




MONOGRAPH	
Inhaled Vancomycin Monograph - Paediatric	
Scope (Staff):	Clinical Staff – Medical, Nursing, Pharmacy
Scope (Area):	Perth Children's Hospital (PCH)
<p><b>Child Safe Organisation Statement of Commitment</b></p> <p>The Child and Adolescent Health Service (CAHS) commits to being a child safe organisation by meeting the National Child Safe Principles and National Child Safe Standards. This is a commitment to a strong culture supported by robust policies and procedures to ensure the safety and wellbeing of children at CAHS.</p>	

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

<p><b>DESCRIPTION</b></p> 	<ul style="list-style-type: none"> <li>Vancomycin is a glycopeptide antibiotic.<sup>(1-3)</sup></li> <li>It inhibits bacterial cell wall synthesis by preventing the formation of peptidoglycan polymers, alters the bacterial cell membrane permeability and inhibits RNA synthesis.<sup>(4-6)</sup></li> <li>Vancomycin is a <a href="#">High Risk Medicine</a>.</li> </ul>
<p><b>INDICATIONS AND RESTRICTIONS</b></p>	<ul style="list-style-type: none"> <li>Inhaled vancomycin is used in the eradication and treatment of <i>Staphylococcus aureus</i> from the respiratory tract in patients with cystic fibrosis.<sup>(3)</sup></li> </ul> <p><b>Inhaled: Monitored (orange) antibiotic</b></p> <ul style="list-style-type: none"> <li>If the use is consistent with a standard approved indication, this must be communicated by documenting that indication on all prescriptions (inpatient and outpatient).</li> <li>The ChAMP team will review if ongoing therapy is required and/or if the order does not meet <a href="#">ChAMP Standard Indications</a>.</li> <li>If use is not for a standard approved indication, phone approval must be obtained from ChAMP before prescribing.</li> <li>Refer to the <a href="#">IV vancomycin</a> and <a href="#">oral vancomycin</a> monograph for further information on different routes of administration.</li> </ul>
<p><b>CONTRAINDICATIONS</b></p>	<ul style="list-style-type: none"> <li>Hypersensitivity to vancomycin or any component of the formulation.<sup>(4, 6)</sup></li> <li>A history of significant bronchospasm on inhalation of vancomycin.<sup>(7)</sup></li> </ul>
<p><b>PRECAUTIONS</b></p>	<ul style="list-style-type: none"> <li>Bronchospasm may occur - ensure a short acting bronchodilator is administered prior to administration of the first and subsequent doses.<sup>(3, 7)</sup></li> </ul>

	<ul style="list-style-type: none"><li>Care must be taken in patients with a history of hypersensitivity to teicoplanin as cross reactivity has occurred.<sup>(3)</sup></li></ul>						
FORMULATIONS	<p><b>Available at PCH:</b></p> <ul style="list-style-type: none"><li>500mg vials</li><li>1gram vials (Only for Pharmacy Compounding Service use)</li><li>125mg capsules (for oral administration only- not covered in this monograph)</li><li>250mg capsules (for oral administration only- not covered in this monograph)</li></ul> <p><b>Other preparations available:</b></p> <ul style="list-style-type: none"><li>Multiple generic preparations</li></ul>						
DOSAGE	<ul style="list-style-type: none"><li>The doses listed below fall within the standard range.</li><li>Higher doses may be prescribed for certain situations in consultation with an Infectious Diseases or Clinical Microbiology consultant.</li></ul> <p><b>Neonates (less than 30 days of age):</b></p> <ul style="list-style-type: none"><li>Not routinely used in neonates less than 30 days old, contact Infectious Diseases or Clinical Microbiology for advice.</li></ul> <p><b>Children:</b></p> <p><b>Inhalation must only be administered after a short acting bronchodilator</b></p> <ul style="list-style-type: none"><li><b>4 years to 18 years:</b> 4mg/kg/dose (to a maximum of 250mg) four times daily for 10 to 14 days.<sup>(3, 7-10)</sup></li></ul> <p>For children less than 4 years old dosing is not established, contact Infectious Diseases or Clinical Microbiology for advice.</p>						
DOSAGE ADJUSTMENT	<ul style="list-style-type: none"><li>As systemic absorption of vancomycin following nebulisation is low, dose adjustment in renal or hepatic impairment is not necessary, however caution should still be taken.<sup>(8, 11)</sup></li></ul>						
RECONSTITUTION	<table><tr><th>Vial</th><th>Volume of 0.9% sodium chloride</th><th>Resulting concentration<sup>(1)</sup></th></tr><tr><td>500mg</td><td>10mL</td><td>50mg/mL</td></tr></table> <ul style="list-style-type: none"><li>Shake the vial well to ensure the vancomycin has dissolved and allow the bubbles to settle before drawing up the required dose.</li></ul>	Vial	Volume of 0.9% sodium chloride	Resulting concentration <sup>(1)</sup>	500mg	10mL	50mg/mL
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500mg	10mL	50mg/mL					
ADMINISTRATION	<ul style="list-style-type: none"><li>Administer a short acting bronchodilator prior to each dose of inhaled vancomycin.<sup>(3)</sup></li><li>After reconstitution, draw up the required volume and place in</li></ul>						




	<p>the nebuliser pot.</p> <ul style="list-style-type: none"> <li>The patient should be sitting upright or standing and breathing normally through the mouthpiece of the nebuliser.</li> <li>Refer to <a href="#">Pari Nebuliser Administration</a> Guideline for further information.</li> </ul>
<b>MONITORING</b>	<ul style="list-style-type: none"> <li>Measure lung function before and after initial dose of vancomycin and monitor for bronchospasm.<sup>(3)</sup></li> <li>Patients should be monitored for adverse effects as per systemic administration, in particular ototoxicity and nephrotoxicity. Please refer to <a href="#">IV vancomycin</a> monograph for possible systemic side effects.</li> </ul>
<b>ADVERSE EFFECTS</b>	<p><b>Common:</b></p> <ul style="list-style-type: none"> <li>Cough, bronchospasm, bitter taste, moderate chest pain after coughing, throat irritation, bronchoconstriction.<sup>(7, 12)</sup></li> </ul> <p><b>Rare:</b></p> <ul style="list-style-type: none"> <li>Studies have shown minimal systemic absorption of vancomycin when administered by inhalation. However, patients should still be monitored for adverse effects as per systemic administration, in particular ototoxicity and nephrotoxicity.</li> </ul>
<b>COMPATIBLE FLUIDS</b>	<ul style="list-style-type: none"> <li>Sodium chloride 0.9%</li> <li>Water for injection.<sup>(1, 3)</sup></li> </ul>
<b>STORAGE</b>	<ul style="list-style-type: none"> <li><b>Vial:</b> Store below 25°C<sup>(1, 4)</sup></li> <li>For use as an inpatient, a new vial must be used for each dose.</li> <li>For use at home a vial may be reconstituted each day and the remaining solution stored between 2-8°C for up to 24 hours.<sup>(2, 13)</sup></li> </ul>
<b>INTERACTIONS</b>	<p><b>Inhaled vancomycin may interact with other medications; please consult PCH approved references (e.g. <a href="#">Clinical Pharmacology</a>), your ward pharmacist or Pharmacy on extension 63546 for more information.</b></p> <ul style="list-style-type: none"> <li>Whilst systemic absorption should be negligible, Vancomycin can cause nephrotoxicity and ototoxicity. Caution should be taken with the concurrent use of nephrotoxic and ototoxic agents.<sup>(4, 5)</sup></li> </ul>
<b>MANUFACTURER SAFETY DATA SHEET (SDS)</b>	<p>To access to the Manufacturer SDS for this product, use the following link to <a href="#">ChemAlert</a>.</p>

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

Related CAHS internal policies, procedures and guidelines
<a href="#">Antimicrobial Stewardship Policy</a>
<a href="#">ChAMP Empiric Guidelines and Monographs</a>
<a href="#">KEMH Neonatal Medication Protocols</a>

References and related external legislation, policies, and guidelines
<ol style="list-style-type: none"> <li>1. Symons K, Ermer J. (editors). Australian injectable drugs handbook. Collingwood: The Society of Hospital Pharmacists of Australia; 2020.</li> <li>2. Clinical Pharmacology [Internet]. Elsevier BV. 2021 [cited 14/01/2021]. Available from: <a href="http://www.clinicalpharmacology-ip.com.pklibresources.health.wa.gov.au/default.aspx">http://www.clinicalpharmacology-ip.com.pklibresources.health.wa.gov.au/default.aspx</a>.</li> <li>3. Paediatric Formulary Committee. BNF for Children: 2020. London: BMJ Group Pharmaceutical Press; 2021.</li> <li>4. MIMS Australia. MIMS online [full product information]. St Leonards, N.S.W: CMP Medica Australia.; 2020. p. 1v. (various pagings).</li> <li>5. Rossi S, editor. Australian Medicines Handbook. Adelaide, S. Aust.: Australian Medicines Handbook; 2020.</li> <li>6. Taketomo CK, Hodding JH, Kraus DM. Pediatric and Neonatal dosage handbook with international trade names index. 26th edition ed. Ohio: Lexi-comp; 2019-2020.</li> <li>7. Dezube R, Jennings MT, Rykiel M, Diener-West M, Boyle MP, Chmiel JF, et al. Eradication of persistent methicillin-resistant Staphylococcus aureus infection in cystic fibrosis. J Cyst Fibros. 2019;18(3):357-63.</li> <li>8. Hayes et al. Aerosolized Vancomycin for the treatment of MRSA after lung transplantation (abstract) Respirology. 2010;15:182-6.</li> <li>9. Solís A, Brown D, Hughes J, Van Saene HK, Heaf DP. Methicillin-resistant Staphylococcus aureus in children with cystic fibrosis: An eradication protocol. Pediatr Pulmonol. 2003;36(3):189-95.</li> <li>10. Kiefer A, Bogdan C, Melichar VO. Successful eradication of newly acquired MRSA in six of seven patients with cystic fibrosis applying a short-term local and systemic antibiotic scheme. BMC Pulm Med. 2018;18(1):20.</li> <li>11. Shirai M et al. Effect of inhaled vancomycin hydrochloride on elimination of methicillin-resistant Staphylococcus aureus (abstract) Nihon Kyobu Shikkan Gakkai Zasshi 1995;Nov 33(11).</li> <li>12. Jennings M, Bucur C, Boyle M, Konstan M. Safety and pharmacokinetics of inhaled vancomycin in individuals with cystic fibrosis. American Cystic Fibrosis Conference; September 2010; Baltimore: Pediatric pulmonology; 2010. p. 320.</li> <li>13. Royal Pharmaceutical Society. Martindale: The Complete Drug Reference. London: The Pharmaceutical Press 2020.</li> </ol>

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