What is the most effective strategy for the investigation of adult haematuria?


**Objectives**
- Evaluate the effectiveness of screening for haematuria.
- Evaluate the effectiveness of tests to determine the underlying cause of haematuria.
- Determine the diagnostic accuracy of tests used to detect haematuria and to investigate its underlying causes.

**Methods**
Searches of multiple electronic databases, internet searches, hand searching of journals and conference proceedings were undertaken (up to August 2004). Reference lists of included papers were scanned, and experts in the field were consulted. Studies (in any language) had to meet the following inclusion criteria:

**Effectiveness studies**
- Screening: RCTs of the effectiveness of screening programmes, reporting patient outcomes.
- Further investigation: RCTs or non-randomised controlled trials (CTs), reporting patient outcomes.

**Diagnostic accuracy studies**
- Design: Diagnostic cohort or case-control studies, including a clear reference standard.
- Intervention: Any test or combination of tests used in the detection or investigation of haematuria.
- Outcomes: Sufficient data to allow construction of a 2x2 table.

Two reviewers independently screened titles and abstracts for relevance. Data extraction and quality assessment were performed using standardised forms and checked by a second reviewer. The quality of the included studies was evaluated using published checklists and criteria.

**Data synthesis**
- Results were analysed according to test grouping and clinical aim of studies.
- Sensitivity, specificity, likelihood ratios and diagnostic odds ratios were calculated.
- Individual study results were presented graphically in ROC space.
- Heterogeneity was investigated using the Q statistic, and diagnostic odds ratios were calculated. "Small-study effects" were investigated using Egger’s test.

**Results**
The searches identified over 12,000 potentially relevant studies. A total of 116 studies met the inclusion criteria (see table 1).

**Table 1: Studies included in the systematic review**

<table>
<thead>
<tr>
<th>Study objective</th>
<th>No. studies identified</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effectiveness of screening</td>
<td>0</td>
</tr>
<tr>
<td>Detection of haematuria</td>
<td>19</td>
</tr>
<tr>
<td>Haematuria as a test for disease presence</td>
<td>6</td>
</tr>
<tr>
<td>Further investigation: Microscopy (localisation)</td>
<td>48</td>
</tr>
<tr>
<td>Tumour markers</td>
<td>12</td>
</tr>
<tr>
<td>Cytology</td>
<td>15</td>
</tr>
<tr>
<td>Imaging</td>
<td>15</td>
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</tbody>
</table>

**Effectiveness of the investigation of haematuria**
No studies that evaluated the effectiveness of screening for haematuria or investigating its underlying cause were identified.

**Conclusions**
There is currently insufficient evidence to develop a purely surveillance-based strategy for the investigation of adult haematuria. Quality of studies was generally poor. Future studies should follow the STARD guidelines for reporting of diagnostic accuracy studies.

The following major outstanding questions for future research were identified:
- Is screening/testing for haematuria effective?
- Is investigation of the cause of haematuria effective?
- Which patients with asymptomatic haematuria need full investigation, and is there a subset of patients who require fewer or no further investigations?
- What is the best diagnostic strategy for those with haematuria and no prior malignancy or past history of malignancy?
- What is the impact of sample degradation with time on the performance of microscopy for the detection of haematuria?
- What would be the incremental benefit of routinely using urinalysis and electrolyte testing to identify patients at high risk of haematuria?

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