

American College of Radiology ACR Appropriateness Criteria®

Chest Pain-Child

Variant 1: Child. Chest pain. Limited to the chest wall. 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]	7	7	0	0	0	0	3	2	4	3	2
		References		Study Quality											
		15 (35316339)		4											
		14 (24209723)		4											
US chest	May be appropriate	Limited	○ 0 mSv	○ 0 mSv [ped]	6	6	1	0	0	0	4	3	5	0	1
		References		Study Quality											
		17 (30612161)		2											
		16 (34117521)		4											
		15 (35316339)		4											
Radiography rib views	May be appropriate	Limited	⊕⊕⊕ 1-10 mSv	⊕ <0.03 mSv [ped]	6	6	1	0	0	0	3	4	4	2	0
		References		Study Quality											
		16 (34117521)		4											
CT chest with IV contrast	Usually not appropriate	Expert Consensus	⊕⊕⊕ 1-10 mSv	⊕⊕⊕⊕ 3-10 mSv [ped]	1	1	10	0	1	1	1	0	1	0	0
CT chest without IV contrast	Usually not appropriate	Expert Consensus	⊕⊕⊕ 1-10 mSv	⊕⊕⊕⊕ 3-10 mSv [ped]	1	1	10	0	2	1	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	11	0	2	1	0	0	0	0	0
MRI chest without IV contrast	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	1	1	10	1	2	1	0	0	0	0	0
MRI chest without and with IV contrast	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	1	1	9	2	2	0	0	0	1	0	0

Variant 2: Child. Chest pain. Suspected pneumothorax or pneumomediastinum. 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	0	14
		References		Study Quality											
		23 (38547031)		4											
US chest	Usually not appropriate	Limited	○ 0 mSv	○ 0 mSv [ped]	2	2	6	2	1	3	0	2	0	0	0
		References		Study Quality											
		24 (24844730)		4											
		25 (25056671)		1											
Radiography chest decubitus view	Usually not appropriate	Expert Consensus		☼ <0.03 mSv [ped]	2	2	5	3	6	0	0	0	0	0	0
CT chest with IV contrast	Usually not appropriate	Expert Consensus	☼☼☼ 1-10 mSv	☼☼☼☼ 3-10 mSv [ped]	1	1	10	0	2	0	1	1	0	0	0
CT chest without IV contrast	Usually not appropriate	Expert Consensus	☼☼☼ 1-10 mSv	☼☼☼☼ 3-10 mSv [ped]	1	1	8	2	1	0	2	0	0	1	0
CT chest without and with IV contrast	Usually not appropriate	Expert Consensus	☼☼☼ 1-10 mSv	☼☼☼☼ 3-10 mSv [ped]	1	1	10	0	2	1	0	0	1	0	0

		34 (28473076)			4											
V/Q scan lung	May be appropriate	Expert Consensus	☼☼☼ 1-10 mSv	☼☼☼ 0.3-3 mSv [ped]	4	4	5	1	1	2	3	1	1	0	0	
MRA pulmonary arteries without and with IV contrast	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	2	2	6	4	3	1	0	0	0	0	0	
CT chest with IV contrast	Usually not appropriate	Expert Consensus	☼☼☼ 1-10 mSv	☼☼☼☼ 3-10 mSv [ped]	1	1	10	1	3	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	10	1	3	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	8	1	3	1	0	0	0	1	0	
CTA chest with IV contrast with CTV lower extremities	Usually not appropriate	Expert Consensus	☼☼☼ 1-10 mSv	☼☼☼☼ 3-10 mSv [ped]	1	1	8	1	3	0	1	0	1	0	0	
Arteriography pulmonary with right heart catheterization	Usually not appropriate	Expert Consensus	☼☼☼☼ 10-30 mSv	☼☼☼☼ 3-10 mSv [ped]	1	1	12	0	1	0	1	0	0	0	0	
MRA pulmonary arteries without IV contrast	Usually not appropriate	Limited	○ 0 mSv	○ 0 mSv [ped]	1	1	8	0	3	1	2	0	0	0	0	

		References			Study Quality											
		28 (34836567)			4											
US chest	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	1	1	11	0	3	0	0	0	0	0	0	0
US duplex Doppler lower extremity	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	1	1	11	2	1	0	0	0	0	0	0	0
US echocardiography transthoracic resting	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	1	1	11	0	2	0	1	0	0	0	0	0
US echocardiography transesophageal	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	1	1	11	0	2	0	1	0	0	0	0	0

Variant 4: Child. Chest pain. Known or suspected cardiac disease. 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	Expert Consensus	⊕ <0.1 mSv	⊕ <0.03 mSv [ped]	8	8	0	0	1	0	2	0	1	4	6
US echocardiography transthoracic resting	Usually appropriate	Limited	○ 0 mSv	○ 0 mSv [ped]	7	7	0	1	0	0	0	0	7	2	4
		References		Study Quality											
		40 (34674303)		4											
CTA chest with IV contrast	May be appropriate	Expert Consensus	⊕⊕⊕ 1-10 mSv	⊕⊕⊕⊕ 3-10 mSv [ped]	4	4	5	0	1	5	1	1	1	0	0
CTA coronary arteries with IV contrast	May be appropriate	Expert Consensus	⊕⊕⊕ 1-10 mSv	⊕⊕⊕⊕ 3-10 mSv [ped]	4	4	5	0	1	6	1	1	0	0	0
CT heart function and morphology with IV contrast	May be appropriate	Expert Consensus	⊕⊕⊕⊕ 10-30 mSv	⊕⊕⊕⊕ 3-10 mSv [ped]	4	4	6	0	1	4	2	1	0	0	0
US echocardiography transesophageal	Usually not appropriate	Limited	○ 0 mSv	○ 0 mSv [ped]	3	3	5	1	2	2	4	0	0	0	0
		References		Study Quality											
		39 (21481076)		4											
US echocardiography transthoracic stress	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	2	2	7	1	4	1	0	0	0	1	0
CT chest with IV contrast	Usually not appropriate	Expert Consensus	⊕⊕⊕ 1-10 mSv	⊕⊕⊕⊕ 3-10 mSv [ped]	1	1	12	0	2	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	10	0	2	2	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	10	0	2	2	0	0	0	0	0
Arteriography pulmonary	Usually not appropriate	Expert Consensus	☼☼☼☼ 10-30 mSv	☼☼☼☼ 3-10 mSv [ped]	1	1	11	0	3	0	0	0	0	0	0
Arteriography coronary with ventriculography	Usually not appropriate	Expert Consensus	☼☼☼ 1-10 mSv	☼☼☼☼ 3-10 mSv [ped]	1	1	11	0	1	0	1	1	0	0	0
MRA chest without IV contrast	Usually not appropriate	Expert Consensus	○ ○ mSv	○ ○ mSv [ped]	1	1	10	1	2	1	0	0	0	0	0
MRA chest without and with IV contrast	Usually not appropriate	Expert Consensus	○ ○ mSv	○ ○ mSv [ped]	1	1	10	1	1	2	0	0	0	0	0
MRI heart function and morphology without IV contrast	Usually not appropriate	Expert Consensus	○ ○ mSv	○ ○ mSv [ped]	1	1	9	0	4	0	0	0	1	0	0
MRI heart function and morphology without and with IV contrast	Usually not appropriate	Expert Consensus	○ ○ mSv	○ ○ mSv [ped]	1	1	8	1	2	0	2	0	1	0	0
MRI heart function with stress without IV contrast	Usually not appropriate	Expert Consensus	○ ○ mSv	○ ○ mSv [ped]	1	1	10	0	3	0	0	0	1	0	0
MRI heart function with stress without and with IV contrast	Usually not appropriate	Expert Consensus	○ ○ mSv	○ ○ mSv [ped]	1	1	10	0	1	0	2	0	1	0	0
V/Q scan lung	Usually not appropriate	Expert Consensus	☼☼☼ 1-10 mSv	☼☼☼ 0.3-3 mSv [ped]	1	1	11	0	3	0	0	0	0	0	0
US chest	Usually not appropriate	Expert Consensus	○ ○ mSv	○ ○ mSv [ped]	1	1	11	1	2	0	0	0	0	0	0
FDG-PET/CT heart	Usually not appropriate	Expert Consensus	☼☼☼☼ 10-30 mSv	☼☼☼☼ 3-10 mSv [ped]	1	1	11	1	1	1	0	0	0	0	0
SPECT or SPECT/CT MPI rest and stress	Usually not appropriate	Expert Consensus	☼☼☼☼ 10-30 mSv	☼☼☼☼☼ 10-30 mSv [ped]	1	1	11	0	1	0	2	0	0	0	0

Variant 5: Child. Chest pain. History of sickle cell disease. 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	1	2	11
		References		Study Quality											
		41 (27404765)		4											
CTA chest with IV contrast	Usually not appropriate	Expert Consensus	⊕⊕⊕ 1-10 mSv	⊕⊕⊕⊕ 3-10 mSv [ped]	1	1	9	0	2	1	1	1	0	0	0
CT chest with IV contrast	Usually not appropriate	Expert Consensus	⊕⊕⊕ 1-10 mSv	⊕⊕⊕⊕ 3-10 mSv [ped]	1	1	11	1	2	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	9	1	2	1	0	0	1	0	0
CT chest without and with IV contrast	Usually not appropriate	Expert Consensus	⊕⊕⊕ 1-10 mSv	⊕⊕⊕⊕ 3-10 mSv [ped]	1	1	10	0	2	0	0	1	0	1	0
MRI chest without IV contrast	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	1	1	11	0	2	0	1	0	0	0	0
MRI chest without and with IV contrast	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	1	1	11	0	1	1	1	0	0	0	0
US abdomen	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	1	1	10	0	2	2	0	0	0	0	0
US chest	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	1	1	10	0	2	1	0	0	0	1	0
US echocardiography transthoracic resting	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	1	1	10	0	1	2	1	0	0	0	0

US echocardiography transthoracic stress	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	11	0	2	1	0	0	0	0	0
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Variant 6: Child. Chest pain. Suspected panic attack. 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	May be appropriate	Expert Consensus	⊕ <0.1 mSv	⊕ <0.03 mSv [ped]	6	6	0	0	0	2	2	5	3	0	2
CT chest with IV contrast	Usually not appropriate	Expert Consensus	⊕⊕⊕ 1-10 mSv	⊕⊕⊕⊕ 3-10 mSv [ped]	1	1	11	0	3	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	12	1	1	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	12	0	2	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	13	0	1	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	12	1	1	0	0	0	0	0	0
US chest	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	11	0	1	1	0	1	0	0	0
US echocardiography transthoracic resting	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	12	0	1	0	0	1	0	0	0
US echocardiography transthoracic stress	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	12	0	2	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.