# ACR Appropriateness Criteria®

## Renal Failure

**Variant 1: Acute kidney injury (AKI), unspecified.**

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Appropriateness Category</th>
<th>SOE</th>
<th>Adults RRL</th>
<th>Peds RRL</th>
<th>Rating</th>
<th>Median</th>
<th>Final Tabulations</th>
</tr>
</thead>
<tbody>
<tr>
<td>US kidneys and bladder</td>
<td>Usually appropriate</td>
<td></td>
<td>O 0 mSv</td>
<td>O 0 mSv [ped]</td>
<td>9</td>
<td>n/a</td>
<td>0 0 0 0 0 0 0 0 0</td>
</tr>
<tr>
<td>Percutaneous US-guided renal biopsy</td>
<td>May be appropriate</td>
<td></td>
<td>O 0 mSv</td>
<td></td>
<td>6</td>
<td>n/a</td>
<td>0 0 0 0 0 0 0 0 0</td>
</tr>
<tr>
<td>Tc-99m MAG3 scan kidney</td>
<td>May be appropriate</td>
<td></td>
<td>☢☢☢ 1-10 mSv</td>
<td></td>
<td>4</td>
<td>n/a</td>
<td>0 0 0 0 0 0 0 0 0</td>
</tr>
<tr>
<td>CT abdomen without IV contrast</td>
<td>Usually not appropriate</td>
<td></td>
<td>☢☢☢ 1-10 mSv</td>
<td>☢☢☢ 3-10 mSv[ped]</td>
<td>3</td>
<td>n/a</td>
<td>0 0 0 0 0 0 0 0 0</td>
</tr>
<tr>
<td>Arteriography kidney</td>
<td>Usually not appropriate</td>
<td></td>
<td>☢☢☢ 1-10 mSv</td>
<td></td>
<td>3</td>
<td>n/a</td>
<td>0 0 0 0 0 0 0 0 0</td>
</tr>
<tr>
<td>MRI abdomen without IV contrast</td>
<td>Usually not appropriate</td>
<td></td>
<td>O 0 mSv</td>
<td>O 0 mSv [ped]</td>
<td>3</td>
<td>n/a</td>
<td>0 0 0 0 0 0 0 0 0</td>
</tr>
<tr>
<td>MRA abdomen without and with IV contrast</td>
<td>Usually not appropriate</td>
<td></td>
<td>O 0 mSv</td>
<td>O 0 mSv [ped]</td>
<td>3</td>
<td>n/a</td>
<td>0 0 0 0 0 0 0 0 0</td>
</tr>
<tr>
<td>MRA abdomen without IV contrast</td>
<td>Usually not appropriate</td>
<td></td>
<td>O 0 mSv</td>
<td>O 0 mSv [ped]</td>
<td>3</td>
<td>n/a</td>
<td>0 0 0 0 0 0 0 0 0</td>
</tr>
<tr>
<td>CTA abdomen with IV contrast</td>
<td>Usually not appropriate</td>
<td></td>
<td>☢☢☢ 1-10 mSv</td>
<td></td>
<td>3</td>
<td>n/a</td>
<td>0 0 0 0 0 0 0 0 0</td>
</tr>
<tr>
<td>Procedure</td>
<td>Appropriateness Category</td>
<td>SOE</td>
<td>Adults RRL</td>
<td>Peds RRL [ped]</td>
<td>Rating</td>
<td>Median</td>
<td>Final Tabulations</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>--------------------------</td>
<td>-----</td>
<td>------------</td>
<td>----------------</td>
<td>--------</td>
<td>--------</td>
<td>-------------------</td>
</tr>
<tr>
<td>X-ray voiding cystourethrography</td>
<td>Usually not appropriate</td>
<td></td>
<td>0.1-1mSv</td>
<td>0.03-0.3 mSv</td>
<td>2</td>
<td>n/a</td>
<td>0 0 0 0 0 0 0 0 0</td>
</tr>
<tr>
<td>X-ray abdomen and pelvis (KUB)</td>
<td>Usually not appropriate</td>
<td></td>
<td>0.1-1mSv</td>
<td></td>
<td>2</td>
<td>n/a</td>
<td>0 0 0 0 0 0 0 0 0</td>
</tr>
<tr>
<td>MRI abdomen without and with IV contrast</td>
<td>Usually not appropriate</td>
<td></td>
<td>O 0 mSv</td>
<td>0.0 mSv</td>
<td>2</td>
<td>n/a</td>
<td>0 0 0 0 0 0 0 0 0</td>
</tr>
<tr>
<td>CT abdomen with IV contrast</td>
<td>Usually not appropriate</td>
<td></td>
<td>1-10 mSv</td>
<td>3-10 mSv</td>
<td>2</td>
<td>n/a</td>
<td>0 0 0 0 0 0 0 0 0</td>
</tr>
<tr>
<td>CT abdomen without and with IV contrast</td>
<td>Usually not appropriate</td>
<td></td>
<td>10-30 mSv</td>
<td>10-30 mSv</td>
<td>2</td>
<td>n/a</td>
<td>0 0 0 0 0 0 0 0 0</td>
</tr>
</tbody>
</table>

**Variant 2: Chronic kidney disease (CKD).**

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Appropriateness Category</th>
<th>SOE</th>
<th>Adults RRL</th>
<th>Peds RRL [ped]</th>
<th>Rating</th>
<th>Median</th>
<th>Final Tabulations</th>
</tr>
</thead>
<tbody>
<tr>
<td>US kidneys and bladder</td>
<td>Usually appropriate</td>
<td></td>
<td>O 0 mSv</td>
<td>O 0 mSv</td>
<td>9</td>
<td>n/a</td>
<td>0 0 0 0 0 0 0 0 0</td>
</tr>
<tr>
<td>CT abdomen without IV contrast</td>
<td>May be appropriate</td>
<td></td>
<td>1-10 mSv</td>
<td>3-10 mSv</td>
<td>5</td>
<td>n/a</td>
<td>0 0 0 0 0 0 0 0 0</td>
</tr>
<tr>
<td>Percutaneous US-guided renal biopsy</td>
<td>May be appropriate</td>
<td></td>
<td>O 0 mSv</td>
<td></td>
<td>5</td>
<td>n/a</td>
<td>0 0 0 0 0 0 0 0 0</td>
</tr>
<tr>
<td>MRI abdomen without IV contrast</td>
<td>May be appropriate</td>
<td></td>
<td>O 0 mSv</td>
<td>O 0 mSv</td>
<td>5</td>
<td>n/a</td>
<td>0 0 0 0 0 0 0 0 0</td>
</tr>
<tr>
<td>CTA abdomen with IV contrast</td>
<td>May be appropriate</td>
<td></td>
<td>1-10 mSv</td>
<td></td>
<td>4</td>
<td>n/a</td>
<td>0 0 0 0 0 0 0 0 0</td>
</tr>
<tr>
<td>MRA abdomen without IV contrast</td>
<td>May be appropriate</td>
<td></td>
<td>O 0 mSv</td>
<td>O 0 mSv</td>
<td>4</td>
<td>n/a</td>
<td>0 0 0 0 0 0 0 0 0</td>
</tr>
<tr>
<td>------------------------------------------------</td>
<td>------------------------</td>
<td>----------------</td>
<td>----------------</td>
<td>---------</td>
<td>-----------</td>
<td>-----------</td>
<td>------</td>
</tr>
<tr>
<td>MRA abdomen without and with IV contrast</td>
<td>May be appropriate</td>
<td>O 0 mSv</td>
<td>O 0 mSv</td>
<td>4</td>
<td>n/a</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>X-ray voiding cystourethrography</td>
<td>Usually not appropriate</td>
<td>☢☢ 0.1-1mSv</td>
<td>☢☢ 0.03-0.3 mSv</td>
<td>3</td>
<td>n/a</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>MRI abdomen without and with IV contrast</td>
<td>Usually not appropriate</td>
<td>O 0 mSv</td>
<td>O 0 mSv</td>
<td>3</td>
<td>n/a</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>CT abdomen without and with IV contrast</td>
<td>Usually not appropriate</td>
<td>☢☢☢☢ 10-30 mSv</td>
<td>☢☢☢☢ 3-10 mSv</td>
<td>3</td>
<td>n/a</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>CT abdomen with IV contrast</td>
<td>Usually not appropriate</td>
<td>☢☢☢ 1-10 mSv</td>
<td>☢☢☢ 3-10 mSv</td>
<td>3</td>
<td>n/a</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Arteriography kidney</td>
<td>Usually not appropriate</td>
<td>☢☢☢ 1-10 mSv</td>
<td>☢☢☢ 3-10 mSv</td>
<td>2</td>
<td>n/a</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Tc-99m MAG3 scan kidney</td>
<td>Usually not appropriate</td>
<td>☢☢ 1-10 mSv</td>
<td>☢☢ 3-10 mSv</td>
<td>2</td>
<td>n/a</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>X-ray abdomen and pelvis (KUB)</td>
<td>Usually not appropriate</td>
<td>☢☢ 0.1-1mSv</td>
<td>☢☢ 0.03-0.3 mSv</td>
<td>2</td>
<td>n/a</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
Appendix Key
A more complete discussion of the items presented below can be found by accessing the supporting documents at the designated hyperlinks.

**Appropriateness Category:** The panel's recommendation for a procedure based on the assessment of the risks and benefits of performing the procedure for the specified clinical scenario.

**SOE:** Strength of Evidence. The assessment of the amount and quality of evidence found in the peer reviewed medical literature for an appropriateness recommendation.

- **References:** The citation number and PMID for the reference(s) associated with the recommendation.
- **Study Quality:** The assessment of the quality of an individual reference based on the number of study quality elements described in the reference.

**RRL:** Relative Radiation Level. A population based assessment of the amount of radiation a typical patient may be exposed to during the specified procedure.

**Rating:** The final rating (1-9 scale) for the procedure as determined by the panel during rating rounds.

**Median:** The median rating (1-9 scale) for the procedure as determined by the panel during rating rounds.

**Final tabulations:** A histogram showing the number of panel members who rated the procedure as noted in the column heading (ie, 1, 2, 3, etc.).

Additional supporting documents about the AC methodology and processes can be found at [www.acr.org/ac](http://www.acr.org/ac).