

X-ray myelography cervical spine	Usually not appropriate	Limited	☼☼☼ 1-10 mSv		3	3	7	2	2	3	2	1	1	0	0
		References	Study Quality												
		17 (-3130497)	4												
MRI cervical spine without and with IV contrast	Usually not appropriate	Strong	○ 0 mSv	○ 0 mSv [ped]	3	3	5	3	4	1	3	2	0	0	0
		References	Study Quality												
		41 (27318668)	3												
		40 (2398088)	3												
		39 (17204882)	4												
		35 (2847516)	4												
		33 (21047885)	2												
		23 (9460946)	2												
		21 (8107998)	3												
CT myelography cervical spine	Usually not appropriate	Strong	☼☼☼☼ 10-30 mSv	☼☼☼ 0.3-3 mSv [ped]	2	2	7	3	3	4	1	0	1	0	0
		References	Study Quality												
		38 (9534693)	2												
		37 (3823440)	2												
CTA neck with IV contrast	Usually not appropriate	Expert Consensus	☼☼☼ 1-10 mSv	☼☼☼ 0.3-3 mSv [ped]	1	1	10	4	2	1	1	0	0	0	0
CT cervical spine with IV contrast	Usually not appropriate	Limited	☼☼☼ 1-10 mSv	☼☼☼☼ 3-10 mSv [ped]	1	1	10	1	5	1	1	0	0	0	0
		References	Study Quality												
		36 (16632616)	2												
		35 (2847516)	4												
CT cervical spine without and with IV contrast	Usually not appropriate	Limited	☼☼☼ 1-10 mSv	☼☼☼☼ 3-10 mSv [ped]	1	1	12	2	2	2	0	0	0	0	0
		References	Study Quality												

			36 (16632616)			2											
			35 (2847516)			4											
Discography cervical spine	Usually not appropriate	Expert Consensus	☹☹ 0.1-1mSv		1	1	12	3	3	0	0	0	0	0	0	0	0
Facet injection/medial branch block cervical spine	Usually not appropriate	Expert Consensus	☹☹ 0.1-1mSv		1	1	15	2	1	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	12	1	4	0	1	0	0	0	0	0	0
MRA neck with IV contrast	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	1	1	12	1	4	0	1	0	0	0	0	0	0
MRI cervical spine with IV contrast	Usually not appropriate	Strong	○ 0 mSv	○ 0 mSv [ped]	1	1	11	1	0	4	1	0	1	0	0	0	0
			References				Study Quality										
			41 (27318668)				3										
			40 (2398088)				3										
			39 (17204882)				4										
			35 (2847516)				4										
			33 (21047885)				2										
			23 (9460946)				2										
			21 (8107998)				3										
Tc-99m bone scan whole body with SPECT/CT neck	Usually not appropriate	Expert Consensus	☹☹☹☹ 10-30 mSv		1	1	14	1	2	0	1	0	0	0	0	0	0

Variant 3: Prior cervical spine surgery. New or increasing nontraumatic cervical or neck pain or radiculopathy. 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]	8	8	1	0	1	0	0	2	2	4	8		

References	Study Quality
66 (23578991)	3
65 (19096562)	4
64 (18628706)	4
63 (21178831)	3
62 (24183750)	4
61 (19665192)	4
60 (23242622)	2

CT cervical spine without IV contrast	Usually appropriate	Strong	☼☼☼ 1-10 mSv	☼☼☼☼ 3-10 mSv [ped]	7	7	1	0	1	0	1	1	6	5	3
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References	Study Quality
53 (26430596)	3
52 (23479714)	4
51 (23318108)	Not Assessed
50 (23118135)	4
49 (16889148)	2
48 (18469691)	2

MRI cervical spine without IV contrast	May be appropriate (Disagreement)	Expert Opinion	○ 0 mSv	○ 0 mSv [ped]	5	7	2	0	1	1	1	1	6	4	3
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References	Study Quality
55 (11371319)	4
54 (-3127628)	4
23 (9460946)	2
22 (26571180)	3

MRI cervical spine without and with IV contrast	May be appropriate (Disagreement)	Expert Opinion	○ 0 mSv	○ 0 mSv [ped]	5	5	0	0	2	4	9	1	2	0	1
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References	Study Quality
57 (2119123)	4
56 (2966418)	2
55 (11371319)	4

Tc-99m bone scan whole body with SPECT/CT neck	Usually not appropriate	Limited	⊕⊕⊕⊕ 10-30 mSv		3	3	7	1	4	0	4	1	1	0	0
		References		Study Quality											
		76 (3875878)		2											
CT myelography cervical spine	Usually not appropriate	Expert Consensus	⊕⊕⊕⊕ 10-30 mSv	⊕⊕⊕ 0.3-3 mSv [ped]	2	2	9	3	3	1	2	0	0	0	0
In-111 WBC scan whole body	Usually not appropriate	Expert Consensus	⊕⊕⊕⊕ 10-30 mSv		2	2	9	1	3	2	1	2	0	0	0
Ga-67 scan whole body	Usually not appropriate	Limited	⊕⊕⊕⊕ 10-30 mSv		2	2	7	3	9	0	0	0	0	0	0
		References		Study Quality											
		75 (26848173)		2											
		74 (11129162)		3											
CTA neck with IV contrast	Usually not appropriate	Expert Consensus	⊕⊕⊕ 1-10 mSv	⊕⊕⊕ 0.3-3 mSv [ped]	1	1	11	2	2	2	1	0	0	0	0
Discography cervical spine	Usually not appropriate	Expert Consensus	⊕⊕ 0.1-1mSv		1	1	14	2	1	0	1	0	0	0	0
Facet injection/medial branch block cervical spine	Usually not appropriate	Expert Consensus	⊕⊕ 0.1-1mSv		1	1	16	1	1	0	0	0	0	0	0
X-ray myelography cervical spine	Usually not appropriate	Limited	⊕⊕⊕ 1-10 mSv		1	1	12	2	1	2	1	0	0	0	0
		References		Study Quality											
		17 (-3130497)		4											
MRA neck without IV contrast	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	1	1	11	2	2	2	1	0	0	0	0
MRA neck with IV contrast	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	1	1	12	2	3	1	0	0	0	0	0

Variant 5: Known malignancy. New or increasing nontraumatic cervical or neck pain or radiculopathy. Initial imaging.

		86 (17890090)		2											
Discography cervical spine	Usually not appropriate	Expert Consensus	☼☼ 0.1-1mSv		1	1	14	3	1	0	0	0	0	0	0
Facet injection/medial branch block cervical spine	Usually not appropriate	Expert Consensus	☼☼ 0.1-1mSv		1	1	16	1	1	0	0	0	0	0	0
X-ray myelography cervical spine	Usually not appropriate	Limited	☼☼☼ 1-10 mSv		1	1	11	2	2	3	0	0	0	0	0
		References		Study Quality											
		17 (-3130497)		4											
MRA neck without IV contrast	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	1	1	11	2	4	0	1	0	0	0	0
MRA neck with IV contrast	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	1	1	11	3	4	0	0	0	0	0	0
F-18 NaF PET/CT whole body	Usually not appropriate	Limited	☼☼☼☼ 10-30 mSv		1	1	13	3	2	0	0	1	0	0	0
		References		Study Quality											
		91 (28872551)		2											
		90 (27634981)		4											

Variant 6: Cervicogenic headache and new or increasing nontraumatic cervical or neck pain. No neurologic deficit. Initial imaging.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
MRI cervical spine without IV contrast	May be appropriate (Disagreement)	Expert Opinion	○ 0 mSv	○ 0 mSv [ped]	5	5	3	0	1	3	6	3	1	2	0
		References		Study Quality											
		104 (14510932)		2											
		103 (2743413)		4											

Radiography cervical spine	May be appropriate	Limited	☼☼ 0.1-1mSv	☼☼☼ 0.03-0.3 mSv [ped]	5	5	0	0	2	6	4	5	1	1	0
		References		Study Quality											
		104 (14510932)		2											
		103 (2743413)		4											
CT cervical spine without IV contrast	May be appropriate	Limited	☼☼☼ 1-10 mSv	☼☼☼☼ 3-10 mSv [ped]	4	4	1	0	2	9	4	2	1	0	0
		References		Study Quality											
		104 (14510932)		2											
		103 (2743413)		4											
Facet injection/medial branch block cervical spine	May be appropriate	Expert Consensus	☼☼ 0.1-1mSv		4	4	4	2	3	6	2	2	0	0	0
Tc-99m bone scan whole body with SPECT/CT neck	Usually not appropriate	Limited	☼☼☼☼ 10-30 mSv		3	3	7	1	3	3	2	1	1	0	0
		References		Study Quality											
		106 (19643679)		4											
		105 (27262701)		4											
		36 (16632616)		2											
MRI cervical spine without and with IV contrast	Usually not appropriate	Limited	0 0 mSv	0 0 mSv [ped]	2	2	9	0	1	3	4	1	0	0	0
		References		Study Quality											
		104 (14510932)		2											
		103 (2743413)		4											
CTA neck with IV contrast	Usually not appropriate	Expert Consensus	☼☼☼ 1-10 mSv	☼☼☼ 0.3-3 mSv [ped]	1	1	10	1	1	3	2	0	1	0	0
CT myelography cervical spine	Usually not appropriate	Expert Consensus	☼☼☼☼ 10-30 mSv	☼☼☼ 0.3-3 mSv [ped]	1	1	14	2	2	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	13	2	2	0	1	0	0	0	0

		References	Study Quality												
		104 (14510932)	2												
		103 (2743413)	4												
CT cervical spine without and with IV contrast	Usually not appropriate	Limited	☹☹☹ 1-10 mSv	☹☹☹☹ 3-10 mSv [ped]	1	1	13	1	3	1	0	0	0	0	0
		References	Study Quality												
		104 (14510932)	2												
		103 (2743413)	4												
Discography cervical spine	Usually not appropriate	Expert Consensus	☹☹ 0.1-1mSv		1	1	10	2	1	1	2	1	1	0	0
X-ray myelography cervical spine	Usually not appropriate	Expert Consensus	☹☹☹ 1-10 mSv		1	1	13	2	3	0	0	0	0	0	0
MRA neck without IV contrast	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	1	1	10	1	1	4	1	1	0	0	0
MRA neck with IV contrast	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	1	1	10	2	1	2	2	0	1	0	0
MRI cervical spine with IV contrast	Usually not appropriate	Limited	○ 0 mSv	○ 0 mSv [ped]	1	1	11	1	3	1	2	0	0	0	0
		References	Study Quality												
		104 (14510932)	2												
		103 (2743413)	4												

Variant 7: Chronic cervical or neck pain. 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]	8	n/a	0	0	0	0	0	0	0	0	0
		References	Study Quality												

Facet injection/medial branch block cervical spine	Usually not appropriate	Expert Consensus	☹☹ 0.1-1mSv		1	n/a	0	0	0	0	0	0	0	0	0
X-ray myelography cervical spine	Usually not appropriate	Expert Consensus	☹☹☹ 1-10 mSv		1	n/a	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	n/a	0	0	0	0	0	0	0	0	0
MRA neck with IV contrast	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0
MRI cervical spine with IV contrast	Usually not appropriate	Limited	○ 0 mSv	○ 0 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0

References	Study Quality
23 (9460946)	2
22 (26571180)	3

Variant 8: Chronic cervical or neck pain. No neurologic findings. Radiographs show degenerative changes. Next imaging study.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
MRI cervical spine without IV contrast	Usually appropriate	Strong	○ 0 mSv	○ 0 mSv [ped]	8	8	0	0	0	1	0	2	3	6	6

References	Study Quality
115 (27492725)	4
114 (28139306)	4
113 (21269888)	4
112 (19333104)	3
111 (10947922)	4
23 (9460946)	2
22 (26571180)	3
21 (8107998)	3
20 (25430861)	4

CT cervical spine without IV contrast	May be appropriate	Limited	☹☹☹ 1-10 mSv	☹☹☹☹ 3-10 mSv [ped]	6	6	0	0	2	0	3	7	3	4	0
		References	Study Quality												
		24 (17379279)	Inadequate												
CT myelography cervical spine	May be appropriate	Expert Consensus	☹☹☹☹ 10-30 mSv	☹☹☹ 0.3-3 mSv [ped]	4	4	5	1	1	5	4	1	1	0	0
MRI cervical spine without and with IV contrast	Usually not appropriate	Strong	○ 0 mSv	○ 0 mSv [ped]	3	3	3	3	6	2	4	0	1	0	0
		References	Study Quality												
		115 (27492725)	4												
		114 (28139306)	4												
		113 (21269888)	4												
		112 (19333104)	3												
		111 (10947922)	4												
		23 (9460946)	2												
		22 (26571180)	3												
		21 (8107998)	3												
		20 (25430861)	4												
Tc-99m bone scan whole body with SPECT/CT neck	Usually not appropriate	Limited	☹☹☹☹ 10-30 mSv		3	3	5	1	7	4	1	1	0	0	0
		References	Study Quality												
		106 (19643679)	4												
		26 (23412368)	3												
MRI cervical spine with IV contrast	Usually not appropriate	Strong	○ 0 mSv	○ 0 mSv [ped]	2	2	8	3	5	2	0	1	0	0	0
		References	Study Quality												
		23 (9460946)	2												
		22 (26571180)	3												
		21 (8107998)	3												
		20 (25430861)	4												

114 (28139306)	4
113 (21269888)	4
112 (19333104)	3
111 (10947922)	4
115 (27492725)	4

CTA neck with IV contrast	Usually not appropriate	Expert Consensus	☼☼☼ 1-10 mSv	☼☼☼ 0.3-3 mSv [ped]	1	1	10	3	2	2	1	0	0	0	0
CT cervical spine with IV contrast	Usually not appropriate	Limited	☼☼☼ 1-10 mSv	☼☼☼☼ 3-10 mSv [ped]	1	1	11	2	1	2	2	0	0	0	0

References	Study Quality
24 (17379279)	Inadequate

CT cervical spine without and with IV contrast	Usually not appropriate	Limited	☼☼☼ 1-10 mSv	☼☼☼☼ 3-10 mSv [ped]	1	1	11	2	1	3	1	0	0	0	0
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References	Study Quality
24 (17379279)	Inadequate

Discography cervical spine	Usually not appropriate	Limited	☼☼ 0.1-1mSv		1	1	11	4	2	1	0	0	0	0	0
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References	Study Quality
1 (18204385)	4

Facet injection/medial branch block cervical spine	Usually not appropriate	Limited	☼☼ 0.1-1mSv		1	1	10	2	2	2	1	1	0	0	0
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References	Study Quality
110 (15168223)	4
109 (18295649)	4

X-ray myelography cervical spine	Usually not appropriate	Limited	☼☼☼ 1-10 mSv		1	1	10	1	1	4	2	0	0	0	0
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References	Study Quality
116 (5643913)	4

CTA neck with IV contrast	Usually not appropriate	Expert Consensus	☼☼☼ 1-10 mSv	☼☼☼ 0.3-3 mSv [ped]	1	1	12	1	2	2	1	0	0	0	0
CT cervical spine with IV contrast	Usually not appropriate	Limited	☼☼☼ 1-10 mSv	☼☼☼☼ 3-10 mSv [ped]	1	1	11	2	2	1	0	2	0	0	0
		References		Study Quality											
		120 (23179977)		4											
CT cervical spine without and with IV contrast	Usually not appropriate	Limited	☼☼☼ 1-10 mSv	☼☼☼☼ 3-10 mSv [ped]	1	1	11	1	2	2	2	0	0	0	0
		References		Study Quality											
		120 (23179977)		4											
Discography cervical spine	Usually not appropriate	Expert Consensus	☼☼ 0.1-1mSv		1	1	15	2	1	0	0	0	0	0	0
Facet injection/medial branch block cervical spine	Usually not appropriate	Expert Consensus	☼☼ 0.1-1mSv		1	1	15	2	1	0	0	0	0	0	0
MRA neck without IV contrast	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	1	1	12	2	3	0	1	0	0	0	0
MRA neck with IV contrast	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	1	1	12	2	3	0	1	0	0	0	0
MRI cervical spine with IV contrast	Usually not appropriate	Limited	○ 0 mSv	○ 0 mSv [ped]	1	1	10	2	2	1	2	1	0	0	0
		References		Study Quality											
		122 (1636514)		3											
Tc-99m bone scan whole body with SPECT/CT neck	Usually not appropriate	Expert Consensus	☼☼☼☼ 10-30 mSv		1	1	13	2	2	1	0	0	0	0	0

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.