American College of Radiology ACR Appropriateness Criteria®

Osteomyelitis or Septic Arthritis-Child (Excluding Axial Skeleton)

Variant 1: Child. Younger than 5 years of age. Concern for osteomyelitis or septic arthritis involving an extremity. Initial imaging.

	Appropriateness	gg-							F	inal	Tabu	latio	ns		
Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
Radiography area of interest	Usually appropriate	Strong	Varies	Varies	9	9	0	0	0	0	1	0	2	3	11
		References		Study	Quality										
		3 (21523583)			4										
		48 (8475290)			4										
		47 (6739205)			4										
		30 (20304319)			4										
		45 (28696851)			4										
		36 (26295653)			2										
		46 (23812139)			2										
		29 (7618566)			4										
MRI area of interest without and with IV contrast	Usually appropriate	Strong	O 0 mSv	O 0 mSv [ped]	7	7	0	0	0	0	2	2	7	5	0
		References		Study	Quality						•		•		<u>. </u>
		38 (20180105)			3										
		37 (19380545)			3										
		39 (22268189)			3										
		30 (20304319)			4										
		41 (22194497)			2										
		32 (30903335)			2										

		36 (26295653)			2										
		33 (26209118)			2										
		40 (25986395)			4										
		35 (23685708)			2										
		42 (20936273)			2										
		34 (21381610)			4										
		29 (7618566)			4										
		31 (17118291)			4										
		28 (2068324)			2					ı	1				
US area of interest	Usually appropriate	Strong	O 0 mSv	O 0 mSv [ped]	7	7	0	1	0	0	1	3	10	1	0
		References		Study	Quality										
		48 (8475290)			4										
		51 (11961445)			4										
		50 (25588046)			4										
		17 (29728840)			3										
		45 (28696851)			4										
		53 (23755165)			3										
		52 (19695738)			2										
		54 (7983130)			4										
		49 (3321461)			3			,							
MRI extremity area of interest without and with IV contrast	Usually appropriate	Limited	O 0 mSv	O 0 mSv [ped]	7	7	0	0	0	0	0	4	10	2	0
		References		Study	Quality										
		43 (23883225)			2										
MRI area of interest without IV contrast	May be appropriate	Strong	O 0 mSv	O 0 mSv [ped]	6	6	0	0	0	2	1	8	3	2	0
		References		Study	Quality										
		38 (20180105)			3										
		37 (19380545)			3										
		39 (22268189)			3										

CT area of interest without IV contrast	Usuall approp		Expert Consensus	Varies	Varies	1	1	13	0	2	1	0	1	0	0	0
CT area of interest with IV contrast	Usuall approp	y not oriate	Expert Consensus	Varies	Varies	1	1	10	3	2	1	0	0	1	0	0
			13 (28514223)			4				•						
			44 (30623210)			2										
			References		Stud	dy Quality		•								
MRI whole body without and with IV contrast	May approp (Disagre	oriate	Expert Opinion	O 0 mSv	O 0 mSv [ped]	5	5	2	2	5	0	4	2	1	0	0
			13 (28514223)			4										
			44 (30623210)			2										
			References		Stud	dy Quality	•		•	•				•	•	
MRI whole body without IV contrast	May approp		Limited	O 0 mSv	O 0 mSv [ped]	5	5	1	6	0	1	6	1	1	0	0
			43 (23883225)			2										
			References		Stud	dy Quality		1						•		
MRI extremity area of interest without IV contrast	May approp		Limited	O 0 mSv	O 0 mSv [ped]	6	6	0	0	0	1	6	4	4	1	0
			28 (2068324)			2	T									
			31 (17118291)			4										
			29 (7618566)			4										
			34 (21381610)			4										
			42 (20936273)			2										
			35 (23685708)			2										
			40 (25986395)			4										
			33 (26209118)			2										
			36 (26295653)			2										
			32 (30903335)			2										
			30 (20304319) 41 (22194497)			2										

CT area of interest without and with IV contrast	Usually not appropriate	Expert Consensus	Varies	Varies	1	1	12	3	0	1	0	1	0	0	0
3-phase bone scan area of interest	Usually not appropriate	Expert Consensus	��� 1-10 mSv	���� 3- 10 mSv [ped]	1	1	13	1	1	1	0	0	0	1	0
Bone scan whole body	Usually not appropriate	Expert Consensus	୫୫୫ 1-10 mSv	≎≎≎≎ 3- 10 mSv [ped]	1	1	12	4	0	0	0	1	0	0	0
Bone scan whole body and 3- phase bone scan area of interest	Usually not appropriate	Expert Consensus		���� 3- 10 mSv [ped]	1	1	11	3	1	0	0	1	1	0	0

Variant 2: Child. Younger than 5 years of age. Concern for osteomyelitis or septic arthritis involving an extremity. Initial radiographs normal, or with findings suggestive of osteomyelitis. Next imaging study.

ъ .	Appropriateness	COF	A L L DDI	n i nnr	D 41	3.6 11			F	inal T	Fabu l	latio	ns		
Procedure	Category	SOE	Adults RRL	Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
MRI area of interest without and with IV contrast	Usually appropriate	Strong	O 0 mSv	O 0 mSv [ped]	8	8	0	0	0	0	0	1	5	4	7

	LI J		
References	Study	Quality	
38 (20180105)		3	
37 (19380545)		3	
39 (22268189)		3	
30 (20304319)		4	
41 (22194497)		2	
32 (30903335)		2	
18 (25575360)		4	
36 (26295653)		2	
33 (26209118)		2	
40 (25986395)		4	
35 (23685708)		2	
42 (20936273)		2	

	34 (21381610)			4										
	67 (21102217)			3										
	29 (7618566)			4										
	31 (17118291)			4										
	28 (2068324)			2										
Usually appropriate	Limited	O 0 mSv	O 0 mSv [ped]	8	8	0	0	0	0	2	0	2	7	6
	References		Study	Quality										
	43 (23883225)			2										
Usually appropriate	Strong	O 0 mSv	O 0 mSv [ped]	7	7	0	1	0	1	2	3	8	1	0
	References		Study	Quality										
	48 (8475290)			4										
	51 (11961445)			4										
	50 (25588046)			4										
	17 (29728840)			3										
	45 (28696851)			4										
	53 (23755165)			3										
	52 (19695738)			2										
	54 (7983130)			4										
	49 (3321461)			3										
Usually appropriate	Limited	O 0 mSv	O 0 mSv [ped]	7	7	0	0	1	1	4	2	7	1	0
	References		Study	Quality										
	43 (23883225)			2										
Usually appropriate	Limited	Varies	Varies	7	7	0	0	0	0	1	1	10	3	1
	References		Study	Quality										
	48 (8475290)			4										
	66 (27603195)			3										
	65 (26830217)			3										
	Usually appropriate Usually appropriate Usually appropriate Usually appropriate	29 (7618566) 31 (17118291) 28 (2068324) Limited References 43 (23883225) Usually appropriate References 48 (8475290) 51 (11961445) 50 (25588046) 17 (29728840) 45 (28696851) 53 (23755165) 52 (19695738) 54 (7983130) 49 (3321461) Usually appropriate References 43 (23883225) Usually appropriate References 43 (23883225) Usually appropriate References 43 (23883225) Limited References 48 (8475290) 66 (27603195)	67 (21102217) 29 (7618566) 31 (17118291) 28 (2068324) Usually appropriate References 43 (23883225) Usually appropriate References 48 (8475290) 51 (11961445) 50 (25588046) 17 (29728840) 45 (28696851) 53 (23755165) 52 (19695738) 54 (7983130) 49 (3321461) Usually appropriate References 43 (23883225) Usually appropriate References 48 (8475290) 66 (27603195)	67 (21102217) 29 (7618566) 31 (17118291) 28 (2068324)	Color Colo	67 (21102217) 3 29 (7618566) 4 4 4 4 4 4 4 4 4	Company	Color	Company	67 (21102217) 3 29 (7618566) 4 31 (17118291) 4 28 (2068324) 2	67 (21102217) 3 29 (7618566) 4 4 4 4 4 4 4 4 4	67 (21102217) 3 29 (7618566) 4 4 4 4 4 4 4 4 4	67 (21102217) 3 29 (7618566) 4 4 4 4 4 4 4 4 4	67 (21102217) 3 29 (7618566) 4

			18 (25575360)			4										
	•		64 (23389564)			2										
MRI area of interest without IV contrast	May approp	be riate	Strong	O 0 mSv	O 0 mSv [ped]	6	6	0	0	1	1	5	2	3	4	0
			References		Study	Quality										
			38 (20180105)			3										
			37 (19380545)			3										
			39 (22268189)			3										
			30 (20304319)			4										
			41 (22194497)			2										
			32 (30903335)		2											
			18 (25575360)			4										
			36 (26295653)			2										
			33 (26209118)			2										
			40 (25986395)			4										
			35 (23685708)			2										
			42 (20936273)			2										
			34 (21381610)			4										
			67 (21102217)			3										
			29 (7618566)			4										
	•		31 (17118291)			4										
			28 (2068324)			2	1				1	1	ı			
MRI whole body without IV contrast	May approp	be riate	Limited	O 0 mSv	O 0 mSv [ped]	5	5	0	1	1	1	11	1	1	0	0
			References		Study	Quality										
			References 44 (30623210)			2										
MRI whole body without and with IV contrast	May approp	be riate	Limited	O 0 mSv	O 0 mSv [ped]	5	5	0	0	2	2	8	3	1	0	0
			References		Study	Quality										
			44 (30623210)			2										

Bone scan whole body and 3-phase bone scan area of interest	May approp	be oriate	Limited		���� 3- 10 mSv [ped]	4	4	0	2	2	5	4	3	0	0	0
			References		Study	y Quality										
			61 (12368368)			4										
			8 (23478935)			4										
			57 (21383641)			4										
			63 (20308478)			3										
			58 (22582364)			4										
			55 (1178860)			4										
			62 (179356)			4										
			60 (1250652)			4										
			56 (1572114)			4										
			59 (8113299)			4										
CT area of interest with IV contrast	Usuall approp	y not oriate	Expert Consensus	Varies	Varies	2	2	7	3	3	1	2	1	0	0	0
CT area of interest without IV contrast	Usuall approp	y not oriate	Expert Consensus	Varies	Varies	1	1	10	1	2	1	2	0	1	0	0
CT area of interest without and with IV contrast	Usuall approp		Expert Consensus	Varies	Varies	1	1	13	1	1	0	2	0	0	0	0

Variant 3: Child. 5 years of age or older. Concern for osteomyelitis or septic arthritis involving an extremity. Initial imaging.

D 1	Appropriateness	COE	A I II DDI	D I DDI	D 4	3.7.11			F	inal T	Гabu	latio	ns		
Procedure	Category	SOE	Adults RRL	Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
Radiography area of interest	Usually appropriate	Moderate	Varies	Varies	9	9	1	0	0	1	1	0	1	4	9

References	Study Quality
3 (21523583)	4
48 (8475290)	4
47 (6739205)	4

		30 (20304319)			4										
		45 (28696851)			4										
		36 (26295653)			2										
		29 (7618566)			4										
MRI area of interest without and with IV contrast	Usually appropriate	Strong	O 0 mSv	O 0 mSv [ped]	8	8	1	0	1	0	2	1	2	8	2
		References		Study	y Quality										
		38 (20180105)			3										
		37 (19380545)			3										
		39 (22268189)			3										
		30 (20304319)			4										
		32 (30903335)			2										
		19 (30969258)			3										
		17 (29728840)			3										
		16 (26691242)			3										
		18 (25575360)			4										
		7 (25575359)			3										
		36 (26295653)			2										
		33 (26209118)			2										
		20 (25698366)			3										
		35 (23685708)			2										
		34 (21381610)			4										
		29 (7618566)			4										
		31 (17118291)			4										
		28 (2068324)			2	1		_							
MRI area of interest without IV contrast	Usually appropriate	Strong	O 0 mSv	O 0 mSv [ped]	7	7	0	0	0	0	1	3	7	5	0
		References		Study	y Quality										
		38 (20180105)			3										
		37 (19380545)			3										
		39 (22268189)			3										

		30 (20304319))		4										
		32 (30903335))		2										
		19 (30969258))		3										
		17 (29728840))		3										
		16 (26691242))		3										
		18 (25575360))		4										
		7 (25575359)			3										
		36 (26295653))		2										
		33 (26209118))		2										
		20 (25698366))		3										
		35 (23685708))		2										
		34 (21381610))		4										
		29 (7618566)			4										
		31 (17118291))		4										
		28 (2068324)			2			1	ı						
US area of interest	Usuall appropri	ly Strong	O 0 mSv	O 0 mSv [ped]	7	7	0	1	0	1	3	1	10	0	0
		References		Stuc	ly Quality										
		48 (8475290)			4										
		51 (11961445))		4										
		50 (25588046))		4										
		17 (29728840))		3										
		45 (28696851))		4										
		53 (23755165))		3										
		52 (19695738))		2										
		54 (7983130)			4										
		49 (3321461)	,		3										
MRI extremity area of interest without and with IV contrast	Usuall appropri	ly iate Limited	O 0 mSv	O 0 mSv [ped]	7	7	0	0	0	0	1	2	7	6	0
		References		Stuc	ly Quality										
		43 (23883225))		2										

MRI extremity area of interest without IV contrast	May approp	Limited	O 0 mSv	O 0 mSv [ped]	6	6	0	0	0	0	6	3	4	3	0
		References 43 (23883225)		Study	Quality 2										
MRI whole body without IV contrast	Usuall approp	Expert Consensus	O 0 mSv	O 0 mSv [ped]	3	3	6	2	6	0	1	2	0	0	0
MRI whole body without and with IV contrast	Usuall approp	Expert Consensus	O 0 mSv	O 0 mSv [ped]	3	3	7	0	6	1	2	1	0	0	0
CT area of interest with IV contrast	Usuall approp	Expert Consensus	Varies	Varies	1	1	10	1	3	2	0	1	0	0	0
CT area of interest without IV contrast	Usuall approp	Expert Consensus	Varies	Varies	1	1	11	1	2	2	0	1	0	0	0
CT area of interest without and with IV contrast	Usuall approp	Expert Consensus	Varies	Varies	1	1	12	2	0	1	1	1	0	0	0
3-phase bone scan area of interest	Usuall approp	Expert Consensus	��� 1-10 mSv	9	1	1	12	1	1	1	0	1	1	0	0
Bone scan whole body	Usuall approp	Expert Consensus	��� 1-10 mSv	999993- 10 mSv [ped]	1	1	12	2	1	0	0	2	0	0	0
Bone scan whole body and 3-phase bone scan area of interest	Usuall approp	Expert Consensus		���� 3- 10 mSv [ped]	1	1	15	0	1	0	0	0	0	0	0

Variant 4: Child. 5 years of age or older. Concern for osteomyelitis or septic arthritis involving an extremity. Initial radiographs normal, or with findings suggestive of osteomyelitis. Next imaging study.

ъ .	Appropriateness	COF	A L L DDI	D I DDI	D. (3.7.11			F	inal '	Tabu	latio	ns		
Procedure	Category	SOE	Adults RRL	Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
MRI area of interest without and with IV contrast	Usually appropriate	Strong	O 0 mSv	O 0 mSv [ped]	9	9	0	0	0	0	0	1	1	4	10
		References		Study	Quality										

	38 (20180105)			3	
	37 (19380545)			3	
	39 (22268189)			3	
	30 (20304319)			4	
	32 (30903335)			2	
	19 (30969258)			3	
	17 (29728840)			3	
	16 (26691242)			3	
	18 (25575360)			4	
	7 (25575359)			3	
	36 (26295653)			2	
	33 (26209118)			2	
	20 (25698366)			3	
	35 (23685708)			2	
	34 (21381610)			4	
	67 (21102217)			3	
	29 (7618566)			4	
	31 (17118291)			4	
	28 (2068324)			2	
11			0.00		

MRI area of interest without IV Usually appropriate Strong O 0 mSv [ped] 8 8 0 0 0 0 0 1 7 7 1

References	Study Q	uality
38 (20180105)	3	
37 (19380545)	3	
39 (22268189)	3	
30 (20304319)	4	
32 (30903335)	2	
19 (30969258)	3	
17 (29728840)	3	
16 (26691242)	3	_
18 (25575360)	4	

		7 (25575359)			3										
		36 (26295653)			2										
		33 (26209118)			2										
		20 (25698366)			3										
		35 (23685708)			2										
		34 (21381610)			4										
		67 (21102217)			3										
		29 (7618566)			4										
		31 (17118291)			4										
		28 (2068324)			2										
MRI extremity area of interest without and with IV contrast	Usually appropriate	Limited	O 0 mSv	O 0 mSv [ped]	8	8	0	0	0	0	2	0	2	8	5
		References		Study	Quality										
		43 (23883225)			2										
MRI extremity area of interest without IV contrast	Usually appropriate	Limited	O 0 mSv	O 0 mSv [ped]	7	7	0	0	0	0	1	2	9	4	0
		References		Study	Quality										
		43 (23883225)			2										
Image-guided aspiration area of interest	Usually appropriate	Limited	Varies	Varies	7	7	0	0	0	1	1	6	5	1	2
		References		Study	Quality										
		48 (8475290)			4										
		66 (27603195)			3										
		65 (26830217)			3										
		64 (23389564)			2		<u> </u>						1		
US area of interest	May be appropriate	Strong	O 0 mSv	O 0 mSv [ped]	6	6	0	0	0	1	3	8	4	0	0
		References		Study	Quality										
		48 (8475290)			4										
		51 (11961445)			4										
		50 (25588046)			4										

		17 (29728840)			3										
		45 (28696851)			4										
		53 (23755165)			3										
		52 (19695738)			2										
		54 (7983130)			4										
		49 (3321461)			3										
3-phase bone scan area of interest	May be appropriate	Limited	≎≎≎ 1-10 mSv	���� 3- 10 mSv [ped]	4	4	0	1	6	2	5	1	1	0	0
		References		Study	Quality										
		8 (23478935)			4										
		57 (21383641)			4										
		63 (20308478)			3										
		55 (1178860)			4										
		56 (1572114)			4										
Bone scan whole body	May be appropriate	Limited	≎≎≎ 1-10 mSv	���� 3- 10 mSv [ped]	4	4	0	1	7	2	5	1	0	0	0
		References		Study	Quality										
		57 (21383641)			4										
		63 (20308478)			3										
		58 (22582364)			4										
		60 (1250652)			4										
		59 (8113299)			4										
Bone scan whole body and 3- phase bone scan area of interest	May be appropriate	Limited		���� 3- 10 mSv [ped]	4	4	0	1	0	8	3	2	1	1	0
		References		Study	Quality										
		61 (12368368)			4										
		57 (21383641)			4										
		63 (20308478)			3										
		58 (22582364)			4										
		62 (179356)			4										

CT area of interest with IV contrast	Usually not appropriate	Expert Consensus	Varies	Varies	2	2	7	2	5	1	2	0	0	0	0
MRI whole body without IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	2	2	6	3	2	2	3	1	0	0	0
MRI whole body without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	2	2	5	4	4	1	2	1	0	0	0
CT area of interest without IV contrast	Usually not appropriate	Expert Consensus	Varies	Varies	1	1	9	2	3	1	2	0	0	0	0
CT area of interest without and with IV contrast	Usually not appropriate	Expert Consensus	Varies	Varies	1	1	12	1	1	1	2	0	0	0	0

Variant 5: Child. With one or more clinical signs concerning for septic arthritis. Initial radiographs normal or demonstrating possible joint effusion. Next imaging study.

ъ .	Appropri	ateness	GOT.	4 1 14 DD		n i nni	D (1	3.7.11			F	inal '	Tabu l	latio	ns		
Procedure	Categ	ory	SOE	Adults RR	L	Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
US area of interest	Usua approp		Limited	O 0 mSv	,	O 0 mSv [ped]	9	9	0	0	0	0	0	0	4	4	9
			References			Study	Quality		•								
			48 (8475290)				4										
			51 (11961445)				4										
			50 (25588046)				4										
			45 (28696851)				4										
			52 (19695738)				2										
			49 (3321461)				3										
MRI area of interest without and with IV contrast	Usua approp		Limited	O 0 mSv	′	O 0 mSv [ped]	8	8	0	0	2	0	1	0	3	5	6
			References			Study	Quality										
			39 (22268189)				3										
			19 (30969258)			3											
			69 (29389760)				3										

		17 (29728840)			3										
		16 (26691242)			3										
		18 (25575360)			4										
		7 (25575359)			3										
		68 (23653039)			4										
Image-guided aspiration area of interest	Usually appropriate	Limited	Varies	Varies	8	8	0	1	0	0	2	0	1	5	8
		References		Study	Quality										
		48 (8475290)			4										
		66 (27603195)			3										
		65 (26830217)			3										
		64 (23389564)			2										
MRI area of interest without IV contrast	May be appropriate	Limited	O 0 mSv	O 0 mSv [ped]	6	6	0	0	0	0	3	7	5	1	0
		References		Study	Quality										
		39 (22268189)		•	3										
		19 (30969258)			3										
		69 (29389760)			3										
		17 (29728840)			3										
		16 (26691242)			3										
		18 (25575360)			4										
		7 (25575359)			3										
		68 (23653039)			4										
MRI extremity area of interest without and with IV contrast	May be appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	6	6	0	0	0	0	4	5	4	3	0
MRI extremity area of interest without IV contrast	May be appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	5	5	0	0	0	0	12	0	3	1	0
CT area of interest with IV contrast	Usually not appropriate	Expert Consensus	Varies	Varies	2	2	8	4	3	1	1	0	0	0	0

MRI whole body without IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	2	2	6	5	3	1	1	0	1	0	0
MRI whole body without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	2	2	0	9	1	1	4	0	1	0	0
CT area of interest without IV contrast	Usually not appropriate	Expert Consensus	Varies	Varies	1	1	11	3	1	1	0	1	0	0	0
CT area of interest without and with IV contrast	Usually not appropriate	Expert Consensus	Varies	Varies	1	1	12	2	1	0	1	1	0	0	0
3-phase bone scan area of interest	Usually not appropriate	Limited	��� 1-10 mSv	���� 3- 10 mSv [ped]	1	1	10	3	1	2	1	0	0	0	0
		References		Study	Quality		_	•	•			•	•		•
		55 (1178860)		-	4										
Bone scan whole body	Usually not appropriate	Limited	��� 1-10 mSv	���� 3- 10 mSv [ped]	1	1	11	3	2	1	0	0	0	0	0
		References		Study Quality											
		59 (8113299)		4											
Bone scan whole body and 3- phase bone scan area of interest	Usually not appropriate	Expert Consensus		���� 3- 10 mSv [ped]	1	1	10	4	1	1	0	1	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.