### American College of Radiology
### ACR Appropriateness Criteria®
### Osteoporosis and Bone Mineral Density

**Variant 1:** Asymptomatic BMD screening or individuals with established or clinically suspected low BMD.

<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>DXA lumbar spine and hip(s)</td>
<td>Usually appropriate</td>
<td>☢</td>
<td>&lt;0.1 mSv</td>
<td>9</td>
<td>n/a</td>
<td>0</td>
<td>0 0 0 0 0 0 0 0 0</td>
</tr>
<tr>
<td>QCT lumbar spine and hip</td>
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<td>☢☢☢</td>
<td>1-10 mSv</td>
<td>6</td>
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<td>☢</td>
<td>&lt;0.1 mSv</td>
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<tr>
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<td>☢</td>
<td>&lt;0.1 mSv</td>
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</table>
Variant 2: In patients with T-scores less than 1.0 and one or more of the following: a. Women age 70 years or men age 80 years b. Historical height loss >4 cm (>1.5 inches) c. Self-reported but undocumented prior vertebral fracture d. Glucocorticoid therapy equivalent to 5 mg of prednisone or equivalent per day for 3 months

<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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<tbody>
<tr>
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Variant 3: Follow-up. Patients demonstrated to have risk for fracture or low density.

<table>
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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>
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<tr>
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<td>n/a</td>
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<td>n/a</td>
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<td>&lt;0.1 mSv</td>
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<td>2</td>
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<td></td>
<td>&lt;0.1 mSv</td>
<td></td>
<td>1</td>
<td>n/a</td>
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<td>n/a</td>
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<td></td>
<td></td>
<td></td>
<td>O 0 mSv</td>
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Variant 4: Identify low BMD. Premenopausal females with risk factors. Males 20-50 years old with risk factors.
<table>
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<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>
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<tbody>
<tr>
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<td>DXA distal forearm</td>
<td>Usually appropriate</td>
<td>☢️ &lt;0.1 mSv</td>
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<td>n/a</td>
<td>0</td>
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<td>0</td>
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<td>0</td>
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<tr>
<td>SXA distal forearm</td>
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<td>n/a</td>
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**Variant 5:** Follow-up to low BMD. Premenopausal females with risk factors. Males 20–50 years of age with risk factors.
### Variant 6: Diagnosis. Males and females >50 years of age with advanced degenerative changes of the spine with or without scoliosis.

<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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<tbody>
<tr>
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<tr>
<td>DXA lumbar spine and hip(s)</td>
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<td></td>
<td>☢ &lt;0.1 mSv</td>
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### Variant 7: Suspected fracture (nonscreening) of a vertebral body based on acute or subacute symptomatology in a patient with suspected osteoporosis or a patient treated with corticosteroids (>3 months). First examination.

<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>Varies</td>
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<td>CT spine area of interest without IV contrast</td>
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<td></td>
<td>Varies</td>
<td>Varies</td>
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<td>MRI spine area of interest without IV contrast</td>
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<td>O 0 mSv [ped]</td>
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<tr>
<td>MRI spine area of interest without and with IV contrast</td>
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<td>O 0 mSv</td>
<td>O 0 mSv [ped]</td>
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<td>Procedure</td>
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<td>SOE</td>
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<td>Rating</td>
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<tr>
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</table>

Variant 8: Suspected fracture (nonscreening) of a vertebral body based on acute or subacute symptomatology in a patient with suspected osteoporosis or a patient treated with corticosteroids (>3 months). Initial radiograph is negative.

Variant 9: Patients on long-term treatment (3–5 years) of bisphosphonates with thigh or groin pain. First examination.
<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>
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<td>&lt;0.1 mSv</td>
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<td>n/a</td>
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<td>☠️ ☠️</td>
<td>1-10 mSv</td>
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<td>n/a</td>
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</tr>
<tr>
<td>CT thigh without IV contrast bilateral</td>
<td>Usually not appropriate</td>
<td>☠️ ☠️</td>
<td>0.1-1mSv</td>
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<td>n/a</td>
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<tr>
<td>CT thigh with IV contrast bilateral</td>
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<td>0.1-1mSv</td>
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<td>n/a</td>
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<td>1-10 mSv</td>
<td>☠️ ☠️ ☠️ 3-10 mSv [ped]</td>
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<td>0 mSv</td>
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<td>n/a</td>
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<tr>
<td>MRI thigh without IV contrast bilateral</td>
<td>Usually not appropriate</td>
<td>☠️</td>
<td>0 mSv</td>
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<tr>
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<td>0 mSv</td>
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Variant 10: Patients on long-term treatment (3–5 years) of bisphosphonates with thigh or groin pain and negative radiographs.
<table>
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<th>Appropriateness</th>
<th>Radiation Dose</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
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<tr>
<td>Bone scan whole body</td>
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</tr>
<tr>
<td>US thigh bilateral</td>
<td>Usually not appropriate</td>
<td>O 0 mSv</td>
<td>1</td>
</tr>
<tr>
<td>MRI thigh without and with IV contrast bilateral</td>
<td>Usually not appropriate</td>
<td>O 0 mSv [ped]</td>
<td>1</td>
</tr>
<tr>
<td>DXA extended femur scan</td>
<td>Usually not appropriate</td>
<td>✳ &lt;0.1 mSv</td>
<td>1</td>
</tr>
<tr>
<td>CT thigh without and with IV contrast bilateral</td>
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<td>✳✳✳ 1-10 mSv</td>
<td>1</td>
</tr>
<tr>
<td>CT thigh with IV contrast bilateral</td>
<td>Usually not appropriate</td>
<td>✳✳ 0.1-1mSv</td>
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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).