American College of Radiology ACR Appropriateness Criteria®

Cervical Pain or Cervical Radiculopathy

Variant 1: Adult. Acute or increasing cervical pain without radiculopathy. No trauma or "red flags." Initial imaging.

	Appropri	iateness	207							F	inal '	Tabu	latio	ns		
Procedure	Categ	gory	SOE	Adults RRL	Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
Radiography cervical spine	May approp		Limited	�� 0.1-1mS	≎≎ 0.03- 0.3 mSv [ped]	5	5	0	0	0	3	8	7	0	0	0
			References		Stud	y Quality										
			48 (24968795)			4										
			49 (9224245)			4										
CTA neck with IV contrast	Usuall approp		Expert Consensus	��� 1-10 mSv	��� 0.3- 3 mSv [ped]	1	1	16	0	0	1	0	0	0	0	1
CT myelography cervical spine	Usuall approp		Expert Consensus	���� 10-3 mSv	0	1	1	16	0	0	1	0	0	0	0	1
CT cervical spine with IV contrast	Usuall approp		Strong	��� 1-10 mSv	���� 3- 10 mSv [ped]	1	1	15	1	0	0	1	0	0	1	0
			References		Stud	y Quality										
			42 (17379279)		Ina	dequate										
			43 (20006557)			1										
			44 (35699680)			2										
			45 (28753389)			2										
CT cervical spine without IV contrast	Usuall approp		Strong	��� 1-10 mSv	���� 3- 10 mSv [ped]	1	1	14	3	1	0	0	0	0	0	0
			References		Stud	y Quality										

		42 (17379279)		Ina	dequate										
		43 (20006557)			1										
		44 (35699680)			2										
		45 (28753389)			2										
CT cervical spine without and with IV contrast	Usually approp	Expert Consensus	��� 1-10 mSv	���� 3- 10 mSv [ped]	1	1	16	0	0	0	1	0	0	0	1
Discography cervical spine	Usually approp	Expert Consensus	�� 0.1-1mS	v	1	1	16	0	0	1	0	0	0	1	0
Radiographic myelography cervical spine	Usually approp	Expert Consensus	≎≎≎ 1-10 mSv		1	1	16	0	0	0	0	1	0	0	1
MRA neck without IV contrast	Usually approp	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	16	0	1	0	0	0	0	0	1
MRA neck without and with IV contrast	Usually approp	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	16	0	1	0	0	0	0	0	1
MRI cervical spine without IV contrast	Usually approp	Limited	O 0 mSv	O 0 mSv [ped]	1	1	14	2	2	0	0	0	0	0	0
		References		Stud	y Quality										
		1 (25659245)			4										
		47 (17088193)			3										
		46 (9460946)			2										
MRI cervical spine without and with IV contrast	Usually approp	Limited	O 0 mSv	O 0 mSv [ped]	1	1	14	1	1	0	1	0	0	0	1
		References		Stud	y Quality		-								
		1 (25659245)			4										
		47 (17088193)			3										
		46 (9460946)			2										
Radiography cervical spine flexion extension lateral views	Usually approp	Limited	�� 0.1-1mS	v	1	1	13	2	3	0	0	0	0	0	0
		References			y Quality										
		48 (24968795)			4										

			49 (9224245)				4										
MRA neck with IV contrast	Usuall approp		Expert Consensus	O 0 mSv	,	O 0 mSv [ped]	1	1	16	0	1	0	0	0	0	0	1
MRI cervical spine with IV contrast	Usuall approp	-	Expert Consensus	O 0 mSv	,	O 0 mSv [ped]	1	1	16	0	0	1	0	0	0	0	1
Bone scan whole body with SPECT or SPECT/CT cervical spine	Usuall approp	y not oriate	Limited	��� 1-1 mSv	0	���� 3- 10 mSv [ped]	1	1	16	1	0	0	0	0	1	0	0
			References			Study	Quality										
			41 (34698290)				4										

Variant 2: Adult. Acute or increasing cervical pain with radiculopathy. No trauma or "red flags." Initial imaging.

ъ .	Appropri	iateness	COL	4 1 14 DD	_ [D I DDI	- ·	3.6.31			F	inal '	Tabu	latio	ns		
Procedure	Categ		SOE	Adults RR	L	Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
MRI cervical spine without IV contrast	May approp	be oriate	Strong	O 0 mSv		O 0 mSv [ped]	6	6	0	0	0	2	7	5	3	0	1
			References			Study	Quality										
			1 (25659245)				4										
			69 (19525791)				3										
			47 (17088193)				3										
			55 (21047885)				2										
			46 (9460946)				2										
			68 (2847516)				4										
			67 (33025192)				2										
			70 (35434382)				2										
Radiography cervical spine	May approp	be oriate	Strong	�� 0.1-1m	Sv	�� 0.03- 0.3 mSv [ped]	5	5	0	0	0	3	10	3	2	0	0
			References			Study	Quality		_								
			67 (33025192)				2										

			71 (35276718)			2										
CTA neck with IV contrast	Usually rappropria		Expert Consensus	��� 1-10 mSv	��� 0.3- 3 mSv [ped]	1	1	16	0	1	0	0	0	0	0	1
CT myelography cervical spine	Usually n	not ate	Limited	���� 10-3 mSv	0	1	1	12	0	2	2	0	1	1	0	0
			References		Study	y Quality										
			64 (21616277)			4										
			65 (27432666)			4										
			66 (32058837)			4										
CT cervical spine with IV contrast	Usually nappropria		Strong	��� 1-10 mSv	���� 3- 10 mSv [ped]	1	1	16	0	0	0	1	0	1	0	0
			References		Study	y Quality										
			42 (17379279)		Ina	dequate										
			62 (16632616)			2										
			43 (20006557)			1										
			44 (35699680)			2										
			45 (28753389)			2										
			63 (26175589)			2										_
CT cervical spine without IV contrast	Usually n		Strong	��� 1-10 mSv	���� 3- 10 mSv [ped]	1	1	11	1	1	4	1	0	0	0	0
			References		Study	y Quality										
			42 (17379279)		Ina	dequate										
			62 (16632616)			2										
			43 (20006557)			1										
			44 (35699680)			2										
			45 (28753389)			2										
			63 (26175589)			2				,		1				
CT cervical spine without and with IV contrast	Usually nappropria		Expert Consensus	��� 1-10 mSv	���� 3- 10 mSv [ped]	1	1	15	1	0	0	1	0	0	0	1

Radiographic myelography cervical spine	Usually appropris	not ate	Expert Consensus	��� 1-10 mSv		1	1	13	1	1	0	1	1	0	0	1
MRA neck without IV contrast	Usually appropris		Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	16	0	1	0	0	0	0	0	1
MRA neck without and with IV contrast	Usually appropri		Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	16	0	1	0	0	0	0	0	1
MRI cervical spine without and with IV contrast	Usually appropri		Strong	O 0 mSv	O 0 mSv [ped]	1	1	14	1	0	0	1	0	2	0	0
			References		Stud	y Quality										
			1 (25659245)			4										
			69 (19525791)			3										
			47 (17088193)			3										
			55 (21047885)			2										
			46 (9460946)			2										
			68 (2847516)			4										
			67 (33025192)		2											
			70 (35434382)			2										
Radiography cervical spine flexion extension lateral views	Usually appropri		Strong	�� 0.1-1mS	Sv	1	1	11	4	1	0	1	1	0	0	0
			References		Stud	y Quality										
			67 (33025192)			2										
			71 (35276718)			2										
MRA neck with IV contrast	Usually appropri		Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	16	0	1	0	0	0	0	0	1
MRI cervical spine with IV contrast	Usually appropris		Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	16	0	0	0	0	1	0	0	1
Bone scan whole body with SPECT or SPECT/CT cervical spine	Usually appropri		Limited	��� 1-10 mSv	���� 3- 10 mSv [ped]	1	1	16	0	1	0	0	0	0	1	0
			References		Stud	y Quality										
			41 (34698290)		4											

Variant 3: Adult. Prior cervical spine surgery. Acute or increasing mechanical cervical pain or radiculopathy. No trauma or "red flags." Initial imaging.

D 1	Appropriateness	COF	A L LA DEST	D I DD	D 41	N. 1.			F	inal	Tabu	latio	ns		
Procedure	Category	SOE	Adults RRL	Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
CT cervical spine without IV contrast	Usually appropriate	Strong	��� 1-10 mSv	���� 3- 10 mSv [ped]	7	7	0	0	0	0	2	2	7	4	3
		References		Study	Quality										
		86 (23479714)			4										
		85 (23118135)			4										
		82 (18469691)			2										
		84 (16889148)			2										
		83 (26430596)			3										
		72 (27417403)			4										
		28 (30667316)			2										
		30 (31039024)			4										
		29 (31944834)			4										
		27 (33963025)			4										
		87 (12734742)			2			1		_					
MRI cervical spine without IV contrast	Usually appropriate	Limited	O 0 mSv	O 0 mSv [ped]	7	7	1	0	0	1	0	5	5	2	4
		References		Study	Quality										
		1 (25659245)			4										
		89 (24183750)			4										
		46 (9460946)			2										
		79 (34113681)			4										
Radiography cervical spine	Usually appropriate	Limited	�� 0.1-1mSv	�� 0.03- v 0.3 mSv [ped]	7	7	0	0	0	0	0	1	10	2	5
		References		Study	Quality										
		85 (23118135)			4										

		92 (32405554)			4										
		73 (35701631)			4										
		79 (34113681)			4										
Radiography cervical spine flexion extension lateral views	Usually appropriate	Limited	�� 0.1-1mSv		7	7	0	0	0	0	3	0	9	4	2
		References		Study	Quality										
		85 (23118135)			4										
		92 (32405554)			4										
		73 (35701631)			4										
		79 (34113681)			4										
CT myelography cervical spine	May be appropriate	Limited	❤❤❤❤ 10-30 mSv	��� 0.3- 3 mSv [ped]	5	5	1	0	1	2	12	1	0	0	1
		References		Study	Quality										
		64 (21616277)			4										
		65 (27432666)			4										
		66 (32058837)			4										
MRI cervical spine without and with IV contrast	May be appropriate	Limited	O 0 mSv	O 0 mSv [ped]	5	5	0	0	0	5	9	3	1	0	0
		References		Study	/ Quality										
		1 (25659245)			4										
		89 (24183750)			4										
		46 (9460946)			2										
		91 (2119123)			4										
		90 (11371319)			4										
		79 (34113681)			4										
CTA neck with IV contrast	Usually not appropriate	Expert Consensus	��� 1-10 mSv	��� 0.3- 3 mSv [ped]	1	1	15	1	1	0	0	0	0	0	1
CT cervical spine with IV contrast	Usually not appropriate	Strong	��� 1-10 mSv	���� 3- 10 mSv [ped]	1	1	10	2	1	2	1	1	1	0	0
		References		Study	Quality										

86 (23479714)	4
85 (23118135)	4
82 (18469691)	2
84 (16889148)	2
83 (26430596)	3
72 (27417403)	4
88 (22643393)	4
28 (30667316)	2
30 (31039024)	4
29 (31944834)	4
27 (33963025)	4
87 (12734742)	2

		07 (12731712)													
CT cervical spine without and with IV contrast	Usually not appropriate	Expert Consensus	��� 1-10 mSv	���� 3- 10 mSv [ped]	1	1	17	0	0	1	0	0	0	0	0
Discography cervical spine	Usually not appropriate	Expert Consensus	�� 0.1-1mSv		1	1	16	0	1	0	0	0	0	1	0
Radiographic myelography cervical spine	Usually not appropriate	Expert Consensus	��� 1-10 mSv		1	1	12	2	1	2	0	0	0	0	1
MRA neck without IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	15	1	1	0	0	0	0	0	1
MRA neck without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	16	0	1	0	0	0	0	0	1
MRA neck with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	16	0	1	0	0	0	0	0	1
MRI cervical spine with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	16	1	1	0	0	0	0	0	0
Bone scan whole body with SPECT or SPECT/CT cervical spine	Usually not appropriate	Strong	ଡ େଡ 1-10 mSv	���� 3- 10 mSv [ped]	1	1	14	1	0	1	1	0	1	0	0

References	Study Quality
78 (11037993)	1

41 (34698290)	4
79 (34113681)	4
80 (26266888)	4
81 (28681193)	2

Variant 4: Adult. Suspected or known infection with acute or increasing cervical pain or radiculopathy. No trauma. Initial imaging.

- ·	Appropriateness	COF	4 1 14 BBI	D 1 DD1	D .:	37.11			I	inal	Tabu	latio	ns		
Procedure	Category	SOE	Adults RRL	Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
MRI cervical spine without and with IV contrast	Usually appropriate	Strong	O 0 mSv	O 0 mSv [ped]	9	9	0	0	0	0	0	1	5	0	12
		References		Study	Quality										
		106 (12802004))		2										
		108 (15776239))		3										
		109 (12594568))		4										
		111 (25637321))		4										
		110 (24999081))		4										
		112 (24742801))		1										
		Strong Strong References 106 (12802004 108 (15776239 109 (12594568 111 (25637321 110 (24999081 112 (24742801 93 (15081128) 100 (20876624 106 (12802004 108 (15776239 111 (25637321 112 (24742801 93 (15081128) 93 (15081128) 100 (20876624 108 (15776239 111 (25637321 112 (24742801 93 (15081128) 100 (1508			4										
		100 (20876624))		4										
MRI cervical spine without IV contrast	May be appropriate	Strong	O 0 mSv	O 0 mSv [ped]	6	6	1	0	1	0	4	7	4	0	1
		References		Study	Quality										
		106 (12802004))		2										
		108 (15776239))		3										
		111 (25637321))		4										
		112 (24742801))		1										
		93 (15081128)			4										
		100 (20876624))		4										

CT cervical spine with IV contrast	May be appropriate	Limited	��� 1-10 mSv	���� 3- 10 mSv [ped]	5	5	0	0	0	4	10	3	1	0	0
		References		Stud	y Quality					•	•	•			•
		94 (25296275))		4										
		103 (22677300))		4										
		97 (30527522)	<i>'</i>		4										
CT cervical spine without IV contrast	May be appropriate	Limited	��� 1-10 mSv	���� 3- 10 mSv [ped]	5	5	0	0	0	4	13	1	0	0	0
		References		Stud	y Quality						•	•	•		•
		94 (25296275))		4										
		103 (22677300))		4										
Radiography cervical spine flexion extension lateral views	Usually not appropriate	Limited	�� 0.1-1mSv	,	3	3	8	1	2	1	4	1	1	0	0
		References		Stud	y Quality						•		•		
		94 (25296275))		4										
		113 (11316355	5)		4										
		103 (22677300))		4										
		99 (23122265))		4										
		100 (20876624	4)		4										
Gallium scan whole body	Usually not appropriate	Strong	���� 10-30 mSv		2	2	9	0	4	0	3	1	1	0	0
		References		Stud	y Quality						•				
		102 (25475377	')		4										
		106 (12802004	.)		2										
		101 (22889769			2										
		107 (1919723))		2										
CTA neck with IV contrast	Usually not appropriate	Expert Consensus	��� 1-10 mSv	��� 0.3- 3 mSv [ped]	1	1	15	1	1	0	0	0	0	0	1

CT myelography cervical spine	Usually approp	Limited	ଡଡଡଡ 10-3 mSv	30	��� 0.3- 3 mSv [ped]	1	1	10	1	2	1	3	0	1	0	0
		References			Study	y Quality		-								
		64 (21616277)				4										
		65 (27432666)				4										
		66 (32058837)				4										
CT cervical spine without and with IV contrast	Usually approp	Expert Consensus	��� 1-10 mSv	0	���� 3- 10 mSv [ped]	1	1	12	0	1	1	3	0	0	0	1
Discography cervical spine	Usually approp	Expert Consensus	�� 0.1-1m	ıSv		1	1	16	0	0	0	0	1	0	0	1
Radiographic myelography cervical spine	Usually approp	Consensus Expert Consensus Expert Consensus Consensus Expert Consensus Consensus Consensus Consensus Consensus Consensus			1	1	14	0	1	1	1	0	0	0	1	
MRA neck without IV contrast	Usually approp	Expert Consensus	O 0 mSv	,	O 0 mSv [ped]	1	1	15	1	1	0	0	0	0	0	1
MRA neck without and with IV contrast	Usually approp	Expert Consensus	O 0 mSv	,	O 0 mSv [ped]	1	1	16	0	1	0	0	0	0	0	1
WBC scan whole body	Usually approp	Limited	≎≎≎≎ 10∹ mSv	30	���� 3- 10 mSv [ped]	1	1	13	3	2	0	0	0	0	0	0
		References			Study	y Quality										
		115 (29256136))			2										
		114 (19182734))			4										
FDG-PET/CT skull base to mid-thigh	Usually approp	Limited	���� 10∹ mSv	30	���� 3- 10 mSv [ped]	1	1	17	1	0	0	0	0	0	0	0
		References			Study	y Quality										
		102 (25475377)				4										
		104 (11914890)				4										
		100 (20876624)				4										
		105 (18525363))			4										

Radiography cervical spine	Usuall approp		Limited	�� 0.1-1n	ıSv	�� 0.03- 0.3 mSv [ped]	1	1	10	3	0	1	3	1	0	0	0
	•		References			Study	Quality										
			94 (25296275)				4										
			113 (11316355))			4										
			103 (22677300))			4										
			99 (23122265)				4										
			100 (20876624))			4										
MRA neck with IV contrast	Usuall _i		Expert Consensus	O 0 mSv	/	O 0 mSv [ped]	1	1	16	0	1	0	0	0	0	0	1
MRI cervical spine with IV contrast	Usuall: approp	y not riate	Expert Consensus	O 0 mSv	/	O 0 mSv [ped]	1	1	17	0	0	1	0	0	0	0	0
Bone scan whole body with SPECT or SPECT/CT cervical spine	Usuall approp		Limited	��� 1-1 mSv	0	���� 3- 10 mSv [ped]	1	1	12	0	2	0	2	0	1	0	1
			References			Study	Quality										
			102 (25475377))			4										
			100 (20876624))			4										
			101 (22889769))			2										

Variant 5: Adult. Diagnosis of malignancy with acute or increasing cervical pain or radiculopathy. No trauma. Initial imaging.

D 1	Appropriateness	COE	A L LA DDI	D I DDI	D 4	3.6.11			F	inal '	Tabu	latio	ns		
Procedure	Category	SOE	Adults RRL	Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
MRI cervical spine without and with IV contrast	Usually appropriate	Limited	O 0 mSv	O 0 mSv [ped]	9	9	0	0	0	0	1	2	2	2	11

References	Study Quality
1 (25659245)	4
133 (25412631)	4
46 (9460946)	2

136 (26339464)																
126 (22487970)			136 (26339464))		4										
123 (23470032)			119 (28507888))	Ina	dequate										
MRI cervical spine without IV contrast May be appropriate			126 (22487970))		4										
CT cervical spine with IV contrast Appropriate Limited Appropriate Limited Appropriate Limited Appropriate Limited Appropriate Limited Appropriate Appropriate			123 (23470032))		4										
1 (25659245)			Limited	O 0 mSv		6	6	1	0	0	0	4	5	5	1	2
133 (25412631)			References		Study	y Quality										
46 (9460946) 2 136 (26339464) 4 4 126 (22487970) 4			1 (25659245)			4										
136 (26339464)			133 (25412631))		4										
126 (22487970)			46 (9460946)			2										
123 (23470032)			136 (26339464))		4										
CT cervical spine with IV contrast			126 (22487970))		4										
CT cervical spine without IV contrast May be appropriate Limited May be appropriate Limited May be appropriate May be app			123 (23470032))		4										
125 (18191356) 3 126 (22487970) 4 123 (23470032) 4 127 (-3197175) 4	CT cervical spine with IV contrast		Limited		10 mSv	5	5	2	0	2	3	9	2	0	0	0
126 (22487970)			References		Study	y Quality										
123 (23470032) 4			125 (18191356))		3										
CT cervical spine without IV contrast May be appropriate Limited Msv 10 mSv 5 5 0 0 0 2 13 2 1 0 0			126 (22487970))		4										
CT cervical spine without IV			123 (23470032))		4										
Contrast Contrast			127 (-3197175)			4										
125 (18191356) 3 126 (22487970) 4		May be appropriate	Limited		10 mSv	5	5	0	0	0	2	13	2	1	0	0
126 (22487970)			References		Study	y Quality										
TDG-PET/CT whole body			125 (18191356))		3										
FDG-PET/CT whole body May be appropriate Moderate Moderate Moderate Moderate Study Quality FDG-PET/CT whole body Study Quality			126 (22487970))		4										
May be appropriate Moderate			123 (23470032))		4										
	FDG-PET/CT whole body		Moderate		10 mSv	5	5	7	0	0	1	8	0	1	1	0
129 (21887484) Good			References		Study	y Quality										
			129 (21887484))	(Good										

		126 (22487970)			4										
		128 (25475379)			4										
		130 (28250855))		4					1	ı				
CTA neck with IV contrast	Usually not appropriate	Expert Consensus	��� 1-10 mSv	��� 0.3- 3 mSv [ped]	1	1	14	0	1	0	1	1	0	0	1
CT myelography cervical spine	Usually not appropriate	Limited	���� 10-30 mSv	0	1	1	11	0	0	2	4	0	0	0	1
		References		Stud	y Quality										
		64 (21616277)			4										
		65 (27432666)			4										
		66 (32058837)			4										
CT cervical spine without and with IV contrast	Usually not appropriate	Expert Consensus	��� 1-10 mSv	���� 3- 10 mSv [ped]	1	1	12	1	1	0	2	0	1	0	1
Discography cervical spine	Usually not appropriate	Expert Consensus	�� 0.1-1mS	Sv	1	1	16	0	0	0	0	1	0	0	1
Radiographic myelography cervical spine	Usually not appropriate	Expert Consensus	��� 1-10 mSv		1	1	14	1	0	1	1	0	0	0	1
MRA neck without IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	14	0	1	1	0	1	0	0	1
MRA neck without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	14	0	1	1	1	0	0	0	1
Radiography cervical spine	Usually not appropriate	Limited	�� 0.1-1mS	& 0.03- 0.3 mSv [ped]	1	1	10	2	2	2	1	0	0	1	0
		References		Stud	y Quality										
		136 (26339464))		4										
		137 (22487972))		4										
		123 (23470032))		4										
Radiography cervical spine flexion extension lateral views	Usually not appropriate	Limited	�� 0.1-1mS	Sv	1	1	16	2	0	0	0	0	0	0	0

			References		St	udy Quality										
			136 (26339464)			4										
			137 (22487972))		4										
			123 (23470032))	1	4										
MRA neck with IV contrast	Usuall approp		Expert Consensus	O 0 mSv	O 0 mS ⁻ [ped]	1	1	14	0	1	1	1	0	0	0	1
MRI cervical spine with IV contrast	Usuall approp		Expert Consensus	O 0 mSv	O 0 mS ⁻ [ped]	1	1	16	1	0	1	0	0	0	0	0
FDG-PET/MRI skull base to midthigh	Usuall approp	y not oriate	Strong	��� 1-10 mSv	99993 10 mSv [ped]		1	14	3	1	0	0	0	0	0	0
			References		St	udy Quality										
			133 (25412631))		4										
			132 (24907940))		1										
			131 (27540427))		2										
Fluoride PET/CT whole body	Usuall approp		Strong	���� 10-3 mSv	30		1	13	0	1	1	1	1	1	0	0
			References		St	udy Quality										
			135 (19504092))		2										
			134 (28872551))		2										
			128 (25475379))		4	_									
Bone scan whole body with SPECT or SPECT/CT cervical spine	Usuall approp		Limited	≎≎≎ 1-10 mSv	999993 10 mSv [ped]		1	14	1	2	1	0	0	0	0	0
			References		St	udy Quality										
			123 (23470032))		4										
			122 (22505821))		4										
			124 (35502272))		4										
FDG-PET/MRI whole body	Usuall approp		Strong	��� 1-10 mSv	999993 10 mSv [ped]		1	15	2	1	0	0	0	0	0	0
			References		St	udy Quality										

133 (25412631)	4
132 (24907940)	1
131 (27540427)	2

Variant 6: Adult. Suspected cervicogenic headache. No neurologic deficit. Initial imaging.

	Appropriate	ness	0.5		_	D 1 DD1	- ·	3.5.11			F	inal '	[abu	latior	ıs		
Procedure	Category		OE	Adults RR	L	Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
MRI cervical spine without IV contrast	May be appropriat (Disagreeme	Expert	Opinion	O 0 mSv		O 0 mSv [ped]	5	5	1	0	1	2	11	1	1	1	0
		Re	eferences		•	Study	Quality										
		141 ((14510932)				2										
		140 ((31820439))			4										
		147 ((31495544))			2										
		138 ((35332024))			4										
		142 ((27927894))			2										
CTA neck with IV contrast	Usually no appropriat			≎≎≎ 1-10 mSv)	��� 0.3- 3 mSv [ped]	1	1	14	0	1	0	2	0	0	0	1
CT myelography cervical spine	Usually no appropriat			���� 10-3 mSv	30	��� 0.3- 3 mSv [ped]	1	1	15	1	1	0	0	0	0	0	1
CT cervical spine with IV contrast	Usually no appropriat		mited	��� 1-10 mSv)	���� 3- 10 mSv [ped]	1	1	16	0	0	1	0	0	0	0	1
		Re	eferences			Study	Quality										
		140 ((31820439))			4										
		138 ((35332024))			4										
		142 ((27927894))			2										
CT cervical spine without IV contrast	Usually no appropriat		nited	��� 1-10 mSv)	���� 3- 10 mSv [ped]	1	1	12	3	1	0	2	0	0	0	0
		Re	Consensus Expert Consensus Limited References 140 (31820439) 138 (35332024) 142 (27927894)			Study	Quality										

	_														
	_	140 (31820439))		4										
		138 (35332024))		4										
		 142 (27927894))		2										
CT cervical spine without and with IV contrast	Usually appropri	Limited	��� 1-10 mSv	���� 3- 10 mSv [ped]	1	1	16	0	0	0	0	1	0	0	1
		References		Stu	dy Quality		-								
		140 (31820439))		4										
		138 (35332024))		4										
		142 (27927894))		2										
Radiographic myelography cervical spine	Usually appropri	Expert Consensus	��⊕ 1-10 mSv		1	1	16	0	0	0	1	0	0	0	1
MRA neck without IV contrast	Usually appropri	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	17	1	0	0	0	0	0	0	0
MRA neck without and with IV contrast	Usually appropri	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	14	1	0	1	1	0	0	0	1
MRI cervical spine without and with IV contrast	Usually appropri	Strong	O 0 mSv	O 0 mSv [ped]	1	1	15	0	2	0	0	0	1	0	0
		References		Stu	dy Quality										
		141 (14510932))		2										
		140 (31820439))		4										
		147 (31495544))		2										
		138 (35332024))		4										
		142 (27927894))		2										
Radiography cervical spine	Usually appropri	Limited	�� 0.1-1mS	& 0.03- Sv 0.3 mSv [ped]	1	1	10	2	1	2	2	1	0	0	0
		References		Stu	dy Quality										
		140 (31820439))		4										
		138 (35332024))		4										
		 142 (27927894))		2										

Radiography cervical spine flexion extension lateral views	Usually approp		Limited		Sv		1	1	15	2	0	0	0	1	0	0	0
			References			Study	Quality										
			140 (31820439))			4										
			138 (35332024))			4										
			142 (27927894)		2												
MRA neck with IV contrast	Usually approp		Expert Consensus O 0 m			O 0 mSv [ped]	1	1	14	1	0	1	1	0	0	0	1
MRI cervical spine with IV contrast	Usually approp		ot Expert			O 0 mSv [ped]	1	1	14	0	2	0	1	0	0	0	1
Bone scan whole body with SPECT or SPECT/CT cervical spine	Usually approp		Limited	��� 1-10 mSv)	���� 3- 10 mSv [ped]	1	1	16	0	0	0	1	0	0	1	0
			References			Study	Quality										
		41 (34698290)				4											
			81 (28681193)				2										

Variant 7: Adult. Chronic cervical pain without radiculopathy. No trauma or "red flags." Initial imaging.

, .	Appropriateness	TOD	A L L DDI	D 1 DD1	D 4	3.6.31			F	inal '	Гаbu	latio	ns		
Procedure	Category	SOE	Adults RRL	Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
MRI cervical spine without IV contrast	May be appropriate	Strong	O 0 mSv	O 0 mSv [ped]	5	5	1	0	1	3	12	1	0	0	0

References	Study Quality
1 (25659245)	4
60 (25430861)	4
47 (17088193)	3
46 (9460946)	2
148 (34929370)	2

Radiography cervical spine	May approp	Limited	�� 0.1-1n	nSv	�� 0.03- 0.3 mSv [ped]	5	5	1	0	0	3	8	4	2	0	0
		References		Study	Quality											
		67 (33025192)			2											
CTA neck with IV contrast	Usually approp	Expert Consensus	��� 1-1 mSv	0	��� 0.3- 3 mSv [ped]	1	1	15	0	2	0	0	0	0	0	1
CT myelography cervical spine	Usually approp	Expert Consensus	≎≎≎≎ 10- mSv	-30	��� 0.3- 3 mSv [ped]	1	1	15	1	0	1	0	0	0	0	1
CT cervical spine with IV contrast	Usually approp	Expert Consensus	��� 1-1 mSv	0	���� 3- 10 mSv [ped]	1	1	16	0	0	1	0	0	0	0	1
CT cervical spine without IV contrast	Usually approp	Expert Consensus	��� 1-1 mSv	0	���� 3- 10 mSv [ped]	1	1	11	1	3	2	1	0	0	0	0
CT cervical spine without and with IV contrast	Usually approp	Expert Consensus	��� 1-1 mSv	0	���� 3- 10 mSv [ped]	1	1	16	0	0	1	0	0	0	0	1
Discography cervical spine	Usually approp	Expert Consensus	�� 0.1-1n	nSv		1	1	16	0	0	1	0	0	0	0	1
Radiographic myelography cervical spine	Usually approp	Expert Consensus	��� 1-1 mSv	0		1	1	15	1	0	0	0	1	0	0	1
MRA neck without IV contrast	Usually approp	Expert Consensus	O 0 mSv	v	O 0 mSv [ped]	1	1	15	1	1	0	0	0	0	0	1
MRA neck without and with IV contrast	Usually approp	Expert Consensus	O 0 mSv	v	O 0 mSv [ped]	1	1	16	0	1	0	0	0	0	0	1
MRI cervical spine without and with IV contrast	Usually approp	Strong	O 0 mSv	v	O 0 mSv [ped]	1	1	13	0	2	1	0	0	0	0	2

References	Study Quality
1 (25659245)	4
60 (25430861)	4
47 (17088193)	3

		46 (9460946)				2										
		148 (34929370))			2										
Radiography cervical spine flexion extension lateral views	Usuall approp			าริง		1	1	11	2	0	1	3	1	0	0	0
		References			Study	Quality										
		67 (33025192)	67 (33025192)		2											
MRA neck with IV contrast	Usuall approp	Expert Consensus	O 0 mSv	/	O 0 mSv [ped]	1	1	16	0	1	0	0	0	0	0	1
MRI cervical spine with IV contrast	Usuall approp	Expert Consensus	O 0 mSv	/	O 0 mSv [ped]	1	1	14	1	2	0	0	0	0	0	1
Bone scan whole body with SPECT or SPECT/CT cervical spine	Usuall approp	Limited	��� 1-1 mSv	0	���� 3- 10 mSv [ped]	1	1	15	1	0	1	0	0	1	0	0
		References			Study	Quality										
		150 (23412368))			3										
		151 (25985461)				4										
		41 (34698290)				4										

Variant 8: Adult. Chronic cervical pain with radiculopathy. No trauma or "red flags." Initial imaging.

n 1	Appropri	iateness	COF	4 1 14 DD1	, D. I. D.I.	_	D 41	3.6.11			F	inal '	Гаbu	latio	ns		
Procedure	Categ		SOE	Adults RRI	L Peds RI	L .	Rating	Median	1	2	3	4	5	6	7	8	9
MRI cervical spine without IV contrast	Usua approp	.*	Strong	Strong O 0 mSv		v	7	7	1	0	0	0	3	1	5	3	5
			References		S	udy Q	Quality										
			1 (25659245)			4	-										

References	Study Quality
1 (25659245)	4
69 (19525791)	3
60 (25430861)	4
47 (17088193)	3
55 (21047885)	2
46 (9460946)	2

		68 (2847516)															
			68 (2847516)				4										
			155 (30324384))			2										
			159 (30343168))			2										
			157 (29095415))			2										
			158 (27548342))			2										
			156 (36317351))			1										
			160 (33530213))			2										
			67 (33025192)				2										
			70 (35434382)				2										
CT cervical spine without IV contrast	May approp				ॐॐॐ 3- 10 mSv [ped]	5	5	1	0	0	2	13	2	0	0	0	
			References			Study	Quality										
			42 (17379279)			Inac	dequate										
			62 (16632616)				2										
			43 (20006557)				1										
			153 (35765137))			1										
			44 (35699680)				2										
			45 (28753389)				2										
			63 (26175589)				2										
Radiography cervical spine	May approp (Disagre	riate	Expert Opinion	�� 0.1-1m	ıSv	≎ 0.03- 0.3 mSv [ped]	5	5	0	1	1	2	9	3	2	0	0
			References			Study	Quality		•								
			67 (33025192)				2										
			71 (35276718)				2										
CTA neck with IV contrast	Usually approp	y not oriate	Expert Consensus	��� 1-10 mSv	0	ॐ ♥ 0.3- 3 mSv [ped]	1	1	15	1	1	0	0	0	0	0	1
CT myelography cervical spine	Usually approp		Limited	���� 10- mSv	30	��� 0.3- 3 mSv [ped]	1	1	15	2	0	0	0	1	0	0	0
		References				Study	Quality										
			64 (21616277)				4										

154 (23179977)	4
65 (27432666)	4
66 (32058837)	4

CT cervical spine with IV contrast	Usually no appropriate		��� 1-10 mSv	���� 3- 10 mSv [ped]	1	1	16	0	0	1	0	0	0	0	1
CT cervical spine without and with IV contrast	Usually no appropriate	~ ^	≎≎≎ 1-10 mSv	��� 3- 10 mSv [ped]	1	1	14	2	0	0	1	0	0	0	1
Discography cervical spine	Usually no appropriate	I Limited I	�� 0.1-1mS	Sv	1	1	16	0	0	0	1	0	1	0	0
		References	References		Quality										

 References
 Study Quality

 40 (18204385)
 4

Radiographic myelography cervical spine	Usually not appropriate	Expert Consensus	��� 1-10 mSv		1	1	14	1	0	1	1	0	0	0	1
MRA neck without IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	16	0	0	1	0	0	0	0	1
MRA neck without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	16	0	0	1	0	0	0	0	1
MRI cervical spine without and with IV contrast	Usually not appropriate	Strong	O 0 mSv	O 0 mSv [ped]	1	1	16	2	0	0	0	0	0	0	0

References	Study Quality
1 (25659245)	4
69 (19525791)	3
60 (25430861)	4
47 (17088193)	3
55 (21047885)	2
46 (9460946)	2
68 (2847516)	4
155 (30324384)	2
159 (30343168)	2
157 (29095415)	2

	,																
		158 (27548342) 156 (36317351) 160 (33530213)			2												
					1												
					2												
		70 (35434382)			2												
Radiography cervical spine flexion extension lateral views	Usually approp		Strong	�� 0.1-1m	าริง		1	1	11	1	2	0	3	1	0	0	0
		References		Study Quality				•	•								
		67 (33025192) 71 (35276718)				2											
					2												
MRA neck with IV contrast	Usually approp		Expert Consensus	O 0 mSv	/	O 0 mSv [ped]	1	1	16	0	0	1	0	0	0	0	1
MRI cervical spine with IV contrast	Usually approp		Expert Consensus O 0 mSv		/	O 0 mSv [ped]	1	1	15	1	0	0	0	0	1	0	1
Bone scan whole body with SPECT or SPECT/CT cervical spine	Usually approp		Limited	��� 1-1 mSv	0	���� 3- 10 mSv [ped]	1	1	15	1	0	0	1	0	1	0	0
		References 150 (23412368)				Study	y Quality										
							3										

151 (25985461) 41 (34698290) 4

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.