

GUIDELINES & PROTOCOLS

ADVISORY COMMITTEE

Protocol for Macroscopic and Microscopic Urinalysis and Investigation of Urinary Tract Infections

Reprinted 2004

Scope

The purpose of this protocol is to avoid unnecessary testing in routine cases while allowing physicians to order tests justified by the patient's clinical condition in special cases.

This protocol applies to:

- samples analysed in a physician's office or referred to a laboratory for routine analysis of urine; and,
- midstream samples referred for urine culture or conditional requests for culture in patients with suspected urinary tract infections.

It does not apply to individuals under 19 years of age, catheter or bagged specimens, or suprapubic aspirations.

Laboratories may now perform a microscopic urinalysis without a preceding macroscopic urinalysis (dipstick) when:

- 'positive macroscopic result' was obtained in the physician's office; or,
- the physician has requested an order for a urine culture, conditional on the results of the microscopic.

RECOMMENDATION 1 Urinalysis When UTI Not Suspected

Negative macroscopic-screened urines do not routinely require microscopic examination of urine sediment. Microscopic examination of urine sediment will be performed when requested only under the following conditions:

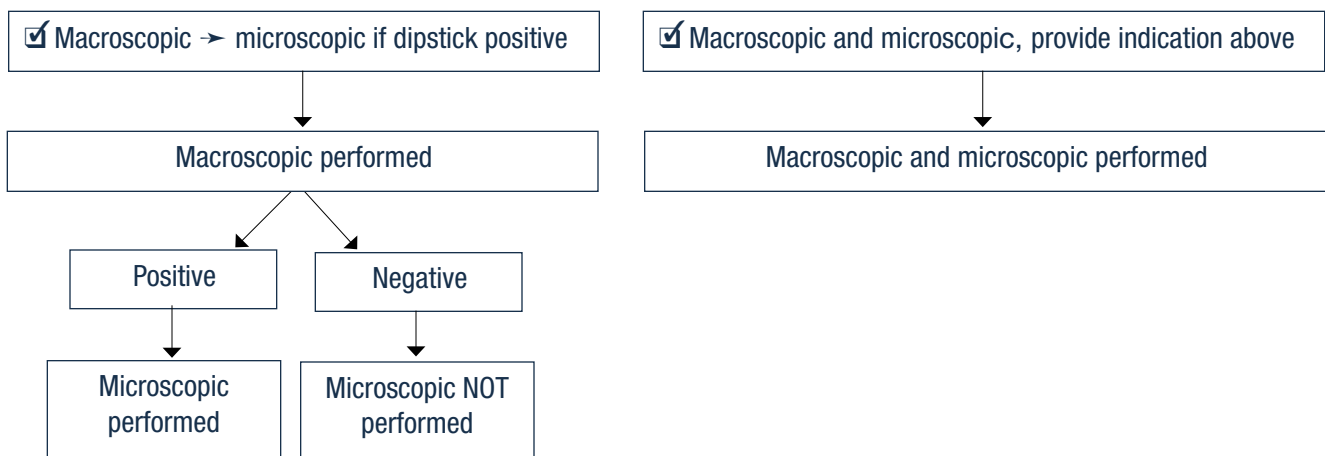
- a) positive macroscopic result:** macroscopic examination positive for any of the following: blood (Hb), protein (greater than trace), nitrite, leukocyte esterase, turbidity, or glucose concentration greater than 55 mmol/l; or,
- b) special case:** patients presenting with a condition where the clinical record justifies further investigation such as:
 - spinal cord injury or disease (including paraplegia or quadriplegia)
 - neurogenic bladder
 - recent urological surgery/cystoscopy
 - established kidney disease

- kidney transplant
- genitourinary problems (nephrolithiasis, bladder calculi, congenital or developmental anatomic abnormalities)
- pregnancy
- diabetes
- recurrent urinary tract infections
- requests by consultant physicians for the investigation of urinary tract problems.

Note: Other choices for urinalysis on the requisition include:

- Macroscopic (dipstick)
- Microscopic

If one of these is checked, the test will be performed as requested. If both are checked, the request will be treated as Macroscopic → microscopic if dipstick positive.



RECOMMENDATION 2 UTI Suspected

If an uncomplicated UTI is suspected in a patient with classic symptoms and treatment is not conditional on culture or sensitivity results (i.e. if antibiotics have been prescribed), then no further testing is necessary.

If an uncomplicated UTI is suspected in a patient with classic symptoms and treatment is conditional on culture or sensitivity, then ‘urine culture’ alone should be requested.

If ‘urine culture’ **and** any combination of macroscopic and/or microscopic urinalysis are ordered, urinalysis will be performed according to the rules outlined in Recommendation 1, and urine culture will be performed regardless of the results of macroscopic and/or microscopic urinalysis.

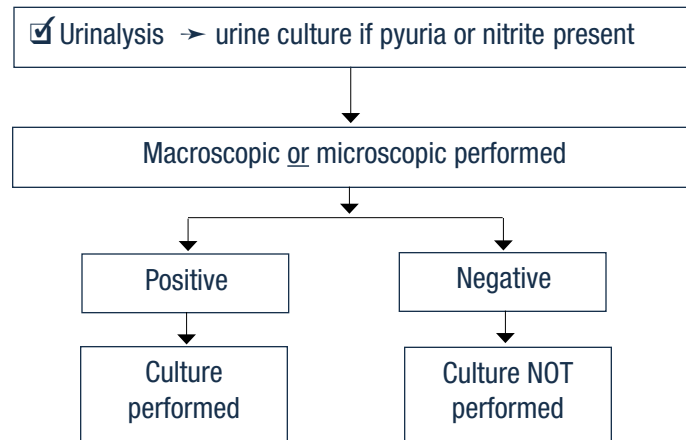
If ‘urine culture’ is requested without an accompanying request for urinalysis, a urine culture will be performed.

RECOMMENDATION 3 UTI Suspected - Conditional Request for Culture

When a ‘urinalysis - urine culture if pyuria or nitrite present’ is requested, either a macroscopic or a microscopic urinalysis,* but not both, will be performed. A urine culture will then be performed only if:

- a macroscopic urinalysis is positive for leukocyte esterase and/or nitrite; or,
- a microscopic urinalysis is positive for white blood cells.**

- * The choice of macroscopic or microscopic urinalysis will be made by the laboratory unless the referring physician requests microscopic.
- **' Positive for white blood cells' must be defined by the local laboratory physician.



Rationale

The purpose of this protocol is to avoid unnecessary testing in routine cases while allowing physicians to order tests justified by the patient’s clinical condition in ‘special cases’.

Routine Urinalysis

Various studies have examined whether macroscopic screening urinalysis can predict the need for further microscopic assessment of urinary sediment.¹⁻¹² While some studies have supported microscopic assessment of all urines, regardless of macroscopic results,¹⁻³ others support microscopic analysis only in certain patient populations.⁴ The majority, however, have concluded that microscopic examination of urine sediment is not necessary if initial macroscopic screening is negative.¹² Notable exceptions are urinalysis for patients with spinal cord injury, quadriplegic or paraplegic patients with no voluntary urine control, and patients with genitourinary problems (e.g. nephrolithiasis, bladder calculi, congenital or developmental anatomic abnormalities).⁴ The latter two patient categories account for about half of the false negative macroscopic screening results.⁴

Macroscopic test results positive for certain components are rarely correlated with positive microscopic examination of urine sediment. A study of 1385 specimens, positive for pH, SG, urobilinogen, bilirubin, ketone, or glucose, found that less than 0.5% were associated with positive microscopic examinations of urine sediment. Macroscopic tests positive for blood (Hb), protein and turbidity, however, are more likely to be associated with positive microscopic examination or urine sediment.⁴ Macroscopic tests positive for leukocyte esterase and nitrite are highly correlated with positive microscopic examinations of urine sediment.^{4,13-16} Since high glucose concentration interferes with leukocyte esterase, a glucose concentration greater than 55 mmol/l may be considered an appropriate justification for proceeding to microscopic urinalysis.

Investigation of Urinary Tract Infection

The costs associated with the investigation of urinary tract infection (UTI) are substantial. However, up to 60-80% of all urine samples sent to the lab for culture are reported negative for bacteria.¹⁷ To reduce the costs of unnecessary testing in the investigation of UTI, the ordering physician should consider whether the test(s) ordered will modify the patient's management. The likelihood of a significant urine culture in the absence of pyuria or nitrite in a midstream specimen is low.¹⁸⁻²⁰ When a urine culture or conditional request for culture is submitted, a midstream sample must be collected. It is important to follow proper technique to prevent contamination (consult your laboratory for details). If urinalysis is required before urine culture, microscopic urinalysis is preferable to macroscopic because of its higher sensitivity and specificity.^{19 - 22} Macroscopic (dipstick) urinalysis may, however, provide a useful aid for the rapid diagnosis of urinary tract infections for physicians who do not have access to a microscope. If pyuria is found on the dipstick in the physician's office, further microscopic urinalysis may not be necessary. It is rarely necessary to order both a macroscopic and a microscopic urinalysis with a urine culture except for 'special cases' (see Recommendation 1). Some laboratories may prefer to perform macroscopic urinalysis to facilitate processing since the difference in sensitivity between macroscopic and microscopic is considered to be relatively small. Physicians concerned about the difference in sensitivity may wish to request microscopic urinalysis on the requisition. In uncomplicated community-acquired cystitis, culture is rarely required when antibiotics are being prescribed. Furthermore, follow-up cultures are not routinely indicated in asymptomatic patients with uncomplicated urinary tract infections.

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Sponsors

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Guidelines and Protocols Advisory Committee
 2-3 1515 Blanshard Street
 Victoria BC V8W 3C8

Phone: 250 952-1347
 Fax: 250 952-1417

E-mail: hlth.guidelines@gems6.gov.bc.ca
 Web site: www.healthservices.gov.bc.ca/msp/protoguides

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