

Antimicrobial Management of Uncomplicated Lower Urinary Tract Infection (UTI) in Non-Pregnant Adults ≥ 16 years old: Using the Microbiology Report to Guide Treatment

Target Audience: All practitioners involved in prescribing antimicrobials for UTI in non-pregnant adults ≥ 16 years old.

Introduction & Aim

- **Aim:** To guide clinical teams on the appropriate management of uncomplicated adult UTIs using microbiology culture and susceptibility reports, facilitating de-escalation of therapy and promoting good antimicrobial stewardship.
- **Scope:** This guideline applies **ONLY** to uncomplicated lower UTIs in adults.

It **does NOT** apply to **complicated UTIs** (e.g., pyelonephritis, urosepsis, UTIs in immunocompromised patients, pregnant patients, patients with indwelling catheters, recurrent UTIs, or men with febrile UTI).

- **Key Principle:** Review empirical therapy, and optimise treatment based on urine culture results.

Definitions

- **Uncomplicated UTI:** Infection of the lower urinary tract (bladder, urethra) in a healthy, non-pregnant, non-immunocompromised adult with normal urinary tract anatomy and function.
- **Empirical Therapy:** Initial treatment given before culture results are available.
- **Targeted Therapy:** Antibiotic treatment chosen based on the identified pathogen and its susceptibility profile from the microbiology report.
- **Asymptomatic Bacteriuria (ASB):** Presence of bacteria in the urine without symptoms of UTI. **ASB should NOT be treated**, except in specific circumstances (e.g., prior to urological procedures involving mucosal breach, pregnancy).

Reference: ADTC 473-01

Written by: Antimicrobial Management Team

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1. Initial Management

Clinical diagnostic criteria for uncomplicated lower UTI

Patient with 2 or more NEW or WORSENING symptoms of UTI	
Localising Urinary Symptoms - Pain or burning when passing urine (dysuria) - Urinary frequency - Urgency	These are the recognised main symptoms of lower UTI (cystitis) – a diagnosis of UTI requires two or more of these to be present. Frequency is specifically the repeated passing of small volumes of urine only, including waking during the night to void.
OR patients with at least one urinary tract symptom AND	
Additional symptoms	Comments
Loin pain or tenderness (back/side pain)	Indicates possible upper UTI (pyelonephritis). This is a complicated UTI.
New or worsening urinary incontinence	May be most obvious observed sign in those unable to communicate the core symptoms
Lower (supra-pubic) abdominal pain	Less reliable sign, other causes common and should be considered
Males with testicular pain or clinical epididymo-orchitis or suspected prostatitis	In older males these are commonly caused by typical urinary pathogens – consider STI testing in younger men

Key principles for empirical therapy

- Clinical symptoms are required:** Neither urinalysis nor urine culture are “tests for UTI” and do not establish a diagnosis of UTI in the absence of clinical symptoms.
- Follow urine sampling guidance** to decide on whether a sample will be useful to guide treatment.
- Prescribe based on likely pathogens and local guidance.** The majority of UTIs are caused by *E.coli*. Refer to [NHSAA Therapeutics Handbook for empirical antimicrobial choices](#). Review previous urine culture results (from last 6 months) and check empirical guideline against reported resistances.
- Consider patient factors** (allergies, renal function, recent antimicrobial use).

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2. Interpreting the Urine Culture and Susceptibility Report

- **Caution: bacteriuria ≠ infection!** UTI is a clinical diagnosis that requires compatible symptoms. **Do not treat asymptomatic bacteriuria.**
- **Look for:**
 - **Organism Identification:** E.g., *Escherichia coli*, *Klebsiella pneumoniae*, *Enterococcus* species, *Staphylococcus saprophyticus*.
 - **Refer to list of antimicrobials in the appendix** for more information on specific frequently reported options. Use [“Access”](#) category agents whenever possible.
 - **Susceptibility Results (S/I/R - EUCAST definitions): S and I are the preferred categories** for empirical and targeted therapy in uncomplicated infections.
 - **S = Susceptible, Standard Dosing:** The organism is inhibited by the standard dose of the antimicrobial.
 - **I = Susceptible, Increased Exposure:** The organism is inhibited when there is *increased* exposure to the agent. This can be achieved by modifying the dosing regimen (e.g., higher dose, more frequent dosing, prolonged infusion) or by the natural concentration of the drug at the site of infection (e.g., in the urine for UTIs). **“I” is a category of “susceptible”, indicating that the antimicrobial is likely to be effective if appropriate dosing is used** to achieve higher drug concentrations.
 - **R = Resistant:** The organism is not inhibited by achievable concentrations of the antimicrobial and **clinical failure is likely**.
- **If a culture is reported as “heavy mixed growth”,** sample contamination is likely. Only send a *carefully* taken MSU if symptoms persist.

3. Post-Report Management (Targeted Therapy)

- **Scenario 1: Clinically Improved & Report Shows Susceptible Organism (S or I):**
 - **Action:** If a broad-spectrum agent was used empirically, **de-escalate** to the most appropriate narrow-spectrum oral antimicrobial based on the susceptibility report and local guidelines. See table in appendix for preferred narrow-spectrum options.
 - **Duration:** 3 days for uncomplicated cystitis in non-pregnant women.

7 days for uncomplicated lower UTI in males.

For other specific scenarios, refer to [local guidelines](#) on duration.

- **Examples of common oral choices:**
 - *E. coli* S to Nitrofurantoin → Switch to Nitrofurantoin.
 - *K.pneumoniae* S to Trimethoprim → Switch to Trimethoprim.
 - *E.faecalis* S to Amoxicillin → Switch to Amoxicillin.

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- **Scenario 2: Clinically Improved OR Stable & Report Shows Resistant Organism (R to current therapy):**
 - **Action: Review** current antimicrobial.
 - If the patient is clinically well and symptoms have resolved, **stop** antimicrobials; **no alternative susceptible agent is needed**.
 - **If symptoms persist**, change to a suitable oral agent based on the report.
 - **Refer to Microbiology inbox if: the only susceptible agents are protected** (e.g., piperacillin-tazobactam, meropenem), or if the organism is a multi-drug resistant isolate (e.g., ESBL with no oral options, Carbapenem-resistant).

- **Scenario 3: Not Clinically Improved / Worsening Despite Antimicrobials:**
 - **Action: Re-assess** the patient (vitals, signs of sepsis, new symptoms), confirm most likely clinical source of infection, check for complications (e.g., pyelonephritis, obstruction), review dosing and administrations
 - **If patient unstable with sepsis:** Manage physiological derangement appropriately and request **senior clinical review**. **If report shows resistant organism: switch** to appropriate antimicrobial as reported. Consider using IV therapy; DO NOT use nitrofurantoin.
 - **Refer to microbiology inbox if: patient deteriorating on culture-based treatment and the remaining susceptible agents are protected** (e.g., piperacillin-tazobactam, carbapenems), **or if the organism is a multi-drug resistant isolate** (e.g., ESBL, Carbapenem-resistant).

- **Scenario 4: Positive culture, but NO urinary tract symptoms = Asymptomatic Bacteriuria (ASB):**
 - **Action: DO NOT TREAT**, unless in pregnancy, or prior to specific urological procedures. Explain to the patient why treatment is not indicated.

4. When to consider referral to Microbiology

- **Organism has multiple drug resistances**, e.g., ESBL-producing Enterobacterales, Carbapenemase-Producing Enterobacterales (CPE), VRE.
- **Recurrent UTIs** (e.g., ≥3 episodes in 12 months) with resistant isolates. Refer to [local guidance on recurrent UTI in females](#).
- **Patient not improving** despite appropriate empirical or targeted therapy.
- **Unusual organism** identified (e.g., *P.aeruginosa* from a non-catheterised patient).

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[Follow most appropriate referral route.](#)

5. Documentation

- Clearly document the indication and rationale for antimicrobial choice, duration, and any changes based on microbiology results.
- Document patient advice and education regarding antimicrobials.

6. References & Further Reading

- [SIGN160 management of suspected lower urinary tract infection in adult women](#)
- [NICE NG109 Urinary tract infection \(lower\): antimicrobial prescribing](#)
- [NHS Ayrshire & Arran Empirical Antimicrobial Guidelines UTI](#)

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Appendix - Guide to antimicrobials commonly reported on urine cultures

Preferred agents 1					
Agent	Suitable if reported as "S" or "I" for treatment of	Do not use if reported as "R" OR	AWaRe Class	Prostatic/ testicular tissue penetration	Comments
Nitrofurantoin PO only	Uncomplicated cystitis (lower UTI) only , females and males	eGFR <45ml/min Do not use as IVOS for patients with suspected or proven bacteraemic UTI	Access	No	Only tested on <i>E.coli</i> and enterococci Concentrated in urine – requires appropriate renal excretion to work Does not achieve any therapeutic levels in blood stream, renal, prostatic, and testicular tissue
Trimethoprim PO only	Uncomplicated cystitis (lower UTI), females and males, including males with pyrexia	Risk of hyperkalaemia	Access	Yes	Caution in elderly and those on ACE inhibitors/ARBs due to risk of hyperkalaemia Adjust for renal function.
Amoxicillin Note: high background resistance in urinary Gram-negatives	IV: Urosepsis for enterococcal cover only PO : Uncomplicated enterococcal cystitis (lower UTI), females and males	Allergy to penicillins	Access	No	Useful for enterococcal cover Do not use empirically as monotherapy – possible narrow-spectrum switch for <i>E.coli</i> or <i>P.mirabilis</i> if reported as S

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Preferred agents 2					
Agent	Suitable if reported as "S" or "I" for treatment of	Do not use if reported as "R" OR	AWaRe Class	Prostatic/testicular tissue penetration	Comments
Gentamicin IV only	Urosepsis in females and males Treatment of uncomplicated cystitis (lower UTI) in women if isolate resistant to oral options	Absolutely contraindicated in Myasthenia gravis eGFR <20 Decompensated alcoholic liver disease (ALD) Previous history of ototoxicity with aminoglycosides	Access	No	Use NHS Ayrshire & Aran dose calculator and prescription charts Requires therapeutic drug monitoring
Co-trimoxazole	Pyelonephritis (upper UTI), females and males IVOS in urosepsis	Risk of hyperkalaemia Previous or current isolates reported as R to trimethoprim	Access	Yes	Caution in elderly and those on ACE inhibitors/ARBs due to risk of hyperkalaemia High oral bioavailability ☐ suitable for early IVOS

If preferred options resistant or contra-indicated					
Agent	Suitable if reported as "S" or "I" for treatment of	Do not use if reported as "R" OR	AWaRe Class	Prostatic/testicular tissue penetration	Comments
Pivmecillinam PO only	Uncomplicated cystitis (lower UTI) only, females and males	Allergy to penicillins Do not use as IVOS for patients with suspected or proven bacteraemic UTI	Access	No	ESBL-stable Only tested on <i>E.coli</i>
Cefalexin PO only	Uncomplicated cystitis (lower UTI) only, females and males	Anaphylaxis to penicillins High risk or previous history of <i>C.difficile</i> infection	Access	No	Not tested on <i>Proteus</i> species locally
Temocillin IV only	Alternative to gentamicin if contra-indications present or gentamicin given for 72hrs	Allergy to penicillins UTI caused by <i>P.aeruginosa</i>	Watch	No	Never reported as "S" Always use increased exposure dosing ("I"), if required adjusted to renal function Has no activity against <i>P.aeruginosa</i> Has no activity against Gram-positive organisms

Use with caution					
Agent	Suitable if reported as “S” or “I” for treatment of	Do not use if reported as “R” OR	AWaRe Class	Prostatic/ testicular tissue penetration	Comments
Ciprofloxacin Subject to MHRA warning Use patient leaflet	UTI caused by organisms resistant to all other oral options or caused by <i>P.aeruginosa</i>	High risk or previous history of <i>C.difficile</i> infection History of tendinitis caused by fluoroquinolones Long QTc or other medications with QTc prolonging effects Epilepsy – lowers seizure threshold	Watch	Yes	Use only if no other appropriate agents available or on Infection Specialist advice Susceptibility to ofloxacin can be inferred from ciprofloxacin result Use increased exposure dosing (“I”) for <i>P.aeruginosa</i>

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