MONOGRAPH	
Cefepime Monograph - Paediatric	
Scope (Staff):	Clinical Staff – Medical, Nursing, Pharmacy
Scope (Area):	Perth Children's Hospital (PCH)

This document should be read in conjunction with this DISCLAIMER

DESCRIPTION	• Cefepime is a broad spectrum 4th generation, bactericidal cephalosporin antibiotic. It interferes with bacterial cell wall peptidoglycan synthesis by binding to penicillin-binding proteins resulting in cell lysis.(1-3)
INDICATIONS AND RESTRICTIONS	• Cefepime is active against most enteric Gram-negative bacilli, including Pseudomonas aeruginosa.(1) Cefepime is indicated in the treatment of febrile neutropenia in patients with a delayed penicillin allergy.(2) **IV: Monitored (orange) antibiotic** • If the use is consistent with a standard approved indication, this must be communicated to ChAMP by documenting that indication on all prescriptions (inpatient and outpatient). • The ChAMP team will review if ongoing therapy is required and/or if the order does not meet ChAMP Standard Indications. • If use is not for a standard approved indication, phone approval must be obtained from ChAMP before prescribing.
CONTRAINDICATIONS	• Cefepime is generally contraindicated in patients with a history of high risk allergy to cephalosporins.
PRECAUTIONS	• Cefepime may be prescribed in selected patients with high risk allergy to another Beta-lactam sub-class (e.g. some penicillins, carbapenems) in discussion with immunology. • In patients with a previous low risk reaction to cefepime or another cephalosporin (delayed rash [>1hr after initial exposure] without mucosal or systemic involvement) the risk of subsequent reaction is low. Re-challenge may be acceptable in discussion with immunology. • Use with caution in patients with seizure disorders or renal impairment due to increased risk of neurotoxicity. (3, 7) • Patients with renal impairment also have an increased risk of neutropenia.(6)

	• IV aminoglycoside antibiotics are inactivated by IV penicillins and cephalosporins. Aminoglycoside antibiotics are rapidly bactericidal and should be administered first. The line should then be flushed well with a compatible fluid and the penicillin administered.[8]
FORMULATIONS	**Available at PCH:** • 2 grams powder for injection vial **Other formulations available:** • 1 gram powder for injection vial (multiple generic brands) • 2 grams powder for injection vial (multiple generic brands)
DOSAGE	• The doses listed below fall within the standard range. Higher doses may be prescribed for certain situations in consultation with an infectious diseases or clinical microbiology consultant. **Neonates (less than 30 days of age):** • Please refer to Neonatal Medication Protocols **Children (>1 month to 18 years):** **IV/IM:** • **Usual dose:** 50mg/kg/dose (to a maximum of 2 grams) 8 hourly.[3]
DOSAGE ADJUSTMENT	**Dosage adjustment required in renal impairment:** • Dosage adjustment may be required in cases of impaired renal function (with creatinine clearance of less than 50mL/min). • To calculate the estimated glomerular filtration rate (eGFR) use the following formula: eGFR (mL/min/1.73m^2) = $\frac{36.5 \times \text{height (in cm)}}{\text{Serum creatinine (micromol/L)}}$ **Dosage adjustment required in renal impairment:** • Give the standard first dose then: • eGFR ≥ 50mL/minute : normal dose • eGFR 30 to <50mL/minute : 50mg/kg/dose given 12hourly • eGFR 10 to <30mL/minute : 50mg/kg/dose given 24 hourly • eGFR <10mL/minute : 25mg/kg/dose given 24 hourly.[2, 3] **Dosage adjustment required in hepatic impairment:** • No dosage adjustments are required in hepatic impairment.[3, 9]
RECONSTITUTION	**IV:** • Reconstitute each vial with the exact volume of water for injection in the table below to give a 100mg/mL solution.[4]

	<table><tr><th>Vial size</th><th>Reconstitution volume</th><th>Final concentration</th></tr><tr><td>1 gram</td><td>8.7mL</td><td>100mg/mL</td></tr><tr><td>2 grams</td><td>17.4mL</td><td>100mg/mL</td></tr></table> **IM:** • Reconstitute each vial with the exact volume of water for injection or lidocaine (lignocaine) 1% (10mg/mL) in the table below for intramuscular injection only.[4, 10] <table><tr><th>Vial size</th><th>Reconstitution volume</th><th>Final concentration</th></tr><tr><td>2 gram</td><td>6mL</td><td>230mg/mL</td></tr></table>
ADMINISTRATION	**IM injection:** • Inject into a large muscle mass.[4] Refer to the Intramuscular Injections Guideline for advice on maximum recommended injection volumes for different aged children. **IV infusion:** • Dilute with compatible fluid to a concentration of 40mg/mL or less and infuse over 30 minutes.[3, 4, 7] **IV push:** • Reconstitute to a concentration of 100mg/mL and give slowly over 3 to 5 minutes.[3, 4, 7] **Continuous infusion:** • May be given over 24 hours by continuous (Baxter) infusion. Contact Pharmacy for advice.
MONITORING	• Renal and haematological function should be monitored weekly with prolonged therapy (i.e. longer than 7 days) or high dose treatment.[2, 3]
ADVERSE EFFECTS	**Common:** Diarrhoea, nausea, vomiting, pain and inflammation at injection site, rash, headache, dizziness and allergy. [2] **Rare:** Neurotoxicity (e.g. confusion, seizures, encephalopathy) increased in high dose and/or renal impairment, blood dyscrasias (e.g. neutropenia), thrombocytopenia, bleeding and renal impairment. Immunological reactions (including eosinophilia, drug fever, anaphylaxis, angioedema, urticaria, haemolytic anaemia, Stevens-Johnson syndrome, toxic epidermal necrolysis, interstitial nephritis, arthritis, serum sickness-like syndrome).[2]
COMPATIBLE FLUIDS	• Glucose 5%

	• Glucose/sodium chloride combinations • Sodium chloride 0.9% • Glucose in 5% Hartmann's solution[4]
STORAGE	• Store vials below 25˚C and protect from light.[4] • Store syringes prepared by PCS between 2 and 8˚C.[9]
INTERACTIONS	**Cefepime interacts with other medications. Please consult PCH approved references (e.g. Clinical Pharmacology), your ward pharmacist or Pharmacy on 63546 for more information** • IV aminoglycoside antibiotics are inactivated by IV penicillins and cephalosporins. Aminoglycoside antibiotics are rapidly bactericidal and should be administered first. The line should then be flushed well with a compatible fluid and the penicillin administered.[8] • Care should be taken and renal function monitored when used with other nephrotoxic drugs (e.g. aminoglycosides or potent diuretics) due to an increased risk of neurotoxicity.[2, 7, 9] • Probenecid increase the half-life and prolongs the activity of cephalosporins, monitor for adverse effects.[2] • Concomitant use of warfarin with cefepime (and other cefalosporins) may increase the INR and potentiate the risk for bleeding. Concurrent infection is also a risk factor for increased INR. Monitor patients for signs and symptoms of bleeding and increased monitoring of INR may be necessary.[9]
COMMENTS	• Each vial of cefepime also contains L-arginine as a buffer.[5, 8]
MANUFACTURER SAFETY DATA SHEET (SDS)	To access to the Manufacturer SDS for this product, use the following link to ChemAlert.

Please note: The information contained in this guideline is to assist with the preparation and administration of **cefepime**. Any variations to the doses recommended should be clarified with the prescriber prior to administration

Related CAHS internal policies, procedures and guidelines
Antimicrobial Stewardship Policy
ChAMP Empiric Guidelines and Monographs
KEMH Neonatal Medication Protocols

References and related external legislation, policies, and guidelines

1. Antibiotic Writing Group. eTG complete. West Melbourne: Therapeutic Guidelines Ltd; 2018. Available from: https://tgldcdp-tg-org-au.pklibresources.health.wa.gov.au/etgAccess.
2. Rossi S, editor. Australian Medicines Handboook. Adelaide, S. Aust.: Australian Medicines Handbook; 2018.
3. Taketomo CK, Hodding JH, Kraus DM. Pediatric and Neonatal dosage handbook with international trade names index. 24th edition ed. Ohio: Lexi-comp; 2017-2018.
4. Burridge N. Symons K. (editors). Australian injectable drugs handbook. Collingwood: The Society of Hospital Pharmacists of Australia; 2017.
5. MIMS Australia. MIMS online [full product information]. St Leonards, N.S.W: CMP Medica Australia.; 2018. p. 1v. (various pagings).
6. Royal Australian College of General Practitioners, Pharmaceutical Society of Australia, Australasian Society of Clinical and Experimental Pharmacologists and Toxicologists. AMH: Children's Dosing Companion. Adelaide: Australian Medicines Handbook Pty Ltd; 2017.
7. Phelps S Hagemann T Lee K Thompson A. Pediatric Injectable Drugs: The Teddy Bear Book. 11th Edition ed. Maryland: American Society of Health-System Pharmacists.
8. McEvoy Ge, editor. AHFS Drug Information. 60th Edition ed. Maryland: American Society of Health-System Pharmacists; 2018.
9. Clinical Pharmacology [Internet]. Elsvier BV. 2018 [cited 08/01/2019]. Available from: http://www.clinicalpharmacology-ip.com.pklibresources.health.wa.gov.au/default.aspx.
10. Lilley L, Legge D. Paediatric Injectable Guidelines 5th ed. Melbourne: Royal Children's Hospital Melbourne; 2016.

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