DESCRIPTION	Vancomycin is a glycopeptide antibiotic, it inhibits bacterial cell wall synthesis by preventing the formation of peptidoglycan polymers. Vancomycin also alters the bacterial cell membrane permeability and RNA synthesis.[1,2,3] Vancomycin is active against Gram-positive bacteria, including methicillin-resistant *Staphylococcus aureus* (MRSA), methicillin-resistant coagulase-negative staphylococcal species and penicillin-resistant Streptococcal or Enterococcal species.[4,5]
ChAMP INDICATIONS AND RESTRICTIONS	**IV, oral and inhaled: Category B: Monitored** ChAMP team to be notified of use and will review if ongoing therapy is required outside of specified indications. Refer to separate IV and Oral Vancomycin monographs for standard ChAMP indications for those routes. **Standard Indications:** • Bone and or joint infection: severe or penicillin allergy • Cystic fibrosis: exacerbation, MRSA • *Clostridium difficile* colitis: proven or suspected, severe or recurrent • CNS infection: empiric, hospital-acquired including shunt infections • Central venous access device infection: empiric • Endocarditis or endovascular infection: empiric • Endophthalmitis or penetrating eye injury: empiric • Febrile neutropenia: immediate penicillin allergy or features of systemic compromise • Meningitis: empiric, ≥1 month old • Peritonitis: CAPD associated: empiric, known/suspected MRSA and/or directed therapy • Pneumonia: empiric, moderate to severe hospital-acquired • Pneumonia: empiric, severe and community-acquired, ≥1 month old • Pneumonia: empiric or proven staphylococcus • Prophylaxis: cardiac surgery and inpatient for > 72 hours • Prophylaxis: VP shunt insertion • Prophylaxis: surgical and known or suspected MRSA • Sepsis: healthcare associated and ≥1 month old • Sepsis: late onset neonatal • Lymphadenitis: severe and ≥3 months old • Sepsis: severe, haemodynamic instability and/or ICU admission • Soft tissue infection: penicillin allergy, MRSA or severe
FORMULATIONS	500mg and 1gram powder for injection vial
DOSAGE	The doses listed below fall within the standard range. Higher doses may be prescribed for certain situations. This should be in consultation with Infectious Diseases or Microbiology consultants. Vancomycin twice daily dosing as suggested in the Therapeutic Guidelines – Antibiotics 14th edition 2010 **is not adopted at PMH** due to: • Vancomycin clearance in children is more rapid compared to adults • It is more difficult to achieve and maintain therapeutic levels in children with twice daily dosing. Loading doses are NOT routinely recommended in paediatrics but can be used for serious infections in discussion with microbiology or infectious diseases. A loading dose should not exceed 30mg/kg/dose to a maximum of 1.5grams once only. **IV:** **Initial dose:** 15mg/kg (to a maximum of 750mg) 6 hourly Subsequent doses may be increased incrementally based on serum trough levels and renal function to a dose of 80mg/kg/day or 3 grams, whichever is less. [3,6,7] ANY increase in dose above 80mg/kg/day or 3 grams per day requires

	consultation with either microbiology or infectious diseases to manage ALL future dose increases. **Oncology patients:** **Initial dose:** 20mg/kg (to a maximum of 1gram) 8 hourly[7, 8] Subsequent doses may be increased incrementally based on serum trough levels and renal function to a dose of 80mg/kg/day or 3grams daily, whichever is less.[3,8] ANY increase in dose above 80mg/kg/day or 3 grams per day requires consultation with either microbiology or infectious diseases to manage ALL future dose increases. **Continuous infusions:** For those patients in whom the maximum recommended dose does not result in therapeutic drug levels, a continuous infusion may be used in consultation with microbiology or infectious diseases. **Initial dose:** 60mg/kg/day (to a maximum of 3 grams over 24 hours.) Subsequent doses may be increased incrementally based on serum plateau levels and renal function to a dose of 80mg/kg/day or 3 grams, whichever is less. ANY increase in dose above 80mg/kg/day or 3 grams per day requires consultation with either microbiology or infectious diseases to manage ALL future dose increases. **Oral:** Please refer to separate oral administration monograph **Inhalation:** Please refer to separate inhalation monograph **Neonates:** Please refer to neonatal clinical care drug protocols Neonatology Clinical Care Unit - Drug Protocols - Services A — Z - Women and Newborn Health Service
DOSAGE ADJUSTMENT	Dose obese patients based on **actual** body weight – shorter dosing intervals may be required to maintain serum trough levels.[8] **Dosage adjustment required in renal impairment:** Dosage adjustment may be required in cases of impaired renal function or haemofiltration/dialysis (with creatinine clearance of less than 90mL/min). http://cahs.hdwa.health.wa.gov.au/__data/assets/pdf_file/0003/106986/01_Guidlines_for_calculating_CLcr.pdf Treatment should be initiated at the standard 15mg/kg dose, but administered at intervals as detailed below: CL_{cr} > 90mL/minute : 100% dose 6 hourly CL_{cr} 70-89mL/minute : 100% dose 8 hourly CL_{cr} 46-69mL/minute : 100% dose 12 hourly CL_{cr} 30-45mL/minute : 100% dose 18 hourly CL_{cr} 15-29mL/minute : 100% dose 24 hourly CL_{cr} < 15mL/minute: 100% dose 24-48 hourly, subsequent levels based on therapeutic monitoring. [7] Contact Pharmacy for further information.
RECONSTITUTION	**IV:** Reconstitute 500mg vial with 10mL water for injection and the 1gram vial with 20mL of water for injection to give a 50mg/mL solution. Further dilute with compatible fluid to 5mg/mL (or 10mg/mL if fluid restricted) [9] Use solution prepared by CIVAS when possible.
ADMINISTRATION	**IV infusion:** Dilute to a concentration of 5mg/mL or less and infuse over at least 60 minutes. Maximum infusion rate is 10mg/minute.[10] If the patient is fluid restricted, a maximum concentration of 10mg/mL may be given via a central line.[10]

	Loading dose: ALL loading doses should be infused over a minimum of 2 hours to avoid infusion related reactions.
MONITORING	**Levels should ALWAYS be taken as a finger prick and NOT from the line to facilitate accurate measurement of levels.** **General monitoring** Trough level should be taken immediately prior to the 4th or 5th dose (18 to 24hr after dose 1) and repeated every 3 to 5 days thereafter with target levels[7] children < 12 years : 10-20mg/L children > 12 years : 15-25mg/L More frequent monitoring should be performed in patients with renal dysfunction or impairment renal function instability and in those patients on concomitant nephrotoxic drugs due to the increased risk of elevated levels. Contact Pharmacy for further information. **Monitoring for continuous infusions:** Plateau level should be measured 36 to 48 hours after commencement of the infusion with target levels between 20-30mg/L **Additional monitoring:** Renal function and electrolytes should be performed twice weekly[2]
ADVERSE EFFECTS	**Common:** local pain, thrombophlebitis, infusion related reactions e.g. red man's syndrome), nephrotoxicity, hypotension, palpitations, tachycardia, fever, dizziness, pruritus, rash, flushing, reversible neutropenia, inflammation or irritation of injection site. **Rare:** Interstitial nephritis, serious skin reactions, *Clostridium difficile*-associated disease, anaphylaxis, hypersensitivity reactions (including; chills, urticaria, Stevens-Johnson syndrome, toxic epidermal necrosis, eosinophilia, angioedema, vasculitis, fever and rigors), ototoxicity.[1, 2]
COMPATIBLE FLUIDS	Glucose 5% and 10% Sodium chloride 0.9% Hartmann's[10]
STORAGE	Vials for reconstitution: below 25˚C Solutions prepared by CIVAS: Store between 2-8˚C
PRECAUTIONS	Vancomycin should be used cautiously in patients with a history of a serious reaction to teicoplanin, cross reactivity has occurred between teicoplanin and vancomycin.[2]
COMMENTS	If symptoms of red man syndrome occur, stop the infusion until symptoms and signs resolve and then recommence with increased infusion time to 120 minutes or longer. Consider use of an antihistamine prior to any future doses.[10] Vancomycin should not be recommenced in children who have developed airway or haemodynamic compromise on therapy. Oral dosing must NEVER be used to treat a systemic infection.[1]

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

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