# American College of Radiology
## ACR Appropriateness Criteria®

## Imaging After Total Knee Arthroplasty

**Variant 1:** Follow-up of the asymptomatic patient with a total knee arthroplasty.

<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>Radiography knee</td>
<td>Usually appropriate</td>
<td>☢</td>
<td>&lt;0.1 mSv</td>
<td>☢ &lt;0.03 mSv [ped]</td>
<td>9</td>
<td>n/a</td>
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<tr>
<td>Fluoroscopy knee</td>
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<td>☢</td>
<td>&lt;0.1 mSv</td>
<td>1</td>
<td>n/a</td>
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<tr>
<td>CT knee without IV contrast</td>
<td>Usually not appropriate</td>
<td>☢</td>
<td>&lt;0.1 mSv</td>
<td>☢☢ 0.03-0.3 mSv [ped]</td>
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<tr>
<td>MRI knee without IV contrast</td>
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<td>0 mSv</td>
<td>☢ 0 mSv [ped]</td>
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<td>n/a</td>
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<tr>
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<td>Usually not appropriate</td>
<td>☢</td>
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<td>☢ 0 mSv [ped]</td>
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<td>☢</td>
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<td>n/a</td>
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<tr>
<td>CT knee without and with IV contrast</td>
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<td>☢</td>
<td>&lt;0.1 mSv</td>
<td>☢☢ 0.03-0.3 mSv [ped]</td>
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<tr>
<td>CT knee with IV contrast</td>
<td>Usually not appropriate</td>
<td>☢</td>
<td>&lt;0.1 mSv</td>
<td>☢☢ 0.03-0.3 mSv [ped]</td>
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### MRI knee without and with IV contrast
- Usually not appropriate
- **0 0 mSv**
- **0 0 mSv** [ped]
- 1
- n/a
- 0 0 0 0 0 0 0 0 0

### 3-phase bone scan knee
- Usually not appropriate
- ☢☢☢ 1-10 mSv
- 1
- n/a
- 0 0 0 0 0 0 0 0 0

### FDG-PET/CT whole body
- Usually not appropriate
- ☢☢☢ 10-30 mSv
- 1
- n/a
- 0 0 0 0 0 0 0 0 0

### WBC scan and sulfur colloid scan knee
- Usually not appropriate
- ☢☢☢ 10-30 mSv
- 1
- n/a
- 0 0 0 0 0 0 0 0 0

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### Variant 2: Status post total knee arthroplasty. Measuring component wear.

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<th>Procedure</th>
<th>Appropriateness Category</th>
<th>SOE</th>
<th>Adults RRL</th>
<th>Peds RRL</th>
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<th>Median</th>
<th>Final Tabulations</th>
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<tbody>
<tr>
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<td>☢ &lt;0.03 mSv [ped]</td>
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<td>0 0 mSv [ped]</td>
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<td>☢ &lt;0.1 mSv</td>
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<td>n/a</td>
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<tr>
<td>CT knee without IV contrast</td>
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<td>☢ &lt;0.1 mSv</td>
<td>☢☢ 0.03-0.3 mSv [ped]</td>
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<tr>
<td>CT knee with IV contrast</td>
<td>Usually not appropriate</td>
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### Variant 3: Pain after total knee arthroplasty. Periprosthetic infection not excluded. Initial imaging evaluation, including image-guided intervention.

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<th>SOE</th>
<th>Adults RRL</th>
<th>Peds RRL</th>
<th>Rating</th>
<th>Median</th>
<th>Final Tabulations</th>
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<td>O 0 mSv</td>
<td>O 0 mSv [ped]</td>
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<td>SOE</td>
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<tr>
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<td>☢ &lt;0.1 mSv</td>
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<td>CT knee with IV contrast</td>
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<tr>
<td>FDG-PET/CT whole body</td>
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<td></td>
<td>☢ ☢ ☢ ☢ 10-30 mSv</td>
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<tr>
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**Variant 4:  Pain after total knee arthroplasty. Joint aspiration cultures positive for infection.** Additional imaging following radiographs.

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<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>MRI knee without and with IV contrast</td>
<td>May be appropriate</td>
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<td>O 0 mSv [ped]</td>
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<td>O 0 mSv [ped]</td>
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<tr>
<td>MRI knee without IV contrast</td>
<td>May be appropriate</td>
<td></td>
<td>O 0 mSv</td>
<td>O 0 mSv [ped]</td>
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<td>CT knee with IV contrast</td>
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<td>☢ &lt;0.1 mSv</td>
<td>☢ ☢ 0.03-0.3 mSv [ped]</td>
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## CT knee without IV contrast

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<th>SOE</th>
<th>Adults RRL</th>
<th>Peds RRL</th>
<th>Rating</th>
<th>Median</th>
<th>Final Tabulations</th>
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<tbody>
<tr>
<td>Fluoroscopy knee</td>
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<td>☢ 0.03-0.3 mSv [ped]</td>
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<tr>
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<td>☢☢☢ 1-10 mSv</td>
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<tr>
<td>FDG-PET/CT whole body</td>
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<td>☢☢☢ 10-30 mSv</td>
<td>☢☢☢ 10-30 mSv</td>
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<td>CT knee without and with IV contrast</td>
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<td>☢ 0.03-0.3 mSv [ped]</td>
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<td>☢☢☢☢ 10-30 mSv</td>
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### Variant 5: Pain after total knee arthroplasty. Joint aspiration culture(s) negative or inconclusive. Suspect infection. Additional imaging following radiographs, including image-guided intervention.
<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>
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</thead>
<tbody>
<tr>
<td>CT knee with IV contrast</td>
<td>May be appropriate</td>
<td>***</td>
<td>&lt;0.1 mSv</td>
<td>*** 0.03-0.3 mSv</td>
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</tr>
<tr>
<td>3-phase bone scan knee</td>
<td>May be appropriate</td>
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<tr>
<td>MRI knee without IV contrast</td>
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<td>0 mSv</td>
<td>O 0 mSv</td>
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<tr>
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<td>US knee</td>
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<tr>
<td>CT knee without and with IV contrast</td>
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<td>&lt;</td>
<td>&lt;0.1 mSv</td>
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**Variant 6:** Pain after total knee arthroplasty. Negative studies for infection. Suspect aseptic loosening. Additional imaging following radiographs.
<table>
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<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>
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<td>☢ &lt;0.1 mSv</td>
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<tr>
<td>CT knee without and with IV contrast</td>
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<td></td>
<td>☢ &lt;0.1 mSv</td>
<td>☢ &lt;0.1 mSv</td>
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<td></td>
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<td>O 0 mSv</td>
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</table>

Variant 7: Pain after total knee arthroplasty. Negative studies for infection. Suspect granulomas/osteolysis. Additional imaging following radiographs.
<table>
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<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>
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<tbody>
<tr>
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<td>May be appropriate</td>
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<td>O 0 mSv [ped]</td>
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<td>May be appropriate</td>
<td>☢&lt;0.1 mSv</td>
<td></td>
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<td>Usually not appropriate</td>
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<td>O 0 mSv</td>
<td>O 0 mSv [ped]</td>
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<td>☢☢ 0.03- 0.3 mSv [ped]</td>
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<td>O 0 mSv [ped]</td>
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Variant 8: Pain after total knee arthroplasty. Clinical concern for instability.

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<th>SOE</th>
<th>Adults RRL</th>
<th>Peds RRL</th>
<th>Rating</th>
<th>Median</th>
<th>Final Tabulations</th>
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<tbody>
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<td>O 0 mSv [ped]</td>
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<td></td>
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<td>☢☢ 0.03-0.3 mSv [ped]</td>
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<tr>
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<td>☢ &lt;0.1 mSv</td>
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Variant 9: Pain after total knee arthroplasty. Suspect periprosthetic fracture.
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<th>Adults RRL</th>
<th>Peds RRL</th>
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<th>Median</th>
<th>Final Tabulations</th>
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<td>0 0 mSv [ped]</td>
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Variant 10: Status post total knee arthroplasty. Suspect complications related to the patella or the patellar liner (subluxation, dislocation, fracture, component loosening or wear, impingement, and osteonecrosis).
<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>
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<td>✅ &lt;0.03 mSv [ped]</td>
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<td>0 0 mSv [ped]</td>
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<td>0 0 mSv [ped]</td>
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<td>✅☢ &lt;0.03-0.3 mSv [ped]</td>
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</table>
### Variant 11: Pain after total knee arthroplasty. Measuring component rotation.

<table>
<thead>
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<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>
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<td>CT knee without and with IV contrast</td>
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</table>
## Variant 12: Pain after total knee arthroplasty. Suspect periprosthetic soft-tissue abnormality unrelated to infection, including quadriceps or patellar tendinopathy (quadriceps or patellar tendon tears, postoperative arthrofibrosis, patellar clunk syndrome, or impingement of nerves or other soft tissues).

<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>
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<tr>
<td>CT knee without and with IV contrast</td>
<td>Usually not appropriate</td>
<td></td>
<td>☢ &lt;0.1 mSv</td>
<td>☢☢ 0.03-0.3 mSv [ped]</td>
<td>1</td>
<td>n/a</td>
<td>0 0 0 0 0 0 0 0 0</td>
</tr>
<tr>
<td>CT knee with IV contrast</td>
<td>Usually not appropriate</td>
<td></td>
<td>☢ &lt;0.1 mSv</td>
<td>☢☢ 0.03-0.3 mSv [ped]</td>
<td>1</td>
<td>n/a</td>
<td>0 0 0 0 0 0 0 0 0</td>
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<tr>
<td>MRI knee 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>1</td>
<td>n/a</td>
<td>0 0 0 0 0 0 0 0 0</td>
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<td>3-phase bone scan knee</td>
<td>Usually not appropriate</td>
<td></td>
<td>☢☢☢ 1-10 mSv</td>
<td></td>
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<tr>
<td>Procedure</td>
<td>Appropriateness</td>
<td>Radiation Dose (mSv)</td>
<td>Dose Coefficient</td>
<td>Reproducibility</td>
<td>Sensitivity</td>
<td>Specificity</td>
<td>Accuracy</td>
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<td>------------------------------------------------</td>
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</tr>
<tr>
<td>FDG-PET/CT whole body</td>
<td>Usually not appropriate</td>
<td>10-30 mSv</td>
<td>1</td>
<td>n/a</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>WBC scan and sulfur colloid scan knee</td>
<td>Usually not appropriate</td>
<td>10-30 mSv</td>
<td>1</td>
<td>n/a</td>
<td>0</td>
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</tr>
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</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).