Management of urinary tract infection (UTI) in children

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Background

May cause a **fever with no focus** in infants and children, however **do not test urine if you have an alternative site of infection**

Assessment

Record risk factors for UTI and serious underlying pathology (see below) in the notes, as part of your history and examination once UTI is confirmed.

- poor urine flow
- history suggesting previous UTI or confirmed previous UTI
- recurrent fever of uncertain origin
- evidence of spinal lesion
- dysfunctional voiding
- abdominal mass
- antenatally-diagnosed renal abnormality
- family history of vesicoureteric reflux (VUR) or renal disease
- constipation
- poor growth
- enlarged bladder
- high blood pressure

Urine Collection

Collect urine by **clean catch** in first instance. *Bag or pad collection urine samples for screening & diagnosis of UTI do not have a place.*

If not practical to get clean catch*, perform in-out catheter or ultrasound aided suprapubic aspiration (SPA) – **send urine for forced culture** if collected by catheter or SPA. Write “SPA – forced culture” clearly on request form (regardless of whether catheter or SPA).

*Clean catch not practical e.g. septic child requiring urgent diagnosis and treatment / Parent/carer preference / Prolonged or multiple attempts at clean catch.

Urine Testing

- All samples to have dipstick test in first instance
- Store all samples in fridge (use children’s emergency department (CED) fridge in sluice) until microbiology lab is open (Monday to Friday 9 am – 5 pm, Saturday and Sunday 9 am – 1 pm. If samples remain unrefrigerated may give false positives).

- Urine samples should be sent for culture in infants / children:
  - who are suspected to have acute pyelonephritis / upper UTI
  - with a high to intermediate risk of serious illness
  - < 3 months old. **NB** all samples from infants < 3 months to have a forced culture: write “age < 3 months, forced culture” clearly on request form.

- with a positive result for leukocyte esterase or nitrite
- with recurrent UTI
- with an infection that does not respond to treatment within 24–48 hours, if no sample has already been sent
- who have clinical symptoms and dipstick tests that do not correlate

Management

See flow chart over the page

Differentiating between upper UTI / acute pyelonephritis and lower UTI / cystitis:

- Children with bacteriuria and fever ≥ 38°C or temp < 38°C but with loin pain / tenderness and bacteriuria should be considered to have acute pyelonephritis / upper urinary tract infection.
- All other children who have bacteriuria but no systemic symptoms or signs should be considered to have cystitis/lower UTI
- Do not use CRP alone to differentiate upper from lower UTI
- In the rare instances when it is clinically important to confirm or exclude acute pyelonephritis/upper UTI, power Doppler ultrasound is recommended. When this is not available or the diagnosis still cannot be confirmed, DMSA scintigraphy scan is recommended.

Antibiotic choice

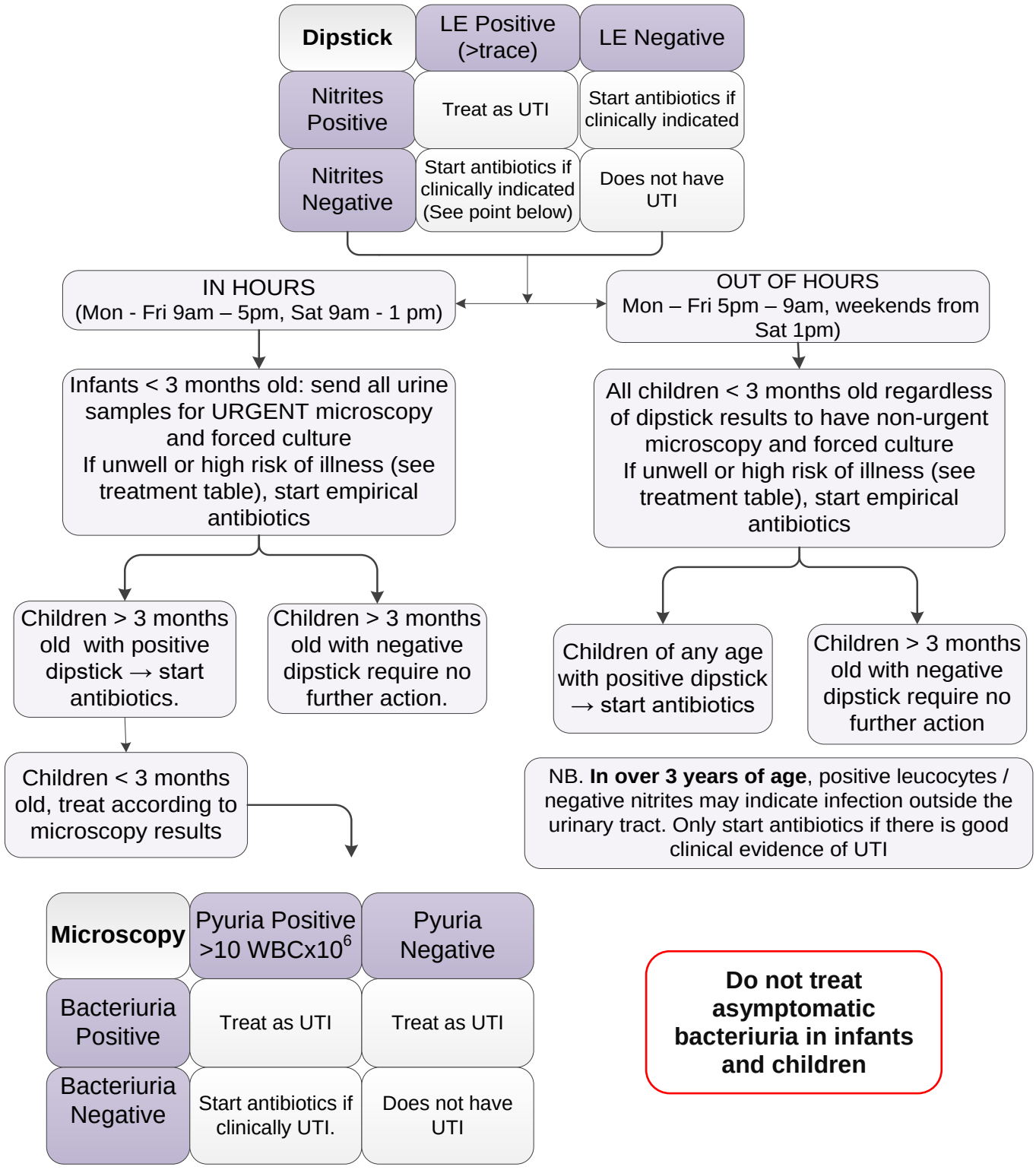
Indication	1st line antibiotic	Duration
Acute pyelonephritis / upper UTI or lower UTI in **< 3 months old**	IV **Cefotaxime** (or **ceftriaxone** if > 1 month and > 42 weeks corrected gestational age) (+ IV **amoxicillin if considering concomitant listeria sepsis / meningitis**) Oral switch when well enough as per sensitivities See fever under 5 & sepsis guidelines Consider stat dose of gentamicin if haemodynamically unstable Discuss with microbiology if severe penicillin allergy	Review and revise by 48 – 72 hours (see sepsis guidelines)
In infants 1 – 3 months old with lower UTI (no fever, systemically well) **senior doctor only (consultant or registrar after discussion with consultant)** can consider treating with oral antibiotics as per lower UTI ≥ 3 months old.		

Indication	1st line IV antibiotic	Alternative IV antibiotic / severe penicillin allergy	1st line oral antibiotic	Duration
Acute pyelonephritis / upper UTI in **≥ 3 months old** **Give IV in first instance if unwell.** Switch to oral when well enough	**Ceftriaxone** Oral switch as per sensitivities Consider stat dose of gentamicin if haemodynamically unstable	**Gentamicin** Oral switch ciprofloxacin (depending on sensitivities)	**Cefalexin** Adjust according to sensitivities	10 days total Oral switch as soon as tolerating oral medication and improving

Indication	1st line oral antibiotic	Alternative oral antibiotic** / severe penicillin allergy	Duration
Cystitis / Lower UTI (well child) in **≥ 3 months old**	**Cefalexin**	**Nitrofurantoin**	3 days total
	If clinical deterioration or resistance on culture results – change to alternative or appropriate antibiotic		

****If no improvement after 48 hours on first line, or if unable to take first line**

Management flow chart



Imaging Schedule

Age	Imaging	Typical	Atypical	Recurrent
<6m	Ultrasound scan (USS) during acute infection		Yes[c]	Yes
	USS 4-6 weeks	Yes[b]		
	DMSA 4-6 months		Yes	Yes
	Micturating Cystourethrogram (MCUG)		Yes	Yes
6m – 3y	USS during acute infection		Yes[c]	
	USS 4-6 weeks			Yes
	DMSA 4-6 months		Yes	Yes
	MCUG		[a]	[a]
>3y	USS during acute infection		Yes[c]	
	USS 4-6 weeks			Yes
	DMSA 4-6 months			Yes

[a]Consider MCUG if:
- dilatation on USS
- poor urine flow
- non E. coli infection
- family history of VUR

[b]If abnormal consider MCUG

[c]In a child with a non-*E. coli*-UTI, responding well to antibiotics and with no other features of atypical infection, the ultrasound can be requested on a non-urgent basis to take place within 6 weeks

Atypical Features
- Seriously ill
- Poor urine flow
- Abdominal / bladder mass
- Raised creatinine
- Septicaemia
- Doesn't respond to antibiotics within 48 hours
- Infection with non - E. coli organism

Recurrent
- Two or more episodes UTI with at least one episode showing signs of pyelonephritis (bacteruria with fever > 38 or loin pain)
- 3 or more episodes UTI without signs of pyelonephritis (as above)

Follow up

- Do not routinely offer antibiotic prophylaxis
- If the child requires follow up of imaging → refer to the paediatric clinic for an appointment AFTER imaging has been done. Use CED OP referral form or on CareFlow discharge summary if admitted.
- Give information to parents and child about how to recognise re-infection and to seek medical advice straight away. Use leaflet (if not available in CED, use patient.co.uk). Address dysfunctional elimination syndromes and constipation and advise on adequate fluid intake.