



MONOGRAPH

Benzylpenicillin Monograph - Paediatric

Scope (Staff):	Medical, Nursing, Pharmacy
Scope (Area):	Perth Children's Hospital (PCH)

This document should be read in conjunction with this [DISCLAIMER](#)

DESCRIPTION	<ul style="list-style-type: none"> • Benzylpenicillin (also known as penicillin G) is a narrow spectrum, bactericidal penicillin antibiotic. It binds to penicillin binding proteins, thereby interfering with bacterial cell wall peptidoglycan synthesis and resulting in cell lysis.⁽¹⁾
INDICATIONS AND RESTRICTIONS	<ul style="list-style-type: none"> • Benzylpenicillin is active against many Gram positive bacteria including <i>Streptococcus pyogenes</i>, <i>Streptococcus agalactiae</i> (Group B Streptococcus) and <i>Streptococcus pneumoniae</i>.⁽¹⁻³⁾ • It has activity against some Gram negative bacteria including <i>Treponema pallidum</i> (syphilis) and <i>Neisseria meningitidis</i>.⁽¹⁻³⁾ • Resistance is most commonly secondary to the inactivation of benzylpenicillin by bacterially derived beta-lactamases.⁽²⁾ <p>Oral and IV: Green (unrestricted) antibiotic</p> <ul style="list-style-type: none"> • This is not a restricted agent. Follow standard ChAMP guidelines where appropriate.
CONTRAINDICATIONS	<ul style="list-style-type: none"> • Benzylpenicillin is generally contraindicated in patients with a history of high risk allergy to penicillins.
PRECAUTIONS	<ul style="list-style-type: none"> • Benzylpenicillin may be prescribed in selected patients with high risk allergy to another Beta-lactam sub-class (e.g. some cephalosporins, carbapenems) in discussion with immunology.^(1, 3-5) • In patients with a previous low risk reaction to benzylpenicillin or another penicillin (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. • Rapid IV injection of large doses may cause seizures and electrolyte imbalance.⁽⁵⁾
FORMULATIONS	<p>Available at PCH:</p> <ul style="list-style-type: none"> • 600mg and 1.2gram powder for injection vial

	<p>Other formulations available:</p> <ul style="list-style-type: none"> • 3gram powder for injection vial
<p>DOSAGE</p>	<ul style="list-style-type: none"> • 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. <p>Neonates (less than 30 days old):</p> <ul style="list-style-type: none"> • Please refer to neonatal clinical care drug protocols <p>IV:</p> <p>1 month to 18 years</p> <ul style="list-style-type: none"> • Usual dose: 50mg/kg/dose (to a maximum of 1.2grams) 6 hourly.^(1, 6) • Severe infections: 50mg/kg/dose (to a maximum of 2.4grams) 4 - 6 hourly.^(1, 6) <p>HiTH dosing:</p> <ul style="list-style-type: none"> • 200-300mg/kg/DAY (to a maximum of 14.4gram per day) via a buffered continuous infusion. • Note: this infusion MUST be prepared by Baxter.^(3,5)
<p>DOSAGE ADJUSTMENT</p>	<p>Dosage adjustment required in renal impairment:</p> <ul style="list-style-type: none"> • 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) in infants > 1 year and children, use the Schwartz formula. $\text{eGFR (mL/min/1.73m}^2\text{)} = \frac{36.5 \times \text{height (in cm)}}{\text{Serum creatinine (micromol/L)}}$ <ul style="list-style-type: none"> • CrCl >50mL/minute: normal dosing • CrCl 10 – 50mL/minute: 75% dose at the normal dosing interval • CrCl < 10mL/minute: 20-50% dose at the normal dosing interval (maximum total daily dose of 6grams).^(2, 4) • Sodium content of the injection may accumulate in patients with renal impairment. Electrolyte levels should be closely monitored.⁽⁴⁾ <p>Dosage adjustment required in hepatic impairment:</p> <ul style="list-style-type: none"> • No dosage adjustment is required in patients with hepatic impairment. • In patients with hepatic impairment in conjunction with renal impairment, the dose adjustments above should be used.⁽⁷⁾

RECONSTITUTION	<p>IV:</p> <ul style="list-style-type: none"> Reconstitute each vial with the volume of water for injection in the table below. Further dilution with a compatible fluid may be required for infusions.⁽⁸⁾ <table border="1" data-bbox="523 349 1469 548"> <thead> <tr> <th>Vial strength</th> <th>Volume of water for injection required</th> <th>Resulting concentration</th> </tr> </thead> <tbody> <tr> <td>600mg</td> <td>9.6mL</td> <td>60mg/mL</td> </tr> <tr> <td>1.2gram</td> <td>19.2mL</td> <td>60mg/mL</td> </tr> </tbody> </table> <p>IM:</p> <ul style="list-style-type: none"> Reconstitute each vial with the volume of water for injection in the table below.⁽⁸⁾ <table border="1" data-bbox="523 710 1469 907"> <thead> <tr> <th>Vial strength</th> <th>Volume of water for injection required</th> <th>Resulting concentration</th> </tr> </thead> <tbody> <tr> <td>600mg</td> <td>1.6mL</td> <td>300mg/mL</td> </tr> <tr> <td>1.2gram</td> <td>3.2mL</td> <td>300mg/mL</td> </tr> </tbody> </table>	Vial strength	Volume of water for injection required	Resulting concentration	600mg	9.6mL	60mg/mL	1.2gram	19.2mL	60mg/mL	Vial strength	Volume of water for injection required	Resulting concentration	600mg	1.6mL	300mg/mL	1.2gram	3.2mL	300mg/mL
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ADMINISTRATION	<p>IV push:</p> <ul style="list-style-type: none"> Infusions over at least 30 minutes are preferred in infants and children.⁽⁵⁾ Dilute the dose to a maximum concentration of 60mg/mL with a compatible fluid and infuse over at least 30 minutes.⁽⁵⁾ <p>IV infusion:</p> <ul style="list-style-type: none"> Further dilute reconstituted vial with compatible fluid to a suitable volume and infuse over 30 to 60 minutes.⁽⁵⁾ <p>HiTH administration:</p> <ul style="list-style-type: none"> Give via continuous Baxter® infusion. This solution must be buffered to ensure stability.⁽⁵⁾ <p>IM Injection:</p> <ul style="list-style-type: none"> If IV access is not available this medication may be given by IM injection. Reconstitute as directed above with water for injection to a concentration of 300mg/mL and inject as per PCH guideline Intramuscular Injections (internal link). 																		
MONITORING	<ul style="list-style-type: none"> Renal & hepatic function and full blood count should be monitored weekly with prolonged high-dose therapy (i.e. longer than 10 days).⁽¹⁾ 																		
ADVERSE EFFECTS	<p>Common (>1%): diarrhoea, nausea, pain and inflammation at injection site.^(1,4)</p> <p>Infrequent (0.1-1%): <i>Clostridium difficile</i>-associated disease, vomiting, hypersensitivity reactions (including maculopapular or urticarial rash, pruritus, erythema, fever, anaphylactic shock,</p>																		

	<p>angioedema, bronchospasm, interstitial nephritis, haemolytic anaemia, eosinophilia, serum sickness-like syndrome, exfoliative dermatitis, Stevens-Johnson syndrome and toxic epidermal necrolysis).^(1,4)</p> <p>Rare (<0.1%): black tongue, electrolyte disturbances, neurotoxicity (including; drowsiness, hallucinations, coma, seizures), bleeding, blood dyscrasias (including neutropaenia & thrombocytopaenia).^(1,4)</p>
COMPATIBLE FLUIDS	<ul style="list-style-type: none"> • Glucose 5% • Sodium chloride 0.9%⁽⁵⁾
STORAGE	<ul style="list-style-type: none"> • Store unreconstituted vials at <25°C and protect from light.⁽⁵⁾
INTERACTIONS	<p>Benzylpenicillin may interact with other medications; please consult PCH approved references (e.g. Clinical Pharmacology), your ward pharmacist or Pharmacy on extension 63546 for more information.</p> <ul style="list-style-type: none"> • 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 before benzylpenicillin is administered.⁽¹⁾ • Benzylpenicillin may inhibit methotrexate excretion and may result in excessive methotrexate levels, monitor methotrexate levels closely.⁽⁴⁾ • Large doses of penicillins may affect platelet aggregation and prolong bleeding time. Care should be taken when used in conjunction with other medications that may affect the clotting process.^(1, 4)
COMMENTS	<ul style="list-style-type: none"> • Each 600mg of benzylpenicillin sodium salt contains 41.4mg of sodium.⁽⁵⁾ • 600mg of benzylpenicillin is equivalent to 1million units.^(1, 5)
MANUFACTURER SAFETY DATA SHEET (SDS)	<p>To access to the Manufacturer SDS for this product, use the following link to ChemAlert.</p>




Please note: The information contained in this guideline is to assist with the preparation and administration of **benzylpenicillin**. 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

References and related external legislation, policies, and guidelines

1. Rossi S, editor. Australian Medicines Handbook 2015. Adelaide, S. Aust.: Australian Medicines Handbook; 2015.
2. Antibiotic Writing Group. Therapeutic Guidelines - Antibiotic. West Melbourne: Therapeutic Guidelines Ltd; 2014. Available from: <http://online.tg.org.au.pklibresources.health.wa.gov.au/ip/>.
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5. Burrige N Deidun D Collard N (editors). Australian injectable drugs handbook. Collingwood: The Society of Hospital Pharmacists of Australia; 2014.
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7. Clinical Pharmacology [Internet]. Elsevier BV. 2016 [cited 10/05/2016]. Available from: <http://pklibresources.health.wa.gov.au/login?url=http://www.clinicalpharmacology-ip.com/?id=24317714>.
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File Path:	W:\Safety & Quality\CAHS\CLOVERS MEDICAL Pharmacy\Procedures Protocols and Guidelines\ChAMP		
Document Owner:	Head of Department – Infectious Diseases		
Reviewer / Team:	Children’s Antimicrobial Management Program Pharmacist		
Date First Issued:	September 2013	Last Reviewed:	June 2020
Amendment Dates:	October 2019, June 2020	Next Review Date:	October 2022
Approved by:	Drug and Therapeutics Committee	Date:	August 2020
Endorsed by:	Chair, Drug and Therapeutics Committee	Date:	August 2020
Standards Applicable:	NSQHS Standards:    NSMHS: N/A Child Safe Standards: N/A		

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