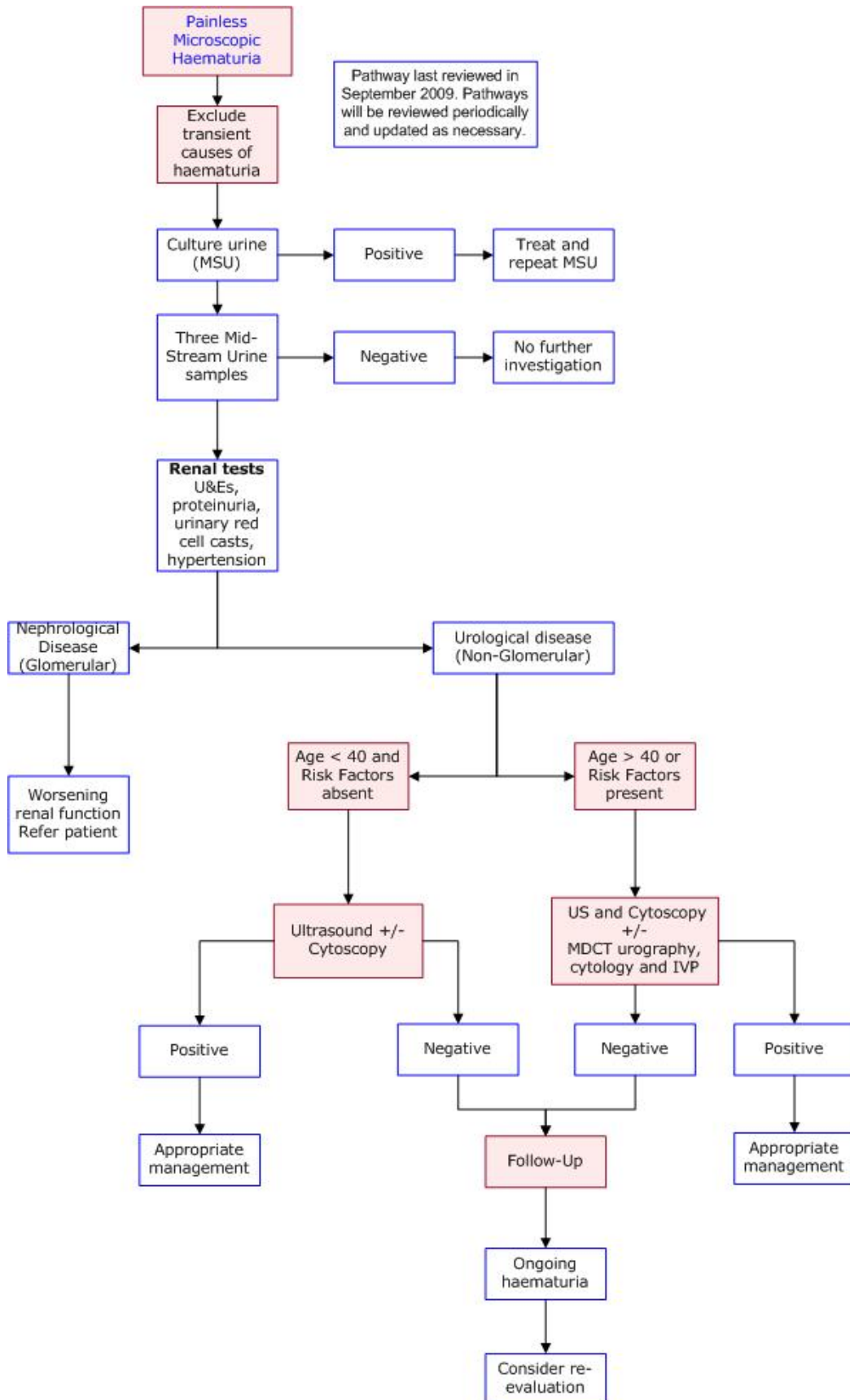




# DIAGNOSTIC IMAGING PATHWAYS

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## PAINLESS MICROSCOPIC HAEMATURIA

- The prevalence of painless microscopic haematuria varies between 0.19-21%, depending on the study population. [3](#) The yield of serious pathology is approximately 1-2% in a number of large series. This contrasts with macroscopic haematuria, where the yield can be as high as 25% [1,2](#). Due to its high prevalence and low yield of significant pathology, there has been considerable debate as to the appropriate protocol to evaluate patients with microscopic haematuria. These considerations include risk-benefit analysis of extensive diagnostic investigations (with the inherent risk of false positive/false negative results) and cost analysis.
- If the presence of red cells is noted, the urine should be cultured for organisms to ensure an infection of the urinary tract is not the cause of bleeding
- Dipstick (reagent strip) is moderately useful in the detection of microscopic haematuria [12](#)
- To confirm the diagnosis of microscopic haematuria, it is suggested that three well collected Mid-Stream Urine samples be analysed. If at least two of these samples show the presence of red cells in the absence of 'transient causes' or infection, evaluation for an underlying cause should be considered.
- In 50-60% of cases despite extensive diagnostic workup, no cause for microscopic haematuria will be found.

## EXCLUDE TRANSIENT CAUSES OF HAEMATURIA

- Transient microscopic haematuria may be induced by a variety of activities; vigorous exercise, mild trauma, menstruation and sexual intercourse [4](#). These causes should be excluded prior to extensive diagnostic work up of microscopic haematuria

## AGE AND RISK FACTOR ASSESSMENT

- The prevalence of malignancy of the renal tract increases with age. In a large prospective evaluation of patients with microscopic haematuria, in men aged <50 the chance of malignancy was 0.44%. In the case of women <60, the detection rate was 0.75%. This contrasts with macroscopic haematuria where the incidence of malignant disease in comparable age groups was 4.8% in men and 2.1% in women [2](#).
- Risk factors predisposing to an increased risk of malignancy of the urinary tract include;
  - Cigarette smoking
  - Analgesic abuse
  - Occupational exposures to chemicals in certain industries (leather, dye and rubber)
  - Past treatment with high doses of cyclophosphamide
  - Past treatment with pelvic irradiation

## ULTRASOUND +/- FLEXIBLE CYSTOSCOPY

- Patients aged < 40 and with no risk factors should have an ultrasound of the upper renal tract. This will detect serious upper renal tract pathology with sufficient sensitivity, mitigating the need for additional investigations.
- Ultrasound is effective in the detection of upper tract tumours, though more sensitive for renal cell carcinoma than for upper tract transitional cell carcinoma. Compared to the use of US and IVP, US alone provided a sensitivity of 94.5% for the detection of all upper tract malignancies [2](#)
- A case by case decision should be made as to whether a flexible cystoscopy should be included as part of the diagnostic algorithm.

## ULTRASOUND AND CYSTOSCOPY +/- MDCT-UROGRAPHY, URINARY CYTOLOGY AND IVP

- Patients aged > 40 or with risk factors should have;
  - Ultrasound of the upper renal tract
  - Cystoureteroscopy - The gold standard for lower urinary tract malignancies [6](#)
- The following tests should be considered on a case by case basis;
- Multidetector CT-Urography

Computed tomography has been shown to be superior to trans-abdominal ultrasound in the detection and characterisation of < 3cm renal masses [7](#). This test has also been shown to improve the diagnostic yield when compared to intravenous pyelogram. [8](#)

There is evidence to suggest that MDCT Urography should be employed in the evaluation of patients, when other diagnostic tests fail to identify a cause of microscopic haematuria. The scan protocol should include; Non contrast scan, arterial/early corticomedullary phase, nephrographic and excretory phase.

This protocol has been shown to demonstrate a cause of microscopic haematuria in up to 45% of patients, who previously had negative diagnostic investigations. In addition to the improved detection of pathology, sensitivity and specificity (92% and 94% respectively) of MDCT compared to histopathological specimen and urological surveillance was maintained. [9,10](#)

However the radiation exposure is much higher in MDCT urography and is highly dependant on the exact CT protocol used. [11](#)

- Urinary cytology (sensitivity 25%, specificity 91%). Therefore high positive predictive value but low negative predictive value [1](#)
- Intravenous pyelogram - This investigation, in addition to ultrasound is more sensitive than either test in the detection of upper tract urothelial tumours [5](#)

## FOLLOW-UP

- In 50-60% of cases, despite extensive radiological and urological investigation no cause for painless microscopic haematuria will be found.
- Given the lack of consensus as to the appropriate algorithm to investigate patients with microscopic haematuria, it is not surprising that there is disagreement as to how individuals with initial negative diagnostic tests should be followed up.
- The follow-up of patients with painless microscopic haematuria is difficult as evidence does suggest that a cause of bleeding will be identified in a small percentage (up to 5%) of these individuals, including malignancy [6](#). Suggested surveillance includes;
  - MSU and properly collected and analysed urinary cytology every 12 months
- Expeditious investigation should be performed in any patient with unexplained microscopic haematuria who develops gross haematuria, recurrent urinary tract infections or changes in voiding characteristics. [6](#)

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