

| | | | | | | | | | | | | | | | | | |
|---|-------------------------|------------------|---------------|---------------------|---|---|----|---|---|---|---|---|---|---|---|---|---|
| | | | 19 (19741398) | | | 4 | | | | | | | | | | | |
| | | | 32 (26514612) | | | 3 | | | | | | | | | | | |
| | | | 31 (26744446) | | | 3 | | | | | | | | | | | |
| CT cervical spine without and with IV contrast | Usually not appropriate | Limited | ⊕⊕⊕ 1-10 mSv | ⊕⊕⊕⊕ 3-10 mSv [ped] | 1 | 1 | 20 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | References | Study Quality | | | | | | | | | | | | | | |
| | | | 30 (15920400) | | | M | | | | | | | | | | | |
| | | | 19 (19741398) | | | 4 | | | | | | | | | | | |
| | | | 32 (26514612) | | | 3 | | | | | | | | | | | |
| | | | 31 (26744446) | | | 3 | | | | | | | | | | | |
| Arteriography cervicocerebral | Usually not appropriate | Expert Consensus | ⊕⊕⊕ 1-10 mSv | ⊕⊕⊕⊕ 3-10 mSv [ped] | 1 | 1 | 24 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| MRA neck without IV contrast | Usually not appropriate | Expert Consensus | ○ 0 mSv | ○ 0 mSv [ped] | 1 | 1 | 20 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| MRA neck without and with IV contrast | Usually not appropriate | Expert Consensus | ○ 0 mSv | ○ 0 mSv [ped] | 1 | 1 | 21 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| MRI cervical spine without IV contrast | Usually not appropriate | Expert Consensus | ○ 0 mSv | ○ 0 mSv [ped] | 1 | 1 | 19 | 0 | 2 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 |
| MRI cervical spine without and with IV contrast | Usually not appropriate | Expert Consensus | ○ 0 mSv | ○ 0 mSv [ped] | 1 | 1 | 20 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| US cervical spine | Usually not appropriate | Expert Consensus | ○ 0 mSv | ○ 0 mSv [ped] | 1 | 1 | 23 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Variant 2: Child, 3 to 16 years of age, acute cervical spine trauma, at least one risk factor with reliable clinical examination (based on PECARN or NEXUS). Initial imaging.

| Procedure | Appropriateness Category | SOE | Adults RRL | Peds RRL | Rating | Median | Final Tabulations | | | | | | | | | | |
|----------------------------|--------------------------|--------|-------------|-----------------------|--------|--------|-------------------|---|---|---|---|---|---|---|----|--|--|
| | | | | | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | | |
| Radiography cervical spine | Usually appropriate | Strong | ⊕⊕ 0.1-1mSv | ⊕⊕ 0.03-0.3 mSv [ped] | 9 | 9 | 0 | 1 | 0 | 0 | 1 | 1 | 3 | 5 | 13 | | |

| References | Study Quality |
|---------------|---------------|
| 45 (23075855) | 2 |
| 41 (23489979) | 4 |
| 38 (22663912) | 4 |
| 35 (22531194) | 2 |
| 30 (15920400) | M |
| 39 (11423804) | 4 |
| 9 (19002679) | 4 |
| 42 (20192648) | 4 |
| 33 (15609065) | 3 |
| 43 (15920399) | 3 |
| 34 (17493540) | 4 |
| 36 (20093616) | 2 |
| 37 (22595586) | 2 |
| 40 (19159734) | 3 |
| 44 (22290498) | 3 |

| | | | | | | | | | | | | | | | |
|---------------------------------------|-----------------------------------|----------------|--------------|---------------------|---|---|---|---|---|---|---|---|---|---|---|
| CT cervical spine without IV contrast | May be appropriate (Disagreement) | Expert Opinion | ⊕⊕⊕ 1-10 mSv | ⊕⊕⊕⊕ 3-10 mSv [ped] | 5 | 5 | 3 | 2 | 7 | 3 | 4 | 4 | 0 | 0 | 1 |
|---------------------------------------|-----------------------------------|----------------|--------------|---------------------|---|---|---|---|---|---|---|---|---|---|---|

| References | Study Quality |
|---------------|---------------|
| 50 (27043893) | 2 |
| 47 (23114489) | 4 |
| 52 (23511151) | 3 |
| 35 (22531194) | 2 |
| 25 (18073623) | 4 |
| 30 (15920400) | M |
| 19 (19741398) | 4 |
| 54 (20889081) | 4 |
| 17 (18301348) | 4 |
| 51 (19396479) | 3 |
| 12 (24528980) | 3 |
| 43 (15920399) | 3 |

| | |
|---------------|---|
| 46 (15920398) | 3 |
| 48 (23584614) | 3 |
| 53 (25033993) | 2 |
| 55 (23453711) | 3 |
| 49 (16374279) | 2 |

| | | | | | | | | | | | | | | | |
|--|-----------------------------------|----------------|---------|---------------|---|---|---|---|---|---|---|---|---|---|---|
| MRI cervical spine without IV contrast | May be appropriate (Disagreement) | Expert Opinion | 0 0 mSv | 0 0 mSv [ped] | 5 | 5 | 3 | 5 | 4 | 3 | 3 | 5 | 0 | 1 | 0 |
|--|-----------------------------------|----------------|---------|---------------|---|---|---|---|---|---|---|---|---|---|---|

| References | Study Quality |
|---------------|---------------|
| 45 (23075855) | 2 |
| 74 (23856632) | M |
| 61 (26151511) | 3 |
| 69 (24119886) | 3 |
| 68 (23232377) | 4 |
| 60 (22491556) | 3 |
| 67 (27334017) | 4 |
| 66 (23321374) | M |
| 73 (21619408) | M |
| 70 (18188119) | M |
| 51 (19396479) | 3 |
| 58 (20493656) | 4 |
| 7 (16494197) | 3 |
| 62 (24157265) | 3 |
| 63 (19095100) | 3 |
| 64 (18469647) | 3 |
| 75 (18665403) | 3 |
| 65 (18404054) | 4 |
| 57 (16297679) | 4 |
| 48 (23584614) | 3 |
| 56 (24091790) | 3 |
| 59 (16122000) | 3 |
| 77 (26512624) | 2 |

| | |
|---------------|---|
| 17 (18301348) | 4 |
| 51 (19396479) | 3 |
| 12 (24528980) | 3 |
| 43 (15920399) | 3 |
| 46 (15920398) | 3 |
| 48 (23584614) | 3 |
| 53 (25033993) | 2 |
| 55 (23453711) | 3 |
| 49 (16374279) | 2 |

| | | | | | | | | | | | | | | | |
|--|-------------------------|--------|--------------|---------------------|---|---|----|---|---|---|---|---|---|---|---|
| CT cervical spine without and with IV contrast | Usually not appropriate | Strong | ☹☹☹ 1-10 mSv | ☹☹☹☹ 3-10 mSv [ped] | 1 | 1 | 19 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
|--|-------------------------|--------|--------------|---------------------|---|---|----|---|---|---|---|---|---|---|---|

| References | Study Quality |
|---------------|---------------|
| 50 (27043893) | 2 |
| 47 (23114489) | 4 |
| 52 (23511151) | 3 |
| 35 (22531194) | 2 |
| 25 (18073623) | 4 |
| 30 (15920400) | M |
| 19 (19741398) | 4 |
| 54 (20889081) | 4 |
| 17 (18301348) | 4 |
| 51 (19396479) | 3 |
| 12 (24528980) | 3 |
| 43 (15920399) | 3 |
| 46 (15920398) | 3 |
| 48 (23584614) | 3 |
| 53 (25033993) | 2 |
| 55 (23453711) | 3 |
| 49 (16374279) | 2 |

| | |
|---------------|---|
| 51 (19396479) | 3 |
| 58 (20493656) | 4 |
| 7 (16494197) | 3 |
| 62 (24157265) | 3 |
| 63 (19095100) | 3 |
| 64 (18469647) | 3 |
| 75 (18665403) | 3 |
| 65 (18404054) | 4 |
| 57 (16297679) | 4 |
| 48 (23584614) | 3 |
| 56 (24091790) | 3 |
| 59 (16122000) | 3 |
| 77 (26512624) | 2 |
| 72 (19820570) | 4 |
| 76 (-3144420) | 4 |
| 71 (12198456) | 3 |

| | | | | | | | | | | | | | | | |
|-------------------|-------------------------|---------|---------------|---------------|---|---|----|---|---|---|---|---|---|---|---|
| US cervical spine | Usually not appropriate | Limited | 0 0 mSv | 0 0 mSv [ped] | 1 | 1 | 23 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| References | | | Study Quality | | | | | | | | | | | | |
| 87 (26167212) | | | 4 | | | | | | | | | | | | |
| 88 (23709440) | | | 3 | | | | | | | | | | | | |
| 89 (19927090) | | | 2 | | | | | | | | | | | | |

Variant 3: Child, younger than 3 years of age, acute cervical spine trauma, Pieretti-Vanmarcke weighted score greater than or equal to 2 to 8 points. Initial imaging.

| Procedure | Appropriateness Category | SOE | Adults RRL | Peds RRL | Rating | Median | Final Tabulations | | | | | | | | |
|----------------------------|--------------------------|---------|---------------|------------------------|--------|--------|-------------------|---|---|---|---|---|---|---|----|
| | | | | | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| Radiography cervical spine | Usually appropriate | Limited | ☼☼ 0.1-1mSv | ☼☼☼ 0.03-0.3 mSv [ped] | 9 | 9 | 1 | 0 | 0 | 1 | 2 | 1 | 3 | 3 | 12 |
| References | | | Study Quality | | | | | | | | | | | | |

| | |
|---------------|---|
| 45 (23075855) | 2 |
| 42 (20192648) | 4 |
| 19 (19741398) | 4 |
| 91 (21980025) | 4 |
| 54 (20889081) | 4 |
| 44 (22290498) | 3 |

| | | | | | | | | | | | | | | | |
|--|-----------------------------------|----------------|---------|---------------|---|---|---|---|---|---|---|---|---|---|---|
| MRI cervical spine without IV contrast | May be appropriate (Disagreement) | Expert Opinion | ○ 0 mSv | ○ 0 mSv [ped] | 5 | 5 | 5 | 2 | 5 | 4 | 3 | 4 | 0 | 1 | 0 |
|--|-----------------------------------|----------------|---------|---------------|---|---|---|---|---|---|---|---|---|---|---|

| | |
|---------------|---------------|
| References | Study Quality |
| 92 (16458247) | 4 |
| 51 (19396479) | 3 |

| | | | | | | | | | | | | | | | |
|---------------------------------------|-------------------------|---------|--------------|---------------------|---|---|---|---|---|---|---|---|---|---|---|
| CT cervical spine without IV contrast | Usually not appropriate | Limited | ☼☼☼ 1-10 mSv | ☼☼☼☼ 3-10 mSv [ped] | 3 | 3 | 3 | 3 | 7 | 2 | 7 | 2 | 0 | 0 | 0 |
|---------------------------------------|-------------------------|---------|--------------|---------------------|---|---|---|---|---|---|---|---|---|---|---|

| | |
|---------------|---------------|
| References | Study Quality |
| 19 (19741398) | 4 |
| 54 (20889081) | 4 |
| 53 (25033993) | 2 |
| 55 (23453711) | 3 |

| | | | | | | | | | | | | | | | |
|------------------------------|-------------------------|---------|---------|---------------|---|---|----|---|---|---|---|---|---|---|---|
| MRA neck without IV contrast | Usually not appropriate | Limited | ○ 0 mSv | ○ 0 mSv [ped] | 3 | 3 | 11 | 0 | 4 | 1 | 7 | 0 | 0 | 0 | 0 |
|------------------------------|-------------------------|---------|---------|---------------|---|---|----|---|---|---|---|---|---|---|---|

| | |
|---------------|---------------|
| References | Study Quality |
| 80 (24355656) | 3 |
| 68 (23232377) | 4 |
| 86 (20154559) | 4 |

| | | | | | | | | | | | | | | | |
|---------------------------|-------------------------|---------|--------------|---------------------|---|---|----|---|---|---|---|---|---|---|---|
| CTA neck with IV contrast | Usually not appropriate | Limited | ☼☼☼ 1-10 mSv | ☼☼☼ 0.3-3 mSv [ped] | 1 | 1 | 12 | 2 | 2 | 1 | 6 | 0 | 0 | 0 | 0 |
|---------------------------|-------------------------|---------|--------------|---------------------|---|---|----|---|---|---|---|---|---|---|---|

| | |
|---------------|---------------|
| References | Study Quality |
| 80 (24355656) | 3 |
| 81 (22990630) | 3 |
| 82 (22137135) | 4 |

| | | | | | | | | | | | | | | | | | |
|--|-------------------------|------------------|----------------|-----------------------|---|---|----|---|---|---|---|---|---|---|---|--|--|
| | | 96 (15385287) | | 1 | | | | | | | | | | | | | |
| CT thoracic and lumbar spine without and with IV contrast | Usually not appropriate | Strong | ☹☹☹☹ 10-30 mSv | ☹☹☹☹ 3-10 mSv [ped] | 1 | 1 | 20 | 3 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | | |
| | | References | Study Quality | | | | | | | | | | | | | | |
| | | 97 (26810978) | | | 2 | | | | | | | | | | | | |
| | | 29 (14654023) | | | 4 | | | | | | | | | | | | |
| | | 94 (20699755) | | | 3 | | | | | | | | | | | | |
| | | 95 (16303994) | | | 2 | | | | | | | | | | | | |
| | | 96 (15385287) | | | 1 | | | | | | | | | | | | |
| MRI thoracic and lumbar spine without and with IV contrast | Usually not appropriate | Strong | ○ 0 mSv | ○ 0 mSv [ped] | 1 | 1 | 17 | 1 | 3 | 1 | 0 | 1 | 1 | 0 | 0 | | |
| | | References | Study Quality | | | | | | | | | | | | | | |
| | | 24 (23276683) | | | 3 | | | | | | | | | | | | |
| | | 27 (17224805) | | | 3 | | | | | | | | | | | | |
| | | 28 (23276357) | | | 2 | | | | | | | | | | | | |
| | | 29 (14654023) | | | 4 | | | | | | | | | | | | |
| | | 91 (21980025) | | | 4 | | | | | | | | | | | | |
| | | 98 (23425746) | | | 4 | | | | | | | | | | | | |
| | | 59 (16122000) | | | 3 | | | | | | | | | | | | |
| | | 93 (27886872) | | | 4 | | | | | | | | | | | | |
| Arteriography thoracic and lumbar spine | Usually not appropriate | Expert Consensus | ☹☹☹☹ 10-30 mSv | ☹☹☹☹ 3-10 mSv [ped] | 1 | 1 | 23 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| CTA thoracic and lumbar spine with IV contrast | Usually not appropriate | Expert Consensus | ☹☹☹☹ 10-30 mSv | ☹☹☹☹☹ 10-30 mSv [ped] | 1 | 1 | 19 | 1 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | | |
| MRA thoracic and lumbar spine without and with IV contrast | Usually not appropriate | Expert Consensus | ○ 0 mSv | ○ 0 mSv [ped] | 1 | 1 | 17 | 4 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| MRA thoracic and lumbar spine without IV contrast | Usually not appropriate | Expert Consensus | ○ 0 mSv | ○ 0 mSv [ped] | 1 | 1 | 15 | 1 | 2 | 2 | 2 | 1 | 0 | 0 | 1 | | |

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.