GUIDELINE

Urinary Tract Infection – Paediatric

Scope (Staff):	Clinical Staff – Medical, Nursing, Pharmacy
Scope (Area):	Perth Children's Hospital (PCH)

Child Safe Organisation Statement of Commitment

CAHS commits to being a child safe organisation by applying the National Principles for Child Safe Organisations. This is a commitment to a strong culture supported by robust policies and procedures to reduce the likelihood of harm to children and young people.

This document should be read in conjunction with this disclaimer

- The ages in this guideline refer to term neonates and older. For dosing in pre-term neonates or those with a corrected gestational age of 4 months or younger, contact infectious diseases or ChAMP for advice.
- In children who have previously isolated resistant Gram-negative bacteria (e.g. *Pseudomonas aeruginosa*, extended spectrum beta lactamase (ESBL) containing Gram-negative bacteria), contact infectious diseases / clinical microbiology for therapeutic advice.
- The following options are for empiric therapy and should be used whilst awaiting the results of culture and susceptibility testing.

CLINICAL SCENARIO	Usual duration	DRUGS/DOSES		
		Standard Protocol	Low Risk Penicillin allergy[a]	High Risk Penicillin allergy[a]
Urinary Tract Infection < 4 weeks		IV amoxicillin **AND** IV gentamicin (doses as per neonatal guidelines)	cefotaxime[b]	Discuss with ID or Microbiology service

<table>
<tr><th rowspan="2">CLINICAL SCENARIO</th><th rowspan="2">Usual duration</th><th colspan="3">DRUGS/DOSES</th></tr>
<tr><th>Standard Protocol</th><th>Low Risk Penicillin allergy[a]</th><th>High Risk Penicillin allergy[a]</th></tr>
<tr><td>Cystitis
(≥4 weeks old and systemically well)</td><td>3 days</td><td>Oral cefalexin 20mg/kg/dose (to a maximum of 750mg) 8 hourly

OR
Oral cotrimoxazole 4mg/kg (to a maximum of 160mg trimethoprim component) 12 hourly</td><td>cefalexin[c]</td><td>cotrimoxazole[d]</td></tr>
<tr><td>Non- severe Pyelonephritis
(≥ 3 months old)

For children <3 months, treat as severe pyelonephritis below</td><td>10 days</td><td>Oral cefalexin 20mg/kg/dose (to a maximum of 750mg) 8 hourly
OR
Oral cotrimoxazole 4mg/kg (to a maximum of 160mg trimethoprim component) 12 hourly
OR
Oral amoxicillin/clavulanic acid 25mg/kg/dose (to a maximum 875mg amoxicillin component) 12 hourly</td><td>cefalexin[c]
OR
cotrimoxazole[d]</td><td>cotrimoxazole[d]</td></tr>
<tr><td rowspan="3">Severe pyelonephritis
≥ 4 weeks
(e.g. with tachycardia, nausea, vomiting)</td><td colspan="4">If concern of urosepsis – refer to Sepsis and Bacteraemia: paediatric</td></tr>
<tr><td rowspan="2">7-10 days (IV and oral)</td><td>IV amoxicillin 50mg/kg/dose (to a maximum of 2 grams) 6 hourly
AND
IV gentamicin[e]</td><td>ceftriaxone[f]</td><td>gentamicin as a stat dose then discuss with ID or Microbiology service.</td></tr>
<tr><td colspan="3">Patients should be switched to oral therapy should be modified based on the results of culture and susceptibility results as soon as they are clinically stable and are able to tolerate oral therapy.

If the patient is asymptomatic, there is no need for a post-treatment urine culture to demonstrate proof of cure.</td></tr>
<tr><td>Urosepsis</td><td colspan="4">Refer to Sepsis and Bacteraemia: paediatric</td></tr>
</table>

CLINICAL SCENARIO	Usual duration	DRUGS/DOSES		
		Standard Protocol	**Low Risk Penicillin allergy**[a]	**High Risk Penicillin allergy**[a]
Urinary Tract Infection prophylaxis children ≥ 4 weeks	Antibiotic prophylaxis is not routinely recommended for children following their first episode of a urinary tract infection but may be considered for children with severe or recurrent UTIs or those with vesicoureteric reflux grades III to V. In children who have previously isolated resistant Gram-negative bacteria (e.g. *Pseudomonas aeruginosa*, ESBL containing Gram-negative bacteria), contact infectious diseases/ clinical microbiology for advice on prophylaxis.			
	N/A	Oral cotrimoxazole 2mg/kg (to a maximum of 80mg trimethoprim component) 24 hourly at night **OR** Oral cefalexin 12.5mg/kg (to a maximum of 250mg) 24 hourly at night	cefalexin[g]	cotrimoxaxole[h]
Epididymo-orchitis (If urinalysis negative)	Nil	Antibiotic therapy is not required- treat symptomatically.		
Epididymo-orchitis (If urinalysis positive)	14 days (IV and oral)	Treat as for Severe pyelonephritis (≥ 4 weeks old) For adolescent patients, consider sexually acquired infection and alter therapy accordingly.[i]		

a. Refer to the ChAMP Beta-lactam Allergy Guideline:
   - Low risk allergy: a delayed rash (>1hr after initial exposure) without mucosal or systemic involvement (without respiratory distress and/or cardiovascular compromise).
   - High risk allergy: an immediate rash (<1hr after exposure); anaphylaxis; severe cutaneous adverse reaction {e.g. Drug Rash with Eosinophilia and Systemic Symptoms (DRESS) and Stevens – Johnson syndrome (SJS) / Toxic Epidermal Necrolysis (TEN)} or other severe systemic reaction.

b. Use doses as per neonatal guidelines for patients less than 1 month of age.

c. Oral cefalexin **20mg/kg/dose** (to a maximum of 750mg) 8 hourly.

d. Oral cotrimoxazole **4mg/kg/dose** (equivalent to 0.5mL/kg/dose of oral suspension), trimethoprim component, to a maximum of 160mg (equivalent to 20mL of oral suspension), 12 hourly.

e. IV/IM gentamicin Children ≥ 4weeks old to <10 years old: 7.5mg/kg ONCE daily to a maximum of 320mg. Children ≥10 years to 18 years: 7mg/kg ONCE daily to a maximum of 560mg. Therapeutic drug monitoring required.

f. IV ceftriaxone **50mg/kg/dose** to a maximum of 2g, once daily.

g. Oral cefalexin **12.5mg/kg/dose** (to a maximum of 250mg) given at once daily at night.

h. Oral cotrimoxazole **2mg/kg/dose** (equivalent to 0.25mL/kg/dose of oral suspension), trimethoprim component, to a maximum of 80mg (equivalent to 10mL of oral suspension), given once daily at night.

i. For prepubertal boys with epididymo-orchitis, perform urinalysis; more than 80% of cases in these patients are not bacterial and do not require antibiotic therapy. If urinalysis is negative for leucocyte esterase and nitrite, treat the child symptomatically (paracetamol or nonsteroidal anti-inflammatory drugs). If the urinalysis is positive for leucocyte esterase or nitrite, take a midstream urine sample for culture and treat as for a urinary tract infection for 14 days.

Related CAHS internal policies, procedures and guidelines
Antimicrobial Stewardship Policy
ChAMP Empiric Guidelines
KEMH Neonatal Medication Protocols
Urine Specimen Collection

References and related external legislation, policies, and guidelines

1. Antibiotic Writing Group. Therapeutic Guidelines - Antibiotic. West Melbourne: Therapeutic Guidelines Ltd; 2022. Available from: http://online.tg.org.au.pklibresources.health.wa.gov.au/ip/.
2. McMullan BJ, Andresen D, Blyth CC, Avent ML, Bowen AC, Britton PN, Clark JE, Cooper CM, Curtis N, Goeman E, Hazelton B, Haeusler GM, Khatami A, Newcombe JP, Osowicki J, Palasanthiran P, Starr M, Lai T, Nourse C, Francis JR, Isaacs D, Bryant PA, ANZPID-ASAP group. Antibiotic duration and timing of the switch from intravenous to oral route for bacterial infections in children: systematic review and guidelines. The Lancet. Infectious diseases 16 (8) : e139 - 52(2016)

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