Louth: Antimicrobial Guidelines - Louth Hospitals: Antimicrobial Guidelines: Paediatric Guidelines

The LH Paediatric Antimicrobial Guidelines were adapted with kind permission from the Children's Health Ireland (CHI) Antimicrobial Guidelines 2024. Antimicrobial choices and management advice have been amended where necessary to reflect local antimicrobial resistance data and the type of patients and infections encountered in LH.

Please see BNFc and/or CHI 'Clinibee' App for paediatric antimicrobial dosing, unless dose already specified in this guideline.

Paediatric Quick Reference Indication and Dose Poster

LH Quick Reference Paediatric Guideline July 2024 Adapted with kind permission from Children's Health Ireland (CHI) Guidelines		
CENTRAL NERVOUS SYSTEM / SEPSIS		
Meningitis/Sepsis If *H.influenzae/S.pneumoniae* suspected and > 6 weeks old, add dexamethasone (0.15mg/kg – Max 10mg) 6 hourly IV x 4/7. Give before or **within 1 hour** of first dose of antibiotics. ***Empiric choice ≤ 8 weeks: Cef-O-taxime + Amoxicillin** ***Empiric choice > 8 weeks: Cef-O-taxime**		
Cef-O-taxime IV	< 7 days 7 - 21 days > 21 days	50mg/kg 12 hourly 50mg/kg 8 hourly 50mg/kg 6 hourly (max 12g/day)
Amoxicillin IV	< 7 days 7 - 28 days > 28 days - ≤ 8 weeks	100mg/kg 12 hourly 100mg/kg 8 hourly 50mg/kg (max 2g) 4 hourly
+ If history of recent foreign travel for mother or baby, contact Micro for advice		
+ Gentamicin **if** severe sepsis/haemodynamically unstable, inotropes/critical care, likely resistant organisms, e.g. frequent or prolonged hospitalisation, > 48 hrs since admission, recent foreign travel.		
Gentamicin IV	< 7 days 7 - 28 days > 28 days - ≤ 8 weeks	5mg/kg 36 hourly 5mg/kg 24 hourly 7mg/kg 24 hourly
+ Vancomycin **if** MRSA positive, recent foreign travel, prolonged antibiotics in past 3 months, concern about infected prosthetic material, e.g. PICC line in-situ. See LH App for dose.		
+ Clindamycin **if** suspected staphylococcal/streptococcal toxic shock.		
+ Aciclovir IV **if HSV** suspected	0-3 months 3 months – 12 years ≥12 years	20mg/kg 8 hourly 20mg/kg or 500mg/m^2 8 hourly 10mg/kg 8 hourly
OSTEMYELITIS/SEPTIC ARTHRITIS		
If penetrating injury to foot, use Pip/Tazobactam IV ± Gentamicin IV		
< 3months ≥ 3months – 5 years ≥ 5 years	Cef-O-taxime IV + Flucloxacillin IV + Gentamicin IV Cef-AZ-olin IV (50mg/kg TDS – usual max 6g/day, max adult dose 12g/day) Flucloxacillin IV or Cef-AZ-olin IV	
SKIN, SOFT TISSUE & SURGICAL WOUNDS		**Duration IV+PO**
Cellulitis Full resolution after 5 - 7 days is not expected as skin takes time to return to normal	**Mild/Moderate**: Flucloxacillin PO or Cef-AL-exin PO **Severe**: Cef-AZ-olin IV (25mg/kg TDS) or Flucloxacillin IV + Clindamycin PO/IV **Associated varicella infection**: Cef-O-taxime IV + Clindamycin PO/IV*	5-7 days (Near eyes/nose 7 days) *As per Micro
Impetigo	**Mild**: Topical fusidic acid cream **Widespread/recurrent**: Flucloxacillin PO or Cef-AL-exin PO **Neonatal**: Cef-AZ-olin IV	5 days 5 – 7 days 10 days
Human/animal bite (see LH App for prophylaxis guide)	**Skin unbroken**: No prophylaxis **Skin broken/blood drawn**: Prophylaxis Co-amoxiclav PO **Infected bite**: Co-amoxiclav PO	 3 days 5 days
Severe SSTI with systemic illness, e.g. Toxic Shock Syndrome, Nec Fas – CONTACT MICRO URGENTLY		

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EYE		**Duration IV+PO**
Pre-septal cellulitis	**Mild**: Co-Amoxiclav PO or Cef-AL-exin PO **Severe**: Cef-O-taxime IV	10 – 14 days
Orbital cellulitis	Cef-O-taxime IV + Metronidazole IV (Dose for child 1 month, 15mg/kg stat then 7.5mg/kg TDS IV; child ≥ 2 months, 7.5mg/kg (max 500mg) TDS IV)	14 – 21 days
ENT		**Duration IV+PO**
Cervical lymphadenitis	**Mild**: Cef-AL-exin or Flucloxacillin or Co-amoxiclav PO **Moderate/severe:** Cef-AZ-olin IV or Flucloxacillin IV + Clindamycin PO/IV	7 days As per Micro
Acute epiglottitis	Cef-O-taxime IV	As per Micro
Bacterial tracheitis	Cef-UR-oxime IV or Co-amoxiclav IV	7-10 days
Acute mastoiditis	Cef-O-taxime IV or Cef-TRI-axone IV	14 days
Peritonsillar abscess	Cef-O-taxime IV + Clindamycin IV/PO	10-14 days
Pharyngitis/Tonsillitis (mainly viral) **Severe/relapse, scarlet fever**	If antibiotics necessary, Phenoxymethylpenicillin PO or Amoxicllin PO or if non-immediate non-severe penicillin allergy, cef-AL-exin PO or if immediate or severe penicillin allergy, clarithromycin	5 days 10 days
Acute sinusitis - only if unresolved after 10/7	**1st Line**: Amoxicillin PO (30mg/kg max 1g 8 hourly) **2nd Line**: Co-amoxiclav PO	5 days
Otitis media – delay for 48hrs if previously well child > 2 years	**1st Episode**: Amoxicillin PO **Recurrence**: Co-amoxiclav PO **Severe/unresponsive to PO**: Cef-TRI-axone IV	5 days 7 days 7 days
RESPIRATORY		**Duration IV+PO**
CAP ≤ 8 weeks	Amoxicillin IV + Cef-O-taxime IV **(if additional risk factors, consider + Gentamicin IV)**	5 days
CAP > 8 weeks	**Mild**: Amoxicillin PO or Azithromycin* PO (if penicillin allergic) **Moderate**: Amoxicillin IV (+/- Azithromycin* PO)	5 days (*3 days)
Complicated pneumonia	Cef-UR-oxime IV + Azithromycin* PO	5 – 10 days (*3 days)
Aspiration pneumonia	Co-amoxiclav IV	5 days
Pertussis	Azithromycin PO: 10mg/kg (max 500mg) once daily	3 days
UTI **If previous/recurrent UTI, check previous antimicrobial susceptibilities**		**Duration IV+PO**
< 2 months	Amoxicillin IV + Cef-O-taxime IV **(if additional risk factors, consider + Gentamicin IV)**	10 days
> 2 – 6 months	Cef-UR-oxime IV + Gentamicin IV	7 – 10 days
> 6 months	**Systemically unwell**: Cef-UR-oxime IV + Gentamicin IV **Lower UTI and well**: Cef-AL-exin PO or Trimethoprim PO or Nitrofurantoin PO	7 – 10 days 3 days

Paediatrics - Evaluating for antibiotic allergy before prescribing antimicrobials

Background:

Before prescribing any antimicrobial agent, a history of possible contraindications, adverse reactions, allergies, must be sought. Rashes, including urticarial rashes are common occurrences in childhood febrile illnesses. Over 90% of reported paediatric "allergic" reactions to antimicrobials cannot be repeated or were merely well described side effects such as penicillin induced diarrhoea or macrolide induced nausea. Unnecessary use of alternative antibiotics increases the risk of development of antimicrobial resistance. Incorrect labelling of antibiotic allergy can lead to unnecessary use of more toxic alternative antimicrobials and increase hospital stay.

Types of allergic reactions:

Immediate hypersensitivity reactions (Type 1)

Type 1 reactions are IgE-mediated and occur <1 hour post dose. Clinical signs include urticarial or pruritic rash, angioedema, rhinitis, respiratory and or cardiovascular compromise.

Delayed Hypersensitivity reactions (Types II, III, IV)

Type II reactions are IgG mediated and occur > 72 hours post dose. These are not true 'allergic reactions' however these reactions should lead to avoidance of future use of the suspected drug. Common manifestations of this type of reaction include haemolytic anaemia, neutropenia or thrombocytopenia.

Type III reactions are generally associated with immune complex deposition and complement activation (e.g. serum sickness like reaction to cefaclor, glomerulonephritis).

Type IV reactions are the most common drug hypersensitivity reactions encountered. These are not antibody mediated but relate to T cell activity. The skin is most often involved in generalised maculopapular eruptions (e.g. beta- lactam related rashes typically developing after a number of days on treatment).

Taking a drug allergy history:

The parent should be asked to describe the previous reaction, including timing of the reaction, the type of rash, distribution and how long it took to resolve. Photos if available should be reviewed. Maculopapular rashes that develop in young children on day 3 or 4 post commencing a course of oral antibiotic and resolve quickly are very unlikely to indicate future risk of severe allergic reaction.

Red flags: (Symptoms more likely to indicate risk of future reactions)

- History of angioedema
- History of breathing difficulties
- History suggestive of cardiovascular compromise

The symptoms listed above are strongly suggestive of a previous Type 1 reaction and thus future prescribing would be contraindicated.

- Joint swelling

A history of joint swelling may indicate serum sickness like reaction. Further administration can trigger a Type 1 reaction. In the first instance avoidance is advised.

- History of hospitalisation due to previous drug eruption.
- History of skin peeling or desquamation
- History of bruising (vasculitis)
- History of involvement of mucous membranes
- History of internal organ involvement, abnormal blood parameters

The symptoms listed suggest a previous severe cutaneous adverse reaction (SCAR). In this case re-prescribing of the suspected agent is contraindicated as SCARs carry a mortality rate of 10%.

Management Options:

No	Conclusion	Outcome
1	History of adverse reaction is not consistent with drug allergy	The recommended antimicrobial can be prescribed
2	History suggests a probable drug allergy	Choose alternative antimicrobial and consider referral to the allergy team for consideration for elective drug provocation test
3	History indicates a probable allergic reaction but alternative antimicrobial choices are limited	Choose alternative antimicrobial in the short term and consider referral to the allergy team for possible formal drug provocation test
4	History clearly suggests previous Type 1 allergic reaction but alternative antimicrobial choices are limited	Choose alternative antimicrobial and consider referral to the allergy team regarding appropriateness of desensitisation
5	The history is suggestive of a previous SCAR	Retrial of antibiotic completely contraindicated. Caution re: cross-reactivity. Discuss antibiotic selection with Micro/ID team.
6	Patient has previously confirmed by the allergy team to have a drug allergy	Choose alternative antibiotic.

Note: Discussion with the ID/Microbiology may be necessary, in order to choose the most appropriate alternative antimicrobial.

Recording adverse drug reactions:

If the clinician determines from the history that use of a particular antimicrobial is contraindicated, this should be documented:

- On the most recent drug chart, dated and signed
- A more detailed note should be recorded in the medical notes documenting all aspects of the history that lead to the decision to avoid the antibiotic
- A follow up plan should be made and documented in the medical notes: see above re management options.

Essential data to record in the medical notes:

- The date of the reaction
- The time of onset with relation to the most recent course of antibiotics
- If multiple antibiotics have been prescribed, document the date of onset of each one
- Record all symptoms and clinical signs including those that may not be (at first glance) involved
  - **Rash:** Include its distribution, characteristics, mucous membrane involvement/not, obvious areas that are spared
  - Presence or absence of lymphadenopathy (check all sites)
  - Evidence of internal organ involvement
  - Presence or absence of fever
  - Also record any abnormal laboratory indices: LFTs, eosinophilia, cytopenia etc.

Choosing alternative antibiotics:

- Patients with a history of Type 1 reactions to penicillin or amoxicillin are likely to tolerate monobactams and carbapenems.
- Patients with a history of Type 1 reactions to amoxicillin are likely to react to cephalosporins with a similar side chain on the β-lactam ring i.e. 1st and 2nd generation cephalosporins. These should be avoided. Other cephalosporins (3rd, 4th and 5th generation) with different side chains are more likely to be tolerated in penicillin allergic individuals. If the initial reaction was severe (anaphylaxis) discuss with allergy team before administration.
- Patients with a history of delayed reactions such as morbilliform or maculopapular rash may also tolerate 1st and 2nd generation cephalosporins.
- Patients with a history of SCARs (SJS, TENS, DRESS) or haemolytic anaemia should not be commenced on a beta-lactam without discussion with allergy/ID/Micro teams.

Paediatric Empiric Treatment Guidelines

Paediatric Gentamicin Once Daily Guideline

Children's Health Ireland Paediatric Gentamicin Dosing and Monitoring Guideline 2020

EXCEPTIONS to this guide

- This guideline does not apply to those with known mitochondrial m.1555A>G mutation.
- This guideline excludes patients on renal replacement therapy; consult local protocols and nephrology department for advice in these cases.

PAEDIATRIC GENTAMICIN DOSING GENERAL GUIDANCE

- Use extended interval or once daily dosing except where recommended by ID/Micro.
- Dose using ideal weight for height in obesity (dose should not exceed maximum adult daily dose of 480mg or as per local policy). However, individual hospitals may have specific protocols for particular patient groups which recommend different maximum daily doses.
- Dose based on kidney function (i.e. review urea and creatinine, urine output, consider any known kidney abnormality or dialysis. However, this should not delay the first dose of gentamicin in patients with suspected sepsis).
- If possible, dehydration should be corrected before starting gentamicin.
- Assess need to continue other ototoxic or nephrotoxic drugs. Where concomitant use is unavoidable, administration should be separated by as long a period as practicable (e.g. gentamicin and an ototoxic diuretic such as furosemide).
- Regular review and documentation of ongoing need for gentamicin is essential.
- The time of blood sampling and the time the last dose was administered must be recorded in order to accurately interpret gentamicin level results.
- This guideline excludes patients on renal replacement therapy; consult local protocols and nephrology department for advice in these cases.

PAEDIATRIC GENTAMICIN INITIAL DOSING REGIMEN

NOTE: Dosing guidelines in individual centres should be agreed locally with input from microbiology/ infectious disease experts, nephrologists and pharmacy.

Age	Renal Function	Initial Dose
Child > 1 month	Normal	7mg/kg 24 hourly IV infusion over 30 min
Updated Renal Dosing from Crumlin/Temple St Hospitals 2019:		
Child > 1 month	Mild renal impairment (GFR 30 – 70ml/min/1.73 m^2)	5mg/kg, prescribe single dose only
Child > 1 month	Moderate renal impairment (GFR 10 – 30 ml/min/1.73 m^2)	3mg/kg, prescribe single dose only
Child > 1 month	Severe renal impairment (HD/GFR < 10 ml/min/1.73 m^2)	2mg/kg, prescribe single dose only

PAEDIATRIC GENTAMICIN MONITORING

Why are levels taken?

- **Pre dose (trough)** levels are taken to ensure that the previous dose of gentamicin has been sufficiently cleared by the kidneys before the next dose is given. Failing to clear doses due to kidney impairment can result in toxic levels and kidney damage.
- **Post dose (peak)** levels are not routinely performed with extended interval or once daily dosing. They may occasionally be required, but should only be done under expert guidance.

When should first level be taken?

- The prescriber must decide on initial timing of therapeutic drug monitoring (TDM) and order first serum pre-dose level in advance of prescribing 1st dose if more than one dose is planned.
- The first pre dose level can be taken either before the 2nd or the 3rd dose depending on the clinical situation.
- For the majority of patients with normal kidney function, taking a pre-dose level before the 3rd dose is appropriate. This prevents unnecessary levels from being taken in patients that are likely to stop gentamicin within the first 36-48 hours of therapy. For example:
  - Patients who are likely to be switched to oral antibiotics after 48 hours of IV therapy e.g. treatment of uncomplicated UTI.
  - Patients being treated for febrile neutropenia who are well, with no clinical focus of infection and where gentamicin will be stopped after 48 hour negative cultures.
- If there are any concerns about a patient's kidney function a level should be taken before the 2nd dose of gentamicin. For example:
  - Patients with acute kidney impairment due to sepsis/or with profound circulatory compromise and/or on inotropes especially in intensive care settings.
  - Any patient with chronic kidney impairment or with a known kidney abnormality.

Timing of levels

- Ideally the blood sample should be taken immediately before the next dose is due.
- However in order to facilitate phlebotomy and laboratory times, levels can be taken in the following time windows:
  - Up to 8 hours before dose is due if on 24 hourly dosing (i.e. 16-24 hours post dose)
  - Up to 8 hours before dose is due if on 36 hourly dosing (i.e. 28-36 hours post dose)
- The time of blood sampling and the time previous dose was administered must be recorded in order to accurately interpret the results.

Subsequent doses

- Give 2nd or 3rd dose as appropriate without waiting for result, unless there is evidence of kidney dysfunction (e.g. elevated serum creatinine or urea concentrations, decreased urine output).
- In patients with kidney dysfunction, wait for result before giving any further doses.
- In acutely septic patients, dose may be given if clinically appropriate under direction of a senior clinician.

Interpreting results

Aim for pre-dose levels < 1mg/L for paediatric patients. If levels are above recommended range:

- Double check that the level was taken in the correct time window (i.e.16-24 hours or 28-36 hours post dose as appropriate).
- If the levels are high in acutely septic patients, contact ID team/Microbiology Consultant for advice.
- In patients with a level >1mg/L who are not acutely septic, hold the next dose and repeat level 12 hours later.

- Recommence dosing if levels are ≤1mg/L and amend the dosage interval to reflect the time required to clear the previous dose (e.g. from every 24 hours to every 36 hours).

Frequency of monitoring

- Check U&E/creatinine each time you check gentamicin level
- In patients with normal kidney function: Repeat level every 3 doses.
- In patients with kidney impairment: Before every dose until discussed with Consultant Nephrologist/Microbiologist or ID.
- More frequent monitoring may be required if the patient is on concomitant nephrotoxic drugs (e.g. ibuprofen, ciclosporin, tacrolimus, furosemide, ACE inhibitors), if the dose has changed or kidney function deteriorates.

Paediatric Vancomycin Guideline

Children's Health Ireland Vancomycin Paediatric Dosing and Monitoring Guideline 2020

Background

Vancomycin is a glycopeptide antibiotic active against *Staphylococcus aureus* and other gram positive susceptible bacterial infections. It is indicated for use when there is resistance pattern such as methicillin-resistant *Staphylococcus aureus* (MRSA) or when the patient demonstrates intolerance to alternative antibiotics. It is not the first line treatment for methicillin-sensitive *Staphylococcus aureus* (MSSA) as it is less effective than beta-lactams.

- **Mechanism of action:** Vancomycin acts by inhibiting the production of the peptidoglycan polymers of the bacterial cell wall by preventing the transfer and addition of the muramylpentapeptide building blocks that make up the peptidoglycan molecule itself.
- **Time dependent killing:** For vancomycin, it has been shown that its efficacy is best predicted by the area under the concentration-time curve over 24 hours (AUC24) divided by the MIC (AUC/MIC). This method of therapeutic drug monitoring is not practical at a ward level, therefore trough levels taken an hour before the dose is due is recommended in this guideline to determine efficacy.
- When treating an infection caused by bacteria with a vancomycin MIC less than 1 mg/L, aim for a trough of 10-15mg/L
- If the vancomycin MIC is greater than 1 mg/L, a trough of 15-20mg/L may be required

Under dosing and sub-therapeutic levels may result in the emergence of drug resistance and subsequent treatment failure.

Adverse Effects

- Common: Decrease in blood pressure, flushing of the upper body (“red man syndrome”), exanthema and mucosal inflammation, pruritus, urticarial, renal insufficiency, increased serum creatinine and urea.
- Uncommon: Transient or permanent loss of hearing (ototoxicity associated with persistent high levels).
- Rare: Hypersensitivity reactions, anaphylactic reactions, vertigo, tinnitus, dizziness, nausea.
- Rapid infusions can result in “Red man syndrome”. “Red man” is a red rash over the upper body that is mediated by a mass histamine release. It is **NOT** an allergy - please contact Micro/ID for advice. Note the rate and the concentration the rate reaction has occurred. Further infusions should be run at a slower rate and more dilute concentration. Document changes in the drug kardex and patient notes.

Vancomycin Dosing, Therapeutic Drug Monitoring and Dose Adjustments in Patients with Normal Renal Function

A. Vancomycin Dosing in Normal Renal Function

For child > 1 month with normal renal function:

- Vancomycin 15mg/kg 6 hourly IV (Maximum single dose 750mg, maximum daily dose 3g)
- Loading dose of **25mg/kg (max 2g)** can be given to achieve faster therapeutic levels. A loading dose would be indicated for patients with bacteraemia, endocarditis, osteomyelitis, meningitis, necrotising fasciitis and empyema for children 12 years and above or under if advised by Micro/ID.

B. Vancomycin Monitoring in Normal Renal Function

- Levels should be taken through venepuncture/capillary blood samples.
- **Do not withhold** the dose when waiting for a level to come back.
- Sub-therapeutic levels can result in treatment failure or the emergence of drug resistance.
- Toxic or high levels of vancomycin can result in nephrotoxic and/or ototoxicity. It is important to monitor renal function for the duration of treatment of vancomycin as it is renally cleared. Monitor creatinine and urea a minimum of twice weekly for the duration of vancomycin treatment.
- If a prolonged course of vancomycin is required a base line auditory test should be carried out.

- If the patient is on additional nephrotoxic medication (e.g. NSAIDs, aciclovir, aminoglycosides, diuretics, omeprazole), monitor renal function more frequently. For Acute Kidney Injury (AKI) monitoring and classification please see section on renal impairment below.
- NB: Check U&E/ creatinine each time you check a vancomycin level.

Important

Vancomycin levels are processed in the Biochemistry Laboratory in OLOL from **8am to 8pm Mon - Fri and from 9am to 5pm on Sat - Sun.**

Consultant request only outside of these hours.

Type of Infection	Target trough concentration
Uncomplicated infections	10 to 20 mg/L
Complicated infections (e.g. bacteraemia, endocarditis, osteomyelitis, meningitis, necrotising fasciitis and empyema)	15 to 20 mg/L

Dosing Frequency	When to take trough level
Six hourly	Up to ONE HOUR **before 4 th , 5 th or 6 th dose** When levels are therapeutic, repeat every 3 days

In patients with normal renal function, DO NOT withhold the next dose while awaiting the result of the trough level – this may result in the patient being under dosed

C. Vancomycin Recommended Dose Adjustment based on Trough Level Results

- After all dose adjustments repeat level as per recommendations above
- If there is a rise in creatinine, please calculate GFR and dose adjust as per recommendations in section on renal impairment below. Additionally assess patient for AKI as per the KDIGO definition in section on renal impairment below.

Trough level interpretation and maintenance dose adjustment for child >1 month (15mg/kg IV 6 HOURLY)

Target trough level	Trough level	Dose Adjustment
10 – 20 mg/L If signs of AKI contact micro/ID and see section on renal impairment below	< 5mg/L	Increase dose by 20%
	5–9 mg/L	Increase dose by 10%
	10–20 mg/L	No change (unless target level is 15-20mg/L for complex infections* contact micro/ID)
	21–24 mg/L	Decrease dose by 10%, but do not omit a dose
	≥ 25 mg/L	Contact micro/ID for advice

*Complicated infections: Severe infection, reduced sensitivities, bacteraemia, endocarditis, osteomyelitis, meningitis, necrotising fasciitis and empyema

Vancomycin Dosing, Therapeutic Drug Monitoring and Dose Adjustments in Patients with Renal Impairment

- Dosing is based on estimated GFR in patients with renal impairment. Please use the Schwartz formula below to calculate GFR
- Dosing and monitoring are expressed in the table below
- Please be aware that impaired renal function should be taken into account for both chronic kidney disease (CKD) and in acute kidney injury (AKI)
- If trough is high, consult nephrologist/Micro/ID for advice on subsequent dosing

GFR can be estimated by the Schwartz formula:

Child over 1 year:

GFR (mL/min/1.73 m ^{2}) = (40 × Height in cm) / Creatinine in micromol/L

Neonate:

GFR (mL/min/1.73 m ^{2}) = (30 × Height in cm) / Creatinine in micromol/L

To monitor for AKI please use the KDIGO model, if a patient is showing signs of AKI please review vancomycin and all nephrotoxic medication prescribed.

KDIGO classification of Acute Kidney Injury (AKI)

Stage 1 : Increase in creatinine of ≥50%

Or

Absolute increase in creatinine of 26.5micromol/L

Stage 2 : Increase in creatinine of ≥100%

Stage 3 : Increase in creatinine of ≥200%

Reference: Kidney Disease: Improving Global Outcomes (KDIGO) Acute Kidney Injury Work Group. KDIGO Clinical Practice Guideline for Acute Kidney Injury. Kidney Int Suppl 2012;2:8.

Vancomycin Reconstitution and Administration

Dilution of reconstituted vials (500mg and 1g)	Dilute with sodium chloride 0.9% or glucose 5% to a concentration of up to 5mg/mL i.e. dilute each 500mg with at least 100mL
Rate of infusion	The rate must not exceed 10mg/minute, give over at least 60 minutes minimum using an infusion pump e.g. 750mg over at least 75 minutes, 1000mg over at least 100 minutes, etc
Infusion reactions	Rapid infusion may cause severe hypotension (including shock and cardiac arrest), wheezing, dyspnoea, urticaria, pruritus, flushing of the upper body ('red man' syndrome), pain and muscle spasm of back and chest. Stop the infusion if they occur. Effects may last between 20 minutes and up to several hours after stopping administration. Peripheral administration may cause injection site pain and thrombophlebitis - rotate injection sites.