



ADULT Medication Monograph

VANCOMYCIN IV

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

[Formulary: Restricted](#)

⚠ HIGH RISK Medication

Incorrect dosing with respect to weight and renal function may result in significant nephrotoxicity and ototoxicity. Under dosing may result in treatment failure, monitoring of drug levels is required.

Class	Bactericidal glycopeptide										
Presentation	Vial: 500mg										
Storage	Store at room temperature, below 25°C. Protect from light										
Dose	<p>All adult patients treated with vancomycin at KEMH should be discussed with the microbiology team and pharmacy team</p> <p><u>Loading Dose</u></p> <p>IV infusion:</p> <p>It is the consensus view of the Therapeutic Guidelines Antibiotic Expert Groups that a loading dose should be considered for critically ill adults because these patients are at high risk of poor outcomes.</p> <p>A weight-based loading dose of 25-30mg/kg (rounded to the nearest 250mg) up to maximum of 2.5g is recommended because volume of distribution and clearance of vancomycin correlate with actual body weight. See Table 1.</p> <p>Seek expert advice on loading doses for obese patients and patients with severe renal impairment.</p> <p>Table 1: Calculated vancomycin LOADING dosages for adults with NORMAL renal function:</p> <table border="1"> <thead> <tr> <th>Actual Body Weight (kg)</th> <th>Recommended LOADING Dose</th> </tr> </thead> <tbody> <tr> <td>40-44</td> <td>1 g</td> </tr> <tr> <td>45-54</td> <td>1.25 g</td> </tr> <tr> <td>55-64</td> <td>1.5 g</td> </tr> <tr> <td>65-74</td> <td>1.75 g</td> </tr> </tbody> </table>	Actual Body Weight (kg)	Recommended LOADING Dose	40-44	1 g	45-54	1.25 g	55-64	1.5 g	65-74	1.75 g
Actual Body Weight (kg)	Recommended LOADING Dose										
40-44	1 g										
45-54	1.25 g										
55-64	1.5 g										
65-74	1.75 g										

75-84	2 g
85-94	2.25 g
>95	2.5g

Maintenance Doses

IV infusion:

For intermittent vancomycin dosing in non-obese adults, an initial maintenance dosage is 15 to 20 mg /kg (actual body weight) every 12 hours. See Table 2.

Table 2: Calculated vancomycin MAINTENANCE dosages for adults with NORMAL renal function:

Actual Body Weight (kg)	Recommended Maintenance Dose
	Creatinine clearance >60mL/minute
40 to 49	750 mg 12-hourly
50 to 64	1 g 12-hourly
65 to 78	1.25 g 12-hourly
79 to 92	1.5g 12-hourly
93 to 107	1.75 g 12-hourly
108 or more	2 g 12-hourly

Renal impairment and obesity:

The frequency of vancomycin dosing depends on patient renal function, a direct correlate of vancomycin clearance. Guidance on the frequency of vancomycin dosing in patients with renal impairment (creatinine clearance [CrCL] < 60 mL/minute) is addressed in Therapeutic Guidelines (eTG complete) Antibiotic: Principles of Vancomycin Use. Alternatively, advice may be sought from the on call Clinical Microbiologist.

Dosing advice for patients with severe renal impairment (CrCL < 20mL/minute) or for obese adults (body mass index > 35 kg/m²) must be sought from the KEMH on call Clinical Microbiologist.

Image 1: Example of vancomycin inpatient order

Start Date <i>01/07</i>	Medicine (print generic name)/form <i>Vancomycin</i>	<input type="checkbox"/> Tick if slow release		Document exact time given						
Route <i>IV</i>	Dose and Frequency <i>1.5g every 12 hours</i>	and how often times →	10:00	X	<input type="checkbox"/>					
Indication <i>MRSA bacteraemia</i>	Pharmacy <i>Aim for level 15-20mg/L</i>	Imprest S8 S4R	22:00							
Prescriber signature <i>A Prescriber</i>	Print name <i>A. Prescriber</i>	SAC/AAN	Level							

Surgical prophylaxis

IV infusion:

Based on 15mg/kg single dose;

Weight (kg)	Dose	Infusion Duration
< 50	15mg/kg	Dependent on calculated dose. Refer to Table 3 below.
50-75	1g	≥ 60 minutes
> 75kg	1.5g	≥ 90 minutes

Prevention of group B streptococcal disease

IV infusion:

Based on 20mg/kg every 12 hours

Weight (kg)	Dose	Infusion Duration
< 50	20mg/kg, 12 hourly	Dependent on calculated dose. Refer to Table 3 below.
50-74	1.25g, 12 hourly	≥ 90 minute
75-100	1.75g, 12 hourly	≥ 120 minutes
> 100	2g, 12 hourly	≥ 120 minutes

Administration

IV infusion

Step 1 Reconstitution:

Add 10mL Water for Injection to vial. Concentration is 50mg/mL.

Step 2 Dilution:

Further dilute to 5mg/mL with glucose 5% or sodium chloride 0.9%.

Maximum concentration for administration via a peripheral line is 5mg/mL (i.e. 1g in at least 200mL fluid). Maximum concentration for administration via a central line is 10mg/mL (i.e. 1g in at least 100mL fluid)

Step 3 Administration:

Infuse at the volumes and durations suggested in Table 3 or at a *maximum rate of 10mg/min* (to avoid red man syndrome).

Table 3: Recommended vancomycin infusion volume and duration

Dose	Volume	Infusion Duration
500 mg	≥ 100mL	≥ 60 minutes
750 mg	≥ 250mL	≥ 60 minutes
1 g	≥ 250mL	≥ 60 minutes
1.25 g	≥ 250mL	≥ 90 minutes
1.5 g	≥ 500mL	≥ 90 minutes
1.75 g	≥ 500mL	≥ 120 minutes
2 g	≥ 500mL	≥ 120 minutes

Fluid restricted patients

May be administered using a concentration NOT exceeding 10mg/mL via a central line or PIVC and at a rate NOT exceeding 10mg/minute

Surgical prophylaxis

Ideally, complete administration prior to induction of anaesthesia.

In an emergency situation, where vancomycin is required, the Antibiotic Expert Groups of the Therapeutic Guidelines: Antibiotic 16 (2019) recommend that the infusion should be started at least 15 minutes before incision to ensure adequate blood and tissue concentrations at the time of incision and allow potential infusion related toxicity to be recognised before the induction of anaesthesia. The infusion can be completed after surgical incision.

Continuous infusion

Can be given as continuous infusion – seek microbiology advice regarding dosing and monitoring

Pregnancy

1st Trimester: Considered safe to use

2nd Trimester: Considered safe to use

3rd Trimester: Considered safe to use

Breastfeeding

Safe to use

Monitoring**Therapeutic Drug Monitoring (TDM)**

Plasma concentration monitoring is recommended for patients treated with vancomycin for longer than 48 hours, to optimise dosing. Monitoring is also important to minimise the risk of toxicity, especially in obese patients or patients with impaired kidney function.

The recommended approach to vancomycin monitoring varies depending on renal function.

Patients with normal renal function (creatinine clearance [CrCL] >60 mL/min):

The first TDM (trough level) should occur just prior to the **fourth** dose (including the loading dose). It is not necessary to wait for the result to give the next scheduled dose.

Patients with a CrCL of 20-60 mL/min

Consider monitoring trough level earlier (after 48 hours).

Patients with a CrCL of <20mL/min

Consider monitoring trough level earlier (after 48 hours). Unless patient is critically unwell, wait for trough result prior to giving dose.

Once stable therapeutic target levels are achieved, TDM can be undertaken twice weekly.

Table 4: Dose adjustment Guide

Trough plasma concentration	Suggested dosage adjustment
Less than 10 mg/L	Increase dosage by adjusting the dose or dose interval.
10 to 14 mg/L	For patients with uncomplicated infection who are clinically improving, maintain current dosage. For patients with complicated infection, increase dosage by adjusting the dose or dose interval
15 to 20 mg/L	Maintain current dosage
21 to 25 mg/L	Reduce dosage by adjusting the dose or dose interval, or withhold dose. Monitor for nephrotoxicity.
More than 25 mg/L	Withhold the dose until concentration is less than 20 mg/L and seek microbiology expert advice.

Monitoring of Renal Function




Serum creatinine must be measured and documented whenever vancomycin TDM is carried out, to assist with interpretation of vancomycin serum levels.

Creatinine levels should be checked daily for the first 2 to 3 days of therapy, even if creatinine levels are in the normal range. If serum creatinine increases significantly at any stage, check serum level and wait for trough result prior to re-dosing.

Patients with unstable renal function and patients receiving concomitant treatment with nephrotoxic drugs including piperacillin/tazobactam require closer monitoring of renal function (possibly daily) to ensure toxicity is avoided as per Microbiologist/ID physician.

	<p><u>Red Man Syndrome</u></p> <p>Red man syndrome is a non-immunological reaction that can occur during or shortly after an infusion of vancomycin and is related to the rate of infusion. The reaction is mediated by histamine release, which is characterised by rash, muscle spasms of the chest and back, and sometimes hypotension.</p> <p>If a patient experiences an infusion related reaction to vancomycin:</p> <ul style="list-style-type: none"> • Temporarily stop the infusion. Restart at a lower rate (i.e. 1 g over 2 hours) • Administer an antihistamine (e.g. promethazine). • If newly hypotensive (SBP <90mmHg) or shock-like symptoms, initiate a Code Blue - Medical.
<p>Vancomycin and Piperacillin-Tazobactam Co-Therapy</p>	<p>There is an increased rate of nephrotoxicity (up to 20%) in patients who receive combination therapy with piperacillin-tazobactam and vancomycin.</p> <p>In order to limit the risk of acute kidney injury with this combination therapy:</p> <ul style="list-style-type: none"> • Use alternative antibiotic if possible. • Avoid vancomycin loading dose unless the patient is critically ill. • Limit duration of treatment with combination therapy. • Increased monitoring of renal function and serum vancomycin level is recommended when combination therapy cannot be avoided. • Avoid treatment with other nephrotoxic agents (e.g. anti-inflammatory medications) whenever possible. • Maintain adequate hydration.
<p>Clinical Guidelines and Policies</p>	<p>HDWA Policies:</p> <p>Methicillin-resistant Staphylococcus aureus (MRSA)</p> <p>NMHS Policies:</p> <p>Infection prevention and control policy</p> <p>WNHS Policies:</p> <p>Antimicrobial Stewardship (AMS) policy</p> <p>Micro Alerts and Multi-Resistant Organisms</p> <p>High Risk Medicines</p> <p>KEMH Clinical Guidelines:</p> <p>Antibiotic Prophylaxis for Caesarean Section</p> <p>Group B Streptococcal Disease</p> <p>Group A Streptococcus (GAS)</p>

	<p>Cardiac Disease</p> <p>Infections: Antibiotic prophylaxis for gynaecological and urogynaecological surgery</p> <p>Sepsis and septic shock: Antibiotics for adult patients at KEMH</p> <p>Transmission based precautions</p> <p>KEMH Pharmaceutical & Medicines Management Guidelines:</p> <p>Medication Administration</p>
<p>References</p>	<p>Therapeutic Guidelines. Principles of vancomycin use. In: eTG complete [Internet]. West Melbourne (Victoria): Therapeutic Guidelines; 2019 [cited 2020 Jul 7]. Available from: https://tguidcdp.tg.org.au</p> <p>Therapeutic Guidelines. Principles of surgical antibiotic prophylaxis. In: eTG complete [Internet]. West Melbourne (Victoria): Therapeutic Guidelines; 2019 [cited 2021 Feb 24]. Available from: https://tguidcdp.tg.org.au</p> <p>SHPA, Australian Injectable Drugs Handbook Sixth Edition, ed. N. Burridge, N. Collard, and K. Symons. Collingwood AUSTRALIA: The Society of Hospital Pharmacists of Australia</p> <p>Luther MK, Timbrook TT1,2, Caffrey AR, Dosa D3,4, Lodise TP5, LaPlante KL. Vancomycin Plus Piperacillin-Tazobactam and Acute Kidney Injury in Adults: A Systematic Review and Meta-Analysis. Crit Care Med. 2018 Jan;46(1):12-20. doi: 10.1097/CCM.0000000000002769. Available at; https://www.ncbi.nlm.nih.gov/pubmed/29088001</p> <p>Intravenous vancomycin dosing and monitoring clinical guideline. Royal Perth Bentley Group 2019</p> <p>Prevention of Group B Streptococcal Early-Onset Disease in Newborns: ACOG Committee Opinion, Number 797. Obstet Gynecol. 2020;135(2):e51-e72. doi:10.1097/AOG.0000000000003668</p> <p>Australian Medicines Handbook. Vancomycin. In: Australian Medicines Handbook [Internet]. Adelaide (South Australia): Australian Medicines Handbook; 2020 [cited 2020 Jul 7]. Available from: https://amhonline.amh.net.au</p> <p>Reardon J, Lau TT, Ensom MH. Vancomycin loading doses: a systematic review. Ann Pharmacother 2015;49(5):557–565</p> <p>The Royal Women's Hospital. Vancomycin. In: Pregnancy and Breastfeeding Medicines Guide [Internet]. Parkville (Victoria): The Royal Women's Hospital; 2020 [cited 2020 Jul 7]. Available from: https://thewomenspbmg.org.au</p>

Keywords:	Vancomycin, MRSA, methicillin resistant staphylococcus aureus, cardiac disease, penicillin allergy, surgical prophylaxis, sepsis, group B strep, GBS, group B streptococcal disease, GAS, group A streptococcus, group A strep, sepsis, septic shock		
Publishing:	<input checked="" type="checkbox"/> Intranet <input checked="" type="checkbox"/> Internet		
Document owner:	Chief Pharmacist		
Author / Reviewer:	KEMH Pharmacy Department		
Date first issued:	Oct 2014	Version:	4.2
Last reviewed:	Dec 2017, amended Jan 2019 and Aug 2019; Jul 2020, Dec 2020, amended Feb 2021 and Mar 2021	Next review date:	Dec 2023
Endorsed by:	Medicines and Therapeutics Committee	Date:	Dec 2020
Standards Applicable:	NSQHS Standards: 1  Governance, 3  Infection Control, 4  Medication Safety		
<p>Printed or personally saved electronic copies of this document are considered uncontrolled.</p> <p>Access the current version from the WNHS website.</p> <p>For any enquiries relating to this guideline, please email KEMH.PharmacyAdmin@health.wa.gov.au</p>			

© Department of Health Western Australia 2020