

BENZYL PENICILLIN

Indication	<ul style="list-style-type: none"> • Treatment of¹: <ul style="list-style-type: none"> ○ Susceptible infections (most gram-positive organisms) including GBS ○ Congenital syphilis ○ Meningitis 			
INTRAVENOUS	Presentation	<ul style="list-style-type: none"> • Vial 600 mg 1.2 g 		
	Dosage sepsis	<ul style="list-style-type: none"> • 60 mg/kg (frequency according to current gestational age and day of life)² 		
		Current gest age (weeks)	Day of life (days)	Frequency
		29+6 or less	0–28	every 12 hours
			29 or more	every 8 hours
30+0–36+6		0–14	every 12 hours	
	15 or more	every 8 hours		
37+0–44+6	0–7	every 12 hours		
	8 or more	every 8 hours		
45+0 or more	0 or more	every 6 hours		
Dosage congenital syphilis	<ul style="list-style-type: none"> • 30 mg/kg (frequency according to day of life) 			
	Day of life (days)	Frequency		
	0–7	every 12 hours		
	8–30	every 8 hours		
	31 or more	every 4 to 6 hours		
Preparation	<ul style="list-style-type: none"> • 600 mg vial <ul style="list-style-type: none"> ○ Add 1.6 mL of water for injection ○ Draw up solution and make up to 10 mL total volume with water for injection ○ <i>Concentration now equal to 60 mg/mL³</i> 			
	<ul style="list-style-type: none"> • 1.2 g vial <ul style="list-style-type: none"> ○ Add 3.2 mL of water for injection³ ○ Draw up 2 mL of solution and make up to 10 mL total volume with water for injection³ ○ <i>Concentration now equal to 60 mg/mL³</i> 			
Administration	<ul style="list-style-type: none"> • IV infusion <ul style="list-style-type: none"> ○ Prime the infusion line and reduce total syringe volume to the prescribed dose ○ IV infusion via syringe driver pump over 30 minutes⁴ ○ On completion, disconnect syringe and infusion line ○ Flush access port at same rate of infusion 			



IM	Presentation	<ul style="list-style-type: none"> Vial 600 mg 1.2 g 																		
	Dosage sepsis	<ul style="list-style-type: none"> 60 mg/kg (frequency according to current gestational age and day of life) <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="background-color: #ffff00;">Current gest age (weeks)</th> <th style="background-color: #ffff00;">Day of life (days)</th> <th style="background-color: #ffff00;">Frequency</th> </tr> </thead> <tbody> <tr> <td rowspan="2" style="text-align: center;">29+6 or less</td> <td style="text-align: center;">0–28</td> <td style="text-align: center;">every 12 hours</td> </tr> <tr> <td style="text-align: center;">29 or more</td> <td style="text-align: center;">every 8 hours</td> </tr> <tr> <td rowspan="2" style="text-align: center;">30+0–36+6</td> <td style="text-align: center;">0–14</td> <td style="text-align: center;">every 12 hours</td> </tr> <tr> <td style="text-align: center;">15 or more</td> <td style="text-align: center;">every 8 hours</td> </tr> <tr> <td rowspan="2" style="text-align: center;">37+0 or more</td> <td style="text-align: center;">0–7</td> <td style="text-align: center;">every 12 hours</td> </tr> <tr> <td style="text-align: center;">8 or more</td> <td style="text-align: center;">every 8 hours</td> </tr> </tbody> </table>	Current gest age (weeks)	Day of life (days)	Frequency	29+6 or less	0–28	every 12 hours	29 or more	every 8 hours	30+0–36+6	0–14	every 12 hours	15 or more	every 8 hours	37+0 or more	0–7	every 12 hours	8 or more	every 8 hours
		Current gest age (weeks)	Day of life (days)	Frequency																
		29+6 or less	0–28	every 12 hours																
			29 or more	every 8 hours																
30+0–36+6		0–14	every 12 hours																	
	15 or more	every 8 hours																		
37+0 or more	0–7	every 12 hours																		
	8 or more	every 8 hours																		
Dosage congenital syphilis	<ul style="list-style-type: none"> 30 mg/kg (frequency according to day of life) <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="background-color: #ffff00;">Day of life (days)</th> <th style="background-color: #ffff00;">Frequency</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">0–7</td> <td style="text-align: center;">every 12 hours</td> </tr> <tr> <td style="text-align: center;">8–30</td> <td style="text-align: center;">every 8 hours</td> </tr> <tr> <td style="text-align: center;">31 or more</td> <td style="text-align: center;">every 4 to 6 hours</td> </tr> </tbody> </table>	Day of life (days)	Frequency	0–7	every 12 hours	8–30	every 8 hours	31 or more	every 4 to 6 hours											
	Day of life (days)	Frequency																		
	0–7	every 12 hours																		
	8–30	every 8 hours																		
31 or more	every 4 to 6 hours																			
Preparation	<ul style="list-style-type: none"> 600 mg vial <ul style="list-style-type: none"> Add 1.6 mL of water for injection Concentration now equal to 300 mg/mL^{3,4} 1.2 g vial <ul style="list-style-type: none"> Add 3.2 mL of water for injection Concentration now equal to 300 mg/mL^{3,4} 																			
	Administration	<ul style="list-style-type: none"> Draw up the prescribed dose Intramuscular injection into thickest part of the vastus lateralis in the anterolateral thigh (maximum 0.5 mL per site)⁵ immediately after reconstitution 																		
Special considerations	<ul style="list-style-type: none"> Cautions <ul style="list-style-type: none"> 600 mg contains 41.4 mg of sodium^{3,4} If renal impairment, may need dosage adjustment 600 mg is equivalent to 1 million units of benzylpenicillin (also referred to as Penicillin G) If co-prescribed with aminoglycoside, give the antibiotic with shortest duration of administration first (so antibiotic cover commences asap) <ul style="list-style-type: none"> Do not mix in the same injection or infusion solution; flush before and after IM route only if IV not possible UAC route: consult with neonatologist/paediatrician prior to use and refer to Queensland Clinical Guideline: <i>Neonatal medicines</i>⁶ 																			
Monitoring	<ul style="list-style-type: none"> Renal and hepatic function if prolonged high-dose treatment⁷ Extravasation risk 																			
Compatibility	<ul style="list-style-type: none"> Fluids <ul style="list-style-type: none"> 5% glucose⁴, 0.9% sodium chloride^{4,8}, water for injection⁴ Y-site <ul style="list-style-type: none"> Limited and conflicting information. Check with pharmacist 																			
Incompatibility	<ul style="list-style-type: none"> PN and fat emulsion⁴: co-infusion with benzylpenicillin not recommended (evidence limited). If unavoidable, seek pharmacist advice first, filter infusion and flush before and after Drugs <ul style="list-style-type: none"> Aminoglycosides⁴ (amikacin, gentamicin, tobramycin) dobutamine⁴, heparin⁴, noradrenaline (norepinephrine)⁴, phenobarbital (phenobarbitone)⁴, suxamethonium⁴ 																			
Interactions	<ul style="list-style-type: none"> IV aminoglycosides are inactivated by IV cephalosporins, penicillins and teicoplanin⁴ 																			
Stability	<ul style="list-style-type: none"> Vial <ul style="list-style-type: none"> Store below 25 °C. Protect from light^{3,4} Reconstituted solution <ul style="list-style-type: none"> Use immediately^{3,4} 																			



Side effects⁷	<ul style="list-style-type: none"> • Hypersensitivity reactions: rare in neonates. May present as erythema and rash (maculopapular rash, red purple plaques or urticarial type plaques⁹⁻¹²) • Blood pathology: electrolyte disturbances (hypernatremia or hypokalaemia), dyscrasias (e.g. neutropenia, related to dose and duration of treatment, thrombocytopenia) angioedema, haemolytic anaemia, eosinophilia, serum sickness-like syndrome • Digestive: diarrhoea, vomiting, Clostridium difficile-associated disease • Genitourinary: interstitial nephritis • Integumentary: inflammation at injection site • Nervous system: neurotoxicity with high doses and/or rapid IV injection⁴ (e.g. drowsiness, coma, seizures)
Actions	<ul style="list-style-type: none"> • Beta-lactamase sensitive penicillin antibiotic
Abbreviations	EOGBSD: early onset group B streptococcal disease, GBS: Group B streptococcus, IM: intramuscular, IV: intravenous, UAC: umbilical arterial catheter
Keywords	Benzylpenicillin, penicillin, penicillin G sodium, crystalline penicillin, BenPen

The Queensland Clinical Guideline *Neonatal Medicines* is integral to and should be read in conjunction with this monograph. Refer to the disclaimer. Destroy all printed copies of this monograph after use.

References

1. IBM Micromedex® Neofax®. Benzylpenicillin. In: IBM Micromedex® NeoFax®/Pediatrics (electronic version) IBM Watson Health, Greenwood Village, Colorado, USA. October 2018 [cited 2019 January 21]. Available from: <https://www.micromedexsolutions.com>.
2. Australian Medicines Handbook Children's Dosing Companion. Benzylpenicillin. [Internet]. Adelaide: Australian Medicines Handbook Pty Ltd; January 2018 [cited 2019 May 09]. Available from: <https://amhonline.amh.net.au>.
3. MIMS Online. Benzylpenicillin. [Internet]: MIMS Australia; May 2007 [cited 2019 January 21]. Available from: <https://www.mimsonline.com.au>.
4. Australian Injectable Drugs Handbook. Nicolette Burrige, Keli Symons, editors. Benzylpenicillin. 7th ed. [Internet]. New South Wales: Society of Hospital Pharmacists of Australia (SHPA); November 2018 [cited 2019 January 21]. Available from: aidh.hcn.com.au.
5. Hockenberry M, Wilson D. Wong's Nursing Care of Infants and Children. 10th ed. USA: Elsevier; 2014.
6. Queensland Clinical Guidelines. Neonatal medicines. Guideline No. MN19.54-V1-R24. [Internet]. Queensland Health. 2019. [cited 2021 January 15]. Available from: <https://www.health.qld.gov.au/gcg>
7. Australian Medicines Handbook. Benzylpenicillin. [Internet]. Adelaide: Australian Medicines Handbook Pty Ltd; January 2019 [cited 2019 January 21]. Available from: <https://amhonline.amh.net.au>.
8. Trissels™ 2 Clinical Pharmaceutics Database. IV Compatibility Module. [online database] 2019 [cited 2020 July 02]. Available from: <https://www.micromedexsolutions.com>.
9. Carder KR. Hypersensitivity reactions in neonates and infants. *Dermatol Ther* 2005;18(2):160-75.
10. Lohmeier K, Megahed M, Schulte KW, Stannigel H, Mayatepek E, Schroten H. Toxic epidermal necrolysis in a premature infant of 27 weeks' gestational age. *Br J Dermatol* 2005;152(1):150-1.
11. Martini S, Alessandrini R, Arcuri S, Faldella G. Vancomycin-induced red man syndrome presentation in a preterm infant. *Pediatr Dermatol* 2018;35(6):e408-e9.
12. Maulidi H, Godambe S, Chow P. Suspected drug reaction with piperacillin/tazobactam, in a premature infant. *Br J Clin Pharmacol* 2008;65(6):971-2.

Document history

ID number	Effective	Review	Summary of updates
NMedQ20.013-V1-R25	01/03/2020	01/03/2025	Endorsed by Queensland Neonatal Services Advisory Group (QNSAG)
NMedQ20.013-V2-R25	03/12/2020	01/03/2025	<ul style="list-style-type: none">• Dose for congenital syphilis changed FROM 50 mg/kg TO 30 mg/kg• PMA changed to current gestational age• QR code added
NMedQ20.013-V3-R25	13/08/2021	01/03/2025	<ul style="list-style-type: none">• Removed UAC icon and amended instructions for administration via UAC• Amended instructions for co-prescription with aminoglycosides to clarify order of administration

QR code

