American College of Radiology
ACR Appropriateness Criteria®

Breast Imaging of Pregnant and Lactating Women

Variant 1: Breast cancer screening during lactation. Initial imaging.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
Mammography screening	Usually appropriate	Limited	☢☢ 0.1-1mSv		8	8	1	0	0	0	5	0	2	4	4

References	Study Quality
10 (23345354)	4
9 (18180221)	4
7 (24485752)	3
13 (23881348)	4
14 (15960763)	2
24 (21382187)	4
38 (17189838)	4
37 (29101979)	4

Digital breast tomosynthesis screening	Usually appropriate	Limited	☢☢ 0.1-1mSv		8	8	0	1	0	0	4	1	1	2	7

References	Study Quality
10 (23345354)	4
9 (18180221)	4
7 (24485752)	3
13 (23881348)	4
14 (15960763)	2
24 (21382187)	4

		38 (17189838)	4													
		37 (29101979)	4													
US breast	May be appropriate	Limited	O 0 mSv	O 0 mSv [ped]	5	5	0	1	1	2	8	4	0	0	0
		References	Study Quality													
		39 (25329763)	3													
		40 (23116728)	2													
MRI breast without and with IV contrast	Usually not appropriate	Strong	O 0 mSv	O 0 mSv [ped]	3	3	5	2	3	0	4	2	0	0	0
		References	Study Quality													
		10 (23345354)	4													
		33 (-3132600)	4													
		3 (17872711)	4													
		7 (24485752)	3													
		34 (16244250)	3													
		35 (12752635)	4													
		41 (23062742)	4													
		42 (10924585)	3													
		38 (17189838)	4													
		19 (28609163)	2													
MRI breast without IV contrast	Usually not appropriate	Strong	O 0 mSv	O 0 mSv [ped]	1	1	15	0	1	0	0	0	0	0	0
		References	Study Quality													
		10 (23345354)	4													
		33 (-3132600)	4													
		3 (17872711)	4													
		7 (24485752)	3													
		34 (16244250)	3													
		35 (12752635)	4													
		41 (23062742)	4													
		42 (10924585)	3													

		38 (17189838)		4											
		19 (28609163)		2											
Sestamibi MBI	Usually not appropriate	Expert Consensus	☢☢☢ 1-10 mSv		1	1	15	1	0	0	0	0	0	0	0

Variant 2: Breast cancer screening during pregnancy. Age younger than 30 at high risk. Initial imaging.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
Mammography screening	Usually appropriate	Limited	☢☢ 0.1-1mSv		7	7	0	0	0	0	2	0	8	2	4
		References		Study Quality											
		28 (21343518)		3											
		44 (-3112876)		4											
		7 (24485752)		3											
		24 (21382187)		4											
		25 (21782123)		4											
		26 (12751860)		3											
		27 (8134581)		3											
		43 (22403117)		4											
		45 (9653462)		4											
Digital breast tomosynthesis screening	Usually appropriate	Limited	☢☢ 0.1-1mSv		7	7	1	0	0	0	3	3	3	3	3
		References		Study Quality											
		28 (21343518)		3											
		44 (-3112876)		4											
		7 (24485752)		3											
		24 (21382187)		4											
		25 (21782123)		4											
		26 (12751860)		3											

		27 (8134581)		3											
		43 (22403117)		4											
		45 (9653462)		4											
US breast	May be appropriate	Limited	O 0 mSv	O 0 mSv [ped]	5	5	0	0	1	1	10	4	0	0	0
		References		Study Quality											
		10 (23345354)		4											
		9 (18180221)		4											
MRI breast without IV contrast	Usually not appropriate	Limited	O 0 mSv	O 0 mSv [ped]	1	1	15	1	0	0	0	0	0	0	0
		References		Study Quality											
		33 (-3132600)		4											
MRI breast without and with IV contrast	Usually not appropriate	Limited	O 0 mSv	O 0 mSv [ped]	1	1	15	1	0	0	0	0	0	0	0
		References		Study Quality											
		33 (-3132600)		4											
Sestamibi MBI	Usually not appropriate	Expert Consensus	☢☢☢ 1-10 mSv		1	1	15	1	0	0	0	0	0	0	0

Variant 3: Breast cancer screening during pregnancy. Age 30 to 39 years at elevated risk (intermediate or high risk). Initial imaging.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
Mammography screening	Usually appropriate	Limited	☢☢ 0.1-1mSv		7	7	0	0	0	0	1	1	7	3	4
		References		Study Quality											
		28 (21343518)		3											
		44 (-3112876)		4											
		7 (24485752)		3											
		24 (21382187)		4											

		25 (21782123)	4												
		26 (12751860)	3												
		27 (8134581)	3												
		43 (22403117)	4												
		45 (9653462)	4												
Digital breast tomosynthesis screening	Usually appropriate	Limited	☢☢ 0.1-1mSv		7	7	1	0	0	0	1	4	3	3	4
		References	Study Quality												
		28 (21343518)	3												
		44 (-3112876)	4												
		7 (24485752)	3												
		24 (21382187)	4												
		25 (21782123)	4												
		26 (12751860)	3												
		27 (8134581)	3												
		43 (22403117)	4												
		45 (9653462)	4												
US breast	May be appropriate	Limited	O 0 mSv	O 0 mSv [ped]	5	5	0	1	1	2	10	2	0	0	0
		References	Study Quality												
		10 (23345354)	4												
		9 (18180221)	4												
MRI breast without IV contrast	Usually not appropriate	Limited	O 0 mSv	O 0 mSv [ped]	1	1	16	0	0	0	0	0	0	0	0
		References	Study Quality												
		33 (-3132600)	4												
MRI breast without and with IV contrast	Usually not appropriate	Limited	O 0 mSv	O 0 mSv [ped]	1	1	16	0	0	0	0	0	0	0	0
		References	Study Quality												
		33 (-3132600)	4												

Sestamibi MBI	Usually not appropriate	Expert Consensus	☢☢☢ 1-10 mSv		1	1	16	0	0	0	0	0	0	0	0

Variant 4: Breast cancer screening during pregnancy. Age 40 years or older, any risk level. Initial imaging.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
Mammography screening	Usually appropriate	Limited	☢☢ 0.1-1mSv		9	9	0	0	0	0	1	0	1	3	11

References	Study Quality
28 (21343518)	3
44 (-3112876)	4
7 (24485752)	3
24 (21382187)	4
25 (21782123)	4
26 (12751860)	3
27 (8134581)	3
43 (22403117)	4
45 (9653462)	4

Digital breast tomosynthesis screening	Usually appropriate	Limited	☢☢ 0.1-1mSv		9	9	0	0	0	0	1	0	0	2	13

References	Study Quality
28 (21343518)	3
44 (-3112876)	4
7 (24485752)	3
24 (21382187)	4
25 (21782123)	4
26 (12751860)	3
27 (8134581)	3
43 (22403117)	4

		45 (9653462)		4												
US breast	May be appropriate	Limited	O 0 mSv	O 0 mSv [ped]	5	5	1	1	3	1	8	2	0	0	0
		References		Study Quality												
		10 (23345354)		4												
		9 (18180221)		4												
MRI breast without IV contrast	Usually not appropriate	Limited	O 0 mSv	O 0 mSv [ped]	1	1	16	0	0	0	0	0	0	0	0
		References		Study Quality												
		28 (21343518)		3												
		44 (-3112876)		4												
		7 (24485752)		3												
		24 (21382187)		4												
		25 (21782123)		4												
		26 (12751860)		3												
		27 (8134581)		3												
		43 (22403117)		4												
		45 (9653462)		4												
MRI breast without and with IV contrast	Usually not appropriate	Limited	O 0 mSv	O 0 mSv [ped]	1	1	15	1	0	0	0	0	0	0	0
		References		Study Quality												
		33 (-3132600)		4												
Sestamibi MBI	Usually not appropriate	Expert Consensus	☢☢☢ 1-10 mSv		1	1	16	0	0	0	0	0	0	0	0

Variant 5: Pregnant women with a palpable breast mass. Initial imaging.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
US breast	Usually	Limited	O 0 mSv	O 0 mSv	9	9	0	0	0	0	0	0	0	0	16

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
	appropriate			[ped]											

References	Study Quality
10 (23345354)	4
9 (18180221)	4
44 (-3112876)	4
7 (24485752)	3
23 (15969981)	4
24 (21382187)	4
25 (21782123)	4
26 (12751860)	3
46 (16311748)	3
47 (16502483)	4
36 (28473077)	4

Mammography diagnostic	May be appropriate	Limited	☢☢ 0.1-1mSv		5	5	0	0	0	0	10	4	1	1	0

References	Study Quality
28 (21343518)	3
44 (-3112876)	4
7 (24485752)	3
24 (21382187)	4
25 (21782123)	4
26 (12751860)	3
27 (8134581)	3
43 (22403117)	4

Digital breast tomosynthesis diagnostic	May be appropriate	Limited	☢☢ 0.1-1mSv		5	5	0	0	0	0	9	5	2	0	0

References	Study Quality
28 (21343518)	3

44 (-3112876)	4
7 (24485752)	3
24 (21382187)	4
25 (21782123)	4
26 (12751860)	3
27 (8134581)	3
43 (22403117)	4

Image-guided core biopsy breast	Usually not appropriate	Expert Consensus	Varies	Varies	1	1	12	1	1	0	0	2	0	0	0
Image-guided fine needle aspiration breast	Usually not appropriate	Expert Consensus	Varies	Varies	1	1	12	1	2	1	0	0	0	0	0
MRI breast without IV contrast	Usually not appropriate	Limited	O 0 mSv	O 0 mSv [ped]	1	1	15	0	0	0	1	0	0	0	0

References	Study Quality
33 (-3132600)	4

MRI breast without and with IV contrast	Usually not appropriate	Limited	O 0 mSv	O 0 mSv [ped]	1	1	16	0	0	0	0	0	0	0	0

References	Study Quality
33 (-3132600)	4

Sestamibi MBI	Usually not appropriate	Expert Consensus	☢☢☢ 1-10 mSv		1	1	15	0	0	0	1	0	0	0	0

Variant 6: Clinically suspicious nipple discharge during pregnancy. Initial imaging.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
US breast	Usually appropriate	Limited	O 0 mSv	O 0 mSv [ped]	9	9	0	0	0	0	0	1	0	3	12

References	Study Quality
48 (-3112883)	4

Mammography diagnostic	Usually appropriate	Limited	☢☢ 0.1-1mSv		7	7	0	0	0	0	3	4	3	4	2

References	Study Quality
28 (21343518)	3
44 (-3112876)	4
7 (24485752)	3
24 (21382187)	4
25 (21782123)	4
43 (22403117)	4

Digital breast tomosynthesis diagnostic	Usually appropriate	Limited	☢☢ 0.1-1mSv		7	7	0	0	0	0	3	4	4	3	2

References	Study Quality
28 (21343518)	3
44 (-3112876)	4
7 (24485752)	3
24 (21382187)	4
25 (21782123)	4
43 (22403117)	4

MRI breast without IV contrast	Usually not appropriate	Limited	O 0 mSv	O 0 mSv [ped]	1	1	16	0	0	0	0	0	0	0	0

References	Study Quality
33 (-3132600)	4

MRI breast without and with IV contrast	Usually not appropriate	Limited	O 0 mSv	O 0 mSv [ped]	1	1	16	0	0	0	0	0	0	0	0

References	Study Quality
33 (-3132600)	4

Sestamibi MBI	Usually not appropriate	Expert Consensus	☢☢☢ 1-10 mSv		1	1	16	0	0	0	0	0	0	0	0

Variant 7: Locoregional staging of newly diagnosed breast cancer during pregnancy. Initial imaging.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
Mammography diagnostic	Usually appropriate	Limited	☢☢ 0.1-1mSv		9	9	0	0	1	1	0	0	0	2	12
References	Study Quality														
44 (-3112876)	4														
43 (22403117)	4														
Digital breast tomosynthesis diagnostic	Usually appropriate	Limited	☢☢ 0.1-1mSv		9	9	0	1	0	0	0	0	1	2	12
References	Study Quality														
44 (-3112876)	4														
43 (22403117)	4														
US axilla	Usually appropriate	Limited	O 0 mSv	O 0 mSv [ped]	9	9	0	0	0	0	2	1	1	1	11
References	Study Quality														
51 (16484353)	3														
US breast	Usually not appropriate	Strong	O 0 mSv	O 0 mSv [ped]	3	3	3	2	6	1	2	1	1	0	0
References	Study Quality														
25 (21782123)	4														
51 (16484353)	3														
52 (27955877)	2														
54 (25013439)	3														
53 (15486214)	3														
MRI breast without IV contrast	Usually not appropriate	Limited	O 0 mSv	O 0 mSv [ped]	1	1	15	0	0	0	0	0	1	0	0
References	Study Quality														
33 (-3132600)	4														
19 (28609163)	2														

MRI breast without and with IV contrast	Usually not appropriate	Limited	O 0 mSv	O 0 mSv [ped]	1	1	15	0	1	0	0	0	0	0	0

References	Study Quality
33 (-3132600)	4
19 (28609163)	2

Sestamibi MBI	Usually not appropriate	Expert Consensus	☢☢☢ 1-10 mSv		1	1	15	0	1	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.**