

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

Supplemental Breast Cancer Screening Based on Breast Density

Variant 1: Supplemental breast cancer screening. Average-risk females with nondense breasts.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations									
							1	2	3	4	5	6	7	8	9	
Digital breast tomosynthesis screening	Usually appropriate	Strong	⊕⊕ 0.1-1mSv		9	9	0	0	0	1	0	1	0	4	11	
		References	Study Quality													
		16 (25058084)	3													
		19 (29429017)	2													
		20 (28516226)	Good													
		23 (27919540)	3													
		17 (26893205)	4													
		18 (26458206)	3													
		22 (26176654)	2													
		21 (25599513)	2													
US breast	Usually not appropriate	Limited	○ 0 mSv	○ 0 mSv [ped]	2	2	7	4	4	2	0	0	0	0	0	
		References	Study Quality													
		24 (27389655)	4													
		25 (24951614)	3													
		5 (12355001)	4													
MRI breast without IV contrast	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	1	1	16	0	1	0	0	0	0	0	0	

MRI breast without and with IV contrast	Usually not appropriate	Limited	○ 0 mSv	○ 0 mSv [ped]	1	1	9	3	3	1	0	1	0	0	0
		References	Study Quality												
		33 (28221097)	1												
FDG-PET breast dedicated	Usually not appropriate	Expert Consensus	⊕⊕⊕⊕ 10-30 mSv		1	1	15	1	0	0	1	0	0	0	0
Sestamibi MBI	Usually not appropriate	Expert Consensus	⊕⊕⊕ 1-10 mSv		1	1	16	1	0	0	0	0	0	0	0
Mammography with IV contrast	Usually not appropriate	Strong	⊕⊕ 0.1-1mSv		1	1	10	3	4	0	1	0	0	0	0
		References	Study Quality												
		28 (24928280)	3												
		29 (24986697)	3												
		26 (30240292)	2												
		30 (27097789)	3												
		31 (24696228)	2												
		27 (31453765)	2												
MRI breast without and with IV contrast abbreviated	Usually not appropriate	Limited	○ 0 mSv	○ 0 mSv [ped]	1	1	9	4	1	1	2	0	0	0	0
		References	Study Quality												
		32 (28138893)	3												
MRI breast without IV contrast abbreviated	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	1	1	16	0	0	1	0	0	0	0	0

Variant 2: Supplemental breast cancer screening. Intermediate-risk females with nondense breasts.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
Digital breast tomosynthesis screening	Usually appropriate	Strong	⊕⊕ 0.1-1mSv		9	9	0	0	0	1	0	1	0	3	12

References	Study Quality
16 (25058084)	3
19 (29429017)	2
20 (28516226)	Good
23 (27919540)	3
17 (26893205)	4
18 (26458206)	3
22 (26176654)	2
21 (25599513)	2

MRI breast without and with IV contrast	May be appropriate	Limited	0 0 mSv	0 0 mSv [ped]	5	5	0	1	4	2	5	4	0	1	0
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References	Study Quality
40 (20651211)	3
42 (21900617)	4
41 (26744477)	3
15 (17392385)	4
43 (29371086)	4

MRI breast without and with IV contrast abbreviated	May be appropriate	Strong	0 0 mSv	0 0 mSv [ped]	5	5	0	0	3	1	11	2	0	0	0
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References	Study Quality
36 (26971429)	2
38 (29030785)	4
37 (25454099)	2
39 (24958821)	2

US breast	Usually not appropriate	Limited	0 0 mSv	0 0 mSv [ped]	2	2	2	8	6	0	1	0	0	0	0
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References	Study Quality
35 (30098212)	3
34 (28786298)	4
24 (27389655)	4
5 (12355001)	4

MRI breast without IV contrast	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	1	1	15	1	1	0	0	0	0	0	0
FDG-PET breast dedicated	Usually not appropriate	Expert Consensus	⊕⊕⊕⊕ 10-30 mSv		1	1	15	1	0	0	1	0	0	0	0
Sestamibi MBI	Usually not appropriate	Expert Consensus	⊕⊕⊕ 1-10 mSv		1	1	15	1	1	0	0	0	0	0	0
Mammography with IV contrast	Usually not appropriate	Strong	⊕⊕ 0.1-1mSv		1	1	10	2	2	0	2	2	0	0	0

References	Study Quality
28 (24928280)	3
29 (24986697)	3
30 (27097789)	3
31 (24696228)	2

MRI breast without IV contrast abbreviated	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	1	1	15	1	1	0	0	0	0	0	0
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Variant 3: Supplemental breast cancer screening. High-risk females with nondense breasts.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
MRI breast without and with IV contrast	Usually appropriate	Strong	○ 0 mSv	○ 0 mSv [ped]	9	9	0	0	0	1	1	1	1	2	11

References	Study Quality
53 (17244718)	2
51 (15910949)	2
45 (22474203)	1
46 (20177029)	1
54 (19884532)	1
15 (17392385)	4
43 (29371086)	4

References	Study Quality
28 (24928280)	3
29 (24986697)	3
47 (29153365)	2
30 (27097789)	3
31 (24696228)	2

MRI breast without IV contrast	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	1	1	15	1	1	0	0	0	0	0	0
FDG-PET breast dedicated	Usually not appropriate	Expert Consensus	☼☼☼☼ 10-30 mSv		1	1	15	0	1	0	1	0	0	0	0
Sestamibi MBI	Usually not appropriate	Expert Consensus	☼☼☼ 1-10 mSv		1	1	15	1	0	1	0	0	0	0	0
MRI breast without IV contrast abbreviated	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	1	1	15	1	0	1	0	0	0	0	0

Variant 4: Supplemental breast cancer screening. Average-risk females with dense breasts.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
Digital breast tomosynthesis screening	Usually appropriate	Strong	☼☼ 0.1-1mSv		9	9	0	0	0	0	0	1	0	4	12

References	Study Quality
16 (25058084)	3
19 (29429017)	2
20 (28516226)	Good
58 (29615072)	Good
23 (27919540)	3
57 (27721194)	4
17 (26893205)	4
18 (26458206)	3

MRI breast without IV contrast	Usually not appropriate	Expert Consensus	0 0 mSv	0 0 mSv [ped]	1	1	15	1	1	0	0	0	0	0	0
FDG-PET breast dedicated	Usually not appropriate	Limited	☼☼☼☼ 10-30 mSv		1	1	14	0	1	1	1	0	0	0	0
		References	Study Quality												
		67 (25454690)	4												
Sestamibi MBI	Usually not appropriate	Limited	☼☼☼ 1-10 mSv		1	1	10	1	4	0	1	1	0	0	0
		References	Study Quality												
		69 (25615744)	1												
		68 (25615745)	4												
		70 (27186635)	3												
MRI breast without IV contrast abbreviated	Usually not appropriate	Expert Consensus	0 0 mSv	0 0 mSv [ped]	1	1	14	1	0	2	0	0	0	0	0

Variant 5: Supplemental breast cancer screening. Intermediate-risk females with dense breasts.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
Digital breast tomosynthesis screening	Usually appropriate	Strong	☼☼ 0.1-1mSv		9	9	0	0	0	0	0	0	1	3	13
		References	Study Quality												
		16 (25058084)	3												
		19 (29429017)	2												
		20 (28516226)	Good												
		58 (29615072)	Good												
		23 (27919540)	3												
		57 (27721194)	4												
		17 (26893205)	4												
		18 (26458206)	3												

		31 (24696228)		2											
MRI breast without IV contrast	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	1	1	15	1	1	0	0	0	0	0	0
FDG-PET breast dedicated	Usually not appropriate	Expert Consensus	☼☼☼☼ 10-30 mSv		1	1	15	0	1	0	1	0	0	0	0
Sestamibi MBI	Usually not appropriate	Expert Consensus	☼☼☼ 1-10 mSv		1	1	15	0	1	0	1	0	0	0	0
MRI breast without IV contrast abbreviated	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	1	1	15	1	0	1	0	0	0	0	0

Variant 6: Supplemental breast cancer screening. High-risk females with dense breasts.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
MRI breast without and with IV contrast	Usually appropriate	Strong	○ 0 mSv	○ 0 mSv [ped]	9	9	0	0	0	0	0	2	1	2	12

References	Study Quality
53 (17244718)	2
51 (15910949)	2
45 (22474203)	1
46 (20177029)	1
54 (19884532)	1
15 (17392385)	4
55 (28586291)	3
56 (27097237)	4
52 (25534390)	Good
50 (15282350)	2

Digital breast tomosynthesis screening	Usually appropriate	Strong	☼☼ 0.1-1mSv		9	9	0	0	0	0	0	0	1	3	13
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References	Study Quality
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16 (25058084)	3
19 (29429017)	2
20 (28516226)	Good
58 (29615072)	Good
23 (27919540)	3
57 (27721194)	4
17 (26893205)	4
18 (26458206)	3
22 (26176654)	2
21 (25599513)	2

US breast	Usually appropriate	Strong	0 0 mSv	0 0 mSv [ped]	7	7	0	1	0	0	2	5	5	1	3
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References	Study Quality
44 (16293877)	2
45 (22474203)	1
46 (20177029)	1
35 (30098212)	3
24 (27389655)	4
5 (12355001)	4

MRI breast without and with IV contrast abbreviated	Usually appropriate	Limited	0 0 mSv	0 0 mSv [ped]	7	7	0	0	0	0	1	6	7	1	2
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References	Study Quality
49 (28506511)	4
48 (26521970)	4

Mammography with IV contrast	May be appropriate	Strong	⊕⊕ 0.1-1mSv		5	5	0	0	1	2	8	3	3	0	0
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References	Study Quality
28 (24928280)	3
29 (24986697)	3
47 (29153365)	2
30 (27097789)	3

		31 (24696228)		2											
MRI breast without IV contrast	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	1	1	15	1	0	1	0	0	0	0	0
FDG-PET breast dedicated	Usually not appropriate	Expert Consensus	☼☼☼☼ 10-30 mSv		1	1	15	0	1	0	1	0	0	0	0
Sestamibi MBI	Usually not appropriate	Expert Consensus	☼☼☼ 1-10 mSv		1	1	15	0	1	1	0	0	0	0	0
MRI breast without IV contrast abbreviated	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	1	1	15	1	0	0	1	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.