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## BRIEF ADMINISTRATION GUIDE

For detailed information refer to The Australasian Neonatal Medicines Formulary [vancomycin \(intermittent\)](#) or [vancomycin \(continuous\)](#) guidelines



**Critical Note:** there are minor variations between the ANMF and Waikato DHB best practice within this drug guideline – see shaded text

### Indications:

- Methicillin resistant staphylococcal infections (MRSA)
- Infections due to gram-positive bacteria, resistant to beta lactam antibiotics, including osteomyelitis, septicaemia and soft-tissue infections
- Coagulase negative staphylococcal sepsis not responsive to initial amikacin/flucloxacillin therapy or when a central venous line is essential

### Route:

Intravenous

- Supplied as vancomycin hydrochloride, equivalent to vancomycin 500mg vial
- pH of vancomycin when reconstituted with water is 2.8 to 4.5

### Intermittent Dose:

**15 mg/kg** initial dose (consider 20 mg/kg in severe sepsis)

Dosing interval as per **table below**:

Current Gestational Age* (weeks)	Interval* (hourly)	Timing of trough level
≤ 26	18	Before 2 <sup>nd</sup> dose
27 <sup>+0</sup> – 34 <sup>+6</sup>	12	Before 4 <sup>th</sup> dose
35 <sup>+0</sup> – 44 <sup>+6</sup>	8	
> 45	6	

Dosage should be based on either actual weight or birthweight, whichever is greater (unless the patient has hydrops fetalis when an adjusted weight should be used)

\* *When baby changes age adjust interval accordingly taking into account known trough level (see under monitoring)*


Note: for infants with renal impairment an antibiotic without known nephrotoxicity is preferred, but if vancomycin is used perform a trough level before the second dose and await level result before administering the dose.

### Continuous Dose:

Loading dose 15mg/kg over 1 hour, immediately followed by continuous infusion, starting as per the following table:

Serum creatinine (micromol/L)	Current Gestational Age (weeks)	Dose
< 40	≥ 40	2.08 mg/kg/hour (50 mg/kg/day)
< 40	<40	1.67 mg/kg/hour (40 mg/kg/day)
40 – 60	All	1.25 mg/kg/hour (30 mg/kg/day)
> 60	All	0.83 mg/kg/hour (20 mg/kg/day)

If switching from intermittent to continuous vancomycin commence at the dose equivalent to the total daily dose administered in the previous 24 hour period, immediately after the last intermittent dose is given.

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**Intermittent Drug monitoring:**

**Target trough concentration 10-20 mg/L** (aim for higher end of range if suspected severe sepsis or MRSA). See above table for when to take the levels, and **table below** for how to respond to the level. Do NOT withhold the dose while awaiting the trough level (if renal function is normal).

Trough level (mg/L)	Action
< 5	Increase total daily dose by 50%
5 – 10	Increase total daily dose by 25%
10 – 15	No change if uncomplicated MRSA. Otherwise increase dose by 25%
15 - 20	Keep same dose
21 – 25	Decrease total daily dose by 25%
> 25	Decrease total daily dose by 25-50%. Repeat level prior to next due dose until below 20 mg/L
> 30	Withhold dose.

Note: altering the total daily dose can be done by either altering the dose or frequency. Only make one change at a time (e.g. if age changes) then check the level before the 4<sup>th</sup> dose.

Once target trough levels are reached, measure trough levels every 3 days (unless renally impaired, receiving other nephrotoxic drugs, severe sepsis or therapeutic hypothermia, when more frequent monitoring should be employed).

If a peak concentration is required to guide dosing, perform this 1 hour after completion of infusion, and target a peak concentration 20-40 mg/L.

**Continuous Drug Monitoring:**

**Target concentration 15-25 mg/L**

Measure vancomycin concentration 24 hours and 48 hours after the start of the infusion, then every 3 days unless any of the following occurs when earlier testing is warranted: 10% change in body weight, 25% change in serum creatinine, age-related dose adjustment, interruption in IV infusion or indomethacin is administered. If the dose is altered measure 24 hours after each change.

**If vancomycin level is < 15 or > 25 mg/L adjust as follows:**

adjusted dose (mg/kg/hr) = last maintenance dose (mg/kg/hr) x (20 ÷ last vancomycin concentration)

Note: careful consideration should be given if calculated dose is > 4.2 mg/kg/hr

**Preparation and administration**

**Compatible fluids:** glucose 5%, glucose 10%, sodium chloride 0.9%, glucose 5% & sodium chloride 0.9%

- Add 9.75 mL of water for injection to the 500 mg vial to make a 50 mg/mL solution.
- Draw up 5 mL (250 mg) of the above solution and make up to 50 mL with compatible fluid. This gives a final concentration of **5 mg/mL**.


Note: in fluid restricted infants vancomycin a concentration of 10 mg/mL (5 mL in 25 mL) can be used, but this should preferably be administered by CVAD to reduce risk of infusion-related events

Intermittent IV Infusion

- Administer by slow intravenous infusion over **at least one hour** (to avoid rapid infusion related reactions) using a Guardrails profiled syringe driver. In some circumstances e.g. high dose, the rate of infusion may be increased – contact Pharmacist for advice.
- Flush before and after with sodium chloride 0.9% at the same rate as the vancomycin.

Continuous IV Infusion

- Administer infusion over 24 hours using a Guardrails profiled syringe driver (when available).

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## Monitoring

- Observe for adverse effects including 'red man syndrome'
- Monitor renal function, particularly in those with renal insufficiency or receiving concomitant nephrotoxic medications
- Monitor fluid balance
- Monitor auditory and vestibular function weekly in those on prolonged therapy
- Monitor IV site regularly for thrombophlebitis
- Monitor serum levels and adjust dose as recommended in this guideline

## Storage and Stability

- Reconstituted solution in the vial can be used for up to 24 hours when refrigerated (2 to 8 °C) (maximum of up to 96 hours after consultation with Pharmacy e.g. if stock shortage)
- Diluted solutions are stable for up to 24 hours in the refrigerator

## Competency for administration

This procedure is carried out by, or under, the direct supervision of a registered nurse/registered midwife who holds current Waikato DHB Generic Medicine Management and IV certification plus Guardrails competency as well as Neonatal specific competency NCV/NAC (if administering via CVAD).


## Guardrails Information

Vancomycin is Guardrail profiled on the CC pump for NICU. Currently only the intermittent infusion is profiled but the continuous infusion will be added at the next upload in 2022. Following are the guardrail limits:

Guardrails Drug Name	Vancomycin (int)*	Vancomycin (contin)
<b>Concentration (mg/ml)</b>		
Minimum	5	3.2
Maximum	10	10
<b>Administration Rate (mg/kg/hr)</b>		
Default	15	0.83
Soft minimum	7.5	0.4
Soft maximum	22	2.1
Hard maximum	30	4.2

## References

- Australasian Neonatal Medicines Formulary (ANMF). Vancomycin Intermittent and Continuous 2020. [https://www.seslhd.health.nsw.gov.au/sites/default/files/groups/Royal\\_Hospital\\_for\\_Women/Neonatal/Neomed/neo20vancomycinintermittentfull.pdf](https://www.seslhd.health.nsw.gov.au/sites/default/files/groups/Royal_Hospital_for_Women/Neonatal/Neomed/neo20vancomycinintermittentfull.pdf) and [https://www.seslhd.health.nsw.gov.au/sites/default/files/groups/Royal\\_Hospital\\_for\\_Women/Neonatal/Neomed/neomed2020vancomycincontinuousfull.pdf](https://www.seslhd.health.nsw.gov.au/sites/default/files/groups/Royal_Hospital_for_Women/Neonatal/Neomed/neomed2020vancomycincontinuousfull.pdf)
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- <https://www.starship.org.nz/guidelines/vancomycin-hydrochloride/>
- Canterbury DHB NICU Drug Information sheet – Vancomycin, August 2016. Available from <https://cdhb.health.nz/wp-content/uploads/4668513f-vancomycin-236820.pdf>
- Notes On Injectable Drugs 8<sup>th</sup> Edition. New Zealand Hospital Pharmacists Association (Inc.) 2020.
- King Edward Memorial Hospital & Perth Children’s Hospital Neonatology guidelines for Vancomycin. Accessed via [www.kemh.health.wa.gov.au](http://www.kemh.health.wa.gov.au)

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## Appendix

### Infusion tables

**Table 1:** Infusion rates when using vancomycin concentration **5 mg/mL**

Rate (mL/hr)	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
Weight (kg)	Approximate mg/kg/hour									
0.5	1	2	3	4	5	6	7	8	9	10
1	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5
1.5	0.3	0.7	1	1.3	1.7	2	2.3	2.7	3	3.3
2	0.3	0.5	0.8	1	1.3	1.5	1.8	2	2.3	2.5
2.5	0.2	0.4	0.6	0.8	1	1.2	1.4	1.6	1.8	2
3	0.2	0.3	0.5	0.7	0.8	1	1.2	1.3	1.5	1.7
3.5	0.1	0.3	0.4	0.6	0.7	0.9	1	1.1	1.3	1.4
4	0.1	0.3	0.4	0.5	0.6	0.8	0.9	1	1.1	1.3
4.5	0.1	0.2	0.3	0.4	0.6	0.7	0.8	0.9	1	1.1
5	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1

**Table 2:** Infusion rates when using vancomycin concentration **10 mg/mL** (for fluid restricted infants)

Rate (mL/hr)	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
Weight (kg)	Approximate mg/kg/hour									
1	1	2	3	4	5	6	7	8	9	10
1.5	0.7	1.3	2	2.7	3.3	4	4.7	5.3	6	6.7
2	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5
2.5	0.4	0.8	1.2	1.6	2	2.4	2.8	3.2	3.6	4
3	0.3	0.7	1	1.3	1.7	2	2.3	2.7	3	3.3
3.5	0.3	0.6	0.9	1.1	1.4	1.7	2	2.3	2.6	2.9
4	0.3	0.5	0.8	1	1.3	1.5	1.8	2	2.3	2.5
4.5	0.2	0.4	0.7	0.9	1.1	1.3	1.6	1.8	2	2.2
5	0.2	0.4	0.6	0.8	1	1.2	1.4	1.6	1.8	2