



GUIDELINE	
Hospital in the Home (HiTH) Antimicrobial Guidelines	
Scope (Staff):	Clinical Staff – Medical, Nursing , Pharmacy
Scope (Area):	Perth Children’s Hospital (PCH)

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

Aim

These guidelines have been developed to facilitate prompt access to the Hospital in the Home (HiTH) program.

Key Points

- Children are accepted into HiTH, following review by the HiTH Nursing Coordinator.
- Acceptance onto the HiTH program is at the discretion of the HiTH Nursing Coordinator
- Inpatient discharge will be contingent upon the availability of HiTH nursing staff and appropriately prepared home IV antibiotics. Please refer to [related HiTH procedures](#) in the Ambulatory Care Services Manual.
- Antibiotics administered once daily or by continuous antibiotic infusions (Baxter® antibiotic infusers) are preferred.
- HiTH can offer up to three nursing visits per day, therefore a maximum frequency of three times daily (tds) dosing is possible in selected patients.

Please note for the following guidelines:

- These guidelines may require adjustment in individual cases. It is recommended that any deviation from the guidelines is discussed with the on call infectious diseases consultant.
- All dosing recommendations are for IV preparation of the drug in children >28 days old with normal renal function.
- Prescribers should know the drug associated toxicities. Weekly blood monitoring should be conducted at a minimum for patients prescribed >7 days of antimicrobial therapy (inclusive of parenteral antibiotics received in hospital). Additional monitoring may be required in certain situations to monitor for drug related adverse events and clinical progress.
- **Infectious Diseases (ID) consultation**
 - ID consultation is not mandatory for:

- children transferred to HiTH for standard indications with an anticipated total length of antibiotic treatment on HiTH ≤ 3 days when prescribing is in accordance with ChAMP guidelines.
- **ID consultation is recommended for:**
 - children requiring total >3 days antimicrobial therapy on HiTH (CF/bronchiectasis excluded)
 - children receiving non-standard antimicrobial treatment for their indication
 - children receiving therapy for CF/bronchiectasis for >14 days total
- The first dose of each IV antibiotic is to be given in hospital.
- 24 hour infusions (Baxter[®] Infusors) require midline or central venous access devices (CVAD). If uncertain please consult the CVAD team to ensure the most appropriate line is selected for the anticipated length of therapy. The ID team will advise the recommended length of therapy.
- Patients on HiTH for >7 days require at least weekly review by the managing team in DTU or OPD
- All microbiological specimens should be checked at 48 hours to confirm appropriate antibiotic selection and to tailor step-down therapy if appropriate.
- All antimicrobial agents requiring therapeutic drug monitoring (TDM) should have stable levels prior to going on to HiTH or a clear plan for TDM including how to modify treatment if TDM is out of the recommended therapeutic range. Subsequent TDM will be conducted as per the ChAMP monographs throughout therapy.
- Baxter infusions can only be ordered on weekdays and require a minimum of 24 hours-notice to allow ordering by Pharmacy Compounding Service (PCS). Longer waiting times may be expected at peak times (e.g. prior to long weekends and public holidays).
 - Orders received by PCS prior to 12pm (midday) Monday to Thursday will be available by 12pm the following day.
 - Orders received by PCS prior to 3pm Monday to Thursday will be available by 3:30pm the following day.
 - Orders placed on Fridays will not be available until the following Monday (or standard working day in the event of a public holiday).
- All patients require an order of IM adrenaline (epinephrine) to be charted (but not dispensed) with dosing as per below:
 - Adrenaline 300 microgram/0.3mL Auto-Injector (EpiPen[®]) for a child > 20 kilograms; or
 - Adrenaline 150 microgram/0.3mL Auto-Injector (EpiPen[®] Jr.) for a child 10 to 20 kilograms; or
 - Adrenaline 1 in 1000 (1mg/mL) ampoule 0.01mg/kg/dose (0.01mL/kg/dose) for a child < 10 kg.

Drug	Frequently prescribed indications	Recommended Dose/Frequency for infants and children	Administration duration for intermittent dosing	Therapeutic drug monitoring	Monitoring for potential toxicity	Notes and Recommended oral step-down
Amikacin *	Gram negative infections resistant to other agents	All ages: 30mg/kg/dose once daily Maximum daily dose 1.25g ¹ (up to 1.5g in CF patients)	30-60 minutes ²	Trough levels are recommended in all patients Trough level should be taken immediately prior to the 4 th dose and should be <5mg/L. Follow-up levels should be performed once weekly unless the clinical situation dictates otherwise.	Once weekly EUC and trough levels Monitoring for cochlear and vestibular toxicity recommended for duration >1 week.	Can be used as an IM injection No oral step-down
Benzylpenicillin	1) Community acquired pneumonia (CAP): moderate 2) Streptococcal (including pneumococcal) bacteraemia 3) Endocarditis	120-360mg/kg/day via continuous infusion (B) Maximum dose: 14.4g per day	Continuous infusion	Nil	Weekly FBC, EUC, LFTS	1) CAP: amoxicillin 25mg/kg (max 1g) orally 8-hourly as soon as practicable to complete total 7 days treatment 2) Bacteraemia: In the afebrile, clinically well child, oral amoxicillin 25mg/kg/dose (max 1g) orally 8-hourly to complete total of 7-10 days may be considered 3) Endocarditis: No oral step down

Drug	Frequently prescribed indications	Recommended Dose/Frequency for infants and children	Administration duration for intermittent dosing	Therapeutic drug monitoring	Monitoring for potential toxicity	Notes and Recommended oral step-down
Cefepime	1) Gram negative infections resistant to other beta-lactam antibiotics	150mg/kg/day via continuous infusion (B) Maximum dose: 6g per day	Individual doses should be given as a slow bolus over 3-5minutes	Nil	Weekly FBC, EUC, LFTS	Discuss with Infectious Diseases
	2) Empiric antibiotic treatment of fever and neutropenia in the setting of delayed penicillin hypersensitivity	OR 50mg/kg/dose (max 2g per dose) given 8 hourly				
Ceftazidime	1) Gram negative infections resistant to other beta-lactam antibiotics	50mg/kg/dose (max 2g per dose) given 8 hourly.	No longer possible as continuous infusion. Individual doses should be given as a slow bolus over 3-5minutes	Nil	Weekly FBC, EUC, LFTS	Discuss with Infectious Diseases
	2) Cystic fibrosis exacerbation as per Chronic respiratory tract infection - Cystic Fibrosis	Usual maximum dose: 6g per day. CF patients: 50mg/kg/dose (max 3g per dose) given 8 hourly. Maximum dose 9g per day				
Ceftriaxone	1) Meningitis and periorbital or orbital cellulitis as an outpatient	Children ≥4 weeks of age: 50-100mg/kg/dose once daily. ³ Maximum dose: 4g per day. ³	Individual doses ≤1gram can be given as a slow bolus over 3-5 minutes. Doses >1gram should be given via a 30 minute infusion	Nil	Weekly FBC, EUC, LFTS	Discuss with Infectious Diseases Ceftriaxone must NOT be administered at the same time as calcium containing fluids for infusion (including TPN) See cefotaxime for neonates
	2) Gram negative bacteraemia including Salmonellosis					
	3) Complicated UTI					

Drug	Frequently prescribed indications	Recommended Dose/Frequency for infants and children	Administration duration for intermittent dosing	Therapeutic drug monitoring	Monitoring for potential toxicity	Notes and Recommended oral step-down
Cefazolin	1) Invasive methicillin sensitive <i>S. aureus</i> infections	100-150mg/kg/day via continuous infusion (B) or 25-50mg/kg/dose (max 2g per dose) given 8 hourly. ³	Preferable as continuous infusion. Individual doses should be given as a slow bolus over 3-5 minutes	Nil	Weekly FBC, EUC, LFTS	1) Discuss with Infectious Diseases
	2) Cellulitis requiring short term IV therapy (1-3 days): moderate	Maximum dose: 6g per day.	2) For cellulitis: Oral cefalexin 12.5mg/kg (max. 500mg) 6 hourly			
Ciprofloxacin*	1) Gram negative infections resistant to other agents	10-15mg/kg/dose (max 400mg per dose) given 12 hourly CF patients: 10mg/kg/dose (max 400mg per dose) given 8 hourly	Infuse over 60minutes	Nil	Weekly FBC, EUC, LFTS	Oral ciprofloxacin has excellent bioavailability. In children able to eat and drink, it can be used as an alternative to IV. A test dose prior to discharge is recommended to ensure tolerated due to taste. Early step-down is recommended. Oral dose rounded to the nearest portion of a tablet to facilitate oral administration.
	2) Gram negative infections in those with immediate hypersensitivity to beta-lactam antibiotics					
Clindamycin	1) Gram positive infections in those with immediate hypersensitivity to beta-lactam antibiotics (preferably where susceptibility has been confirmed)	30-40mg/kg/day via continuous infusion (B) OR 10mg/kg/dose (max 600mg per dose) given 8 hourly ¹	Preferable as a continuous infusion Individual doses should be diluted to 18mg/mL or weaker and infused over 10-60mins at no greater than 30mg/minute	Nil	Weekly FBC, EUC, LFTS	Can cause severe hypotension if these strengths or rates of infusion are exceeded. Oral clindamycin has excellent bioavailability. In children able to swallow capsules, it can be used as an alternative. A test dose prior to discharge is recommended to ensure tolerated due to taste.
	2) Non-multi resistant <i>Staphylococcus aureus</i> and <i>Streptococcus pyogenes</i> infection (not to be used as monotherapy in bacteraemia)	Maximum dose: 2.4g/day				
	3) Empyema					

Drug	Frequently prescribed indications	Recommended Dose/Frequency for infants and children	Administration duration for intermittent dosing	Therapeutic drug monitoring	Monitoring for potential toxicity	Notes and Recommended oral step-down
Ertapenem *	1) Gram negative infections (excluding meningitis) resistant to other agents	3 months-11 years: 15mg/kg/dose (max 500mg ₃ per dose) given 12 hourly Children ≥12 years: 1g given once daily.	Dilute to 20mg/mL or less and infuse over 30 minutes	Nil	Weekly FBC, EUC, LFTS	Ertapenem is not routinely used in infants < 3 months old. Discuss with Infectious Diseases
Flucloxacillin	1) Invasive <i>Staphylococcus aureus</i> infections including bacteraemia and bone/joint infections	200mg/kg/day via continuous infusion (B)	Continuous infusion	Nil	Weekly FBC, EUC, LFTS	1) Discuss with Infectious Diseases
	2) Staphylococcal skin infection or cellulitis requiring prolonged intravenous therapy.	Maximum dose: 8g per day.				2) For cellulitis: Oral Cefalexin 12.5mg/kg (max. 500mg) 6 hourly OR Oral Flucloxacillin 12.5mg/kg (max. 500mg) 6 hourly for 5-10 days
Gentamicin	1) Serious Gram negative infections	All ages: 7.5mg/kg/dose given once daily ¹	Dilute to 10mg/mL or less and infuse over a minimum of 20 minutes	Trough level should be taken immediately prior to the 4 th dose and should be <0.6mg/L. Follow-up levels should be performed once weekly unless the clinical situation dictates otherwise.	Once weekly EUC and trough levels. Weekly trough level (non CF) or weekly AUC (CF) Monitoring for cochlear and vestibular toxicity recommended for duration >1 week.	Can be used undiluted as an IM injection
	2) In addition to beta-lactam antibiotics in febrile neutropaenic patients	Maximum dose: 480mg per day				
	3) In addition to other agents for sub-acute bacterial endocarditis					

Drug	Frequently prescribed indications	Recommended Dose/Frequency for infants and children	Administration duration for intermittent dosing	Therapeutic drug monitoring	Monitoring for potential toxicity	Notes and Recommended oral step-down													
Linezolid *	1) Gram positive infections in those with immediate hypersensitivity to beta-lactam antibiotics	<12years: 10mg/kg/dose (max 600mg per dose) given 8 hourly ¹ ≥12years: 10mg/kg/dose (max 600mg per dose) given 12 hourly ¹	Infuse undiluted over 30 - 120 minutes	Nil	Weekly FBC, EUC, LFTS Monitoring for peripheral neuropathy with weekly checks of reflexes.	Keep bags in foil over-wrap until ready to use Oral linezolid is available as tablets and liquid and has excellent bioavailability. In children able to eat and drink, it should be used as an alternative to IV linezolid.													
	2) Methicillin-resistant <i>Staphylococcus aureus</i> resistant to alternative agents						Maximum recommended duration of therapy (IV and oral combined) is 28 days	Liposomal amphotericin B (Ambisome®) *	1) Invasive fungal infection	1 to 5mg/kg/dose given once daily. ¹ 1mg/kg/dose given three times a week for mould prophylaxis may be used in selected patients‡	Infuse over 2 hrs. If tolerated, infusion time may be reduced to 1 hr provided there has not been >1 week since last tolerated infusion. If doses infused over 1 hr are tolerated then the infusion may be given over 30 mins provided there has not been >1 week since the last rapid ² infusion	Nil	Twice weekly EUC to monitor potassium and Magnesium	Only compatible with glucose 5%. Must flush IV lines with glucose 5% prior to infusion	2) Prolonged fever and neutropenia unresponsive to intravenous antibiotics	3) Antifungal prophylaxis	Micafungin	1) Invasive fungal infection	Prophylaxis: 1mg/kg/dose (max 50mg per dose) given once daily Treatment: 2mg/kg/dose (max 100mg per dose) given once daily. May be increased to 4mg/kg/dose (max 200mg per dose) given once daily if inadequate clinical response
Liposomal amphotericin B (Ambisome®) *	1) Invasive fungal infection	1 to 5mg/kg/dose given once daily. ¹ 1mg/kg/dose given three times a week for mould prophylaxis may be used in selected patients‡	Infuse over 2 hrs. If tolerated, infusion time may be reduced to 1 hr provided there has not been >1 week since last tolerated infusion. If doses infused over 1 hr are tolerated then the infusion may be given over 30 mins provided there has not been >1 week since the last rapid ² infusion	Nil	Twice weekly EUC to monitor potassium and Magnesium	Only compatible with glucose 5%. Must flush IV lines with glucose 5% prior to infusion													
	2) Prolonged fever and neutropenia unresponsive to intravenous antibiotics																		
	3) Antifungal prophylaxis																		
Micafungin	1) Invasive fungal infection	Prophylaxis: 1mg/kg/dose (max 50mg per dose) given once daily Treatment: 2mg/kg/dose (max 100mg per dose) given once daily. May be increased to 4mg/kg/dose (max 200mg per dose) given once daily if inadequate clinical response	Infuse over at least 60 minutes	Nil	Weekly EUC and LFT's	Discuss with Infectious Diseases for step down options													
	2) Prolonged fever and neutropenia unresponsive to intravenous antibiotics																		
	3) Antifungal prophylaxis																		

Drug	Frequently prescribed indications	Recommended Dose/Frequency for infants and children	Administration duration for intermittent dosing	Therapeutic drug monitoring	Monitoring for potential toxicity	Notes and Recommended oral stepdown
Meropenem	1) Gram negative infections resistant to other agents	20-40mg/kg/dose (max 2g per dose) given 8 hourly ¹ Maximum dose: 6g per day. CF patients should receive 40mg/kg/dose (max 2g per dose)	Individual doses should be given as a slow bolus over 3-5minutes	Nil	Weekly FBC, EUC, LFTS	Discuss with Infectious Diseases for step down options
Piperacillin with tazobactam (Tazocin®)*	1) Gram negative infections resistant to other beta-lactam antibiotics 2) Empiric antibiotic treatment of fever and neutropenia 3) Intra-abdominal sepsis	300mg/kg/day via continuous infusion (B) OR 100mg/kg/dose (max 4g per dose) given 8 hourly ¹ Maximum dose: 12g per day. Oncology: 400mg/kg/day via continuous infusion (B)	Preferable as continuous infusion. Individual doses should be given as an infusion over a minimum of 30 minutes	Nil	Weekly FBC, EUC, LFTS	All doses expressed as the piperacillin component Discuss with Infectious Diseases for step down options if applicable
Teicoplanin	1) Invasive Staphylococcal infections resistant to beta-lactam antibiotics.	10mg/kg/dose (max 800mg per dose) given 12 hourly for three doses then 6-10mg/kg/dose (max 400mg per dose) once daily thereafter ¹	Can be given as a slow push over 5 minutes or infused over 30 minutes	Nil	Weekly FBC and EUC	Teicoplanin should only be used in children requiring short course therapy (<72 hours) or children intolerant to vancomycin

Drug	Frequently prescribed indications	Recommended Dose/Frequency for infants and children	Administration duration for intermittent dosing	Therapeutic drug monitoring	Monitoring for potential toxicity	Notes and Recommended oral stepdown
Tobramycin	1) Serious Gram negative infections	All ages: 7.5mg/kg/dose (max 320mg per dose) given once daily.	Dilute to a final concentration of 40mg/mL or less and infuse over 20 - 60minutes	Trough levels are recommended in all patients except CF patients where area under the curve (AUC) monitoring is recommended Trough levels should be taken immediately prior to the 4 th dose and should be <0.6mg/L. Follow-up levels should be performed once weekly unless the clinical situation dictates otherwise. AUC monitoring should be discussed with the ward/department pharmacist.	Once weekly EUC. Weekly trough levels (non CF) or weekly AUC (CF) Monitoring for cochlear and vestibular toxicity recommended for duration >1 week.	Can be used as an IM injection into a large muscle mass
	2) Cystic fibrosis	CF patients: Initial dose of 10/kg/dose (max 750mg per dose) given once daily. Subsequent doses based on AUC level to a maximum of 750mg or 15mg/kg/dose (whichever is less)				
Vancomycin	1) Invasive Staphylococcal infections (MRSA) resistant to beta-lactam antibiotics.	Initial dose 60/kg/day via continuous infusion (B) Maximum dose: 3g per day. Higher doses may be required only after discussion with Infectious Diseases or Clinical Microbiology OR	Infuse over at least 60 minutes	When using continuous infusions a level should be performed 24 AND 48 hours after commencing the infusion with a paired serum creatinine. Levels should be 20-25mg/L . With intermittent dosing , a trough level should be taken immediately prior to the 4th dose and should be between 5-15mg/L unless treating invasive MRSA infection . Follow-up levels should be performed twice weekly unless the clinical situation dictates otherwise.	Weekly FBC and EUC Once vancomycin levels are stable, they should be repeated every 3 days throughout treatment with a paired serum creatinine	Patients should have stable levels on continuous infusions prior to going on HiTH. Contact the Infectious Diseases or ChAMP teams for advice on dose adjustment.
	2) Meningitis with <i>Streptococcus pneumoniae</i> with proven or suspected decreased penicillin susceptibility	20-25mg/kg/dose (max 1g per dose) given 8 hourly				

‡ Please discuss with clinical microbiologist or infectious diseases physician prior to prescribing


* Restricted drug-see Drug Formulary System for PCH prescribing criteria

(B) available as Baxter infusor

Related internal policies, procedures and guidelines
Antimicrobial Stewardship Policy ChAMP Empiric Guidelines Medication Management and Anaphylaxis Protocol - HiTH Eligibility Criteria and Referral Process For Hospital in the Home Services (HiTH)

References
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2. Paediatric Formulary Committee. BNF for Children: 2019. London: BMJ Group Pharmaceutical Press; 2019.
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