by SC injection when required (PRN)

### Oral Oxycodone to CSCI Oxycodone

Oral Oxycodone 24 hours dose  $\div$  2 = CSCI Oxycodone 24 hour dose

Breakthrough dose = CSCI Oxycodone 24 hour dose  $\div$  6

#### eg Conversion of oral Oxycodone to CSCI Oxycodone

Oral Oxycodone SR 60mg twice daily = 120mg in 24 hours  
 $120\text{mg} \div 2 = 60\text{mg}$  Oxycodone by CSCI over 24 hours

#### Calculation of breakthrough dose:

Oxycodone 60mg by CSCI over 24 hours  $\div$  6 = 10mg  
For Oxycodone SC injection 10mg when required (PRN)

#### Final prescription

Oxycodone 60mg by CSCI over 24 hours  
Oxycodone 10mg by SC injection when required (PRN)

## **E.2 Management of patients on Transdermal opioids (Fentanyl / Buprenorphine) converting to CSCI opioid**

Refer to Specialist Palliative Care Symptom Control guidelines or contact the Specialist Palliative Care team

## **E.3 How to convert oral anti-emetic doses to CSCI by syringe driver**

- Stop oral anti-emetic
- Start syringe driver immediately
- Ensure breakthrough doses of anti-emetics are prescribed and given as needed
- If symptomatic consider the length of time since the last oral dose and if appropriate give a subcutaneous injection of anti-emetic at the appropriate breakthrough dose

<b>Metoclopramide, Haloperidol and Cyclizine</b>
Oral 24 hour dose = CSCI 24 hour dose
<b>Levomepromazine</b>
Oral 24 hour dose $\div$ 2 = CSCI 24 hour dose <b>e.g. Levomepromazine 12.5mg orally = 6.25mg subcutaneous</b>

## **E.4 Conversion of doses of other oral agents for symptom control to CSCI by syringe driver**

Refer to Specialist Palliative Care Symptom Control Guidelines or contact the Specialist Palliative Care team

## Appendix F

# Guidance notes on how to convert continuous subcutaneous infusion (CSCI) drugs by syringe driver to oral/transdermal

F.1	How to convert opioids by continuous subcutaneous infusion by syringe driver to oral opioid and how to calculate breakthrough (rescue) doses
F.2	How to convert opioids by CSCI by syringe driver to Fentanyl transdermal patch
F.3	How to convert CSCI anti-emetics by syringe driver to oral anti-emetics

**F.1 How to convert from opioid by continuous subcutaneous infusion (CSCI) by syringe driver to oral opioid and how to calculate breakthrough (rescue) doses**

- Start oral opioid when opioid in CSCI stopped
- Ensure breakthrough dose of oral opioid is prescribed and given as needed

<b>CSCI Morphine to oral Morphine</b>
CSCI Morphine 24 hour dose x 2 = oral Morphine 24 hour dose Breakthrough dose = oral Morphine 24 hour dose ÷ 6
<b>eg Conversion of CSCI Diamorphine to oral Morphine</b> Morphine 60mg by CSCI over 24 hours x 2 = 120mg oral Morphine 24 hour dose
<b>Calculation of breakthrough dose:</b> Oral Morphine 120mg over 24 hours ÷ 6 = 20mg For Morphine normal release (NR) 20mg PRN
<b>Final prescription:</b> Morphine SR 120mg ONCE daily (MXL) or Morphine SR 60mg TWICE daily (MST, Zomorph, Morphgesic SR) + Morphine normal release (NR) 20mg when required (PRN) (Oramorph, Sevredol)

**CSCI Diamorphine to oral Morphine**

CSCI Diamorphine 24 hour dose x 3 = oral Morphine 24 hour dose

Breakthrough dose = oral Morphine 24 hour dose ÷ 6

**eg Conversion of CSCI Diamorphine to oral Morphine**

CSCI Diamorphine 100mg over 24 hours x 3 = 300mg oral Morphine 24 hour dose

**Calculation of breakthrough dose:**

Oral morphine 300mg over 24 hours ÷ 6 = 50mg

For Morphine normal release (NR) 50mg when required (PRN)

**Final prescription:**

Morphine SR 150mg TWICE daily (MST/Zomorph/Morphgesic SR)

Morphine normal release (NR) 50mg when required (PRN) (Oramorph/Sevredol)

**CSCI Oxycodone to oral Oxycodone**

CSCI Oxycodone 24 hour dose x 2 = oral Oxycodone 24 hour dose

Breakthrough dose = oral Oxycodone 24 hour dose ÷ 6

**eg Conversion of CSCI Oxycodone to oral Oxycodone**

CSCI Oxycodone 80mg over 24 hours x 2 = 160mg oral Oxycodone 24 hour dose

**Calculation of breakthrough dose:**

Oral Oxycodone 160mg over 24 hours ÷ 6 = 26.6mg (25 – 30mg)

For Oxycodone normal release (NR) 25 - 30mg when required (PRN)

**Final prescription:**

Oxycodone SR 80mg TWICE daily (Oxycontin)

Oxycodone normal release (NR) 25-30mg when required (PRN) (Oxynorm)

## F.2 How to convert CSCI opioid to Fentanyl transdermal patch

- Apply patch and continue CSCI opioid for 12 hours
- Ensure appropriate breakthrough dose of opioid prescribed  
Refer to Specialist Palliative Care Symptom Control Guidelines

## F.3 How to convert CSCI anti-emetic dose to oral anti-emetic

- Start oral anti-emetics when anti-emetics in syringe driver stopped
- Ensure relevant anti-emetic agents are prescribed at appropriate breakthrough doses and given as needed

<b>Levomepromazine</b>
CSCI 24 hour dose x 2 = oral 24 hour dose eg Levomepromazine 12.5mg by CSCI over 24 hours = 25mg orally, given at night
<b>All other anti-emetics</b>
CSCI 24 hour dose = oral 24 hour dose

**For any other information, contact the Specialist Palliative Care team**

## Appendix G

### Controlled drug prescriptions

Controlled Drug prescriptions may be computer generated.

**The prescriber's signature must be handwritten.**

In order to comply with legislation the following information must be included:

- Patient's name and address
- Hospital number (for inpatients)
  
- Drug
- Form
- Dose
- Strength (where appropriate)
  
- Total quantity in both words and figures as dosage units or millilitres (for liquids)
  
- Date
  
- Prescriber's signature

### Examples

Morphine sulphate injection 30mg by continuous subcutaneous infusion over 24 hours.  
Supply 10 (ten) ampoules of 30mg in 1ml

Morphine sulphate injection 5mg by subcutaneous injection prn up to 2 hourly.  
Supply 10 (ten) ampoules of 10mg in 1ml

Morphine sulphate SR tablets (MST) 50mg twice daily  
Supply 60 (sixty) x 30mg tablets  
and 120 (one hundred and twenty) x 10mg tablets

Morphine sulphate normal release liquid (Oramorph) 15mg prn  
Supply 200ml (two hundred millilitres) of 10mg in 5ml

Fentanyl transdermal patches 150mcg/hour every 3 days  
Supply 10 (TEN) x 75mcg/hour patches

## Appendix H

### OBTAINING SYRINGE DRIVERS IN THE COMMUNITY

If medication via a syringe driver is likely to be needed, the syringe driver and required medication should be obtained in advance whenever possible during working hours.

When setting up a syringe driver for the first time, a syringe driver kit containing the equipment required, may be obtained from the following locations:

Service	Syringe driver type	Number	Location
District Nursing Service	MS26	2	Chalkhill Health Centre
	MS26	7	Wembley Centre for Health and Care
	MS26	2	Craven Park Health Centre
	MS26	2	Willesden Centre for Health and Care
	MS26	2	Kilburn Square Clinic
District Nursing Out of Hours	MS26	1	Willesden Centre for Health and Care

**The Kensington & Chelsea, Westminster, Hammersmith & Fulham and South Brent Palliative Homecare teams based at Pembridge, St Charles' ospital, have syringe drivers and kits available for Pembridge Homecare patients.**

**St Lukes Hospice Palliative Care Specialist Team can be contacted for patients located in Brent North (Wembley and Kingsbury).**

For North Brent the following locations have syringe drivers:  
Wembley Centre for Health and Care  
Chalkhill Health Centre

For South Brent patients, the following locations have syringe drivers:  
Community Children's Nurses, Central Middlesex Hospital  
Craven Park Health Centre  
Kilburn Square Clinic  
Neasden and Willesden teams, Willesden Centre for Health and Care

## Promoting safer use of injectable medicines

### A template standard operating procedure for:

### prescribing, preparing and administering injectable medicines in clinical areas

#### Introduction

The use of injectable medication has many healthcare benefits for patients. The complexities associated with the prescription, preparation and administration of injectable medicines means that there are greater potential risks for patients than for other routes of administration. Weak operating systems increase the potential risk of harm, and safe systems of work are needed to minimise these risks.

#### Step 1: Prescribing

- 1.1 All prescriptions for injectable medicines must specify the following:
  - patient's name;
  - prescriber's signature;
  - the approved medicine name;
  - the dose and frequency of administration;
  - the date and route of administration;
  - the allergy status of the patient.
- 1.2. Where relevant, the prescription, or a readily available local protocol, must specify the following:
  - brand name and formulation of the medicine;
  - concentration or total quantity of medicine in the final infusion container or syringe;
  - name and volume of diluent and/or infusion fluid;
  - rate *and* duration of administration;
  - stability information to determine the expiry date of the final product;
  - type of rate-control pump or device(s) to be used;
  - the age and weight of any patient under 16 years of age, where relevant;
  - date on which treatment should be reviewed;
  - arrangements for fluid balance or clinical monitoring should be made on an individual patient basis and according to local protocol and clinical need.

#### Step 2: Preparation

##### 2.1 General

- 2.1.1 Read all prescription details carefully and confirm that they relate to the patient to be treated.
- 2.1.2 Ensure that the area in which the medicine is to be prepared is as clean, uncluttered and free from interruption and distraction as possible. Ideally, preparation should take place in an area dedicated to this process.
- 2.1.3 Assemble all materials and equipment: sharps bin for waste disposal, medicine ampoule(s)/vial(s), diluent, syringe(s), needle(s), alcohol wipes, disposable protective gloves, clean re-usable plastic tray.

Check the following:

- expiry dates;
- damage to containers, vials or packaging;
- that medicines were stored as recommended, e.g. in the refrigerator.

2.1.4 Beware of the risk of confusion between similar looking medicine packs, names and strengths. Read all labels carefully.

2.1.5 Check that:

- the formulation, dose, diluent, infusion fluid and rate of administration correspond to the prescription and product information;
- the patient has no known allergy to the medicine (see 1.1);
- you understand the method of preparation.

2.1.6 Calculate the volume of medicine solution needed to give the prescribed dose. Write the calculation down and obtain an independent check by another qualified healthcare professional.

2.1.7 Prepare the label for the prepared medicine (see standard 2.7).

2.1.8 Cleanse your hands according to local policy.

2.1.9 Put on a pair of disposable protective gloves.

2.1.10 Use a 70% alcohol wipe or spray to disinfect the surface of the plastic tray.

2.1.11 Assemble the syringe(s) and needle(s). Peel open wrappers carefully and arrange all ampoules/vials, syringes and needles neatly in the tray.

2.1.12 Use a 'non-touch' technique, i.e. avoid touching areas where bacterial contamination may be introduced, e.g. syringe-tips, needles, vial tops. Never put down a syringe attached to an unsheathed needle.

2.1.13 Prepare the injection by following the manufacturer's product information or local guidelines, and the relevant guidance in standards 2.2 to 2.7.

## **2.2 Withdrawing solution from an ampoule (glass or plastic) into a syringe**

2.2.1 Tap the ampoule gently to dislodge any medicine in the neck.

2.2.2 Snap open the neck of glass ampoules, using an ampoule snapper if required.

2.2.3 Attach a needle to a syringe and draw the required volume of solution into the syringe. Tilt the ampoule if necessary.

2.2.4 Invert the syringe and tap lightly to aggregate the air bubbles at the needle end. Expel the air carefully.

2.2.5 Remove the needle from the syringe and fit a new needle or sterile blind hub.

2.2.6 Label the syringe (see standard 2.7).

2.2.7 Keep the ampoule and any unused medicine until administration to the patient is complete to enable further checking procedures to be undertaken.

2.2.8 If the ampoule contains a suspension rather than solution, it should be gently swirled to mix the contents immediately before they are drawn into the syringe.

2.2.9 The neck of some plastic ampoules is designed to connect directly a syringe without use of a needle, after the top of the ampoule has been twisted off.

### **2.3 Withdrawing a solution or suspension from a vial into a syringe**

- 2.3.1 Remove the tamper-evident seal from the vial and wipe the rubber septum with an alcohol wipe. Allow to dry for at least 30 seconds.
- 2.3.2 With the needle sheathed, draw into the syringe a volume of air equivalent to the required volume of solution to be drawn up.
- 2.3.3 Remove the needle cover and insert the needle into the vial through the rubber septum.
- 2.3.4 Invert the vial. Keep the needle in the solution and slowly depress the plunger to push air into the vial.
- 2.3.5 Release the plunger so that solution flows back into the syringe.
- 2.3.6 If a large volume of solution is to be withdrawn, use a push-pull technique. Repeatedly inject small volumes of air and draw up an equal volume of solution until the required total is reached. This 'equilibrium method' helps to minimise the build-up of pressure in the vial.
- 2.3.7 Alternatively, the rubber septum may be pierced with a second needle to let air into the vial as solution is withdrawn. The tip of the vent needle must always be kept above the solution to prevent leakage.
- 2.3.8 With the vial still attached, invert the syringe. With the needle and vial uppermost, tap the syringe lightly to aggregate the air bubbles at the needle end. Push the air back into the vial.
- 2.3.9 Fill the syringe with the required volume of solution then draw in a small volume of air. Withdraw the needle from the vial.
- 2.3.10 Expel excess air from the syringe. Remove the needle and exchange it for a new needle or a sterile blind hub.
- 2.3.11 The vial(s) and any unused medicine should be kept until administration to the patient is complete.
- 2.3.12 If the vial contains a suspension rather than solution, it should be gently swirled to mix the contents, immediately before they are drawn into the syringe.

### **2.4 Reconstituting powder in a vial and drawing the resulting solution or suspension into a syringe**

- 2.4.1 Remove the tamper-evident seal from the vial and wipe the rubber septum with an alcohol wipe. Allow to dry for at least 30 seconds.
- 2.4.2 Use the procedure in 2.2 above to withdraw the required volume of diluent (e.g. water for injections or sodium chloride 0.9%) from ampoule(s) into the syringe.
- 2.4.3 Inject the diluent into the vial. Keeping the tip of the needle above the level of the solution in the vial, release the plunger. The syringe will fill with the air which has been displaced by the solution (if the contents of the vial were packed under a vacuum, solution will be drawn into the vial and no air will be displaced). If a large volume of diluent is to be added, use a push-pull technique (see above).
- 2.4.4 With the syringe and needle still in place, gently swirl the vial(s) to dissolve all the powder, unless otherwise indicated by the product information. This may take several minutes.
- 2.4.5 Follow the relevant steps in 2.3 above to withdraw the required volume of solution from the vial into the syringe.
- 2.4.6 Alternatively, the rubber septum may be pierced with a second needle to let air into the vial as solution is withdrawn. The tip of the vent needle must always be kept above the solution to prevent leakage.
- 2.4.7 If a purpose-designed reconstitution device is used, the manufacturer's instructions should be read carefully and followed closely.

## **2.5 Adding a medicine to an infusion**

- 2.5.1 Prepare the medicine in a syringe using one of the methods described in 2.2 to 2.4 above.
- 2.5.2 Check the outer wrapper of the infusion container is undamaged.
- 2.5.3 Remove the wrapper and check the infusion container itself in good light. It should be intact and free of cracks, punctures/leaks.
- 2.5.4 Check the infusion solution, which should be free of haziness, particles and discolouration.
- 2.5.5 Where necessary, remove the tamper-evident seal on the additive port according to the manufacturer's instructions or wipe the rubber septum on the infusion container with an alcohol wipe and allow to dry for at least 30 seconds.
- 2.5.6 If the volume of medicine solution to be added is more than 10% of the initial contents of the infusion container (more than 50ml to a 500ml or 100ml to a 1litre infusion), an equivalent volume must first be removed with a syringe and needle.
- 2.5.7 Inject the medicine into the infusion container through the centre of the injection port, taking care to keep the tip of the needle away from the side of the infusion container. Withdraw the needle and invert the container at least five times to ensure thorough mixing before starting the infusion.
- 2.5.8 Do not add anything to any infusion container other than a burette when it is hanging on the infusion stand since this makes adequate mixing impossible.
- 2.5.9 Before adding a medicine to a hanging burette, administration must be stopped. After the addition has been made and before administration is re-started, the contents of the burette must be carefully swirled to ensure complete mixing of the contents.
- 2.5.10 Check the appearance of the final infusion for absence of particles, cloudiness or discolouration.
- 2.5.11 Label the infusion (see standard 2.7).

## **2.6 Diluting a medicine in a syringe for use in a pump or syringe-driver**

- 2.6.1 Prepare the medicine in a syringe using one of the methods described above.
- 2.6.2 Draw the diluent into the syringe to be used for administration by the pump or syringe-driver. Draw in some air (slightly more than the volume of medicine needed) and remove the needle.
- 2.6.3 Stand the diluent syringe upright. Insert the needle of the syringe containing the medicine into the tip of the diluent (administration) syringe and add the medicine to it. Alternatively, a disposable sterile connector may be used to connect two syringes together directly.
- 2.6.4 Check the following:
  - the total volume of injection solution in the syringe is as specified in the prescription and that the infusion can be delivered at the prescribed rate by the administration device chosen;
  - the rate of administration is set correctly on the administration device and according to the manufacturer's instructions.
- 2.6.6 Fit a blind hub to the administration syringe and invert several times to mix the contents.
- 2.6.7 Remove the blind hub. Tap the syringe lightly to aggregate the air bubbles at the needle end. Expel the air and refit the blind hub.
- 2.6.8 Carefully check the syringe for cracks and leaks and then label it (see standard 2.7), especially noting the requirements specific to syringe drivers.
- 2.6.9 Check that the rate of administration is set correctly on the device before fitting the syringe, priming the administration set and starting the infusion device.

## 2.7 Labelling injection and infusion containers

- 2.7.1 All injections should be labelled immediately after preparation, except for syringes intended for immediate push (bolus) administration by the person who prepared them. Under no circumstances should an operator be in possession of more than one unlabelled syringe at any one time, nor must an unlabelled syringe be fitted to a syringe driver or similar device.
- 2.7.2 Labels used on injectable medicines prepared in clinical areas should contain the following information:
- name of the medicine;
  - strength;
  - route of administration;
  - diluent and final volume;
  - patient's name;
  - expiry date and time;
  - name of the practitioner preparing the medicine.
- 2.7.3 Place the final syringe or infusion and the empty ampoule(s)/vials(s) in a clean plastic tray with the prescription for taking to the patient for administration.

## Step 3: Administration of an injectable medicine

### 3.1 Before administering any injection

- 3.1.1 Check all the following:
- patient's name, hospital/NHS Number or date of birth or address;
  - prescriber's signature;
  - the approved medicine name;
  - the dose and frequency of administration;
  - the date and route of administration;
  - the allergy status of the patient.
- 3.1.2 Also check, where relevant:
- brand name and formulation of the medicine;
  - concentration or total quantity of medicine in the final infusion container or syringe;
  - name and volume of diluent and/or infusion fluid;
  - rate *and* duration of administration;
  - type of rate-control pump or device(s) to be used;
  - the age and weight of any patient under 16 years of age, where relevant;
  - date on which treatment should be reviewed.
- 3.1.3 Check that the medicine is due for administration at that time and has not already been given.
- 3.1.4 Assemble everything you need including any flushing solution(s) needed.
- 3.1.5 Explain and discuss the procedure with the patient.
- 3.1.6 Check any infusion already in progress. It should be free of haziness, particles and discolouration.
- 3.1.7 Check that an appropriate access device is in place. Flush it immediately before and after administration of a medicine, and between doses of different medicines administered

consecutively, according to local policy. Also check the administration site for signs of leakage, infection or inflammation.

### **3.2 Administration of infusions – general**

- 3.2.1 Check infusions. They should be free of haziness, particles and discolouration.
- 3.2.2 Use non-touch technique at all times.
- 3.2.3 Attach administration sets to infusion containers carefully, on a flat surface and using the technique appropriate to the type of container.
- 3.2.4 Prime the access device according to local policy immediately before starting an infusion.
- 3.2.5 Before adding a medicine to a hanging burette, administration must be stopped. After the addition has been made and before re-commencement, the contents of the burette must be carefully swirled to ensure complete mixing.

### **3.3 After administration**

- 3.3.1 After completion of an intermittent infusion, flush the access device according to local policy.
- 3.3.2 Ask the patient to report promptly any soreness at the injection site or discomfort of any sort.
- 3.3.3 Make a detailed record of administration.
- 3.3.4 Discard the empty ampoules/vials from which the injection was prepared and any unused medicine. Ampoules or vials should *never* be used to prepare more than one injection unless specifically labelled by the manufacturer for 'multi-dose' use.
- 3.3.5 Re-check the administration site for signs of leakage, infection or inflammation and continue to monitor the patient, contents of the infusion container and the rate of infusion according to local policy.
- 3.3.6 Check that arrangements for monitoring fluid balance or clinical parameters have been made. Ensure that relevant documentation is made available for subsequent regular monitoring to take place.

## Appendix J

### GASEBY MS26 SYRINGE DRIVER

#### COMPETENCY CHECK LIST – STAGE 1/LEVEL 1

Name: ..... Title: .....

Hospital/Dept: ..... Expected date of completion .....

Competency Statement: Participant will demonstrate proper practical knowledge, theory of operation and clinical application of the Graseby MS26 Syringe Driver

Performance Criteria	Evaluation Method	Achieved/Not Achieved	Date	Assessor
<p>The participant will be able to:</p> <p><b>1. <u>Demonstrate pre-operational inspection and proper set-up of the MS26</u></b></p> <p>a) Define the type of pump utilised, and explain the difference between an MS26 and MS16A.</p> <p>b) Define the application for usage of this Syringe Driver.</p> <p>c) Identify the components on the Syringe driver that secures the syringe and explain their function.</p> <p>d) Install the battery.</p>	<p>a) Questioning</p> <p>b) Questioning</p> <p>c) Direct observation/questioning</p> <p>d) Direct observation</p>			

e) Explain why the alarm sounds when the battery is inserted.	e) Questioning			
f) Demonstrate the motor safety circuits are operating by holding down the Start/Boost button.	f) Direct observation			
g) Explain the function of the boost facility and how much the plunger is advanced with each boost.	g) Questioning			
h) Demonstrate administration of a bolus by utilising the boost facility.	h) Direct observation			
i) Explain which sizes of syringe can be used.	i) Questioning			
j) Connect the syringe to the infusion line and explain why a luer lock syringe should be used.	j) Direct observation/Questioning			
k) Prime the infusion line.	k) Direct observation			

GRASEBY MS26 SYRINGE DRIVER

COMPETENCY CHECK LIST – STAGE 1/LEVEL 2

Performance Criteria	Evaluation Method	Achieved/Not Achieved	Date	Assessor
<p>The participant will be able to:</p> <p><b>2. <u>Demonstrate the ability to operate the MS26</u></b></p> <p>a) Measure the syringe fluid length against the scale on the Syringe driver.</p> <p>b) State the type of unit measurement that is utilised.</p> <p>c) Explain why this type of unit measurement is utilised.</p> <p>d) Calculate and set the infusion rates for the following periods:</p> <p>    i) 1 day</p> <p>    ii) 2 days</p> <p>    iii) 5 days</p> <p>e) Insert the syringe.</p> <p>f) Fit plastic cover if utilised.</p> <p>g) Start the infusion.</p> <p>h) Explain what indicator light shows.</p> <p>i) Stop the infusion.</p>	<p>a) Direct observation</p> <p>b) Questioning</p> <p>c) Questioning</p> <p>d) Direct observation</p> <p>    i)</p> <p>    ii)</p> <p>    iii)</p> <p>e) Direct observation</p> <p>f) Direct observation</p> <p>g) Direct observation</p> <p>h) Questioning</p> <p>i) Direct observation/Questioning</p>			

<p><b>3. <u>Monitoring an infusion in progress</u></b></p> <p>a) Measure the length of fluid in the syringe whilst secured on the Syringe driver using an appropriate rule or gauge.</p> <p>b) Chart the remaining fluid length and give a brief estimate of the infusion Time remaining, e.g. 50mgDiam/24hr</p>	<p>a) Questioning</p> <p>b) direct observation/Questioning</p>			
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GRASEBY MS26 SYRINGE DRIVER

COMPETENCY CHECK LIST – STAGE 1/LEVEL 3

Performance Criteria	Evaluation Method	Achieved/Not Achieved	Date	Assessor
<p>The participant will be able to:</p> <p><b>4. <u>Review MS26 maintenance/trouble shooting considerations and appropriate action</u></b></p> <p>a) Review care and cleaning of the Syringe Driver.</p> <p>b) review battery life and type.</p> <p>c) Explain possible causes for the following:</p> <p>i) The infusion ended early.</p> <p>ii) The infusion has ended late.</p> <p>iii) The infusion has stopped.</p> <p>iv) The Syringe Driver will not start.</p> <p>v) The infusion has completed, but the motor is still running. The indicator light still flashes and there is a periodic click.</p> <p>vi) The indicator light is no longer flashing but the motor runs.</p> <p>d) State the conditions which will cause the syringe driver to alarm.</p>	<p>a) Questioning</p> <p>b) Questioning</p> <p>c)</p> <p>i) Questioning</p> <p>ii) Questioning</p> <p>iii) Questioning</p> <p>iv) Questioning</p> <p>v) Questioning</p> <p>vi) Questioning</p> <p>d) Questioning</p>			

GRASEBY MS26 SYRINGE DRIVER  
COMPETENCY CHECK LIST - STAGE 1/LEVEL

<b>Performance Criteria</b>	<b>Evaluation Method</b>	<b>Achieved/Not Achieved</b>	<b>Date</b>	<b>Assessor</b>

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GRASEBY MS26 SYRINGE DRIVER  
COMPETENCY CHECK LIST - STAGE 1/LEVEL 3

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Comments:

Level 1

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Level 2

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Level 3

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Signature of Assessor: ..... Date: .....

Signature of Participant: ..... Date: .....

### ***Risk assessment tool for the preparation and administration of injectable medicines in clinical areas***

#### **The risk assessment process**

1. Carry out a risk assessment in all clinical areas where injectable medicines are prepared and administered
2. A pharmacist and a senior clinical practitioner from the area being assessed should carry out the risk assessment
3. Risk assessments should be conducted annually, and when new injectable products or practices are introduced
4. Risk assess local practice, i.e. how injectable medicines are prepared and administered (see proforma 1)
5. Risk assess individual injectable medicine products used in the clinical area (see proforma 2) – there are examples to assist with this
6. A summary of products with high and moderate risk assessments should be completed (see proforma 3)
7. Identify risk reduction methods to minimise these risks (see guidance)
8. Where possible, implement appropriate risk reduction methods
9. Re-assess high and moderate-risk practices and products, and record the new scores following the introduction of risk reduction methods (see proformas 1 and 3)
10. Identify any remaining high-risk products and practices for consideration by the Drugs and Therapeutics Committee (or equivalent) and, if these risks cannot be minimised, they should be recorded in the organisation's risk register

**Proforma 1: Risk assessment of injectable medicine procedures – how medicines are prepared and administered**

	<b>Clinical area:</b>		<b>Clinical directorate:</b>	<b>Hospital site:</b>	
	<b>Date of first assessment:</b>			<b>Date of second</b>	
	<b>High-risk practice</b>	✓	<b>Suggested risk reduction method</b>	<b>Comments/revised</b>	
1	Inadequate technical information or written procedures for preparing and administering injectable		Provide essential technical information and written procedures		
2	Use of unlabelled bolus syringes (including flushes) and infusions – see guidance in multidisciplinary		Reinforce and audit policy to ensure all syringes and infusions containing injectable medicines that leave the hands of practitioners		
3	Use of 'open systems'. Is the injection or infusion transferred into an open container?		Introduce 'closed systems'		
4	Preparation of a cytotoxic drug outside of the pharmacy department		Prepare all cytotoxic drugs in the pharmacy department or use closed system products designed for use in clinical areas		
5	Preparation of, or addition to, total parenteral nutrition (TPN) outside of the pharmacy		Prepare and make all additions to TPN in the pharmacy department or use closed system products designed for use in clinical areas		

	<b>High-risk practice</b>	✓	<b>Suggested risk reduction method</b>	<b>Comments/revised score</b>	✓
6	Administration of an injectable medicine, prepared more than 24 hours previously in the clinical area		Introduce procedures to ensure that all injectable medicine products prepared in clinical areas have expiry dates of 24 hours or less to minimise the risk of microbial contamination unless specifically permitted by a written organisationally approved protocol		
7	Admixture of two or more active medicines without information from the pharmacy service concerning compatibility of the medicines		Obtain compatibility information or administer as separate infusions		
8	Failure to use infusion pump or syringe driver for injectable medicines that require their rate of infusion to be controlled		Ensure that adequate numbers and types of infusion pumps and syringe drivers are available for use, and users have knowledge and training of when and how this equipment		
9	Use of an injectable medicine ampoule, vial or infusion to prepare more than a single dose (unless the product is specifically licensed for		Reinforce and audit policy to ensure that single-use products are only used to prepare a single dose (unless specifically permitted by an organisationally approved protocol)		
10	Unauthorised use of unlicensed medicines or 'off-label' use of licensed medicines (unless specifically permitted by a written organisationally approved protocol or BNF-C)		Reinforce and audit policy on the use of unlicensed or 'off-label' injectable medicines. Ensure approved protocols are used, include BNF-C recognised off-label usage		
	<b>Total number of high-risk practices identified in baseline assessment</b>			<b>Total number of high-risk practices remaining after risk reduction</b>	

## Proforma 2: Risk assessment of individual injectable medicine products prepared in clinical areas

<b>Clinical area:</b>		<b>Directorate:</b>		<b>Hospital site:</b>		<b>Date:</b>	
<b>Name and strength of prepared injectable product</b>			<b>Diluent</b>		<b>Final volume</b>		<b>Bag or syringe</b>
	<b>Risk factors</b>		<b>Description</b>				✓
1	<b>Therapeutic risk</b>		Where there is a significant risk of patient harm if the injectable medicine is not used as intended.				
2	<b>Use of a concentrate</b>		Where further dilution (after reconstitution) is required before use, i.e. slow iv bolus not appropriate.				
3	<b>Complex calculation</b>		Any calculation with more than one step required for preparation and/or administration, e.g. microgram/kg/hour, dose unit conversion such as mg to mmol or % to mg.				
4	<b>Complex method</b>		More than five non-touch manipulations involved or others including syringe-to-syringe transfer, preparation of a burette, use of a filter.				
5	<b>Reconstitution of powder in a vial</b>		Where a dry powder has to be reconstituted with a liquid.				
6	<b>Use of a part vial or ampoule, or use of more than one vial or ampoule</b>		Examples: 5ml required from a 10ml vial or four x 5ml ampoules required for a single dose.				
7	<b>Use of a pump or syringe driver</b>		All pumps and syringe drivers require some element of calculation and therefore have potential for error and should be included in the risk factors. However it is important to note that this potential risk is considered less significant than the risks associated with not using a pump when indicated.				
8	<b>Use of non-standard giving set/device required</b>		Examples: light protected, low adsorption, in-line filter or air inlet.				
	<b>Total number of product risk factors</b>		Six or more risk factors = high-risk product (Red). Risk reduction strategies are required to minimise these risks. Three to five risk factors = moderate-risk product (Amber). Risk reduction strategies are recommended. One or two risk factors = lower-risk product (Green). Risk reduction strategies should be considered.				
<b>Risk assessment undertaken by:</b>			<b>Name of pharmacist:</b>		<b>Name of clinical practitioner:</b>		

**A summary of all high and moderate-risk injectable products should be completed for each clinical area. (See Proforma 3)**

## **Suggested risk reduction methods that can be used to minimise risks with injectable medicines**

1. Simplify and rationalise the range of products and presentations of injectable medicines. Where possible, reduce the range of strengths of high-risk products and provide the most appropriate vial/ampoule sizes
2. Provide ready-to-administer or ready-to-use injectable products – this will minimise preparation risks and simplify administration
3. Provide dose calculating tools – for example, dosage charts for a range of body weights that eliminate the need for dose calculations
4. Provide additional guidance on how to prescribe, prepare and administer high-risk injectable medicines
5. Consider the provision of pre-printed prescriptions or stickers – this will help to ensure that information on the prescription about preparation and administration of high-risk products is clearer
6. Provide locally approved protocols that clarify approved unlicensed and ‘off-label’ use of injectable medicines
7. Use double-checking systems – an independent second check from another practitioner and/or the use of dose-checking software in ‘Smart’ infusion pumps and syringe drivers
8. Use an infusion monitoring form or checklist – this will help to ensure that infusions are monitored throughout administration

### Proforma 3: Risk assessment summary for high and moderate-risk injectable medicines products

Name of clinical area				Directorate:								Date:				
<b>Risk factors</b>																
Prepared medicine	injectable	Strength	Diluent	Final volume	Bag/syringe	Therapeutic risk	Use of concentrate	Complex calculation	Complex preparation	Reconstitute vial		Infusions pump or driver	Non-standard infusion set	Risk assessment score	Risk reduction method(s)	Revised score
						✓	✓	✓	✓	✓	✓	✓	✓			
Risk assessment undertaken by:			Name of pharmacist:							Name of clinical practitioner:						

## Appendix L - Equality Impact Assessment Tool

To be completed and attached to any procedural document when submitted to the appropriate committee for consideration and approval.

		Yes/No	Comments
<b>1.</b>	<b>Does the policy/guidance affect one group less or more favourably than another on the basis of:</b>		
	• Race	No	
	• Ethnic origins (including gypsies and travellers)	No	
	• Nationality	No	
	• Gender	No	
	• Culture	No	
	• Religion or belief	No	
	• Sexual orientation including lesbian, gay and bisexual people	No	
	• Age	No	
<b>2.</b>	<b>Is there any evidence that some groups are affected differently?</b>	No	
<b>3.</b>	<b>If you have identified potential discrimination, are any exceptions valid, legal and/or justifiable?</b>	n/a	
<b>4.</b>	<b>Is the impact of the policy/guidance likely to be negative?</b>	No	
<b>5.</b>	<b>If so can the impact be avoided?</b>	n/a	
<b>6.</b>	<b>What alternatives are there to achieving the policy/guidance without the impact?</b>	n/a	
<b>7.</b>	<b>Can we reduce the impact by taking different action?</b>	n/a	

If you have identified a potential discriminatory impact of this procedural document, please refer it to the Equality & Diversity Manager together with any suggestions as to the action required to avoid/reduce this impact.

For advice in respect of answering the above questions, please contact the Equality & Diversity Manager.



**APPENDIX N: POLICY PUBLICATION FLOWCHART**

