

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

**Suspected Spine Trauma-Child**

**Variant 1: Child, 3 to 16 years of age, acute cervical spine trauma, meets low risk criteria (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 not appropriate	Limited	☹☹ 0.1-1mSv	☹☹ 0.03-0.3 mSv [ped]	2	2	10	6	4	2	1	0	0	0	1
		References		Study Quality											
		4 (20433260)		4											
CTA neck with IV contrast	Usually not appropriate	Expert Consensus	☹☹☹ 1-10 mSv	☹☹☹ 0.3-3 mSv [ped]	1	1	21	1	2	0	0	0	0	0	0
CT myelography cervical spine	Usually not appropriate	Expert Consensus	☹☹☹☹ 10-30 mSv	☹☹☹ 0.3-3 mSv [ped]	1	1	23	1	0	0	0	0	0	0	0
CT cervical spine with IV contrast	Usually not appropriate	Limited	☹☹☹ 1-10 mSv	☹☹☹☹ 3-10 mSv [ped]	1	1	22	2	0	0	0	0	0	0	0
		References		Study Quality											
		19 (19741398)		4											
		30 (15920400)		M											
		31 (26744446)		3											
		32 (26514612)		3											
CT cervical spine without IV contrast	Usually not appropriate	Limited	☹☹☹ 1-10 mSv	☹☹☹☹ 3-10 mSv [ped]	1	1	13	1	5	2	1	0	2	0	0
		References		Study Quality											
		19 (19741398)		4											

			30 (15920400)		M												
			31 (26744446)		3												
			32 (26514612)		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												
			19 (19741398)		4												
			30 (15920400)		M												
			31 (26744446)		3												
			32 (26514612)		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
9 (19002679)	4
30 (15920400)	M
33 (15609065)	3
34 (17493540)	4
35 (22531194)	2
36 (20093616)	2
37 (22595586)	2
38 (22663912)	4
39 (11423804)	4
40 (19159734)	3
41 (23489979)	4
42 (20192648)	4
43 (15920399)	3
44 (22290498)	3
45 (23075855)	2

CT cervical spine without IV contrast	May be appropriate (Disagreement)	Expert Opinion	⊕⊕⊕ 1-10 mSv	⊕⊕⊕⊕ 3-10 mSv [ped]	5	4	3	2	7	3	4	4	0	0	1
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References	Study Quality
12 (24528980)	3
17 (18301348)	4
19 (19741398)	4
25 (18073623)	4
30 (15920400)	M
35 (22531194)	2
43 (15920399)	3
46 (15920398)	3
47 (23114489)	4
48 (23584614)	3
49 (16374279)	2
50 (27043893)	2

51 (19396479)	3
52 (23511151)	3
53 (25033993)	2
54 (20889081)	4
55 (23453711)	3

MRI cervical spine without IV contrast	May be appropriate (Disagreement)	Expert Opinion	0 0 mSv	0 0 mSv [ped]	5	4	3	5	4	3	3	5	0	1	0
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References	Study Quality
7 (16494197)	3
45 (23075855)	2
48 (23584614)	3
51 (19396479)	3
56 (24091790)	3
57 (16297679)	4
58 (20493656)	4
59 (16122000)	3
60 (22491556)	3
61 (26151511)	3
62 (24157265)	3
63 (19095100)	3
64 (18469647)	3
65 (18404054)	4
66 (23321374)	M
67 (27334017)	4
68 (23232377)	4
69 (24119886)	3
70 (18188119)	M
71 (12198456)	3
72 (19820570)	4
73 (21619408)	M
74 (23856632)	M

75 (18665403)	3
76 (-3144420)	4
77 (26512624)	2

CTA neck with IV contrast	Usually not appropriate	Limited	☼☼☼ 1-10 mSv	☼☼☼ 0.3-3 mSv [ped]	2	2	11	2	2	3	6	0	0	0	0
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References	Study Quality
68 (23232377)	4
78 (16688051)	3
79 (20496085)	4
80 (24355656)	3
81 (22990630)	3
82 (22137135)	4
83 (25803220)	3
84 (24722311)	3
85 (20019135)	3

CT myelography cervical spine	Usually not appropriate	Limited	☼☼☼☼ 10-30 mSv	☼☼☼ 0.3-3 mSv [ped]	1	1	20	2	2	0	0	0	0	0	0
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References	Study Quality
90 (16439090)	4

CT cervical spine with IV contrast	Usually not appropriate	Strong	☼☼☼ 1-10 mSv	☼☼☼☼ 3-10 mSv [ped]	1	1	17	6	1	0	0	0	0	0	0
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References	Study Quality
12 (24528980)	3
17 (18301348)	4
19 (19741398)	4
25 (18073623)	4
30 (15920400)	M
35 (22531194)	2
43 (15920399)	3
46 (15920398)	3

47 (23114489)	4
48 (23584614)	3
49 (16374279)	2
50 (27043893)	2
51 (19396479)	3
52 (23511151)	3
53 (25033993)	2
54 (20889081)	4
55 (23453711)	3

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



62 (24157265)	3
63 (19095100)	3
64 (18469647)	3
65 (18404054)	4
66 (23321374)	M
67 (27334017)	4
68 (23232377)	4
69 (24119886)	3
70 (18188119)	M
71 (12198456)	3
72 (19820570)	4
73 (21619408)	M
74 (23856632)	M
75 (18665403)	3
76 (-3144420)	4
77 (26512624)	2

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												



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

MRI cervical spine without IV contrast	May be appropriate (Disagreement)	Expert Opinion	0 0 mSv	0 0 mSv [ped]	5	4	5	2	5	4	3	4	0	1	0
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References	Study Quality
51 (19396479)	3
92 (16458247)	4

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

MRA neck without IV contrast	Usually not appropriate	Limited	0 0 mSv	0 0 mSv [ped]	3	3	11	0	4	1	7	0	0	0	0
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References	Study Quality
68 (23232377)	4
80 (24355656)	3
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
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References	Study Quality
68 (23232377)	4
78 (16688051)	3
79 (20496085)	4







		97 (26810978)		2													
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														
		29 (14654023)			4												
		94 (20699755)			3												
		95 (16303994)			2												
		96 (15385287)			1												
		97 (26810978)			2												
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												
		59 (16122000)			3												
		91 (21980025)			4												
		93 (27886872)			4												
		98 (23425746)			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](http://www.acr.org/ac).