

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

Suspected Spine Infection

Variant 1: Suspected spine infection (such as epidural abscess or discitis osteomyelitis), with new or worsening back or neck pain, with or without fever, who may have one or more of the following red flags (diabetes mellitus, IV drug use, cancer, HIV, or dialysis) or abnormal lab values. Initial imaging.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
MRI spine area of interest without and with IV contrast	Usually appropriate	Strong	0 0 mSv	0 0 mSv [ped]	9	9	1	0	0	0	0	0	1	2	17

References	Study Quality
3 (22643395)	4
51 (21669158)	4
14 (25296275)	4
16 (26585257)	2
66 (24999081)	4
7 (31103765)	2
6 (27616314)	4
64 (27452260)	2
67 (24742801)	1
24 (22922857)	2
65 (29582111)	2
27 (17416823)	2
18 (21417700)	4
68 (25899662)	2
17 (28379730)	2
37 (30971277)	2
10 (31399800)	4

MRI spine area of interest without IV contrast	Usually appropriate	63 (32554421)			2											
		Strong	0 0 mSv	0 0 mSv [ped]	7	7	0	0	0	0	1	0	20	1	0	

References	Study Quality
3 (22643395)	4
51 (21669158)	4
14 (25296275)	4
16 (26585257)	2
66 (24999081)	4
7 (31103765)	2
6 (27616314)	4
64 (27452260)	2
67 (24742801)	1
24 (22922857)	2
65 (29582111)	2
27 (17416823)	2
18 (21417700)	4
68 (25899662)	2
17 (28379730)	2
37 (30971277)	2
10 (31399800)	4
63 (32554421)	2

CT spine area of interest with IV contrast	May be appropriate	Strong	Varies	Varies	6	6	1	1	0	2	3	11	2	0	1
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References	Study Quality
3 (22643395)	4
57 (30691569)	4
30 (20515351)	2
33 (28249310)	2
52 (29915936)	4

42 (27160950)	2
38 (28299432)	2
31 (29452617)	4
44 (31729539)	Good
10 (31399800)	4

CT spine area of interest without and with IV contrast	Usually not appropriate	Strong	Varies	Varies	2	2	9	2	1	4	3	1	1	0	0
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References	Study Quality
3 (22643395)	4
57 (30691569)	4
30 (20515351)	2
33 (28249310)	2
52 (29915936)	4

WBC scan and sulfur colloid scan complete spine	Usually not appropriate	Limited	⊕⊕⊕⊕ 10-30 mSv		2	2	10	3	4	2	0	1	0	0	1
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References	Study Quality
31 (29452617)	4

MRI spine area of interest with IV contrast	Usually not appropriate	Strong	0 0 mSv	0 0 mSv [ped]	1	1	12	3	7	0	0	0	0	0	0
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References	Study Quality
3 (22643395)	4
51 (21669158)	4
14 (25296275)	4
16 (26585257)	2
66 (24999081)	4
7 (31103765)	2
6 (27616314)	4
64 (27452260)	2
67 (24742801)	1
24 (22922857)	2
65 (29582111)	2

27 (17416823)	2
18 (21417700)	4
68 (25899662)	2
17 (28379730)	2
37 (30971277)	2
10 (31399800)	4
63 (32554421)	2

Variant 2: Suspected spine infection (such as epidural abscess or discitis osteomyelitis), with recent intervention (such as surgery with or without hardware, pain injection, or stimulator implantation). Initial imaging.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
MRI spine area of interest without and with IV contrast	Usually appropriate	Strong	0 0 mSv	0 0 mSv [ped]	9	9	1	0	0	0	0	0	0	6	14

References	Study Quality
3 (22643395)	4
51 (21669158)	4
14 (25296275)	4
16 (26585257)	2
66 (24999081)	4
7 (31103765)	2
6 (27616314)	4
64 (27452260)	2
28 (24792614)	4
24 (22922857)	2
65 (29582111)	2
18 (21417700)	4
29 (27755204)	4
17 (28379730)	2
37 (30971277)	2

		10 (31399800)			4													
CT spine area of interest without and with IV contrast	Usually not appropriate	Strong	Varies	Varies	2	2	11	5	5	0	1	0	0	0	0			
		References			Study Quality													
		3 (22643395)			4													
		8 (23756630)			4													
		30 (20515351)			2													
		33 (28249310)			2													
MRI spine area of interest with IV contrast	Usually not appropriate	Strong	0 0 mSv	0 0 mSv [ped]	2	2	11	4	7	0	0	0	0	0	0			
		References			Study Quality													
		3 (22643395)			4													
		51 (21669158)			4													
		14 (25296275)			4													
		16 (26585257)			2													
		66 (24999081)			4													
		7 (31103765)			2													
		6 (27616314)			4													
		64 (27452260)			2													
		28 (24792614)			4													
		24 (22922857)			2													
		65 (29582111)			2													
		18 (21417700)			4													
		29 (27755204)			4													
		17 (28379730)			2													
		37 (30971277)			2													
		69 (1509065)			2													
		10 (31399800)			4													
		70 (28437330)			2													
		63 (32554421)			2													

WBC scan and sulfur colloid scan complete spine	Usually not appropriate	Limited	⊕⊕⊕⊕ 10-30 mSv		2	2	10	3	5	0	1	0	1	0	1
		References		Study Quality											
		31 (29452617)		4											

Variant 3: Suspected spine infection (such as epidural abscess or discitis osteomyelitis), with new neurologic deficit or cauda equina syndrome. Initial imaging.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations									
							1	2	3	4	5	6	7	8	9	
MRI spine area of interest without and with IV contrast	Usually appropriate	Strong	○ 0 mSv	○ 0 mSv [ped]	9	9	1	0	0	0	0	0	0	0	0	20
		References		Study Quality												
		3 (22643395)		4												
		51 (21669158)		4												
		14 (25296275)		4												
		16 (26585257)		2												
		66 (24999081)		4												
		7 (31103765)		2												
		6 (27616314)		4												
		64 (27452260)		2												
		24 (22922857)		2												
		65 (29582111)		2												
		18 (21417700)		4												
		17 (28379730)		2												
		37 (30971277)		2												
		10 (31399800)		4												
		63 (32554421)		2												
MRI spine area of interest without IV contrast	Usually appropriate	Strong	○ 0 mSv	○ 0 mSv [ped]	7	7	0	0	0	1	0	0	19	2	0	
		References		Study Quality												

3 (22643395)	4
51 (21669158)	4
14 (25296275)	4
16 (26585257)	2
66 (24999081)	4
7 (31103765)	2
6 (27616314)	4
64 (27452260)	2
24 (22922857)	2
65 (29582111)	2
18 (21417700)	4
17 (28379730)	2
37 (30971277)	2
10 (31399800)	4
63 (32554421)	2

CT spine area of interest without IV contrast	May be appropriate	Strong	Varies	Varies	5	5	0	1	3	6	7	3	0	1	0
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References	Study Quality
8 (23756630)	4
71 (27789449)	2
33 (28249310)	2

CT spine area of interest with IV contrast	May be appropriate	Strong	Varies	Varies	5	5	0	0	2	2	9	5	2	0	1
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References	Study Quality
8 (23756630)	4
71 (27789449)	2
33 (28249310)	2

Radiography spine area of interest	Usually not appropriate	Limited	Varies	Varies	3	3	3	3	11	1	2	2	0	0	0
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References	Study Quality
72 (25911501)	4

CT spine area of interest without and with IV contrast	Usually not appropriate	Strong	Varies	Varies	3	3	9	1	3	4	2	1	1	0	0
		References		Study Quality											
		8 (23756630)		4											
		71 (27789449)		2											
		33 (28249310)		2											
MRI spine area of interest with IV contrast	Usually not appropriate	Strong	0 0 mSv	0 0 mSv [ped]	2	2	11	3	8	0	0	0	0	0	0
		References		Study Quality											
		3 (22643395)		4											
		51 (21669158)		4											
		14 (25296275)		4											
		16 (26585257)		2											
		66 (24999081)		4											
		7 (31103765)		2											
		6 (27616314)		4											
		64 (27452260)		2											
		24 (22922857)		2											
		65 (29582111)		2											
		18 (21417700)		4											
		17 (28379730)		2											
		37 (30971277)		2											
		10 (31399800)		4											
		63 (32554421)		2											
FDG-PET/CT whole body	Usually not appropriate	Expert Consensus	⊕⊕⊕⊕ 10-30 mSv	⊕⊕⊕⊕ 3-10 mSv [ped]	1	1	11	3	4	0	2	0	0	1	0
Gallium scan whole body	Usually not appropriate	Expert Consensus	⊕⊕⊕⊕ 10-30 mSv		1	1	12	3	3	2	0	0	0	0	1
3-phase bone scan complete spine	Usually not appropriate	Expert Consensus	⊕⊕⊕ 1-10 mSv		1	1	13	3	4	0	0	0	0	0	1

WBC scan and sulfur colloid scan complete spine	Usually not appropriate	Expert Consensus	⊕⊕⊕⊕ 10-30 mSv		1	1	15	3	2	0	0	0	0	0	1
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Variant 4: Suspected spine infection (such as epidural abscess or discitis osteomyelitis), with decubitus ulcer or wound overlying spine. Initial imaging.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
MRI spine area of interest without and with IV contrast	Usually appropriate	Strong	0 0 mSv	0 0 mSv [ped]	9	9	1	0	0	0	0	0	0	3	17

References	Study Quality
3 (22643395)	4
51 (21669158)	4
14 (25296275)	4
16 (26585257)	2
66 (24999081)	4
7 (31103765)	2
64 (27452260)	2
28 (24792614)	4
24 (22922857)	2
65 (29582111)	2
29 (27755204)	4
37 (30971277)	2
69 (1509065)	2
10 (31399800)	4
70 (28437330)	2
63 (32554421)	2

MRI spine area of interest without IV contrast	Usually appropriate	Strong	0 0 mSv	0 0 mSv [ped]	7	7	0	0	0	0	1	1	18	2	0
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References	Study Quality
3 (22643395)	4

51 (21669158)	4
14 (25296275)	4
16 (26585257)	2
66 (24999081)	4
7 (31103765)	2
64 (27452260)	2
28 (24792614)	4
24 (22922857)	2
65 (29582111)	2
29 (27755204)	4
37 (30971277)	2
69 (1509065)	2
10 (31399800)	4
70 (28437330)	2
63 (32554421)	2

CT spine area of interest with IV contrast	May be appropriate	Strong	Varies	Varies	6	6	0	0	1	0	4	8	6	1	1
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References	Study Quality
3 (22643395)	4
30 (20515351)	2
33 (28249310)	2

Radiography spine area of interest	May be appropriate	Limited	Varies	Varies	5	5	0	0	2	6	10	4	0	0	0
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References	Study Quality
3 (22643395)	4
8 (23756630)	4

CT spine area of interest without IV contrast	May be appropriate	Strong	Varies	Varies	5	5	1	1	0	3	7	6	3	0	0
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References	Study Quality
3 (22643395)	4
30 (20515351)	2

16 (26585257)	2
66 (24999081)	4
7 (31103765)	2
64 (27452260)	2
28 (24792614)	4
24 (22922857)	2
65 (29582111)	2
29 (27755204)	4
37 (30971277)	2
69 (1509065)	2
10 (31399800)	4
70 (28437330)	2
63 (32554421)	2

Variant 5: Suspected spine infection (such as epidural abscess or discitis osteomyelitis). Abnormal radiographs or CT findings. 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 spine area of interest without and with IV contrast	Usually appropriate	Strong	0 0 mSv	0 0 mSv [ped]	9	9	1	0	0	0	0	0	0	1	19
References			Study Quality												
3 (22643395)			4												
51 (21669158)			4												
14 (25296275)			4												
16 (26585257)			2												
66 (24999081)			4												
7 (31103765)			2												
6 (27616314)			4												
64 (27452260)			2												
24 (22922857)			2												
65 (29582111)			2												

18 (21417700)	4
17 (28379730)	2
37 (30971277)	2
10 (31399800)	4
63 (32554421)	2

MRI spine area of interest without IV contrast	Usually appropriate	Strong	0 0 mSv	0 0 mSv [ped]	7	7	1	0	1	0	3	2	11	2	1
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References	Study Quality
3 (22643395)	4
51 (21669158)	4
14 (25296275)	4
16 (26585257)	2
66 (24999081)	4
7 (31103765)	2
6 (27616314)	4
64 (27452260)	2
24 (22922857)	2
65 (29582111)	2
18 (21417700)	4
17 (28379730)	2
37 (30971277)	2
10 (31399800)	4
63 (32554421)	2

FDG-PET/CT whole body	May be appropriate	Moderate	☹☹☹☹ 10-30 mSv	☹☹☹☹ 3-10 mSv [ped]	5	5	1	0	3	2	6	7	1	0	1
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References	Study Quality
31 (29452617)	4
44 (31729539)	Good
10 (31399800)	4

Gallium scan whole body	May be appropriate	Limited	☹☹☹☹ 10-30 mSv		5	5	1	0	1	4	9	4	2	0	0
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References	Study Quality
3 (22643395)	4
31 (29452617)	4
10 (31399800)	4

3-phase bone scan complete spine	May be appropriate	Limited	☼☼☼☼ 1-10 mSv		5	5	2	0	3	4	5	5	2	0	0
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References	Study Quality
31 (29452617)	4

MRI spine area of interest with IV contrast	Usually not appropriate	Strong	0 0 mSv	0 0 mSv [ped]	1	1	12	4	6	0	0	0	0	0	0
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References	Study Quality
3 (22643395)	4
51 (21669158)	4
14 (25296275)	4
16 (26585257)	2
66 (24999081)	4
7 (31103765)	2
6 (27616314)	4
64 (27452260)	2
24 (22922857)	2
65 (29582111)	2
18 (21417700)	4
17 (28379730)	2
37 (30971277)	2
10 (31399800)	4
63 (32554421)	2

WBC scan and sulfur colloid scan complete spine	Usually not appropriate	Limited	☼☼☼☼☼ 10-30 mSv		1	1	11	2	4	2	1	1	0	0	0
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References	Study Quality
31 (29452617)	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.