Nurse Compounding of Antibiotics in Elastomeric Devices Guideline

1. Guiding Principles

This document provides guidance for the safe and appropriate preparation, handling and administration of intravenous antibiotics, prepared by registered nursing and midwifery staff of the WA Country Health Service (WACHS), as a continuous intravenous infusion for patients utilising the services of the Hospital Nurse Discharge Service (HNDS) or equivalent.

The use of registered nurse / midwife loaded infusors facilitates the timely administration of antibiotics, for patients able to be treated in the home, when commercially compounded specific devices are unable to be obtained from the manufacturer in a timely manner.

As there is generally a delay from when the order is placed for compounded antibiotics and the actual delivery, two to four days, registered nurse / midwife loaded infusors enable administration to patients who are to be discharged on the day of the referral. It also allows timely administration to those patients referred to HNDS after hours or over the weekend or patients whose drug or dose may change during the course of treatment.

2. Guideline

All relevant registered nursing / midwifery staff need to review their scope of professional practice and be aware of how to administer antibiotics utilising elastomeric devices and how to order such devices within their facility.

> The availability and use of antibiotics may vary between WACHS sites due to formulary or antimicrobial stewardship restrictions (Restricted Antimicrobial Drug Lists). Please check for restrictions on formulary one or contact your Pharmacy Department should you require clarification.

2.1 Indications for use

- To facilitate drug supply to patients on home discharge programs where commercially compounded patient specific devices are unable to be obtained from the manufacturer in a timely manner. [1, 2]
- All patients must be accepted into the WACHS area's designated home discharge program.

2.2 Contraindications and precautions

- Refer to product information for each drug or the relevant drug monographs in Australian Medicines Handbook or the MIMS.

2.3 Dosage

The following antibiotics are suitable for registered nurse / midwife compounding [3, 4]

Antibiotic Agent	Maximum Concentration(4)
Aciclovir	10mg/mL
Aztreonam	60mg/mL
Caspofungin	0.5mg/mL
Cefepime	20mg/mL
Cefotaxime	40mg/mL
Ceftazidime	40mg/mL
Ceftriaxone	40mg/mL
Cefalothin (cephalothin)	80mg/mL
Cefazolin (cephazolin)	40mg/mL
Clindamycin	12mg/mL
Flucloxacillin*	60mg/mL
Piperacillin and Tazobactam	90mg/mL
Teicoplanin	133.3mg/mL
Ticarcillin and Clavulanate	103.3mg/mL
Tobramycin	5mg/mL
Vancomycin	20mg/mL

NB: Benzylpenicillin is not suitable for nurse compounding as buffered sodium chloride is required for drug stability[5].

***Flucloxacillin requires special consideration during administration[6]**

All registered nurse/midwife-compounded infusors containing flucloxacillin must be stored below 30˚C for the entire 24 hour infusion. If the solution warms to body temperature (37˚C) there is a potential for loss of flucloxacillin content.

Patients being administered flucloxacillin via an elastomeric device, compounded by a registered nurse/midwife, must be supplied with a wearable cooler bag and two small cold packs. One FRIDGE CHILLED cold pack should be placed inside the cooler bag, alongside the infuser solution.

To ensure the solution remains below 30˚C for the full 24 hours, the cold packs should be used alternatively (i.e. one chilling in the fridge while one is in use) and changed at least every eight (8) hours.

When wearing the cooler bag, ensure that the cold pack is aligned inside the pack so that it is alongside the body, meaning the infusor solution is protected from the body warmth as much as possible.
The patient can still follow the Baxter Elastomeric Pumps - Patient Guide for other standard conditions of use (e.g. sleeping/bathing).
Wearable cooler bags for infusor devices are supplied by the manufacturer and are available from your Pharmacy Department.
NB: These precautions are not required with manufacturer supplied flucloxacillin infusors.

2.4 Duration of Therapy

Registered nurse / midwife loaded infusor devices are stable at room temperature for 24 hours and must be discarded after this time.
Total duration of antibiotic therapy is to be determined by the treating physician.

2.5 Important Drug Interactions

Refer to individual drug monographs and the Australian Injectable Drugs Handbook.

2.6 Administration Instructions

Elastomeric devices (10ml/hr, LV10) containing 180 mL of 0.9% sodium chloride are ordered from the manufacturer via the Pharmacy Department. Infusor devices containing 0.9% sodium chloride are stable when stored below 25 degrees prior to compounding.

Information in this guideline pertains to infusors provided by Baxter Pharmacy Services. See appendix 1 for the Baxter Infusor Saline Prefilled Infusor Filling Guide.

Registered nurse/ midwife loaded infusions are made up:

- immediately prior to use
- in a clean clinical area
- using non-touch aseptic technique
- using Baxter® guide for loading infusors
- with antibiotics that have proven stability in solution for 24hrs in an infusor (see “dosage”).

Antibiotics to be added to 180ml (LV10) device:

- Reconstitute the antibiotic according to the manufacturers guideline or the instructions in the Australian Injectable Drug Handbook
- Dilute the reconstituted antibiotic solution with 0.9% sodium chloride to a final volume of 60 ml.
- Add diluted antibiotic solution to elastomeric infusor.
- Invert the infusor device multiple times to ensure adequate mixing.
- The final volume of the elastomeric infusor device will be 240 mL.
- Attach an IV additive label to the infusor device.

For devices supplied by alternate companies contact your pharmacy department for specific instructions.

All registered nurse/midwife loaded infusions must be double checked by two (2) registered nurses /midwives or a registered nurse/midwife and a medication competent enrolled nurse prior to administration to the patient.

Infusions are to be charted on the WA Hospital Medication Chart (WA HMC) or endorsed regional chart prior to administration of infusion. This must be signed by the nursing / midwifery staff compounding and checking the antibiotic.

Registered nursing /midwifery staff should exclude an allergy or previous adverse drug reaction to the medication being added to the elastomeric device prior to administration to the patient.

2.7 Monitoring Requirements

Patients are to be reviewed daily by nursing/midwifery staff.
Monitor and document the following:

- Appropriate deflation of elastomeric balloon in infusor device.
- Peripheral intravenous vascular assessment score (PIVAS)
- Temperature. Frequency as per the nursing / midwifery care plan.
- Other monitoring such as therapeutic drug monitoring (e.g. vancomycin) or other biochemical monitoring (e.g. liver function tests) as guided by recommendations for the individual agents in the Australian Medicines Handbook (AMH), Therapeutic Guidelines: Antibiotic and/or the approved Product Information monographs (eMIMs) and the prescribing doctor.

2.8 Management of Complications

- Cease infusion by disconnecting infusor device.
- Contact medical officer for review of patient.

3. Definitions

Elastomeric device / infusor	A non-electronic, ambulatory, disposable infusion device which ranges from 12 hours to seven days of continuous infusion. It is designed for ambulatory medication therapies requiring slow, continuous infusion.
LV10 INFUSOR	Elastomeric device with a flow rate of 10 mL/hr providing a nominal delivery time of one day.

4. Roles and Responsibilities

The registered nurse / midwife is responsible for:

- preparing the medication in readiness for treatment checking with another registered nurse/midwife medication competent enrolled nurse or medical officer
- completing all nursing / midwifery duties for the patient, including monitoring, within scope of practice
- completion of all required documentation.

5. Compliance

WACHS staff are reminded that compliance with all policies is mandatory.

6. Records Management

Health Record Management Policy

7. Evaluation

Adverse events and clinical incidents relating to nurse /midwife compounded antibiotics in elastomeric devices are to be zero (0).

8. Standards

National Safety and Quality Health Service Standards (Second edition 2017) – 1.7, 3.15, 4.1, 4.11, 4.14, 5.13, 5.14, 6.11, 8.4, 8.8.

9. References

1. Baxter Healthcare. Saline Prefill Infusor Filling Guide Sydney: Baxter Healthcare; 2016 [cited 2019 16th January]. Available from: https://www.baxterprofessional.com.au/system/files/2016-12/Saline%20PreFilled%20Infusor_Filling%20Guide.pdf.
2. Dobson PM, Loewenthal M, Harris L. Determining the Risk of Sepsis Using Nurse-Compounded Elastomeric Pumps for Continuous Infusion in Outpatient Parenteral Antibiotic Therapy. Journal of infusion nursing : the official publication of the Infusion Nurses Society. 2017;40(5):282-5.
3. Society of Hospital Pharmacist Australia. Australian Injectable Drug Handbook (AIDH). 7th Edition ed. Melbourne: SHPA; 2018.
4. Baxter Healthcare. Baxter Compounding Product Stability Australia Sydney: Baxter Healthcare; 2018 [cited 2019 16th January]. Available from: https://www.baxterprofessional.com.au/hosted-apps/stability-data/.
5. Nakamura T, Enoki Y, Uno S, Uwamino Y, Iketani O, Hasegawa N, et al. Stability of benzylpenicillin potassium and ampicillin in an elastomeric infusion pump. Journal of infection and chemotherapy : official journal of the Japan Society of Chemotherapy. 2018;24(10):856-9.
6. To T-P, Ching M, Ellis AG, Williams L, Garrett MK. Stability of Intravenous Flucloxacillin Solutions used for Hospital-in-the-Home. J Pharm Prac. 2010;40(2):101-5.

10. Related Forms

- MR170A WA Hospital Medication Chart –Adult Short Stay
- MR1701 WA Hospital Medication Chart – Adult Long Stay
- MR170D National Inpatient Medication Chart – Paediatric Short Stay
- MR170E National Inpatient Medication Chart – Paediatric Long Stay

11. Related Policy Documents

Specialised Medication – Intravenous Vancomycin in Adults Guideline.

12. Policy Framework

Clinical Governance, Safety and Quality.

13. Appendices

Appendix 1 – Baxter Infusor® Saline Prefill Infusor Filling Guide.

This document can be made available in alternative formats on request for a person with a disability

Contact:	WACHS Chief Pharmacist (M. Clay)		
Directorate:	Medical Services	**TRIM Record #**	ED-CO-13-12165
Version:	4.00	**Date Published:**	23 April 2019

Appendix 1 – Baxter Infusor® Saline Prefill Infusor Filling Guide.

BAXTER INFUSOR®

Saline Prefill Infusor Filling Guide

Pharmacy Services

Baxter's Saline Pre-Filled Infusors allow for the easy addition of reconstituted drug for patients referred to Hospital in the Home after hours or over the weekend or patients whose drug or dose may change during the course of treatment. The Pre-Filled Infusors can also be used to transfer patients from the emergency department directly into Hospital in the Home. LV10 Infusors are available with 180 or 200 mL of saline and are stable at room temperature for 180 days. Ensure you follow your hospital's procedure for medication ordering and checking

This procedure should be performed using aseptic technique in a clean treatment area.

When compounded outside a sterile suite the Infusor is only sterile for 24 hours.

Dissolve the required medication in the recommended diluent (0.9% saline or sterile water for injection).
Please refer to the IV drug handbook.
Ensure the drug is completely dissolved then draw the solution into a syringe

Check for air bubbles and expel.

Repeat the process as required to dissolve and draw up the required dose

Check the label on the Infusor, including expiry date.

Remove the protective injection port cap from the Infusor and place temporarily on a sterile alcohol wipe.

Luer lock the syringe to the injection port on the LV10.

With firm downward pressure, on the plunger, inject the contents of the syringe into the Infusor.

Be careful to limit lateral movement at the luer connection site.

Disconnect the syringe and repeat for any additional syringes you have prepared.

For continuous 24 hour infusion ensure the final infusor volume is 240 mL.

Using non-touch technique, replace the protective injection port cap and secure tightly.

Label the Infusor and follow any additional protocols required by your hospital.

The Infusor is now ready to be connected to the patient's catheter.

Use Immediately.

Baxter Healthcare Pty Ltd ABN 43 000 392 781 1 Baxter Drive, Old Toongabbie NSW 2146 Australia Tel: +612 9848 1111
www.baxterhealthcare.com.au

Baxter