**American College of Radiology**  
**ACR Appropriateness Criteria®**

**Acute Mental Status Change, Delirium, and New Onset Psychosis**

**Variant 1:** Acute mental status change. Increased risk for intracranial bleeding (ie, anticoagulant use, coagulopathy), hypertensive emergency, or clinical suspicion for intracranial infection, mass, or elevated intracranial pressure. Initial imaging.

<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>CT head without IV contrast</td>
<td>Usually appropriate</td>
<td>Strong</td>
<td>☢☢☢ 1-10 mSv</td>
<td>☢☢☢ 0.3-3 mSv [ped]</td>
<td>9</td>
<td>9</td>
<td>0 0 0 0 0 0 1 17</td>
</tr>
<tr>
<td>References</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30 (22186148)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4 0 0 0 0 0 1 17</td>
</tr>
<tr>
<td>29 (22978732)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4 0 0 0 0 0 1 17</td>
</tr>
<tr>
<td>28 (19787177)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 0 0 0 0 0 1 17</td>
</tr>
<tr>
<td>27 (24927985)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 0 0 0 0 0 1 17</td>
</tr>
<tr>
<td>26 (25763568)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 0 0 0 0 0 1 17</td>
</tr>
<tr>
<td>2 (19773662)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 0 0 0 0 0 1 17</td>
</tr>
<tr>
<td>MRI head without IV contrast</td>
<td>Usually appropriate</td>
<td>Strong</td>
<td>O 0 mSv</td>
<td>O 0 mSv [ped]</td>
<td>7</td>
<td>7</td>
<td>0 0 1 0 4 3 4 5 1</td>
</tr>
<tr>
<td>References</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>35 (25260346)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4 0 0 0 0 0 1 17</td>
</tr>
<tr>
<td>34 (19017925)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4 0 0 0 0 0 1 17</td>
</tr>
<tr>
<td>33 (22633790)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 0 0 0 0 0 1 17</td>
</tr>
<tr>
<td>32 (27220652)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 0 0 0 0 0 1 17</td>
</tr>
<tr>
<td>26 (25763568)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 0 0 0 0 0 1 17</td>
</tr>
<tr>
<td>MRI head without and with IV contrast</td>
<td>May be appropriate</td>
<td>Strong</td>
<td>O 0 mSv</td>
<td>O 0 mSv [ped]</td>
<td>6</td>
<td>6</td>
<td>0 0 1 1 3 5 2 4 2</td>
</tr>
<tr>
<td>References</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>35 (25260346)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4 0 0 0 0 0 1 17</td>
</tr>
<tr>
<td>34 (19017925)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4 0 0 0 0 0 1 17</td>
</tr>
<tr>
<td>33 (22633790)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 0 0 0 0 0 1 17</td>
</tr>
<tr>
<td>32 (27220652)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 0 0 0 0 0 1 17</td>
</tr>
<tr>
<td>26 (25763568)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 0 0 0 0 0 1 17</td>
</tr>
</tbody>
</table>
### References

<table>
<thead>
<tr>
<th>References</th>
<th>Study Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>35 (25260346)</td>
<td>4</td>
</tr>
<tr>
<td>34 (19017925)</td>
<td>4</td>
</tr>
<tr>
<td>33 (22633790)</td>
<td>2</td>
</tr>
<tr>
<td>32 (27220652)</td>
<td>2</td>
</tr>
<tr>
<td>26 (25763568)</td>
<td>1</td>
</tr>
</tbody>
</table>

### Study Quality

#### CT head without and with IV contrast

<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>CT head without and with IV contrast</td>
<td>May be appropriate</td>
<td>Strong</td>
<td>☢☢☢ 1-10 mSv</td>
<td>☢☢☢ 3-10 mSv [ped]</td>
<td>5</td>
<td>5</td>
<td>1 0 3 2 8 4 0 0 0</td>
</tr>
</tbody>
</table>

### References

<table>
<thead>
<tr>
<th>References</th>
<th>Study Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>31 (25173368)</td>
<td>4</td>
</tr>
<tr>
<td>30 (22186148)</td>
<td>4</td>
</tr>
<tr>
<td>29 (22978732)</td>
<td>4</td>
</tr>
<tr>
<td>28 (19787177)</td>
<td>2</td>
</tr>
<tr>
<td>27 (24927985)</td>
<td>2</td>
</tr>
<tr>
<td>26 (25763568)</td>
<td>1</td>
</tr>
<tr>
<td>2 (19773662)</td>
<td>2</td>
</tr>
</tbody>
</table>

### CT head with IV contrast

<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>CT head with IV contrast</td>
<td>Usually not appropriate</td>
<td>Limited</td>
<td>☢☢☢ 1-10 mSv</td>
<td>☢☢☢ 0.3-3 mSv [ped]</td>
<td>3</td>
<td>3</td>
<td>4 1 5 5 1 1 1 0 0</td>
</tr>
</tbody>
</table>

### References

<table>
<thead>
<tr>
<th>References</th>
<th>Study Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>31 (25173368)</td>
<td>4</td>
</tr>
</tbody>
</table>

---

**Variant 2**: Acute or progressively worsening mental status change in patient with a known intracranial process (mass, recent hemorrhage, recent infarct, central nervous system infection, etc). Initial imaging.
### Variant 3: Acute mental status change. Suspected cause(s) found on initial clinical or lab assessment (intoxication, medication-related, hypoglycemia, sepsis, etc). Low clinical suspicion for trauma, intracranial hemorrhage, stroke, mass, or intracranial infection. Initial imaging.

<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>CT head without IV contrast</td>
<td>May be appropriate (Disagreement)</td>
<td>Expert Opinion</td>
<td>☢☢☢ 1-10 mSv</td>
<td>☢☢☢ 0.3-3 mSv [ped]</td>
<td>5</td>
<td>5</td>
<td>0 0 3 3 4 6 2 0 0</td>
</tr>
<tr>
<td>References</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>References</td>
<td>Study Quality</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>36 (27743625)</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>17 (22362650)</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### References

- **2 (19773662)**
- **36 (27743625)**
- **17 (22362650)**
### Variant 4: Persistent or worsening mental status change despite clinical management of the suspected underlying cause (intoxication, medication-related, hypoglycemia, sepsis, etc) or acute change in mental status of unknown cause. Initial imaging.

<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>Strong</td>
<td>O 0 mSv</td>
<td>O 0 mSv [ped]</td>
<td>8</td>
<td>8</td>
<td>0 0 0 0 4 0 4 8 2</td>
</tr>
<tr>
<td>CT head without and with IV contrast</td>
<td>Usually not appropriate</td>
<td>Limited</td>
<td>☢☢☢ 1-10 mSv</td>
<td>☢☢☢☢ 3-10 mSv [ped]</td>
<td>3</td>
<td>3</td>
<td>3 4 4 1 1 1 0 0</td>
</tr>
<tr>
<td>CT head with IV contrast</td>
<td>Usually not appropriate</td>
<td>Limited</td>
<td>☢☢☢ 1-10 mSv</td>
<td>☢☢☢ 0.3-3 mSv [ped]</td>
<td>2</td>
<td>2</td>
<td>5 7 3 3 0 0 0 0 0</td>
</tr>
<tr>
<td>Procedure</td>
<td>Appropriateness</td>
<td>Radiation Dose</td>
<td>Study Quality</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>------------------------------------------------</td>
<td>-----------------------</td>
<td>----------------</td>
<td>---------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MRI head without and with IV contrast</td>
<td>Usually appropriate</td>
<td>0 mSv [ped]</td>
<td>8 8 0 0 1 2 1 5 6 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1-10 mSv</td>
<td>7 7 0 0 0 1 2 7 3 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CT head without IV contrast</td>
<td>Usually appropriate</td>
<td>0.3-3 mSv [ped]</td>
<td>4 4 1 1 6 6 1 2 0 1 0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CT head without and with IV contrast</td>
<td>May be appropriate</td>
<td>1-10 mSv</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CT head with IV contrast</td>
<td>Usually not appropriate</td>
<td>0.3-3 mSv [ped]</td>
<td>3 3 3 3 6 5 0 1 0 0 0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Variant 5: New onset delirium. Initial imaging.

<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>CT head without IV contrast</td>
<td>Usually appropriate</td>
<td>Strong</td>
<td>✧✧✧ 1-10 mSv</td>
<td>✧✧✧ 0.3-3 mSv [ped]</td>
<td>7</td>
<td>7</td>
<td>0 0 0 1 2 2 10 2 1</td>
</tr>
</tbody>
</table>

- **References**: 41 (18336626), 40 (25839350), 39 (21118407), 38 (18973639), 11 (17324689), 8 (24733711)

| MRI head without IV contrast                 | May be appropriate (Disagreement) | Expert Opinion | O 0 mSv | O 0 mSv [ped] | 5      | 6      | 0 1 1 2 3 6 5 0 0 |

- **References**: 41 (18336626), 11 (17324689)

| MRI head without and with IV contrast        | May be appropriate (Disagreement) | Expert Opinion | O 0 mSv | O 0 mSv [ped] | 5      | 5      | 0 1 1 2 8 3 3 0 0 |

- **References**: 41 (18336626)
<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>CT head without IV contrast</td>
<td>Strong</td>
<td>☢☢☢ 1-10 mSv</td>
<td>☢☢☢ 3-10 mSv [ped]</td>
<td>3</td>
<td>3</td>
<td>4 3 5 4 2 0 0 0 0</td>
<td></td>
</tr>
<tr>
<td>CT head with IV contrast</td>
<td>Strong</td>
<td>☢☢☢ 1-10 mSv</td>
<td>☢☢☢ 0.3-3 mSv [ped]</td>
<td>2</td>
<td>2</td>
<td>5 8 3 2 0 0 0 0 0</td>
<td></td>
</tr>
</tbody>
</table>

References

```
<table>
<thead>
<tr>
<th>References</th>
<th>Study Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>41 (18336626)</td>
<td>2</td>
</tr>
<tr>
<td>40 (25839350)</td>
<td>4</td>
</tr>
<tr>
<td>39 (21118407)</td>
<td>4</td>
</tr>
<tr>
<td>38 (18973639)</td>
<td>2</td>
</tr>
<tr>
<td>11 (17324689)</td>
<td>4</td>
</tr>
<tr>
<td>8 (24733711)</td>
<td>4</td>
</tr>
</tbody>
</table>
```

```
<table>
<thead>
<tr>
<th>References</th>
<th>Study Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>41 (18336626)</td>
<td>2</td>
</tr>
<tr>
<td>40 (25839350)</td>
<td>4</td>
</tr>
<tr>
<td>39 (21118407)</td>
<td>4</td>
</tr>
<tr>
<td>38 (18973639)</td>
<td>2</td>
</tr>
<tr>
<td>11 (17324689)</td>
<td>4</td>
</tr>
<tr>
<td>8 (24733711)</td>
<td>4</td>
</tr>
</tbody>
</table>
```

Variant 6: New onset psychosis. Initial imaging.

<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>CT head without IV contrast</td>
<td>May be appropriate</td>
<td>Limited</td>
<td>☢☢☢ 1-10 mSv</td>
<td>☢☢☢ 0.3-3 mSv [ped]</td>
<td>5</td>
<td>5</td>
<td>0 0 4 2 7 4 1 0 0</td>
</tr>
</tbody>
</table>

References

```
<table>
<thead>
<tr>
<th>References</th>
<th>Study Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>49 (15000267)</td>
<td>4</td>
</tr>
</tbody>
</table>
```
<table>
<thead>
<tr>
<th>Study Quality</th>
<th>MRI head without IV contrast</th>
<th>May be appropriate</th>
<th>Strong</th>
<th>O 0 mSv</th>
<th>O 0 mSv [ped]</th>
<th>5</th>
<th>5</th>
<th>0</th>
<th>0</th>
<th>5</th>
<th>1</th>
<th>8</th>
<th>3</th>
<th>1</th>
<th>0</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>48 (28335913)</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>47 (22959259)</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>46 (20958941)</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>45 (25174841)</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>42 (19660172)</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

References

<table>
<thead>
<tr>
<th>Study Quality</th>
<th>MRI head without and with IV contrast</th>
<th>May be appropriate</th>
<th>Strong</th>
<th>O 0 mSv</th>
<th>O 0 mSv [ped]</th>
<th>5</th>
<th>5</th>
<th>0</th>
<th>0</th>
<th>5</th>
<th>3</th>
<th>7</th>
<th>3</th>
<th>0</th>
<th>0</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>48 (28335913)</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>47 (22959259)</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>46 (20958941)</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>45 (25174841)</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>42 (19660172)</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

References

<table>
<thead>
<tr>
<th>Study Quality</th>
<th>CT head without and with IV contrast</th>
<th>Usually not appropriate</th>
<th>Limited</th>
<th>1-10 mSv</th>
<th>3-10 mSv [ped]</th>
<th>3</th>
<th>3</th>
<th>3</th>
<th>6</th>
<th>2</th>
<th>5</th>
<th>1</th>
<th>1</th>
<th>0</th>
<th>0</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>49 (15000267)</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

References
<table>
<thead>
<tr>
<th>Reference</th>
<th>Study Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>48 (28335913)</td>
<td>4</td>
</tr>
<tr>
<td>47 (22959259)</td>
<td>2</td>
</tr>
<tr>
<td>46 (20958941)</td>
<td>4</td>
</tr>
<tr>
<td>45 (25174841)</td>
<td>4</td>
</tr>
<tr>
<td>42 (19660172)</td>
<td>4</td>
</tr>
</tbody>
</table>

| CT head with IV contrast | Usually not appropriate | 1-10 mSv | 0.3-3 mSv [ped] | 2 | 2 | 5 | 7 | 4 | 2 | 0 | 0 | 0 | 0 |
|-------------------------|------------------------|---------|----------------|---|---|---|---|---|---|---|---|---|---|---|
| References              | Study Quality          |
| 49 (15000267)           | 4                      |
| 48 (28335913)           | 4                      |
| 47 (22959259)           | 2                      |
| 42 (19660172)           | 4                      |
| 46 (20958941)           | 4                      |
| 45 (25174841)           | 4                      |
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.