Guide to preoperative testing: Urine testing before elective urological surgery

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Supporting theatres, anaesthesia and perioperative medicine services

GIRFT is part of an aligned set of programmes within NHS England

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Glossary

APOM	Anaesthetic and Perioperative Medicine
ASB / ABU	Asymptomatic bacteriuria
FURS	Flexible ureteroscopy
MC&S	Urine microscopy culture and sensitivities
PCNL	Percutaneous nephrolithotomy
POA	Pre-operative assessment
TCI	‘To-come-in’ date, when the patient attends hospital for their procedure
TULA	transurethral laser ablation
TURP	Transurethral resection of prostate
TURBT	Transurethral resection of bladder tumour
URS	Ureteroscopy / ureteroenoscopy
UTI	Urinary tract infection

When to use urine testing before elective urological surgery

Recommendations for preoperative assessment services

1	Test only when necessary and targeted to the relevant urological procedures. (See Table 1.)
2	If indicated, perform tests close to the surgical date, recommended approximately 2 weeks prior to 'to-come-in' date.
3	Where indicated (Table 1), send for urine MC&S according to procedure. In patients with symptoms suggestive of UTI, irrespective of the planned procedure, do not use dipstick testing but send urine for MC&S.
4	If there is a positive result in the absence of symptoms (asymptomatic bacteriuria), start antibiotics according to sensitivity results for 48 hours before the procedure and give targeted antibiotic prophylaxis 30 minutes before the procedure or on induction.
5	For patients symptomatic of UTI at pre-op assessment and a subsequent positive MC&S treat immediately according to local protocols.

The full evidence and rationale for these recommendations and testing requirements is set out from page 7.

Table 1 Overview of testing requirements

Procedure type	Urine test requirements	Action required if positive
Flexible cystoscopy. With or without interventions: + urethral dilation + stent removal / change + bladder biopsy + diathermy	✕ No urine test required	Not applicable
Transrectal prostate biopsy Transperineal prostate biopsy		
Transurethral laser ablation (TULA) (En-bloc / enucleation)	? Consider urine MC&S ~2 weeks before TCI	Start antibiotics according to sensitivites 48 hours before the procedure and give targeted antibiotic prophylaxis 30 minutes before the procedure.
Transurethral resection of: prostate (TURP) bladder tumour (TURBT)	✓ Urine MC&S ~2 weeks before TCI	
Upper tract endourology: Ureteroscopy / ureteroenoscopy (URS) Flexible ureteroscopy (FURS) Percutaneous nephrolithotomy (PCNL)		
Patients symptomatic of UTI at pre-op assessment for any procedure	✓ Immediate urine MC&S	Symptomatic patients for any procedure with a positive urine MC&S should be treated immediately according to local protocols

Introduction

Unwarranted variation and challenges in preoperative screening and diagnostic pathways have been identified by the Preoperative Assessment (POA) non-medical network, as well as from feedback from providers and on-site reviews. This variation can impact on the timing of elective surgical pathways and may result in postponements and on the day cancellations.

NICE has published guidance on preoperative testing but this requires interpretation by provider sites.

This guide forms part of a series of practical guides that aim to support providers to:

- improve preoperative patient pathways;
- take a targeted and evidence-based approach to diagnostic testing, avoiding blanket testing policies;
- reduce postponements of surgery and on the day cancellations.

This guide has been produced by the GIRFT Anaesthetic and Perioperative Medicine (APOM) medical and nursing leads, taking an evidence-based approach and with input and consensus of experts and key stakeholders.

We hope that this practical guidance helps providers to reduce delays and cancellations of patients and make the best use of surgical capacity to tackle waiting lists.

This guide relates to preoperative urine testing, management and treatment of bacteriuria / UTI before elective urological surgery.

Who should read this guide?

This document is aimed at clinicians and managers who work across the elective pathway for urological surgery including:

- POA teams (medical and non-medical)
- Theatre, booking and scheduling teams involved in urological surgery
- Urology surgical directorates (clinical and non-clinical staff)
- Theatre and ward staff working within urological surgery
- Healthcare professionals working in outpatient urological services

What is the guide's aim?

The aim is to create guidance for a standardised approach to screening, management and treatment for urinary infections specifically regarding urine microscopy culture and sensitivities (MC&S) taken prior to elective urological surgery. Overall aims are to:

- Reduce the unwarranted variation in practice
- Reduce cancellations on the day and postponements at POA due to positive urine microscopy and subsequent cultures
- Rationalise indications for targeted testing for specific patient groups (type of surgical procedure/patient risk) and subsequent treatments

Context

Urine dipstick testing for nitrites and leucocytes and urine MC&S, are tests that look for evidence of uropathogenic microorganisms such as bacteria or less-commonly yeasts in urine. Both tests are used by multiple providers prior to elective urological surgery. The purpose of these tests is to identify the presence of uropathogenic microorganisms in the urine and provide antimicrobial susceptibility results to help providers select the most effective antimicrobial therapy.

The presence of micro-organisms in urine is not diagnostic for a urinary tract infection (UTI) as many patients are asymptomatic and by definition do not have infection. Patients without symptoms who have microorganisms in the urine are correctly classified as having asymptomatic bacteriuria (ASB) which would not usually be an indication for antibiotics but should be considered prior to certain urological procedures.

In preoperative assessment, urine MC&S are typically performed for two reasons:

1. For symptomatic patients (such as painful urination, fever, or urinary urgency and frequency), to quickly identify and manage an infection that could complicate surgery or make the patient unwell in the perioperative period.
2. For asymptomatic patients where national / local guidance advocates screening for targeted invasive procedures.

POA pathways are developing to ensure that routine (non-urgent) patients are reviewed in POA before a confirmed date for surgery is given, so that any potentially modifiable risk factors can be identified and treated in an appropriate time frame.

The majority of POA units perform preoperative tests based on the NICE Guideline. NICE guidance is to completely avoid routine urine dipstick testing for elective surgery and only to

consider a urine MC&S before surgery if the presence of bacteriuria would influence perioperative management. In implementing this guidance, providers must interpret when the presence of bacteriuria would influence management.

For urological surgery, the limited level of published evidence available means that establishing a consensus expert opinion is necessary. The expert stakeholder group who have developed this guidance were informed by literature review and clinical expertise and experience.

A study looking at cancellations in elective urological surgery due to medical conditions, found that 78% of these were due to the presence of a UTI. This figure represented 27% of all cancelled urological operations.

These data validate the provider feedback we have had in terms of cancellations on the day or postponements from POA secondary to urine infections, and more specifically, in urological surgery.

Key areas of challenge

This guidance covers 4 main areas with current evidence and key recommendations:

1. Targeted testing for urological procedures
2. Time of testing before urological procedures
3. Type of urine testing i.e. dipsticks or MC&S
4. Action taken following a positive result

Evidence and rationale for recommendations

Recommendation 1: Test only when necessary and targeted to the relevant urological procedures.

No urine MC&S required	
Flexible Cystoscopy	Diagnostic/check
Flexible cystoscopy + some intervention	Intervention: ○ urethral dilatation ○ stent removal ○ bladder biopsy ○ diathermy
Prostate biopsies	Transrectal/transperineal [9]

Consider MC&S	
Transurethral laser ablation (TULA)+	Consider testing. There is insufficient evidence to make a strong recommendation.

Urine MC&S required	
TURP [10]	
Upper tract endourology	Ureteroscopy [11] PCNL [12]
TURBT [13]	
Please note that any patients with symptoms of a UTI should be tested and treated accordingly at POA or on the day of surgery if there is concern, and treated accordingly https://www.nice.org.uk/guidance/ng45/resources/routine-preoperative-tests-for-elective-surgery-pdf-1837454508997	

Existing guidance

The evidence in the literature is conflicting, leading to variation in the recommendations from guideline bodies.

The European Association of Urology[3] (EAU) 2024 guidelines recommend that a urine culture must be taken prior to urological procedures that breach the mucosa. There is also a strong recommendation that in cases of ASB, pre-operative antimicrobial treatment should commence, but without reference to when treatment should be started or for how long it should continue.

Similarly, the Infectious Diseases Society of America[4] (IDSA) 2019 guidelines advise screening for and treating ASB in patients undergoing endoscopic urologic procedures associated with mucosal trauma (strong recommendation, moderate-quality evidence).

In contrast, the Canadian Association of Medical Microbiology and Infectious Disease[5] (2017) guidelines recommend against obtaining a urine culture from adults who lack symptoms localising to the urinary tract or fever, unless they are pregnant or undergoing genitourinary instrumentation where mucosal bleeding is expected.

The management of ASB in patients undergoing urological surgical procedures has been a topic of considerable debate. The primary concern is whether POA and treatment of ASB are essential for reducing the risk of postoperative symptomatic UTIs. Several studies have explored this issue, providing valuable insights into the necessity and effectiveness of such interventions.

Evidence from key studies

A study published in 2017 reported on a multicentre trial in Sweden with 2,200 patients. This study focused on patients undergoing urologic surgical procedures who were receiving antimicrobial prophylaxis in accordance with the European Association of Urology guidelines. The findings revealed that the preoperative presence of ASB was **not** associated with a higher incidence of postoperative symptomatic UTI. This suggests that routine treatment of ASB to prevent postoperative UTIs may not be necessary.

Further supporting evidence comes from a prospective study published in 2019[7] which examined the risk of infection in patients undergoing urologic surgery based on the presence of ASB. This study found **no** association between ASB and postoperative infectious complications. The study concluded that ASB did not need to be managed differently before intermediate or higher-risk procedures. Instead, single-dose antimicrobial prophylaxis, which is the standard practice prior to genitourinary procedures where a mucosal barrier will be broken, should be administered regardless of the presence of ASB.

Conflicting evidence comes from a multicentre study in September 2024[8] which further examined the implications of positive urine cultures prior to urological surgery. The study concluded that positive urine cultures **were** associated with an increased risk of postoperative infections. Additionally, patients who experienced infectious complications also had a higher incidence of other complications, such as haematuria and urinary retention. However, the study noted that the effectiveness of systematic preventive antibiotic therapy for a positive urine culture has not been conclusively established. This highlights the need for clinicians to carefully weigh the risks and benefits of antibiotic therapy on a case-by-case basis.

Conclusion

The current body of evidence suggests that universal preoperative screening and treatment of ASB may not be necessary for reducing the risk of postoperative symptomatic UTIs in patients undergoing certain urological surgical procedures, but conflicting evidence exists. However, the literature suggests that positive urine tests pre-operatively are a significant driver for cancellations of procedures. To reduce the cancellation rate, a consensus for this guideline was made for the types of procedures still requiring urine screening (see Table 1 on page 3).

Antimicrobial prophylaxis should be given according to local guidelines and positive urine cultures should be managed with careful consideration of individual patient risks (see later recommendations). This approach ensures that patients receive appropriate care without unnecessary interventions, ultimately contributing to better surgical outcomes, reduced patient delays and improved patient safety.

Implementation in Clinical Practice

Patients should undergo urine testing as per linked procedures set out in Table 1 and/or if they have symptoms of UTI.

Recommendation 2: If indicated, perform testing close to the surgical date, recommended as approximately 2 weeks prior to to-come-in date.

Evidence in timing of urine MC&S before surgery is currently lacking.

The French Association of Urology (AFU)[14] has established comprehensive guidelines for antibiotic prophylaxis in urological procedures, emphasising the critical role of preoperative urine cultures. These guidelines are designed to mitigate the risk of postoperative infections, which remain a significant concern for urological surgery. One of the key recommendations is the timing of urine sample collection, specifically conducting urine cultures 10 to 14 days before surgery to detect bacteriuria.

The recommended window for urine sample collection is 10 to 14 days before surgery is strategically chosen to balance several factors:

1. **Detection and Treatment**: This timeframe allows sufficient time to detect bacteriuria and initiate appropriate antibiotic treatment if necessary. Early detection ensures that bacteriuria or symptomatic infection is adequately managed before the surgical procedure, reducing the risk of complications.
2. **Minimising Resistance**: Collecting samples too close to the surgery date might not provide enough time to address the infection effectively. Conversely, collecting samples too early might miss transient bacteriuria that could develop closer to the surgery date. The 10 to 14-day window strikes a balance, ensuring timely detection and treatment while minimising the risk of antibiotic resistance emerging during any pre-operative antibiotic course.
3. **Operational Efficiency**: This timing also aligns with preoperative planning and patient preparation schedules, allowing for seamless integration into the surgical workflow. It ensures that results are available in time for the surgical team to make informed decisions about antibiotic prophylaxis.

Conclusion

A consensus was made within this group and for the purpose of this recommendation to advocate urine testing approximately 2 weeks prior to the confirmed TCI date.

Implementation in Clinical Practice

Implementing these guidelines requires coordination between POA, urologists, microbiologists, urology directorates and theatre, booking and scheduling teams. Patients scheduled for urological procedures should be informed about the importance of preoperative urine MC&S and the specific timing for sample collection. Key principles to consider include:

- There should be clear visibility on procedures that require urine MC&S by POA and booking and scheduling teams.
- Robust pathways should be in place to contact patients before TCI date for collection of urine specimens within the appropriate time frame and to allow for treatment.
- Where POA is not within this timeframe, an alternative pathway for dissemination and collection should be available.
- An appropriate prescriber should have sight of results and any relevant clinical details and issue the prescription as per localised policy.
- Patients should have any clinical symptoms of UTI recorded and escalated to the surgical team.

Recommendation 3: Where indicated (table 1), send for urine MC&S according to procedure. In patients with symptoms suggestive of UTI, irrespective of planned procedure, do not use dipstick testing but send urine for MC&S.

Evidence examining the mode of testing was reviewed. The American Urological Association (AUA) does not recommend using dipstick tests for detecting nitrates due to their poor accuracy, particularly in patients who experience high UTI frequency. Nitrites are only produced in urine by certain bacterial species and so are not always present in true bacteriuria with a uropathogen. These limitations can lead to false negatives, making dipstick tests unreliable in such cases.

Urine culture is strongly advocated by several other major guideline bodies, including the European Association of Urology (EAU)[3], the Infectious Diseases Society of America (IDSA)[4], and the French Association of Urology[14]. These organisations emphasise the importance of urine culture in accurately diagnosing and managing UTIs. The AUA[8] recommends starting with urine microscopy to identify any abnormalities, followed by urine culture for a more detailed analysis if needed.

Conclusion

A consensus was established that urine MC&S is the recommended mode of testing.

Recommendation 4: If there is a positive result in the absence of symptoms (asymptomatic bacteriuria), start antibiotics according to sensitivity results for 48 hours before the procedure and give targeted antibiotic prophylaxis 30 minutes before the procedure or on induction.

Recommendation 5: For patients symptomatic of UTI at pre-op assessment and a subsequent positive MC&S treat immediately according to local protocols.

The management of ASB in urological procedures varies across guidelines and studies. The **Infectious Diseases Society of America (IDSA) guidelines (2019)**[4] recommend targeted antimicrobial therapy over empiric therapy, emphasising a short course (1-2 doses) due to weak evidence. This approach aims to minimise antibiotic resistance and unnecessary exposure.

The **American Urological Association's (AUA) 2020**[16] **best practice statement** supports single dose targeted antibiotic prophylaxis to reduce infection risk while avoiding overuse of antibiotics. This aligns with efforts to combat antibiotic resistance.

French Association of Urology (AFU) guidelines[14] suggest starting antimicrobial treatment 48 hours before urologic surgery and continuing for up to 7 days post-surgery. For ureteric stent procedures, treatment is recommended for up to 24 hours post-procedure, reflecting a more conservative approach to infection prevention.

In summary, while the IDSA and AUA favour shorter, targeted regimens to minimise resistance, AFU guidelines recommend longer courses for thorough infection prevention.

For patients who exhibit symptoms suggestive of a urinary tract infection at their preoperative assessment (irrespective of the type of planned urological surgery) a urine sample for MC&S should be sent immediately and if positive prompt treatment according to local protocols is advised.

Conclusion

A consensus was established to start culture sensitive antibiotics 48 hours prior to the procedures and targeted antibiotics 30 min beforehand or on induction. Where the patient has clinical symptoms of a UTI (i.e. they are symptomatic), then irrespective of the planned urological surgery, antibiotic treatment should be organised at the earliest opportunity and the patient informed.

Implementation in Clinical Practice

Treating patients with antibiotic therapy prior to TCI may cause a challenge and the following principles should be considered:

- There is a suitable point of contact for patients with positive urine cultures and to action treatment when indicated.
- Patient information on when to start treatment should be communicated clearly in the patient's preferred method of communication.
- Coordinated approach for treatment (when indicated) which should address patient related factors for collection (i.e. delivery to local pharmacies to avoid excess travel).

Recommendations for further research

Future research on this topic area should focus on:

- The optimum duration of antibiotic prophylaxis prior to urological surgery.
- Procedure specific efficacy data for antibiotic prophylaxis prior to urological surgery.
- The value of prophylactic antibiotics for TULA procedures due to the lack of existing clinical evidence.
- Patient factors which determine risk of peri procedure UTI and sepsis.
- Peri procedure UTI/sepsis risk stratification based on patient and procedural factors.
- Health economic evaluation of peri procedure antibiotics in urological surgery.

Further information

#	Recommended document	Author	Overview
Guidelines			
1	NICE Guideline [NG45] on routine preoperative tests for elective surgery	NICE	Published 2016. NICE guideline covering routine preoperative tests for people aged over 16 who are having elective surgery.
3	EAU guidelines on Urological Infections	European Association of Urology	Published 2024, recommending that a urine culture must be taken prior to urological procedures that breach the mucosa.
4	IDSA Clinical Practice Guideline for the Management of ASB	Infectious Diseases Society of America	Updated 2019. Guideline on ASB advising screening for and treating ASB in patients undergoing endoscopic urologic procedures associated with mucosal trauma.
5	AMMI Canada position statement on ASB	Canadian Association of Medical Microbiology and Infectious Disease	Published 2018. Position statement recommending against obtaining a urine culture from adults who lack symptoms localising to the urinary tract or fever, unless they are pregnant or undergoing genitourinary instrumentation where mucosal bleeding is expected.
8	AUA Asymptomatic Bacteriuria and Urological Surgery: Risk Factor or Not?	American Urological Association	AUA publication of results From the National and Multicenter TOCUS Database.
14	AFU recommendations: Antibiotic prophylaxis for urological procedures	Infectious Disease Committee French Association of Urology (AFU)	Guidelines published 2010 for antibiotic prophylaxis in urological procedures.
16	AUA Best Practice Statement on Urologic Procedures and Antimicrobial Prophylaxis	American Urological Association	Best practice statement published in 2020 supporting single dose targeted antibiotic prophylaxis to reduce infection risk.

Research and studies			
2	Preventing ‘same-day’ cancellations in elective urological surgery	AJ O’Dwyer, S Pridgeon, and JSA Green	Article from 2015 identifying reasons for cancellations of elective urological procedures and offering recommendations for prevention.
9	Preoperative urine culture is unnecessary in asymptomatic men prior to prostate needle biopsy	David Z. Qi, Kathleen Lehman et al.	Article from 2017 concluding that routine office urine culture in the asymptomatic male prior to PNB was unnecessary.
10	Infection after Transurethral Resection of the Prostate: Variation among Centers and Correlation with a Long-Lasting Surgical Procedure	Anne Vivien; Thierry Lazard et al.	1998 study of the risk factors of post-TURP infection.
11	Predictive risk factors of urinary tract infection following flexible ureteroscopy despite preoperative precautions to avoid infectious complications	Michael Baboudjian et al.	Study from 2019 investigating incidence and predictive risk factors of UTI following fURS procedure.
12	Urological infections after endourological procedures	Robert M Geraghty; Bhaskar K Somani.	Article from 2021 on post-endourological infection risk factors for procedures including URS and PCNL.
13	Antimicrobial Prophylaxis for Postoperative Urinary Tract Infections in Transurethral Resection of Bladder Tumors: A Systematic Review and Meta-Analysis	Kathrin Bausch, Florian S. Halbeisen at al.	Published in 2021, reviewing trials assessing the effect of antimicrobial prophylaxis in patients with TURBT on postoperative UTI or ASB.
17	Pre-procedural antibiotics for endoscopic urological procedures: Initial experience in individuals with spinal cord injury and asymptomatic bacteriuria	Julio T. Chong; Adam P. Klausner et al.	Study from 2014 comparing safety, efficacy, quality-of-life impact, and costs of a single dose or a longer course of pre-procedural antibiotics prior to elective endoscopic urological procedures in individuals with spinal cord injury and disorders (SCI/D) and ASB.

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