



Specialised Medication – Intravenous Vancomycin in Adults Guideline

1. Guiding Principles

Vancomycin is regarded as a high risk antibiotic if not used correctly. It is most commonly given by intermittent administration. Continuous infusions may be used, but this is usually only of benefit in the setting of ICU or home intravenous therapy.

2. Guideline

Vancomycin is a restricted antibiotic on the Statewide Medicine Formulary – [Formulary One](#). Expert advice should be sought where recommended on the formulary and all antibiotic prescriptions should include indication and duration.

The use in Febrile Neutropenia should be in accordance with [EVIQ guidelines](#) as per WACHS [Cancer Institute NSW - Standard Cancer Treatments - eviQ - EUCP Policy](#).

2.1 Contraindications and precautions

Contraindicated in patient with a history of serious hypersensitivity caused by vancomycin or teicoplanin (excludes red-man syndrome which is a non-immunologic reaction due to infusion rate).

Precautions

- Renal impairment including chronic renal failure or deteriorating renal function; requires reduced maintenance dose and dose intervals
- Patients receiving concurrent piperacillin-tazobactam; requires increased monitoring for renal impairment and closer therapeutic drug monitoring. Avoid loading doses with this combination unless critically ill.
- Patient receiving concurrent nephrotoxic agents such as aminoglycosides, ACE inhibitors and NSAIDS: increased risk of renal impairment requiring close monitoring.

2.2 Dose

All patients need an accurate actual body weight before giving vancomycin as all doses are based on body weight.

Loading dose (only if required)

Where rapid achievement of therapeutic trough level is recommended (e.g. patient critically unwell) a loading dose should be given. Loading dose is 25-30mg/kg actual body weight rounded to the nearest 250mg. Maximum loading dose is 2.5g. For patients with significant renal impairment ($\text{CrCl} < 20\text{mg/min}$) or patients receiving renal

replacement therapy seek advice from an ID physician. See [Table 1](#) for suggested loading doses .

Table 1 : Calculated Vancomycin loading dose for adults with normal renal function

Actual body weight	Recommended loading dose
40-44 kg	1 g
45-54 kg	1.25 g
55-64 kg	1.5 g
65-74 kg	1.75 g
75-84 kg	2 g
85-94 kg	2.25 g
> 95 kg	2.5 g

Surgical prophylaxis

Vancomycin may be indicated in selected surgical prophylaxis usually as a single dose using the loading dose. The infusion should be completed prior to the commencement of the procedure to ensure adequate tissue concentrations at the site of surgical incision. Given the long infusion times, coordination between wards and pre-operative nursing and medical teams is required.

Maintenance doses

Intermittent maintenance doses should be charted at 10:00hrs and 22:00hrs when 12 hourly dosing is recommended.

Vancomycin is documented on the MR170A WA Hospital Medication Chart.

[Table 2](#) provides a guide to initial doses of vancomycin which are then altered according to levels as below. Estimated Creatinine Clearance (CrCl) should be calculated using Cockcroft-Gault equation (online calculators are available via AMH and eTG on the [WACHS library site](#)) and the dose rounded to nearest 250mg. The table is designed as a clinical tool and is intended to be used with clinical judgement.

Table 2: Suggested initial vancomycin maintenance dosages for adults

Actual body weight	Suggested initial vancomycin maintenance dose and frequency		
	CrCl > 60m/min	CrCl 20-60ml/min	CrCl < 20ml/min
< 49kg	15mg/kg 12-hourly	15mg/kg 24-hourly	Seek specialist advice. Recommended frequency from eTG is 48-72 hourly.
50-64kg	1g 12-hourly	1g 24-hourly	
65-78kg	1.25g 12-hourly	1.25g 24-hourly	
79-92kg	1.5g 12-hourly	1.5g 24-hourly	
93-107kg	1.75g 12-hourly*	1.75g 24-hourly*	
> 108kg	2g 12-hourly *	2g 24-hourly*	

*Seek expert advice in critically ill obese patients and patients above BMI 35kg/m².

Continuous Infusions

Home therapy

For home therapy, continuous infusions via an elastomeric device are used. These are generally commenced after a period of dose stabilisation as an inpatient and the initial dose in the infuser is the total daily dose of vancomycin administered over 24 hours. Spot concentration levels are used to monitor as continuous infusions do not have a peak or trough.

Continuous infusions should be documented on the MR170A WA Hospital Medication Chart. The medication order should include the dose, volume and rate.

2.3 Administration

Vancomycin is an irritant drug. Extravasation may cause tissue necrosis.

Vancomycin can cause severe infusion reactions including profound hypotension and red-man syndrome. Do not exceed recommended rates.

- For peripheral lines, administer as an infusion at the rate depending on the dose of vancomycin specified in [Table 4](#) to reduce adverse events
- The maximum concentration of vancomycin (even in fluid-restricted individuals) should NOT exceed 10mg/ml due to the irritant nature of the drug.
- The maximum rate of administration via a peripheral IVC should NOT exceed 10mg/minute. Following the infusion rates recommended in [Table 4](#) may reduce the risk of 'red-man' syndrome.
- Faster infusion rates may be administered through a central or peripherally inserted central catheter (PICC) compared to a peripheral intravenous catheter. Central infusion rates above 1g per hour increase the risk of red man syndrome and should be avoided.
- Record the time and rate of administration – this is important for determining the timing for the trough concentration.

In patients with a previous reaction to vancomycin administration (e.g. 'red-man' syndrome) the infusion rate may be reduced further to minimise the severity of the reaction.

2.4 Monitoring

Therapeutic Drug Monitoring (TDM)

- TDM is recommended for all patients who receive vancomycin for longer than 48 hours.
- TDM is recommended to prevent toxicity and to ensure adequate levels to achieve therapeutic effect.
- Renal function should also be monitored regularly on treatment – daily in acute phase, at least weekly if longer term.

Table 3: Infusion rates for intermittent infusions via a peripheral line

Dose	Volume*	Rate*
500mg	100ml	60 minutes
750mg	250ml	75 minutes
1g	250ml	100 minutes
1.25g	250ml	120 minutes
1.5g	500ml	150 minutes
1.75g	500ml	180 minutes
2g	500ml	200 minutes
>2g	Refer to clinical pharmacist Dilute in 500ml (max conc 10mg/ml) Administer at a maximum 1g per hour.	

*recommended minimum volume and rate for peripheral IVC

Monitoring (cont.)

Intermittent Infusions:

- Steady state is usually reached after the 4th dose. Levels should be taken before the 4th or 5th dose in patient with normal renal function having BD dosing. Steady state will take longer in patients with reduced renal function. Stat doses and courses less than 48 hours do not require levels.
- Blood should be taken immediately before the next dose is due i.e. pre-dose / “trough level. The time of last administration should be recorded on the pathology form.
- Do not withhold the next dose unless specifically advised.
- Facilities without on site vancomycin assay capability will have a delay in the result. Co-ordination with pathology services is important to optimise dosing, check with pathology or your pharmacy department.
- Target vancomycin trough concentrations in Western Australia are 15 to 25mg/L
 - For most indications range of 15 to 20mg/L is appropriate.
 - Target concentrations may vary with the specific target organism and indications such as CNS infections or more severe infections – for more advice regarding the most appropriate target trough concentration for complex infections contact an Infectious Diseases Physician or clinical microbiologist.
- Levels need to be reassessed after a dose adjustment after allowing for time to reach steady state after the dose change.

Continuous infusions

Target levels for continuous infusions are less well defined. Generally 20mg/L is the target concentration but higher or lower targets may be used where the vancomycin MIC is known. Seek expert advice from a clinical microbiologist or infectious disease physician if unsure of target concentration.

Repeat monitoring

In patients with varying renal function or clinical state repeat monitoring every 1-2 days, with dose adjustments as needed.

2.6 Dose adjustment

Dose adjustments should be made in a linear manner (e.g. if the concentration is two - thirds the target concentration then increase the dose by one-third).

Before dose adjusting confirm the timing of the level was appropriate and steady state had been reached. Patients with uncomplicated infections who are clinically improving may be maintained on lower trough concentrations. Treatment failure has been reported with levels below 10mg/L.

Table 4: Suggested dose adjustments

Level	Recommended Dose Adjustment
> 25mg/L	Withhold the next dose until level is below 20ml/L Continuous infusions may only require a dose reduction if the level is more than 30mg/L
20 to 25 mg/L	Dose adjustment may not be necessary depending on clinical context especially with continuous infusions and CNS infections.
15 to 20 mg/L	No change
10 to 15 mg/L	Patients with uncomplicated infections who are improving, maintain the current dose. Increase the dose for continuous infusions.
< 10mg/L	increase the dose by adjusting the dose or frequency

3. Definitions

IVC	Peripheral Intravenous Catheter
Red-man Syndrome	A reaction usually due to infusion being given too quickly. It is not an allergic reaction although symptoms are partly due to histamine release; they include fever, chills, erythema, facial and upper torso rash, which may be followed by hypotension, angioedema and itch.
BMI	Body Mass Index
MIC	Minimum Inhibitor Concentration determined through a laboratory.
TDM	Therapeutic Drug Monitoring.

4. Roles and Responsibilities

All Staff

All staff are required to work within policies and guidelines to make sure that WACHS is a safe, equitable and positive place to be.

Prescribers should ensure pathology requests have been completed for therapeutic drug monitoring where treatment is expected to extend beyond 48 hours. Prompt follow up of blood levels is required to enable dose adjustment, where required, occurs at the first opportunity.

Nurse staff should ensure administration is appropriate for the dose prescribed.

5. Compliance

WACHS staff are reminded that compliance with all policies is mandatory.

6. Evaluation

Monitoring of compliance with this document is to be carried out by WACHS Chief Pharmacist every three (3) years using the following means or tools:

- Assessment of incidents involving vancomycin with the target being zero.

7. Standards

National Safety and Quality Health Care Standards - 3.15, 4.13, 4.15

8. References

- Product information. Vancomycin (DBL Vancomycin) [Internet]. MIMS Australia Pty Ltd & CMPMedica Australia Pty Ltd. Available from [MIMS Online](#)
- Vancomycin. Adelaide SA 5000: Australian Medicines Handbook Pty Ltd; 2019.
- Therapeutic Guidelines: Antibiotic. Melbourne, Australia: Therapeutic Guidelines Limited; 2019.
- Vancomycin. 7th ed. Collingwood 3066, Australia: The Society of Hospital Pharmacists of Australia; 2019. Available from [Australian Injectable Drugs Handbook](#)
- Royal Perth Bentley Group, Intravenous (IV) Vancomycin Dosing and Monitoring Clinical Guideline.
- Tsai, D et al. Optimised dosing of vancomycin in critically ill indigenous Australian patients with severe sepsis. Anaesth Intensive Care. 2018 Jul;46(4):374-380

9. Related forms

[MR170A WA Hospital Medication Chart – Adult short stay](#)

10. Policy Framework

[Clinical Governance, Safety and Quality](#)

**This document can be made available in alternative formats
on request for a person with a disability**

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Appendix 1 – Quick Guide to Vancomycin Dosing and Administration

All patients need an accurate weight before dosing with vancomycin.

Loading dose: Give 25-30mg/kg actual body weight rounded to the nearest 250mg if rapid therapeutic trough is needed. Maximum loading dose 2.5g.

Initial intermittent dose:

Actual body weight	Suggested initial vancomycin maintenance dose and frequency		
	CrCl > 60m/min	CrCl 20-60ml/min	CrCl < 20ml/min
< 49kg	15mg/kg 12-hourly	15mg/kg 24-hourly	Seek specialist advice. Recommended frequency from eTG is 48-72 hourly.
50-64kg	1g 12-hourly	1g 24-hourly	
65-78kg	1.25g 12-hourly	1.25g 24-hourly	
79-92kg	1.5g 12-hourly	1.5g 24-hourly	
93-107kg	1.75g 12-hourly*	1.75g 24-hourly*	
> 108kg	2g 12-hourly *	2g 24-hourly*	

Administration:

For peripheral IV administration the recommended volume and rate are:

Dose	Volume*	Rate*
500mg	100ml	60 minutes
750mg	250ml	75 minutes
1g	250ml	100 minutes
1.25g	250ml	120 minutes
1.5g	500ml	150 minutes
1.75g	500ml	180 minutes
2g	500ml	200 minutes
> 2g	Dilute in 500ml (max conc 10mg/ml) Administer at a maximum 1g per hour.	

Therapeutic Drug Monitoring:

- Vancomycin level and renal function is recommended for all patients who receive vancomycin for longer than 48 hours.
- Check level before the 4th dose for 12 hour dosing or the 3rd dose for 24 hour dosing.
- Target concentration is 15-20mg/L for most infections.

Extravasation may cause tissue necrosis.

Vancomycin can cause severe infusion reactions including profound hypotension and red-man syndrome. Do not exceed recommended rates.

Nephrotoxicity is more common with other nephrotoxic medications like piperacillin/ tazobactam, aminoglycosides and NSAIDs.

This guide should be used with the full Specialised Medication – Intravenous Vancomycin in Adults Guideline