American College of Radiology  
ACR Appropriateness Criteria®  

Dementia and Movement Disorders  

Variant 1:  Probable Alzheimer's disease.

<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>MRI head without IV contrast</td>
<td>Usually appropriate</td>
<td>O 0 mSv</td>
<td>O 0 mSv [ped]</td>
<td>8</td>
<td>n/a</td>
<td>0 0 0 0 0 0 0 0 0</td>
<td></td>
</tr>
<tr>
<td>MRI head without and with IV contrast</td>
<td>Usually appropriate</td>
<td>O 0 mSv</td>
<td>O 0 mSv [ped]</td>
<td>7</td>
<td>n/a</td>
<td>0 0 0 0 0 0 0 0 0</td>
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<tr>
<td>CT head without IV contrast</td>
<td>May be appropriate</td>
<td>☢☢☢ 1-10 mSv</td>
<td>☢☢☢ 0.3-3 mSv [ped]</td>
<td>6</td>
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<tr>
<td>FDG-PET/CT head</td>
<td>May be appropriate</td>
<td>☢☢☢☢ 10-30 mSv</td>
<td>☢☢☢☢ 3-10 mSv [ped]</td>
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<td>☢☢☢ 0.3-3 mSv [ped]</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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<td>n/a</td>
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<td>☢☢☢☢ 3-10 mSv [ped]</td>
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### Amyloid PET/CT head

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<th>Peds RRL</th>
<th>Rating</th>
<th>Median</th>
<th>Final Tabulations</th>
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<tr>
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### Variant 2: Possible Alzheimer’s disease.

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<th>Rating</th>
<th>Median</th>
<th>Final Tabulations</th>
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<tbody>
<tr>
<td>MRI head without IV contrast</td>
<td>Usually appropriate</td>
<td>O 0 mSv</td>
<td>O 0 mSv [ped]</td>
<td>8</td>
<td>n/a</td>
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</tr>
<tr>
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<td>Usually appropriate</td>
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<td>O 0 mSv [ped]</td>
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<td>☢☢☢ 0.3-3 mSv [ped]</td>
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<td>☢☢☢ 3-10 mSv [ped]</td>
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<td>0</td>
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<tr>
<td>CT head without and with IV contrast</td>
<td>May be appropriate</td>
<td>☢☢☢ 1-10 mSv</td>
<td>☢☢☢ 0.3-3 mSv [ped]</td>
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<td>n/a</td>
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<td>0</td>
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<tr>
<td>CT head with IV contrast</td>
<td>May be appropriate</td>
<td>☢☢☢ 1-10 mSv</td>
<td>☢☢☢ 0.3-3 mSv [ped]</td>
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<td>0</td>
</tr>
<tr>
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<td>Usually not appropriate</td>
<td>O 0 mSv</td>
<td>O 0 mSv [ped]</td>
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<tr>
<td>MRI functional (fMRI) head without IV contrast</td>
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<td>O 0 mSv [ped]</td>
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<td>n/a</td>
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<tr>
<td>Tc-99m HMPAO SPECT head</td>
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<td>☢☢☢ 3-10 mSv [ped]</td>
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**Variant 3:**  Suspected frontotemporal dementia.

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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>MRI head without IV contrast</td>
<td>Usually appropriate</td>
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<td>O 0 mSv [ped]</td>
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<tr>
<td>MRI head without and with IV contrast</td>
<td>Usually appropriate</td>
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<td>O 0 mSv [ped]</td>
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<td>n/a</td>
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<td>CT head without IV contrast</td>
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<td>☢☢☢ 0.3-3 mSv [ped]</td>
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<td>☢☢☢☢ 3-10 mSv [ped]</td>
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<td></td>
</tr>
<tr>
<td>CT head without and with IV contrast</td>
<td>May be appropriate</td>
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<td>☢☢☢ 3-10 mSv [ped]</td>
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<tr>
<td>CT head with IV contrast</td>
<td>May be appropriate</td>
<td>☢☢☢ 1-10 mSv</td>
<td>☢☢☢ 0.3-3 mSv [ped]</td>
<td>4</td>
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</tr>
<tr>
<td>MR spectroscopy head without IV contrast</td>
<td>Usually not appropriate</td>
<td>O 0 mSv</td>
<td>O 0 mSv [ped]</td>
<td>3</td>
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<td>O 0 mSv [ped]</td>
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<td>Tc-99m HMPAO SPECT head</td>
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<td>☢☢☢☢ 10-30 mSv</td>
<td>☢☢☢☢ 3-10 mSv [ped]</td>
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**Variant 4:**  Suspected dementia with Lewy bodies.
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<th>Appropriateness Category</th>
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<th>Adults RRL</th>
<th>Peds RRL</th>
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<th>Final Tabulations</th>
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<tbody>
<tr>
<td>MRI head without IV contrast</td>
<td>Usually appropriate</td>
<td>O 0 mSv</td>
<td>O 0 mSv</td>
<td>n/a</td>
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<td>MRI head without and with IV contrast</td>
<td>Usually appropriate</td>
<td>O 0 mSv</td>
<td>O 0 mSv</td>
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<td>7</td>
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<td>May be appropriate</td>
<td>$$$ 1-10 mSv</td>
<td>$$$ 0.3-3 mSv</td>
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<td>FDG-PET/CT head</td>
<td>May be appropriate</td>
<td>$$$ 10-30 mSv</td>
<td>$$$ 3-10 mSv</td>
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<td>6</td>
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<tr>
<td>CT head without and with IV contrast</td>
<td>May be appropriate</td>
<td>$$$ 1-10 mSv</td>
<td>$$$ 3-10 mSv</td>
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<td>May be appropriate</td>
<td>$$$ 10-30 mSv</td>
<td>$$$ 3-10 mSv</td>
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<td>CT head with IV contrast</td>
<td>May be appropriate</td>
<td>$$$ 1-10 mSv</td>
<td>$$$ 0.3-3 mSv</td>
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<td>n/a</td>
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<td>Usually not appropriate</td>
<td>O 0 mSv</td>
<td>O 0 mSv</td>
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<td>3</td>
<td>n/a</td>
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<tr>
<td>MRI functional (fMRI) head without IV contrast</td>
<td>Usually not appropriate</td>
<td>O 0 mSv</td>
<td>O 0 mSv</td>
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<td>Usually not appropriate</td>
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### Variant 5: Suspected vascular dementia.

<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>
<td>MRI head without and with IV contrast</td>
<td>Usually appropriate</td>
<td></td>
<td>O 0 mSv</td>
<td>O 0 mSv [ped]</td>
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<td>n/a</td>
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<tr>
<td>MRI head without IV contrast</td>
<td>Usually appropriate</td>
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<td>O 0 mSv</td>
<td>O 0 mSv [ped]</td>
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<tr>
<td>CT head without IV contrast</td>
<td>May be appropriate</td>
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<td>🌶️🌶️ 1-10 mSv</td>
<td>🌶️🌶️ 0.3-3 mSv [ped]</td>
<td>6</td>
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<td>US duplex Doppler carotid</td>
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<td>O 0 mSv [ped]</td>
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<td>MRA head without IV contrast</td>
<td>May be appropriate</td>
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<td>O 0 mSv</td>
<td>O 0 mSv [ped]</td>
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<td>n/a</td>
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<td>MRA neck without and with 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>🌶️🌶️ 1-10 mSv</td>
<td>🌶️🌶️ 3-10 mSv [ped]</td>
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</tr>
<tr>
<td>CT head without and with IV contrast</td>
<td>May be appropriate</td>
<td></td>
<td>🌶️🌶️ 1-10 mSv</td>
<td>🌶️🌶️ 3-10 mSv [ped]</td>
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</tr>
<tr>
<td>CT head with IV contrast</td>
<td>May be appropriate</td>
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<td>🌶️🌶️ 1-10 mSv</td>
<td>🌶️🌶️ 0.3-3 mSv [ped]</td>
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</tr>
<tr>
<td>FDG-PET/CT head</td>
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<td>MRA neck without IV contrast</td>
<td>May be appropriate</td>
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<td>O 0 mSv</td>
<td>O 0 mSv [ped]</td>
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<td>Procedure</td>
<td>Appropriateness Category</td>
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<td>Adults RRL</td>
<td>Peds RRL</td>
<td>Rating</td>
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<td>-------------------</td>
</tr>
<tr>
<td>MRA head without and with IV contrast</td>
<td>Usually not appropriate</td>
<td>O 0 mSv</td>
<td>O 0 mSv [ped]</td>
<td>3</td>
<td>n/a</td>
<td>0</td>
<td>0 0 0 0 0 0 0 0 0</td>
</tr>
<tr>
<td>MRI functional (fMRI) head without IV contrast</td>
<td>Usually not appropriate</td>
<td>O 0 mSv</td>
<td>O 0 mSv [ped]</td>
<td>2</td>
<td>n/a</td>
<td>0</td>
<td>0 0 0 0 0 0 0 0 0</td>
</tr>
<tr>
<td>MR spectroscopy head without IV contrast</td>
<td>Usually not appropriate</td>
<td>O 0 mSv</td>
<td>O 0 mSv [ped]</td>
<td>2</td>
<td>n/a</td>
<td>0</td>
<td>0 0 0 0 0 0 0 0 0</td>
</tr>
<tr>
<td>Tc-99m HMPAO SPECT head</td>
<td>Usually not appropriate</td>
<td>***1 0-30 mSv</td>
<td>***3-10 mSv [ped]</td>
<td>2</td>
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</table>

**Variant 6: Suspected prion disease (Creutzfeld-Jakob, iatrogenic or variant).**

<table>
<thead>
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<th>Appropriateness Category</th>
<th>SOE</th>
<th>Adults RRL</th>
<th>Peds RRL</th>
<th>Rating</th>
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<tr>
<td>MRI head without IV contrast</td>
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<td>O 0 mSv</td>
<td>O 0 mSv [ped]</td>
<td>8</td>
<td>n/a</td>
<td>0</td>
<td>0 0 0 0 0 0 0 0 0</td>
</tr>
<tr>
<td>MRI head without and with IV contrast</td>
<td>Usually appropriate</td>
<td>O 0 mSv</td>
<td>O 0 mSv [ped]</td>
<td>7</td>
<td>n/a</td>
<td>0</td>
<td>0 0 0 0 0 0 0 0 0</td>
</tr>
<tr>
<td>CT head without IV contrast</td>
<td>May be appropriate</td>
<td>***1 0-10 mSv</td>
<td>***0.3-3 mSv [ped]</td>
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<td>n/a</td>
<td>0</td>
<td>0 0 0 0 0 0 0 0 0</td>
</tr>
<tr>
<td>CT head without and with IV contrast</td>
<td>May be appropriate</td>
<td>***1 0-10 mSv</td>
<td>***3 10 mSv [ped]</td>
<td>5</td>
<td>n/a</td>
<td>0</td>
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<tr>
<td>MR spectroscopy head without IV contrast</td>
<td>May be appropriate</td>
<td>O 0 mSv</td>
<td>O 0 mSv [ped]</td>
<td>5</td>
<td>n/a</td>
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<tr>
<td>Tc-99m HMPAO SPECT head</td>
<td>May be appropriate</td>
<td>***1 0-30 mSv</td>
<td>***3-10 mSv [ped]</td>
<td>5</td>
<td>n/a</td>
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<tr>
<td>FDG-PET/CT head</td>
<td>May be appropriate</td>
<td>***1 0-30 mSv</td>
<td>***3-10 mSv [ped]</td>
<td>5</td>
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</table>
### Variant 7: Suspected normal pressure hydrocephalus.

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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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<tbody>
<tr>
<td>MRI head without IV contrast</td>
<td>Usually appropriate</td>
<td>O 0 mSv</td>
<td>O 0 mSv [ped]</td>
<td>8</td>
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<td>May be appropriate</td>
<td>☢☢☢ 1-10 mSv</td>
<td>☢☢☢ 0.3-3 mSv [ped]</td>
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</tr>
<tr>
<td>CT head without and with IV contrast</td>
<td>May be appropriate</td>
<td>☢☢☢ 1-10 mSv</td>
<td>☢☢☢ 3-10 mSv [ped]</td>
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<td>n/a</td>
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</tr>
<tr>
<td>CT head with IV contrast</td>
<td>May be appropriate</td>
<td>☢☢☢ 1-10 mSv</td>
<td>☢☢☢ 0.3-3 mSv [ped]</td>
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<td>Usually not appropriate</td>
<td>O 0 mSv</td>
<td>O 0 mSv [ped]</td>
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### Variant 8: Suspected Huntington disease.
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<th>SOE</th>
<th>Adults RRL</th>
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<th>Median</th>
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<th>Final Tabulations</th>
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<tbody>
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<td>O 0 mSv</td>
<td>O 0 mSv</td>
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<tr>
<td>MRI head without and with IV contrast</td>
<td>Usually appropriate</td>
<td>O 0 mSv</td>
<td>O 0 mSv</td>
<td>O 0 mSv</td>
<td>7</td>
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<td>May be appropriate</td>
<td>☢☢☢ 1-10 mSv</td>
<td>☢☢☢ 0.3-3 mSv [ped]</td>
<td>5</td>
<td>n/a</td>
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</tr>
<tr>
<td>CT head without and with IV contrast</td>
<td>Usually not appropriate</td>
<td>☢☢☢ 1-10 mSv</td>
<td>☢☢☢ 3-10 mSv [ped]</td>
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<td>O 0 mSv</td>
<td>O 0 mSv</td>
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<tr>
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<td>Usually not appropriate</td>
<td>☢☢☢ 10-30 mSv</td>
<td>☢☢☢ 3-10 mSv [ped]</td>
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<tr>
<td>FDG-PET/CT head</td>
<td>Usually not appropriate</td>
<td>☢☢☢ 10-30 mSv</td>
<td>☢☢☢ 3-10 mSv [ped]</td>
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<td>n/a</td>
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</tr>
<tr>
<td>CT head with IV contrast</td>
<td>Usually not appropriate</td>
<td>☢☢☢ 1-10 mSv</td>
<td>☢☢☢ 0.3-3 mSv [ped]</td>
<td>3</td>
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<tr>
<td>MRI functional (fMRI) head without IV contrast</td>
<td>Usually not appropriate</td>
<td>O 0 mSv</td>
<td>O 0 mSv</td>
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**Variant 9:** Clinical features suggestive of neurodegeneration with brain iron accumulation.

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<th>Procedure</th>
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<th>SOE</th>
<th>Adults RRL</th>
<th>Peds RRL</th>
<th>Rating</th>
<th>Median</th>
<th></th>
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<th>Final Tabulations</th>
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<td>Peds RRL</td>
<td>Rating</td>
<td>Median</td>
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</tr>
<tr>
<td>MRI head without and with IV contrast</td>
<td>Usually appropriate</td>
<td>O 0 mSv</td>
<td>O 0 mSv [ped]</td>
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</tr>
<tr>
<td>CT head without IV contrast</td>
<td>May be appropriate</td>
<td>☢☢☢ 1-10 mSv</td>
<td>☢☢☢ 0.3-3 mSv [ped]</td>
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<td>n/a</td>
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<tr>
<td>CT head without and with IV contrast</td>
<td>May be appropriate</td>
<td>☢☢☢ 1-10 mSv</td>
<td>☢☢☢☢ 0.3-10 mSv [ped]</td>
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<tr>
<td>CT head with IV contrast</td>
<td>May be appropriate</td>
<td>☢☢☢ 1-10 mSv</td>
<td>☢☢☢ 0.3-3 mSv [ped]</td>
<td>4</td>
<td>n/a</td>
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<tr>
<td>MRI functional (fMRI) head without IV contrast</td>
<td>Usually not appropriate</td>
<td>O 0 mSv</td>
<td>O 0 mSv [ped]</td>
<td>3</td>
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<td>MR spectroscopy head without IV contrast</td>
<td>Usually not appropriate</td>
<td>O 0 mSv</td>
<td>O 0 mSv [ped]</td>
<td>3</td>
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<td>Tc-99m HMPAO SPECT head</td>
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<td>☢☢☢ 10-30 mSv</td>
<td>☢☢☢ 0.3-10 mSv [ped]</td>
<td>3</td>
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<tr>
<td>FDG-PET/CT head</td>
<td>Usually not appropriate</td>
<td>☢☢☢ 10-30 mSv</td>
<td>☢☢☢ 0.3-10 mSv [ped]</td>
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**Variant 10: Parkinson disease. Typical clinical features. Responsive to levodopa.**

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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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</thead>
<tbody>
<tr>
<td>MRI head without IV contrast</td>
<td>Usually appropriate</td>
<td>O 0 mSv</td>
<td>O 0 mSv [ped]</td>
<td>7</td>
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</tr>
<tr>
<td>MRI head without and with IV contrast</td>
<td>Usually appropriate</td>
<td>O 0 mSv</td>
<td>O 0 mSv [ped]</td>
<td>7</td>
<td>n/a</td>
<td>0</td>
<td>0 0 0 0 0 0 0 0 0</td>
</tr>
<tr>
<td>CT head without IV contrast</td>
<td>May be appropriate</td>
<td>☢☢☢ 1-10 mSv</td>
<td>☢☢☢ 0.3-3 mSv [ped]</td>
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<td>Procedure</td>
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<td>SOE</td>
<td>Adults RRL</td>
<td>Peds RRL</td>
<td>Rating</td>
<td>Median</td>
<td>Final Tabulations</td>
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</tr>
<tr>
<td>CT head without and with IV contrast</td>
<td>May be appropriate</td>
<td>☢☢☢ 1-10 mSv</td>
<td>☢☢☢ 3-10 mSv [ped]</td>
<td>5</td>
<td>n/a</td>
<td>0 0 0 0 0 0 0 0 0</td>
<td></td>
</tr>
<tr>
<td>CT head with IV contrast</td>
<td>May be appropriate</td>
<td>☢☢☢ 1-10 mSv</td>
<td>☢☢☢ 0.3-3 mSv [ped]</td>
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<td>I-123 Ioflupane SPECT head (DaT scan)</td>
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<td>MR spectroscopy head without IV contrast</td>
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<td>O 0 mSv</td>
<td>O 0 mSv [ped]</td>
<td>3</td>
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<td>Tc-99m HMPAO SPECT head</td>
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<td>☢☢☢ 3-10 mSv [ped]</td>
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<tr>
<td>FDG-PET/CT head</td>
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<td>O 0 mSv [ped]</td>
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**Variant 11: Parkinsonian syndrome. Atypical clinical features. Not responsive to levodopa.**
<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>
<td>CT head without IV contrast</td>
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<td>☢☢☢ 1-10 mSv</td>
<td>☢☢☢ 0.3-3 mSv [ped]</td>
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<td>CT head with IV contrast</td>
<td>May be appropriate</td>
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<td>CT head without and with IV contrast</td>
<td>May be appropriate</td>
<td>☢☢☢ 1-10 mSv</td>
<td>☢☢☢☢ 3-10 mSv [ped]</td>
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<tr>
<td>MR spectroscopy head without IV contrast</td>
<td>Usually not appropriate</td>
<td>☢☢☢ 0 mSv</td>
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<td>n/a</td>
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<tr>
<td>Tc-99m HMPAO SPECT head</td>
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<td>☢☢☢ 3-10 mSv [ped]</td>
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<tr>
<td>FDG-PET/CT head</td>
<td>Usually not appropriate</td>
<td>☢☢☢ 10-30 mSv</td>
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<td>☢☢☢ 0 mSv [ped]</td>
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<tr>
<td>Amyloid PET/CT head</td>
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<td>☢☢☢ 0 mSv [ped]</td>
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**Variant 12: Motor neuron disease.**

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<th>Adults RRL</th>
<th>Peds RRL</th>
<th>Rating</th>
<th>Median</th>
<th>Final Tabulations</th>
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</thead>
<tbody>
<tr>
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<td>Usually appropriate</td>
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<td>☢☢☢ 0 mSv [ped]</td>
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</tr>
<tr>
<td>MRI spine without IV contrast</td>
<td>Usually appropriate</td>
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<td>☢☢☢ 0 mSv [ped]</td>
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</tr>
<tr>
<td>MRI head without and with IV contrast</td>
<td>Usually appropriate</td>
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<td>☢☢☢ 0 mSv [ped]</td>
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<td>0 0 mSv [ped]</td>
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<tr>
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<td>☢☢☢ 0.3-3 mSv [ped]</td>
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<tr>
<td>CT head without and with IV contrast</td>
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<td>☢☢☢ 3-10 mSv [ped]</td>
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<td>0</td>
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<tr>
<td>CT head with IV contrast</td>
<td>May be appropriate</td>
<td>☢☢☢ 1-10 mSv</td>
<td>☢☢☢ 0.3-3 mSv [ped]</td>
<td>4</td>
<td>n/a</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>MR spectroscopy head without IV contrast</td>
<td>Usually not appropriate</td>
<td>0 0 mSv</td>
<td>0 0 mSv [ped]</td>
<td>3</td>
<td>n/a</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Tc-99m HMPAO SPECT head</td>
<td>Usually not appropriate</td>
<td>☢☢☢ 10-30 mSv</td>
<td>☢☢☢ 3-10 mSv [ped]</td>
<td>3</td>
<td>n/a</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>FDG-PET/CT head</td>
<td>Usually not appropriate</td>
<td>☢☢☢ 10-30 mSv</td>
<td>☢☢☢ 3-10 mSv [ped]</td>
<td>3</td>
<td>n/a</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>MRI functional (fMRI) head without IV contrast</td>
<td>Usually not appropriate</td>
<td>0 0 mSv</td>
<td>0 0 mSv [ped]</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).