American College of Radiology ACR Appropriateness Criteria®

Pneumonia in the Immunocompetent Child

Variant 1: Child. 3 months of age and older. Immunocompetent. Suspected uncomplicated community-acquired pneumonia in a well-appearing child who does not require hospitalization. Initial imaging.

n 1	Appropria	Appropriateness Category SOE Adults 1				. D.	26.11			F	inal	Tabu	latio	ns		
Procedure			SOE	Adults RR	L Peds RR	L Rating	Median	1	2	3	4	5	6	7	8	9
Radiography chest	Usually appropr		Limited	 <0.1 mS	5v	2	2	6	5	5	0	0	0	0	0	0
			References		S	udy Quality										
			24 (29043422)			4										
			4 (21903691)			4										
			3 (21880587)			4										
			23 (24369343)			4	_									
CT chest with IV contrast	Usually appropr		Expert Consensus	≎≎≎ 1-10 mSv)		1	15	1	0	0	0	0	0	0	0
CT chest without IV contrast	Usually appropr		Expert Consensus	&&& 1-10 mSv	9999		1	16	0	0	0	0	0	0	0	0
CT chest without and with IV contrast	Usually appropr		Expert Consensus	��� 1-10 mSv	AAAA 1		1	16	0	0	0	0	0	0	0	0
MRI chest without IV contrast	Usually appropr		Expert Consensus	O 0 mSv	O 0 mS [ped]	v 1	1	16	0	0	0	0	0	0	0	0
MRI chest without and with IV contrast	Usually appropr		Expert Consensus	O 0 mSv	O 0 mS [ped]	v 1	1	16	0	0	0	0	0	0	0	0

US chest	Usuall approp	Moderate	O 0 mSv	O 0 mSv [ped]	1	1	9	2	3	1	1	0	0	0	0
		References		Study	/ Quality										
		27 (29112644)		(Good										
		26 (29043420)			4										
		29 (26923626)			1										
		28 (27749801)			3										
		25 (25780071)		(Good										

Variant 2: Child. 3 months of age and older. Immunocompetent. Community-acquired pneumonia that does not respond to initial outpatient treatment or requires hospital admission. Initial imaging.

D 1	Appropri	iateness	COE	All Do		1 DDI	D 4	3.7.11			F	inal '	Tabu	latio	ns		
Procedure	Categ	gory	SOE	Adults RR	L Pe	ds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
Radiography chest	Usua approp		Limited	≎ <0.1 mS	Sv	<0.03 mSv [ped]	9	9	0	0	0	0	0	0	0	3	13
			References			Study	Quality										
			24 (29043422)				4										
			3 (21880587)				4										
			30 (29658199)				3										
US chest	May approp	be oriate	Moderate	O 0 mSv		0 mSv [ped]	4	4	3	1	2	5	4	0	0	1	0
			References			Study	Quality										
			27 (29112644)			C	Good										
			26 (29043420)				4										
			29 (26923626)				1										
			28 (27749801)				3										
			25 (25780071)			C	ood										
CT chest with IV contrast	Usuall approp	y not oriate	Expert Consensus	ଫଫଫ 1-10 mSv	1 1	୭⊛⊛ 3- 0 mSv [ped]	1	1	14	1	0	0	0	1	0	0	0

CT chest without IV contrast	Usually not appropriate	Expert Consensus	୫୫୫ 1-10 mSv	���� 3- 10 mSv [ped]	1	1	16	0	0	0	0	0	0	0	0
CT chest without and with IV contrast	Usually not appropriate	Expert Consensus	≎≎≎ 1-10 mSv	���� 3- 10 mSv [ped]	1	1	16	0	0	0	0	0	0	0	0
MRI chest without IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	16	0	0	0	0	0	0	0	0
MRI chest without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	16	0	0	0	0	0	0	0	0

Variant 3: Child. 3 months of age and older. Immunocompetent. Suspected hospital-acquired pneumonia. Initial imaging.

P 1	Appropri	ateness	COF	ALL DD	, D 1 DD1	D	3.5 11			F	inal '	Гаbu	latio	ns		
Procedure	Categ		SOE	Adults RRI	L Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
Radiography chest	Usua approp		Limited	≎ <0.1 mS	v <0.03 v mSv [ped]	9	9	0	0	0	0	2	0	1	2	11
			References		Study	Quality										
			11 (26527358)			4										
			10 (19648731)			4										
US chest	May approp		Expert Consensus	O 0 mSv	O 0 mSv [ped]	4	4	7	0	1	5	2	0	0	1	0
CT chest with IV contrast	Usually approp		Expert Consensus	��� 1-10 mSv	���� 3- 10 mSv [ped]	1	1	14	0	0	0	0	2	0	0	0
CT chest without IV contrast	Usually approp		Expert Consensus	��� 1-10 mSv	���� 3- 10 mSv [ped]	1	1	15	0	0	0	1	0	0	0	0
CT chest without and with IV contrast	Usually approp		Expert Consensus	��� 1-10 mSv	���� 3- 10 mSv [ped]	1	1	15	1	0	0	0	0	0	0	0
MRI chest without IV contrast	Usually approp		Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	15	1	0	0	0	0	0	0	0

MRI chest without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	15	1	0	0	0	0	0	0	0
--	-------------------------	---------------------	---------	------------------	---	---	----	---	---	---	---	---	---	---	---

Variant 4: Child. Immunocompetent. Pneumonia complicated by suspected moderate or large parapneumonic effusion by chest radiograph. Next imaging study.

D 1	Appropriate	eness	A L L DDI	D I DDI	D 41	3.7.11			F	inal	Tabu	latio	ıs		
Procedure	Category		Adults RRI	Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
US chest	Usually appropriat		O 0 mSv	O 0 mSv [ped]	9	9	0	0	0	0	0	1	3	2	10
		References		Study	Quality										
		26 (29043420))		4										
		38 (28301494	ł)		3										
		16 (27709281	.)		3										
		31 (23164006	5)		4										
		39 (19933660))		3										
		34 (19198826	5)		4										
		36 (16906429			2										
		35 (9609186)			4										
		33 (14695718	3)		2				1						
CT chest with IV contrast	May be appropriat	te Limited	��� 1-10 mSv	⊛⊛⊛ 3- 10 mSv [ped]	6	6	0	0	1	4	3	4	3	1	0
		References		Study	Quality										
		31 (23164006	5)		4										
		34 (19198826	5)		4										
		36 (16906429			2										
		35 (9609186))		4										
		37 (9207521))		3		1			1	1	1	ı		
Radiography chest decubitus view	May be appropriat				6	6	0	0	0	2	4	7	3	0	1

CT chest without IV contrast	Usually not appropriate	Limited	��� 1-10 mSv	���� 3- 10 mSv [ped]	2	2	7	3	3	3	0	0	0	0	0
		References		Study	Quality										
		31 (23164006)			4										
		34 (19198826)			4										
		36 (16906429)			2										
		35 (9609186)			4										
		37 (9207521)			3										
MRI chest without IV contrast	Usually not appropriate	Limited	O 0 mSv	O 0 mSv [ped]	2	2	8	2	1	3	2	0	0	0	0
		References		Study	Quality		•	•	•						
		41 (29043418)			4										
		44 (18726093)			4										
		43 (21816896)			3										
		40 (23701075)			2										
MRI chest without and with IV contrast	Usually not appropriate	Limited	O 0 mSv	O 0 mSv [ped]	2	2	7	2	3	1	3	0	0	0	0
		References		Study	Quality										
		41 (29043418)			4										
		44 (18726093)			4										
		43 (21816896)			3										
		40 (23701075)			2										
CT chest without and with IV contrast	Usually not appropriate	Limited	��� 1-10 mSv	���� 3- 10 mSv [ped]	1	1	9	4	1	1	0	1	0	0	0
		References		Study	Quality										
		31 (23164006)			4										
		34 (19198826)			4										
		36 (16906429)			2										
		35 (9609186)			4										
		37 (9207521)			3										

Variant 5: Child. Immunocompetent. Pneumonia complicated by suspected bronchopleural fistula by chest radiograph. Next imaging study.

	Appropriate	ness		D 1 DD1	- ·	3.5.31			F	inal '	Tabu	latio	ns		
Procedure	Category		Adults RRL	Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
CT chest with IV contrast	Usually appropriat		��� 1-10 mSv	���� 3- 10 mSv [ped]	9	9	0	0	0	0	0	0	2	6	8
		References		Study	Quality										
		45 (20118715)			4			_						_	
CT chest without IV contrast	May be appropriat (Disagreeme	Expert Opinion	��� 1-10 mSv	���� 3- 10 mSv [ped]	5	5	0	0	2	2	4	5	1	0	2
		References		Study	Quality										
		45 (20118715)			4										
CT chest without and with IV contrast	Usually no appropriat		��� 1-10 mSv	���� 3- 10 mSv [ped]	2	2	8	3	2	1	1	0	0	1	0
		References		Study	Quality										
		45 (20118715)			4										
MRI chest without IV contrast	Usually no appropriat		O 0 mSv	O 0 mSv [ped]	1	1	13	2	1	0	0	0	0	0	0
MRI chest without and with IV contrast	Usually no appropriat		O 0 mSv	O 0 mSv [ped]	1	1	13	1	1	0	0	1	0	0	0
US chest	Usually no appropriat		O 0 mSv	O 0 mSv [ped]	1	1	13	1	1	0	0	0	1	0	0

Variant 6: Child. Immunocompetent. Pneumonia complicated by suspected lung abscess by chest radiograph. Next imaging study.

ъ 1	Appropriateness	COF	A L L DDI	D I DDI	D 41	3.7.11			Final	Tabu	ılatio	ns		
Procedure	Category	SOE	Adults RRL	Peds RRL	Rating	Median	1 2	3	4	5	6	7	8	9

	Appropriateness	COF		D 1 DD1		3.5.11			F	inal	Tabu	latio	ıs		
Procedure	Category	SOE	Adults RRL	Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
CT chest with IV contrast	Usually appropriate	Limited	��� 1-10 mSv	���� 3- 10 mSv [ped]	9	9	0	0	0	0	0	0	0	4	12
		References		Study	Quality										
		13 (29043419)			4										
		46 (26785088)			4										
		47 (26086718)			2										
		31 (23164006)			4										
		35 (9609186)			4										
		19 (11870440)			4										
US chest	May be appropriate	Limited	O 0 mSv	O 0 mSv [ped]	6	6	0	0	0	1	5	9	1	0	0
		References		Study	Quality										
		49 (19255298)			2										
		50 (1683367)			3										
		51 (2052687)			4										
MRI chest without and with IV contrast	May be appropriate	Limited	O 0 mSv	O 0 mSv [ped]	4	4	4	3	1	1	6	1	0	0	0
		References		Study	Quality										
		41 (29043418)			4										
		40 (23701075)			2										
CT chest without IV contrast	Usually not appropriate	Expert Consensus	≎≎≎ 1-10 mSv	���� 3- 10 mSv [ped]	2	2	6	5	2	3	0	0	0	0	0
MRI chest without IV contrast	Usually not appropriate	Limited	O 0 mSv	O 0 mSv [ped]	2	2	6	3	2	0	3	2	0	0	0
		References Study Quality													
		41 (29043418)			4										
		40 (23701075)			2										

CT chest without and with IV contrast	Usuall approp	-	Limited	��� 1-10 mSv	0	1	1	9	3	2	1	0	0	1	0	0
			References		Study	y Quality										
			13 (29043419)			4										
			46 (26785088)			4										
			47 (26086718)			2										
			31 (23164006)			4										
			35 (9609186)			4										
			19 (11870440)			4										

Variant 7: Child. 3 months of age and older. Immunocompetent. Recurrent nonlocalized pneumonia by chest radiograph. Next imaging study.

Procedure	Appropri	iateness	COF	Adults RRL	n l ppr	D 4	3.6.11	Final Tabulations											
Procedure	Categ		SOE Adults RRI		L Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9			
CT chest without IV contrast	Usually appropriate		Limited	≎≎≎ 1-10 mSv	9999 3- 10 mSv [ped]	8	8	1	0	0	0	0	1	3	4	7			
			References	Stud	y Quality														
			52 (23169612)																
CT chest with IV contrast	Usually not appropriate		Expert Consensus	≎≎≎ 1-10 mSv	9999 3- 10 mSv [ped]	3	3	5	1	4	1	4	0	1	0	0			
MRI chest without IV contrast		Usually not appropriate Limited		O 0 mSv	O 0 mSv [ped]	2	2	6	3	3	4	0	0	0	0	0			
			References		Stud														
			53 (21943039)			2													
MRI chest without and with IV contrast	Usually approp		Limited	O 0 mSv	O 0 mSv [ped]	2	2	7	4	3	1	1	0	0	0	0			
	<u> </u>		References		Study Quality														
			53 (21943039)			2													

CT chest without and with IV contrast	Usually not appropriate		Limited	��� 1-10 mSv	���� 3- 10 mSv [ped]	1	1	9	4	2	0	1	0	0	0	0
			References		Study											
			52 (23169612)		2											
US chest	Usually approp		Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	14	1	1	0	0	0	0	0	0

Variant 8: Child. 3 months of age and older. Immunocompetent. Recurrent localized pneumonia by chest radiograph. Next imaging study.

Procedure	Appropri	iateness	COF	A dulta DDI	B 1 DD1	D (1	3.7.11	Final Tabulations												
Procedure	Categ	gory	SOE	Adults RRL	Peds RRL	Rating	Median	1	2	3	4	5	6	7		9				
CTA chest with IV contrast	Usually appropriate		Limited	��� 1-10 mSv	���� 3- 10 mSv [ped]	9	9	1	0	1	0	0	0	1	3	10				
		References			Study	Quality														
			63 (22956521)		2															
			59 (22087520)			4														
CT chest with IV contrast	Usua approp	ally oriate	Strong	��� 1-10 mSv	���� 3- 10 mSv [ped]	8	8	0	0	0	0	1	2	4	7	2				
		References			Study															
			13 (29043419)																	
			21 (22726867)																	
			58 (27723920)			4														
			62 (27659701)			3														
			60 (27464296)			2														
			61 (24234181)			3														
			55 (23378160)			3														
			52 (23169612)			2														
			63 (22956521)			2														
			59 (22087520)			4														

		54 (21512069)				2										
		56 (18718229)				2										
		57 (17527118)				3										
CT chest without IV contrast	May be appropriate (Disagreement)	Expert Opinion	��� 1-10 mSv	99999 10 m [pec	Sv	5	5	1	1	0	5	4	3	2	0	0
		References			Study	Quality										
		13 (29043419)		4 4 4												
		21 (22726867)														
		58 (27723920)														
		62 (27659701)				3										
		60 (27464296)				2										
		61 (24234181)				3										
		55 (23378160)				3										
		52 (23169612)				2										
		63 (22956521)				2										
		59 (22087520)				4										
		54 (21512069)		2												
		56 (18718229)				2										
		57 (17527118)														
MRI chest without and with IV contrast	Usually not appropriate	Limited	O 0 mSv	O 0 m [pec		2	2	6	3	5	2	0	0	0	0	0
		References		Study Quality												
		53 (21943039)				2						_				
CT chest without and with IV contrast	Usually not appropriate	Strong	��� 1-10 mSv	\$\$\$ \$ 10 m. [pec	Sv	1	1	9	4	3	0	0	0	0	0	0
		References			Study Quality											
		13 (29043419)			4											
		21 (22726867)			4											
		58 (27723920)				4										
	62 (27659701)					3										

		60 (27464296)					2										
			61 (24234181)														
			55 (23378160)														
			52 (23169612)				2										
	İ	63 (22956521)				2											
		59 (22087520)															
		54 (21512069)															
		56 (18718229)															
			57 (17527118)														
MRI chest without IV contrast	Usually approp	y not riate	Limited	O 0 mSv	,	O 0 mSv [ped]	1	1	10	4	2	0	0	0	0	0	0
		References			Study		•										
		53 (21943039)					2									_	
US chest	Usually approp	y not riate	Expert Consensus	O 0 mSv	,	O 0 mSv [ped]	1	1	14	2	0	0	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.