Pan-Birmingham NHS
Cancer Network

Coversheet for Network Site Specific Group Agreed Documentation

This sheet is to accompany all documentation agreed by Pan Birmingham Cancer Network Site Specific Groups. This will assist the Network Governance Committee to endorse the documentation and request implementation.

Document Title	Guidelines for the use of Graseby Syringe Drivers in Palliative Care
Document Date	January 2010
Document Purpose	This guidance has been produced to support the safe use of Graseby syringe drivers in palliative care patients.
Authors	Abi Jenkins, Pan Birmingham Cancer Network David Edwards, Birmingham St Mary's Hospice
References	1. www.palliativedrugs,com. Accessed June 2009. 2. Eds Faull C, Carter Y, Daniels L. Handbook of Palliative Care. Second Edition. Blackwell Publishing, Oxford, 2005. 3. Smiths Medical. Graseby MS 16A and MS 26 Syringe Driver- Instructions Manual, 2008. 4. West Midlands Palliative Care Physicians. *Palliative Care Guidelines for the use of drugs in symptom control. 4th edition*. University Hospitals Birmingham, 2007. 5. Mitten, T (2000) Subcutaneous drug infusions: a review of the problems and solutions. *British Journal of Palliative Nursing* 6 (5) 6. Hirsch, C M et al (2002) Set-up and maintenance of syringe drivers for subcutaneous drug administration in palliative care. *International Journal of Pharmacy Practice,* 10(suppl) R43
Consultation Process	Network Specialist Palliative Care Audit and Guidelines Sub Group
Review Date (must be within three years)	January 2013
Approval Signatures: Network Site Specific Group Clinical Chair	Diana Webb
Date Approved by Network Governance Committee	13 / 01 / 2010

ENDORSED BY THE GOVERNANCE COMITTEE

Guidelines for the use of Graseby Syringe Drivers in Palliative Care

Version History

Version	Date	Summary of change/ process
0.1	07/08/09	Draft document circulated for initial consultation to Network Specialist Palliative Care Audit and Guidelines Sub Group (SPAGG)
0.1	19/08/09	SPAGG agreed to circulate document for comments by 14/09/09
0.2	18/09/09	Amendments made following comments from SPAGG
0.3	21/10/09	Amendments made following discussion at SPAGG meeting
1.0	13/01/10	Endorsed by the Governance Committee following amendments

1. Scope of the Guideline

This guidance has been produced to support the safe use of Graseby syringe drivers in palliative care patients.

2. Guideline Background

2.1 In September 2008 the Medicines and Healthcare products Regulatory Agency (MHRA) published a statement advising on the current legal position of non-medical prescribers prescribing and therefore directing the mixing of medicines in syringe drivers in palliative care.

2.2 The MHRA stated that the mixing of two licensed drugs where one is not the vehicle for administration for the other falls within the definition of manufacture. As a new product is being manufactured, a manufacturer's license would be required.

2.3 The result of mixing two or more drugs in a syringe is an unlicensed product which under current legislation non-medical prescribers are not authorised to prescribe.

2.4 The MHRA recognised that palliative care requires special consideration and in July 2009 issued a further statement recommending change to the law to allow non-medical prescribers in palliative care to prescribe mixtures of drugs within a syringe driver for which there is compatibility data, and to prescribe unlicensed drugs.

3. Guideline Statements

3.1 In any cases where practitioners prescribe or administer a syringe containing two or more drugs, published compatibility data should be sought and its source documented in patients notes. The source generally used across the Network is the 'West Midlands Guidelines Palliative Care Guidelines for the Use of Drugs in Symptom Control (January 2007)'. If the West Midlands guidelines are not used, the source should be documented.

3.2 All registered nurses are accountable for their practice, ensuring that they undertake appropriate training to carry out these procedures and that they maintain their competencies in accordance with the NMC Code of Professional Conduct.

4. Definition and use of syringe drivers

4.1 A syringe driver is a medical device, which is a small, portable, battery-operated infusion pump weighing approximately 175g (including battery). It is used to deliver medication via the subcutaneous route over a calculated period of time, providing a continuous level of medication.

4.2. It can be set up on ambulant patients as well as those confined to bed, and can be worn unobtrusively in a hip/shoulder holster tucked into a pocket or under a pillow. It is convenient and discreet, but at the same time is easily accessible.

4.3 The syringe driver can be used to give medication subcutaneously via a syringe, usually over 24 hours. It can be used when other routes are unsuitable or unavailable (eg oral, buccal, rectal, transdermal).

4.4 These guidelines refer to the Graseby Medical MS16A (blue) and Graseby MS26 (green) syringe drivers. The MS16A delivers drugs at an hourly rate; the MS26 delivers drugs at a 24 hourly or daily rate.

4.5 If more than one type of syringe driver is used, local guidelines should be in place in order to avoid confusion and reduce the risk of possible errors.

<u>Differences between MS16A and MS26</u>

	MS16A	**MS26**
1. Colour	Blue	Green
2. Rate setting	mm/hr	mm/day
3. Boost button	No	Yes (See item 7)
4. Light indicator	1 second	25 seconds

(Smiths Medical, 2008)

5. Indications for starting a syringe driver

The syringe driver may be indicated in the following situations:

a) Persistent nausea and vomiting
b) Difficulty in swallowing
c) Poor alimentary absorption
d) Intestinal obstruction
e) Profound weakness/cachexia
f) Comatose or moribund patient
g) Administration of drugs that can not be given by non-parenteral routes
Patients consent to treatment obtained (if patient has capacity)

6. Advantages in the use of the syringe driver

a) Avoids the necessity of intermittent injections
b) Infusion timing is accurate, which is particularly advantageous in the community
c) The device is convenient, unobtrusive and light to wear
d) Ambulant patients can move around freely
e) Patients and relatives can be taught to care for the syringe driver themselves if appropriate
f) Mixtures of drugs can be administered (see section 13)

7. Disadvantages in the use of the syringe driver

a) The patient may become psychologically dependent upon the device
b) Inflammation or infection can occasionally occur at the needle site. This may interfere with drug absorption
c) Patients who have peripheral circulatory shut down may not absorb the drugs being infused

8. Information for patients and carers

8.1 In order to alleviate fears and promote understanding and ensure consent, patients should receive information on the following:

a) Explanation of rationale of the syringe driver
a) Explanation and demonstration of how it works
b) What action to take if the alarm sounds or it becomes disconnected
c) Information on care of the syringe driver (to include not getting it wet)
d) Who to contact if help is needed
e) Information about drugs being administered
f) Care and safety of drugs and return of unused drugs (particularly in primary care)

9. Prescribing and administering drugs by subcutaneous infusion

9.1 The choice of drug(s) should follow locally endorsed guidelines and be based on a careful patient assessment.

9.2 **Good Practice Statement-** except under exceptional circumstances the same practitioner should not be involved in more than one of the following for a single patient episode:

a) Prescribing
b) Dispensing
c) Administering

9.3 A prescription authorising the administration of drugs via a syringe driver should be written by a prescriber and include the following information:

a) Date infusion is to commence
b) Patient's name, address and date of birth
c) Name and dose of each drug to be given over 24 hours
d) Details of diluent
e) Any special instructions
f) An appropriate bolus dose of analgesic and other drugs should be prescribed on an as required (prn) basis in anticipation of 'breakthrough' symptoms
g) Name and profession of the prescriber

10. Choice of skin site and care of the skin

10.1 Sites of choice include:

a) Anterior chest wall (avoid if patient very cachexic)
b) Lateral upper arms
c) Anterior abdominal wall
d) Anterior outer thigh
e) Area over scapula (in confused or disorientated patients)

10.2 Areas which should **NOT** be used for cannula placement are:-

a) Lymphoedematous areas or areas at risk of developing lymphoedema. The rate of absorption from a skin site would be adversely affected and the insertion of a cannula breaches skin integrity, thus increasing the risk of infection in an area, which is already susceptible.
b) Sites over bony prominences. The amount of subcutaneous tissue is diminished, therefore impairing the rate of drug absorption.
c) Previously irradiated skin. Radiotherapy can cause sclerosis of the small blood vessels, thus reducing skin perfusion.
d) Site near a joint. Excessive movement may cause cannula displacement and patient discomfort.
e) Areas of inflammation or infection.
f) Skin folds.
g) Sites of obvious tumour involvement.

11. Care of the skin site

11.1 The infusion site should only be renewed when there is evidence of inflammation (erythema or reddening) or poor absorption (a hard subcutaneous swelling) *(Faull, 2005).*

11.2 The time taken for this to occur can vary from hours to over three weeks dependent on the patient and the drug(s) being infused. If sites break down rapidly, suggestions include: (www.palliativedrugs.com, 2009)

a) Further diluting the drug being infused – consider changing from 10ml to 20ml syringe
b) Changing the diluent from water for injection to sodium chloride 0.9% (unless contra-indicated e.g. cyclizine)
c) Use an alternative cannula (eg. Teflon, Vialon)
d) Adding dexamethasone to the barrel of the syringe (0.5-1mg)
e) Using hydrocortisone cream 1% around the needle site before insertion
f) Administering sub-cutaneous hyaluronidase 1,500units dissolved in 1ml of water for injections or sodium chloride 0.9% to the site before starting an infusion and repeating every 24 hours as required
g) Changing the site dressing (if this is the suspected irritant)
h) Two commonly used drugs that can cause site irritation include cyclizine and levomepromazine. If thought appropriate and these drugs are being used then alternative anti-emetics could be considered

12. Boost Button

12.1 The MS26 syringe driver has a 'boost' that was designed for administering 'breakthrough' doses, and is only used to start the syringe driver.

Do not use the boost button for breakthrough doses:

a) The volume is insufficient to give an adequate dose for breakthrough pain.
b) All drugs will be administered which may increase side effects and skin site problems.
c) Bolus doses of drugs should be prescribed separately in anticipation of breakthrough symptoms. Administration of a 'boost' would need to be prescribed to make its administration legal.
d) Frequent boosting results in the syringe driver running through early.

13. Drug Stability and Compatibility

13.1 The selection of drugs used in the syringe driver is determined by the patients' symptoms, the suitability of drugs for the subcutaneous route and the compatibility of other drugs to be used.

13.2 Reference should be made to current guidance on drug stability and compatibility which can be found in the British National Formulary, the Palliative Care Formulary (Third Edition), the West Midlands Guidelines for the Use of Drugs in Symptom Control (2007), and www.palliativedrugs.com.

13.3 In order to reduce risk of incompatibility, no more than two drugs should be mixed in a syringe. Combinations of two drugs should be checked with the West Midlands Guidelines (2007) Combinations of three or more drugs should be checked with a Specialist Palliative Care Practitioner or Pharmacist.

13.4 All drugs should be diluted with water for injection unless otherwise stated (Hirsch 2002).

14. Monitoring of the Infusion

14.1 In an inpatient unit the syringe driver should be checked regularly at the time of each drug round and will be monitored every day.

14.2 In the community, the syringe driver should be checked every day. Check for:

a) Irritation at the injection site
b) Crystallisation of drugs
c) Light flashing
d) Secure connections
e) Leakage
f) Correct volume remaining

14.3 In the community, verbal and written patient information should be given (Appendix 2). The carers may be asked to monitor the syringe driver, based on information in the leaflet, which is a reference guide provided to alleviate fears, promote understanding and inform consent.

14.4 Only change the site if there is any evidence of inflammation, infection or hypertrophy. This varies depending on the individual patient and the drug being used.

14.5 A new 9v alkaline battery (DURACELL or PROCELL) should last for fifty full syringes.

14.6 The flashing indicator light will stop flashing when the battery needs changing. (The syringe driver will continue to operate for 24 hours after the light has stopped flashing)

14.7 Document and sign chart for checking procedure.

15. Documentation of the Infusion.

15.1 Details of setting up each syringe driver and reloading needs to be documented on the administration chart by the healthcare professional(s) who have performed the procedure according to Trust/Hospice policy.

Documentation should include:
a) Date and time infusion commenced.
b) Model of syringe driver
c) Rate of syringe driver

d) Site of cannula
e) Drug expiry date and batch number according to Trust/Hospice policy

15.2 The syringe should be labelled with the date, drug names, dosages and diluent. (Avoid the numbers on the barrel of the syringe so that amount remaining can be easily seen).

16. Transfer of patients

16.1 When a patient is discharged from hospital to home with a syringe driver, information should be clearly communicated to the Primary Care Team. Arrangements should be made for the timely prescribing of drugs in the community. A standard prescription card can be used for controlled drugs and drugs used in the syringe driver.

17. Maintenance

The manufacturers of the drivers recommend that:

a) The syringe driver should be serviced every 12 months.
b) If the syringe driver is dropped or damaged at any time, it should be checked by the appropriate maintenance department.
c) Following any significant fluid spillage onto the syringe driver, it should be returned for servicing.
d) Any outside surfaces of the syringe driver can be cleaned using a damp cloth and a mild detergent.

18. Discarding the Syringe Driver

It is important to measure and document the remaining syringe contents prior to discarding it.

19. When the Patient Dies

It is considered good practice in an inpatient setting and acute hospital to retain syringes for seven days following a patient's death before destruction. This reflects the Department of Health National Minimum Standards Regulations (Standard H9 H9.9 and Standard A34 A34.10).

20. Monitoring of the Guideline

Implementation of the guidance will be considered as a topic for audit by the Supportive and Palliative Care Network Site Specific Group in 2013.

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Approval Date of Network Site Specific Group Date: 13.01.10

Approval Date of the Governance Committee Date: 13.01.10

Approval Signatures

Pan Birmingham Cancer Network Governance Committee Chair

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Signature: Date: 13.01.10

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APPENDIX 1

PROCEDURE FOR SETTING UP

MS16A AND MS26 SYRINGE DRIVERS

(West Midlands Palliative Care Physicians Guidelines 2007, www.palliativedrugs.com, 2009, Faull 2005, Mitten 2001).

1. Equipment required

1. MS16A or MS 26 syringe driver
2. 9v battery (eg Duracell MN 1604)
3. Syringe (Luer Lok to reduce risk of infusion set disconnection)
4. Infusion set (choose shortest length available)
5. Clear adhesive dressing (eg Opsite, Tegaderm)
6. Diluent (usually water for injection)
7. Fine gauge needle (23G or 25G)
8. Medication as prescribed
9. Cottonbag/holster
10. Millimetre ruler
11. Label to be attached to syringe
12. Monitoring chart
13. Sharps bin

2. Commencing infusion

1. Collect equipment and drug chart with prescribers prescription.

2. Choose syringe type and size. Syringe size bore varies with different makes therefore **IT IS ESSENTIAL** that the infusion is measured in length and not in volume. Normally a 10ml syringe is an adequate size, but it may sometimes be necessary to use a 20ml or larger syringe if:
    - the total volume of the drug(s) exceeds 48 millimetres in a 10ml syringe;

3. Increased dilution of drugs is required if there is evidence of site irritation or inflammation or drug crystallisation or precipitation within the syringe.

4. Measure syringe barrel against ruler edge and note infusion that measures
    - 48 millimetres

5. Dissolve powdered drugs to be used with sterile water for injection

6. Draw up drugs into the syringe and dilute to the required volume that measures 48 millimetres in length

7. Ensure adequate mixing of drugs by inverting the syringe several times. Do not shake.

8. Connect the infusion line to the luer-lok syringe and prime the line with the infusion.

9. Remeasure the length of infusion in syringe to determine when the infusion will run through.

10. Following priming the line less than 48 millimetres of drug solution will remain in the syringe. Therefore syringes that are used to prime the line will be infused in less than 24 hours. **DO NOT further dilute the contents of the syringe** to ensure 48 millimetres remain in the syringe since the patient will receive a significantly reduced dose each time this practice is undertaken.

11. **DO NOT prime the line, re-measure the syringe and then set the driver to administer this reduced volume over 24 hours** since the patient will receive a significantly reduced dose each time this practice is undertaken.

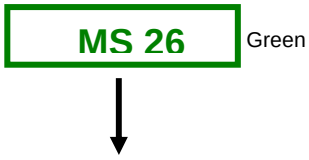
12. Label the syringe clearly with the patient's name, infusion contents, final length (mm) and date and time prepared, signature of preparing nurse(s).

3. Setting the rate

There are two different types of Graseby syringe drivers, the MS26 which is set at mm/day and the MS16A which is set at mm/hour.

Set the rate of the syringe driver according to the model being used.

The MS26 device states that the infusion rate is millimetres delivered per 24 hours. For simplicity one 24 hour period will henceforth be called one day.



Green

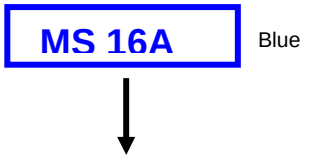
Rate = millimetres delivered per day

Rate = $\frac{\text{fluid length in millimetres}}{\text{Infusion time in days}}$

Eg. Infusion to run over one day

Rate = $\frac{48 \text{ mm}}{1 \text{ day}}$ = 48 mm per day

Rate dial is set at 48 mm/day



Blue

Rate = millimetres delivered per hour

Rate = $\frac{\text{fluid length in millimetres}}{\text{Infusion time in hours}}$

Eg Infusion to run over 24 hours

Rate = $\frac{48 \text{ mm}}{24 \text{ hours}}$ = 2 mm per hour

Rate dial is set at 02 mm/hour

4. Remeasure

Remeasure the length of drug solution in the syringe to determine when the infusion will run through. (Please note that when a new line is attached the infusion will run through in less than 24 hours).

5. Insert battery

When the battery is inserted, an alarm will sound to show that there is battery power. This will cease after a few seconds.

6. Inserting the infusion set

1. Insert the fine gauge needle according to manufacturer's instructions, pinching the skin to facilitate the insertion.

2. Make a hoop in the infusion set and cover with adhesive dressing – this prevents accidental displacement.

7. Fit and secure syringe in syringe driver

Place a flange of the syringe into the slot provided on the syringe driver and secure with the small rubber strap. Press the white release button and slide the plunger assembly along until it rests against the syringe plunger.

8. Commence infusion

Press the 'start/test' (MS16A) or 'start/boost' (MS 26) button to commence the infusion. The flashing indicator light on the front panel will flash every second (MS 16A) or 25 seconds (MS26).

9. Placement of the syringe driver

Place the syringe driver in the plastic holder and then into a cotton holster to protect from light. Avoid placing the syringe driver above the height of the infusion site.

10. Alarm

Should the alarm sound, the syringe driver should be checked for:

a. Empty syringe
b. Kinked tubing
c. Blocked needle
d. Jammed plunger
e. Malfunction

11. Reloading the syringe driver

1. Every 24 hours draw up a new supply of drugs as previous procedure required for the next 24 hour period, having reassessed the patient for drug/dosage requirements.

2. Remove the used syringe from the syringe driver. Discard any unused fluid into a sharps container or 'DOOP' (disposal of old pharmaceuticals) system.

3. Place the new full syringe into the syringe driver.

4. If the dose of any of the drugs in the combination needs to be changed or a new drug added the syringe and line should be changed.

5. It is important to measure and document the remaining syringe contents prior to discarding it.

12. Troubleshooting

12.1 The syringe driver action is too slow:

a. Check syringe chart to check volume in syringe and time commenced
b. Check that battery is working
c. Check rate of infusion
d. Replace syringe driver if found to be faulty

If appropriate seek medical advice.

Always complete an incident form for a syringe driver whose contents have been administered differently to that which is prescribed.

12.2 The syringe driver action is too fast:

a. Check chart
b. Has boost button been used?
c. Was the rate set correctly?
d. Is there a possibility someone has tampered with the device?
e. Replace the syringe driver if found to be faulty

If appropriate seek medical advice.
It is always appropriate to complete an incident form for a syringe driver whose contents have been administered differently to that which is prescribed.

APPENDIX 2

SYRINGE DRIVER INFORMATION FOR PATIENTS AND CARERS

Trouble-shooting: when to contact your District Nurse

Your District Nurse will visit you daily whilst you are receiving your medication this way. This enables the Nurse to set up your daily medication, check the syringe driver and check the site where the needle is inserted into your skin. You may need to contact your District Nurse outside of the usual visiting time:

- If the light stops flashing (the light should flash every second on a blue syringe driver MS16A and every 25 seconds on a green syringe driver MS26).
- If the skin around the needle site is showing any signs of inflammation (i.e., swelling, redness, heat and pain).
- If there is evidence of poor absorption (i.e., hard swelling just under the skin).
- If the needle becomes dislodged or the syringe or tubing become detached.

If the alarm sounds, check the tubing. If it is kinked, straighten it and the alarm should fade after a few seconds. However, if the alarm continues to sound and or the syringe is empty, contact your District Nurse.

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District Nurse contact details

Your District Nurse contact telephone numbers:

Mon-Fri 8.30am-5pm
All other times

These guidelines were developed by Anne Beardsmore and Margaret Blaikie, Heart of Birmingham Teaching Primary Care Trust, with a contribution from Helen Meehan at Solihull PCT. They were published in July 2006.

References:

Faull C. Hirsch C (1999) How To Use The Syringe Driver in Palliative Care. University Hospital Birmingham NHS Trust

Pan Birmingham NHS Cancer Network (2005) Syringe Driver in Palliative Care Guidelines

Pan Birmingham NHS
Palliative Care Network

Syringe Driver Information for Patients and Carers

This reference guide is provided to alleviate fears, promote understanding and inform consent

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What is a syringe driver and what is it used for?

A syringe driver is a portable, battery powered pump, small enough to be carried in a pouch attached to a belt, a shoulder holster or in a large pocket for easy mobility. It is convenient and discreet but at the same time accessible.

A syringe containing your medication is connected to the pump. The pump allows the medication to be delivered at a regular rate over a period of time, usually 24 hours.

A thin tube is attached to the syringe at one end and at the other end is a fine needle. The needle is inserted into the fatty tissue beneath the skin.

Preferred areas for inserting the needle are the chest or upper arm. Sometimes the tummy or top of the legs is used. The needle can stay in place for several days and is kept in place by a small, clear, film dressing.

A syringe driver is used for a number of reasons:

- To avoid giving frequent injections which may be painful or uncomfortable.
- To give medication that cannot be given by mouth.
- To help control symptoms associated with your illness.

How to take good care of your syringe driver

- Keep the syringe driver in the plastic holder and the cotton holster to protect it from light.
- Do not let the syringe driver get wet. The manufacturer states that it cannot be taken into the shower. However, if you wish to bathe, discuss this with your District Nurse.
- Do not press the boost button.
- Do not alter the rate.
- Avoid placing the syringe driver above the height of the needle site.

Please note that a new 9-volt alkaline long life battery will be inserted in your syringe driver when you start using it. On average, it will last 50 full syringes.

The flashing indicator light will stop flashing when the battery needs changing. Note: the syringe driver will continue to operate for 24 hours after the light has stopped flashing.