American College of Radiology
ACR Appropriateness Criteria®

Palpable Breast Masses

Variant 1: Palpable breast mass. Female, 40 years of age or older, initial evaluation. (See Appendices 1A-1B for additional steps in the workup of these patients.)

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		☢☢ 0.1-1mSv		9	n/a	0	0	0	0	0	0	0	0	0
Digital breast tomosynthesis diagnostic	Usually appropriate		☢☢ 0.1-1mSv		9	n/a	0	0	0	0	0	0	0	0	0
US breast	May be appropriate		O 0 mSv	O 0 mSv [ped]	4	n/a	0	0	0	0	0	0	0	0	0
MRI breast without and with IV contrast	Usually not appropriate		O 0 mSv	O 0 mSv [ped]	2	n/a	0	0	0	0	0	0	0	0	0
FDG-PEM	Usually not appropriate		☢☢☢☢ 10-30 mSv		1	n/a	0	0	0	0	0	0	0	0	0
Image-guided core biopsy breast	Usually not appropriate		Varies		1	n/a	0	0	0	0	0	0	0	0	0
Image-guided fine needle aspiration breast	Usually not appropriate		Varies		1	n/a	0	0	0	0	0	0	0	0	0
MRI breast without IV contrast	Usually not appropriate		O 0 mSv	O 0 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0
Sestamibi MBI	Usually not appropriate		☢☢☢ 1-10 mSv		1	n/a	0	0	0	0	0	0	0	0	0

Variant 2: Palpable breast mass. Female, 40 years of age or older, mammography findings suspicious for malignancy. Next examination to perform. (See Appendix 1A for additional steps in the workup of these patients.)

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		O 0 mSv	O 0 mSv [ped]	9	n/a	0	0	0	0	0	0	0	0	0
Image-guided core biopsy breast	Usually not appropriate		Varies		2	n/a	0	0	0	0	0	0	0	0	0
MRI breast without and with IV contrast	Usually not appropriate		O 0 mSv	O 0 mSv [ped]	2	n/a	0	0	0	0	0	0	0	0	0
FDG-PEM	Usually not appropriate		☢☢☢☢ 10-30 mSv		1	n/a	0	0	0	0	0	0	0	0	0
Image-guided fine needle aspiration breast	Usually not appropriate		Varies		1	n/a	0	0	0	0	0	0	0	0	0
Mammography short interval follow-up	Usually not appropriate		☢☢ 0.1-1mSv		1	n/a	0	0	0	0	0	0	0	0	0
MRI breast without IV contrast	Usually not appropriate		O 0 mSv	O 0 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0
Digital breast tomosynthesis short-interval follow-up	Usually not appropriate		☢☢ 0.1-1mSv		1	n/a	0	0	0	0	0	0	0	0	0
Sestamibi MBI	Usually not appropriate		☢☢☢ 1-10 mSv		1	n/a	0	0	0	0	0	0	0	0	0

Variant 3: Palpable breast mass. Female, 40 years of age or older, mammography findings probably benign. Next examination to perform. (See Appendix 1A for additional steps in the workup of these patients.)

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
Mammography short interval follow-up	Usually appropriate		☢☢ 0.1-1mSv		8	n/a	0	0	0	0	0	0	0	0	0
US breast	Usually appropriate		O 0 mSv	O 0 mSv [ped]	8	n/a	0	0	0	0	0	0	0	0	0
Digital breast tomosynthesis short-interval follow-up	Usually appropriate		☢☢ 0.1-1mSv		8	n/a	0	0	0	0	0	0	0	0	0
Image-guided core biopsy breast	Usually not appropriate		Varies		2	n/a	0	0	0	0	0	0	0	0	0
MRI breast without and with IV contrast	Usually not appropriate		O 0 mSv	O 0 mSv [ped]	2	n/a	0	0	0	0	0	0	0	0	0
FDG-PEM	Usually not appropriate		☢☢☢☢ 10-30 mSv		1	n/a	0	0	0	0	0	0	0	0	0
Image-guided fine needle aspiration breast	Usually not appropriate		Varies		1	n/a	0	0	0	0	0	0	0	0	0
MRI breast without IV contrast	Usually not appropriate		O 0 mSv	O 0 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0
Sestamibi MBI	Usually not appropriate		☢☢☢ 1-10 mSv		1	n/a	0	0	0	0	0	0	0	0	0

Variant 4: Palpable breast mass. Female, 40 years of age or older, mammography findings benign (like lipoma) at site of palpable mass. Next examination to perform.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
Image-guided fine needle aspiration breast	Usually not appropriate		Varies		2	n/a	0	0	0	0	0	0	0	0	0
Mammography short interval follow-up	Usually not appropriate		☢☢ 0.1-1mSv		2	n/a	0	0	0	0	0	0	0	0	0

US breast	Usually not appropriate		O 0 mSv	O 0 mSv [ped]	2	n/a	0	0	0	0	0	0	0	0	0
Digital breast tomosynthesis short-interval follow-up	Usually not appropriate		☢☢ 0.1-1mSv		2	n/a	0	0	0	0	0	0	0	0	0
FDG-PEM	Usually not appropriate		☢☢☢☢ 10-30 mSv		1	n/a	0	0	0	0	0	0	0	0	0
Image-guided core biopsy breast	Usually not appropriate		Varies		1	n/a	0	0	0	0	0	0	0	0	0
MRI breast without and with IV contrast	Usually not appropriate		O 0 mSv	O 0 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0
MRI breast without IV contrast	Usually not appropriate		O 0 mSv	O 0 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0
Sestamibi MBI	Usually not appropriate		☢☢☢ 1-10 mSv		1	n/a	0	0	0	0	0	0	0	0	0

Variant 5: Palpable breast mass. Female, 40 years of age or older, mammography findings negative. Next examination to perform. (See Appendix 1B for additional steps in the workup of these patients.)

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		O 0 mSv	O 0 mSv [ped]	9	n/a	0	0	0	0	0	0	0	0	0
Digital breast tomosynthesis diagnostic	Usually not appropriate		☢☢ 0.1-1mSv		3	n/a	0	0	0	0	0	0	0	0	0
FDG-PEM	Usually not appropriate		☢☢☢☢ 10-30 mSv		1	n/a	0	0	0	0	0	0	0	0	0
Image-guided core biopsy breast	Usually not appropriate		Varies		1	n/a	0	0	0	0	0	0	0	0	0

Image-guided fine needle aspiration breast	Usually not appropriate		Varies		1	n/a	0	0	0	0	0	0	0	0	0
MRI breast without and with IV contrast	Usually not appropriate		O 0 mSv	O 0 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0
MRI breast without IV contrast	Usually not appropriate		O 0 mSv	O 0 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0
Mammography diagnostic	Usually not appropriate		☢☢ 0.1-1mSv		1	n/a	0	0	0	0	0	0	0	0	0
Sestamibi MBI	Usually not appropriate		☢☢☢ 1-10 mSv		1	n/a	0	0	0	0	0	0	0	0	0

Variant 6: Palpable breast mass. Female, younger than 30 years of age, initial evaluation. (See Appendices 2A-2B for additional steps in the workup of these patients.)

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		O 0 mSv	O 0 mSv [ped]	9	n/a	0	0	0	0	0	0	0	0	0
Mammography diagnostic	Usually not appropriate		☢☢ 0.1-1mSv		3	n/a	0	0	0	0	0	0	0	0	0
Digital breast tomosynthesis diagnostic	Usually not appropriate		☢☢ 0.1-1mSv		3	n/a	0	0	0	0	0	0	0	0	0
FDG-PEM	Usually not appropriate		☢☢☢☢ 10-30 mSv		1	n/a	0	0	0	0	0	0	0	0	0
Image-guided core biopsy breast	Usually not appropriate		Varies		1	n/a	0	0	0	0	0	0	0	0	0
Image-guided fine needle aspiration breast	Usually not appropriate		Varies		1	n/a	0	0	0	0	0	0	0	0	0
MRI breast without and with IV contrast	Usually not appropriate		O 0 mSv	O 0 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0

MRI breast without IV contrast	Usually not appropriate		O 0 mSv	O 0 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0
Sestamibi MBI	Usually not appropriate		☢☢☢ 1-10 mSv		1	n/a	0	0	0	0	0	0	0	0	0

Variant 7: Palpable breast mass. Female, younger than 30 years of age, US findings suspicious for malignancy. Next examination to perform. (See Appendix 2A for additional steps in the workup of these patients.)

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
Image-guided core biopsy breast	Usually appropriate		Varies		9	n/a	0	0	0	0	0	0	0	0	0
Mammography diagnostic	Usually appropriate		☢☢ 0.1-1mSv		8	n/a	0	0	0	0	0	0	0	0	0
Digital breast tomosynthesis diagnostic	Usually appropriate		☢☢ 0.1-1mSv		8	n/a	0	0	0	0	0	0	0	0	0
FDG-PEM	Usually not appropriate		☢☢☢☢ 10-30 mSv		1	n/a	0	0	0	0	0	0	0	0	0
Image-guided fine needle aspiration breast	Usually not appropriate		Varies		1	n/a	0	0	0	0	0	0	0	0	0
MRI breast without and with IV contrast	Usually not appropriate		O 0 mSv	O 0 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0
MRI breast without IV contrast	Usually not appropriate		O 0 mSv	O 0 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0
US breast short interval follow-up	Usually not appropriate		O 0 mSv	O 0 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0
Sestamibi MBI	Usually not appropriate		☢☢☢ 1-10 mSv		1	n/a	0	0	0	0	0	0	0	0	0

Variant 8: Palpable breast mass. Female, younger than 30 years of age, US findings probably benign. Next examination to perform. (See Appendix 2B for additional steps in the workup of these patients.)

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
US breast short interval follow-up	Usually appropriate		O 0 mSv	O 0 mSv [ped]	9	n/a	0	0	0	0	0	0	0	0	0
Image-guided core biopsy breast	Usually not appropriate		Varies		3	n/a	0	0	0	0	0	0	0	0	0
Mammography diagnostic	Usually not appropriate		☢☢ 0.1-1mSv		3	n/a	0	0	0	0	0	0	0	0	0
Digital breast tomosynthesis diagnostic	Usually not appropriate		☢☢ 0.1-1mSv		3	n/a	0	0	0	0	0	0	0	0	0
Image-guided fine needle aspiration breast	Usually not appropriate		Varies		2	n/a	0	0	0	0	0	0	0	0	0
MRI breast without and with IV contrast	Usually not appropriate		O 0 mSv	O 0 mSv [ped]	2	n/a	0	0	0	0	0	0	0	0	0
FDG-PEM	Usually not appropriate		☢☢☢☢ 10-30 mSv		1	n/a	0	0	0	0	0	0	0	0	0
MRI breast without IV contrast	Usually not appropriate		O 0 mSv	O 0 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0
Sestamibi MBI	Usually not appropriate		☢☢☢ 1-10 mSv		1	n/a	0	0	0	0	0	0	0	0	0

Variant 9: Palpable breast mass. Female, younger than 30 years of age, US findings benign (like simple cyst). Next examination to perform.

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

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
Image-guided fine needle aspiration breast	Usually not appropriate		Varies		2	n/a	0	0	0	0	0	0	0	0	0
Mammography diagnostic	Usually not appropriate		☢☢ 0.1-1mSv		2	n/a	0	0	0	0	0	0	0	0	0
US breast short interval follow-up	Usually not appropriate		O 0 mSv	O 0 mSv [ped]	2	n/a	0	0	0	0	0	0	0	0	0
Digital breast tomosynthesis diagnostic	Usually not appropriate		☢☢ 0.1-1mSv		2	n/a	0	0	0	0	0	0	0	0	0
FDG-PEM	Usually not appropriate		☢☢☢☢ 10-30 mSv		1	n/a	0	0	0	0	0	0	0	0	0
Image-guided core biopsy breast	Usually not appropriate		Varies		1	n/a	0	0	0	0	0	0	0	0	0
MRI breast without and with IV contrast	Usually not appropriate		O 0 mSv	O 0 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0
MRI breast without IV contrast	Usually not appropriate		O 0 mSv	O 0 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0
Sestamibi MBI	Usually not appropriate		☢☢☢ 1-10 mSv		1	n/a	0	0	0	0	0	0	0	0	0

Variant 10: Palpable breast mass. Female, younger than 30 years of age, US findings negative. Next examination to perform.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
Mammography diagnostic	Usually not appropriate		☢☢ 0.1-1mSv		3	n/a	0	0	0	0	0	0	0	0	0
Digital breast tomosynthesis diagnostic	Usually not appropriate		☢☢ 0.1-1mSv		3	n/a	0	0	0	0	0	0	0	0	0

MRI breast without and with IV contrast	Usually not appropriate		O 0 mSv	O 0 mSv [ped]	2	n/a	0	0	0	0	0	0	0	0	0
FDG-PEM	Usually not appropriate		☢☢☢☢ 10-30 mSv		1	n/a	0	0	0	0	0	0	0	0	0
Image-guided core biopsy breast	Usually not appropriate		Varies		1	n/a	0	0	0	0	0	0	0	0	0
Image-guided fine needle aspiration breast	Usually not appropriate		Varies		1	n/a	0	0	0	0	0	0	0	0	0
MRI breast without IV contrast	Usually not appropriate		O 0 mSv	O 0 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0
US breast short interval follow-up	Usually not appropriate		O 0 mSv	O 0 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0
Sestamibi MBI	Usually not appropriate		☢☢☢ 1-10 mSv		1	n/a	0	0	0	0	0	0	0	0	0

Variant 11: Palpable breast mass. Female, 30 to 39 years of age, initial evaluation. (See Appendix 3 for additional steps in the workup of these patients.)

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		☢☢ 0.1-1mSv		8	n/a	0	0	0	0	0	0	0	0	0
US breast	Usually appropriate		O 0 mSv	O 0 mSv [ped]	8	n/a	0	0	0	0	0	0	0	0	0
Digital breast tomosynthesis diagnostic	Usually appropriate		☢☢ 0.1-1mSv		8	n/a	0	0	0	0	0	0	0	0	0
MRI breast without and with IV contrast	Usually not appropriate		O 0 mSv	O 0 mSv [ped]	2	n/a	0	0	0	0	0	0	0	0	0
FDG-PEM	Usually not appropriate		☢☢☢☢ 10-30 mSv		1	n/a	0	0	0	0	0	0	0	0	0

Image-guided core biopsy breast	Usually not appropriate		Varies		1	n/a	0	0	0	0	0	0	0	0	0
Image-guided fine needle aspiration breast	Usually not appropriate		Varies		1	n/a	0	0	0	0	0	0	0	0	0
MRI breast without IV contrast	Usually not appropriate		O 0 mSv	O 0 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0
Sestamibi MBI	Usually not appropriate		☢☢☢ 1-10 mSv		1	n/a	0	0	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.**