# NMP-22 urinary tumour marker for evaluation of haematuria

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## Background

- NMP-22 urinary tumour marker is non-invasive test that is reported to aid in the diagnosis of bladder cancer in conjunction with standard diagnostic procedures. It can also be used in surveillance.
- Nuclear Matrix Proteins (NMP) serve as scaffold in the nucleus and help regulate mitosis, which can be overexpressed in urothelial tumours and released into the urine.
- Urine is tested at the point-of-care and the result takes 30 minutes to develop.
- Current literature states that NMP-22 has a sensitivity of 47% and specificity of 93% *(AUA NMIBC guidelines 2016)*
- Urinary tumour markers are not currently recommended for the routine evaluation of haematuria by NICE, European Association of Urology or American Urological Association

## Aim

- Assess diagnostic accuracy of NMP-22 test for urothelial cancers
- Assess the clinical need for the use of NMP-22 urinary tumour marker as part of evaluation for patients referred with haematuria under the 2 week wait pathway
- Improve efficiency and reduce cost of haematuria 2 week wait pathway

## Methodology

- Data collected retrospectively for all patients on the haematuria 2 week wait pathway at QEH between December 2016 and September 2017 for cystoscopy, USS/CTU, MSU, histology, NMP-22 results
- Patients excluded if: no cystoscopy (gold standard) or upper tract imaging; previous bladder cancer; no haematuria; no clinical documentation available

## Results

- Total: 182 patients:
  - 109 (59.9%) Visible haematuria
  - 71 (39.0%) Non-visible haematuria
  - 2 (1.1%) not documented
- Age: 62.2 years (17-94)
- 8 bladder tumours diagnosed using cystoscopy + biopsy/TURBT
- False positives (n = 7):
  - 3 = positive MSU, 3 = LTC, 1 = no LTC and negative MSU
  - Cystoscopy: 4 NAD, 1 cystitis, 1 ketamine bladder, 1 bladder calculi

| | Tumour | No tumour |
|---|---|---|
| Positive NMP-22 | 4 | 7 |
| Negative NMP-22 | 4 | 167 |

**Sensitivity 50% , Specificity 96%**

PPV 36%, NPV 98%

## Discussion

- <u>Cost analysis:</u>
  - Pack of 24 bladder kits = £554.40
  - Cost per NMP test= **£23.10**
  - Approximately 60 tests performed a month
  - Estimated cost per year= **£16,632**
- NMP-22 is highly specific but **lacks sensitivity**
- Multiple reasons for raised NMP-22
- So far, there is **no evidence to justify the routine use of NMP-22** in the haematuria 2 week wait pathway

## Recommendation for practice:

To **stop using NMP-22** as it is of little diagnostic value and does not increase bladder tumour detection

- Poor sensitivity – does not identify 50% of tumours
- High false positive rate – confuses clinical judgement