

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.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
Radiography chest	Usually not appropriate	Limited	☼ <0.1 mSv	☼ <0.03 mSv [ped]	2	2	6	5	5	0	0	0	0	0	0
		References		Study Quality											
		24 (29043422)		4											
		4 (21903691)		4											
		3 (21880587)		4											
		23 (24369343)		4											
CT chest with IV contrast	Usually not appropriate	Expert Consensus	☼☼☼ 1-10 mSv	☼☼☼☼ 3-10 mSv [ped]	1	1	15	1	0	0	0	0	0	0	0
CT chest without 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
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	○ 0 mSv	○ 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	○ 0 mSv	○ 0 mSv [ped]	1	1	16	0	0	0	0	0	0	0	0

US chest	Usually not appropriate	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.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
Radiography chest	Usually appropriate	Limited	☼ <0.1 mSv	☼ <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 be appropriate	Moderate	O 0 mSv	O 0 mSv [ped]	4	4	3	1	2	5	4	0	0	1	0
		References	Study Quality												
		27 (29112644)	Good												
		26 (29043420)	4												
		29 (26923626)	1												
		28 (27749801)	3												
		25 (25780071)	Good												
CT chest with IV contrast	Usually not appropriate	Expert Consensus	☼☼☼ 1-10 mSv	☼☼☼☼ 3-10 mSv [ped]	1	1	14	1	0	0	0	1	0	0	0

CT chest without 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
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	○ 0 mSv	○ 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	○ 0 mSv	○ 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.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
Radiography chest	Usually appropriate	Limited	☼ <0.1 mSv	☼ <0.03 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 be appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	4	4	7	0	1	5	2	0	0	1	0
CT chest with IV contrast	Usually not appropriate	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 not appropriate	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 not appropriate	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 not appropriate	Expert Consensus	○ 0 mSv	○ 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	0 0 mSv	0 0 mSv [ped]	1	1	15	1	0	0	0	0	0	0	0
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Variant 4: Child. Immunocompetent. Pneumonia complicated by suspected moderate or large parapneumonic effusion by chest radiograph. Next imaging study.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
US chest	Usually appropriate	Strong	0 0 mSv	0 0 mSv [ped]	9	9	0	0	0	0	0	1	3	2	10

	References		Study Quality												
	26 (29043420)		4												
	38 (28301494)		3												
	16 (27709281)		3												
	31 (23164006)		4												
	39 (19933660)		3												
	34 (19198826)		4												
	36 (16906429)		2												
	35 (9609186)		4												
	33 (14695718)		2												

CT chest with IV contrast	May be appropriate	Limited	⊕⊕⊕ 1-10 mSv	⊕⊕⊕⊕⊕ 3-10 mSv [ped]	6	6	0	0	1	4	3	4	3	1	0
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	References		Study Quality												
	31 (23164006)		4												
	34 (19198826)		4												
	36 (16906429)		2												
	35 (9609186)		4												
	37 (9207521)		3												

Radiography chest decubitus view	May be appropriate	Expert Consensus		⊕ <0.03 mSv [ped]	6	6	0	0	0	2	4	7	3	0	1
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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	○ ○ mSv	○ ○ 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	○ ○ mSv	○ ○ 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.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							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	2	6	8
		References		Study Quality											
		45 (20118715)		4											
CT chest without IV contrast	May be appropriate (Disagreement)	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 not appropriate	Limited	☼☼☼ 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 not appropriate	Expert Consensus	○ ○ mSv	○ ○ mSv [ped]	1	1	13	2	1	0	0	0	0	0	0
MRI chest without and with IV contrast	Usually not appropriate	Expert Consensus	○ ○ mSv	○ ○ mSv [ped]	1	1	13	1	1	0	0	1	0	0	0
US chest	Usually not appropriate	Expert Consensus	○ ○ mSv	○ ○ 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.

[illegible]

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							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	○ ○ mSv	○ ○ 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	○ ○ mSv	○ ○ 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	○ ○ mSv	○ ○ mSv [ped]	2	2	6	3	2	0	3	2	0	0	0
		References		Study Quality											
		41 (29043418)		4											
		40 (23701075)		2											

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

MRI chest without IV contrast	Usually not appropriate	Limited	0 0 mSv	0 0 mSv [ped]	1	1	10	4	2	0	0	0	0	0	0
		References	Study Quality												
		53 (21943039)	2												
US chest	Usually not appropriate	Expert Consensus	0 0 mSv	0 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.