American College of Radiology
ACR Appropriateness Criteria®

Stage I Breast Cancer: Initial Workup and Surveillance for Local Recurrence and Distant Metastases in Asymptomatic Women

Variant 1: Newly diagnosed. Stage I breast cancer. Asymptomatic. Rule out bone metastases. Initial imaging.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
FDG-PET/CT whole body	Usually not appropriate	Strong	☢☢☢☢ 10-30 mSv		2	n/a	0	0	0	0	0	0	0	0	0

References	Study Quality
6 (27422453)	4
12 (15668281)	3
13 (20516453)	3
14 (21969709)	3
15 (21076343)	2
16 (29025377)	4

Tc-99m bone scan whole body	Usually not appropriate	Moderate	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0

References	Study Quality
11 (3338047)	4
17 (8427400)	3
18 (3373314)	3
19 (3565316)	4
20 (4064511)	4
21 (213852)	3
22 (7848404)	1

Radiography skeletal survey	Usually not appropriate	Limited	☢☢☢ 1-10 mSv	☢☢☢ 0.3-3 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0

References	Study Quality
11 (3338047)	4

Variant 2: Newly diagnosed. Stage I breast cancer. Asymptomatic. Rule out thoracic metastases. Initial imaging.

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 not appropriate	Limited	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	2	n/a	0	0	0	0	0	0	0	0	0

References	Study Quality
27 (21298335)	3

CT chest without IV contrast	Usually not appropriate	Limited	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	2	n/a	0	0	0	0	0	0	0	0	0

References	Study Quality
27 (21298335)	3

CT chest without and with IV contrast	Usually not appropriate	Limited	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	2	n/a	0	0	0	0	0	0	0	0	0

References	Study Quality
27 (21298335)	3

FDG-PET/CT whole body	Usually not appropriate	Limited	☢☢☢☢ 10-30 mSv		2	n/a	0	0	0	0	0	0	0	0	0

References	Study Quality
6 (27422453)	4
12 (15668281)	3
16 (29025377)	4

Radiography chest	Usually not appropriate	Limited	☢ <0.1 mSv	☢ <0.03 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0

References	Study Quality
11 (3338047)	4
12 (15668281)	3
23 (8164036)	4
24 (12000220)	3
25 (2714345)	4
26 (8182811)	1

Variant 3: Newly diagnosed. Stage I breast cancer. Asymptomatic. Rule out abdominal metastases. Initial imaging.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
CT abdomen with IV contrast	Usually not appropriate	Limited	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	2	n/a	0	0	0	0	0	0	0	0	0

References	Study Quality
27 (21298335)	3
29 (3490743)	4

CT abdomen without IV contrast	Usually not appropriate	Limited	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	2	n/a	0	0	0	0	0	0	0	0	0

References	Study Quality
27 (21298335)	3
29 (3490743)	4

CT abdomen without and with IV contrast	Usually not appropriate	Limited	☢☢☢☢ 10-30 mSv	☢☢☢☢☢ 10-30 mSv [ped]	2	n/a	0	0	0	0	0	0	0	0	0

References	Study Quality
27 (21298335)	3

		29 (3490743)		4												
MRI abdomen without IV contrast	Usually not appropriate	Limited	O 0 mSv	O 0 mSv [ped]	2	n/a	0	0	0	0	0	0	0	0	0
		References		Study Quality												
		29 (3490743)		4												
MRI abdomen without and with IV contrast	Usually not appropriate	Limited	O 0 mSv	O 0 mSv [ped]	2	n/a	0	0	0	0	0	0	0	0	0
		References		Study Quality												
		29 (3490743)		4												
FDG-PET/CT whole body	Usually not appropriate	Limited	☢☢☢☢ 10-30 mSv		2	n/a	0	0	0	0	0	0	0	0	0
		References		Study Quality												
		6 (27422453)		4												
		12 (15668281)		3												
		16 (29025377)		4												
US abdomen	Usually not appropriate	Limited	O 0 mSv	O 0 mSv [ped]	2	n/a	0	0	0	0	0	0	0	0	0
		References		Study Quality												
		11 (3338047)		4												
		26 (8182811)		1												
		30 (6258861)		4												
		31 (7208864)		4												
		32 (11387916)		4												

Variant 4: Newly diagnosed. Stage I breast cancer. Asymptomatic. Rule out brain metastases. Initial imaging.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
MRI head without IV contrast	Usually not appropriate	Limited	O 0 mSv	O 0 mSv [ped]	2	n/a	0	0	0	0	0	0	0	0	0

		References		Study Quality												
		33 (3317495)		2												
		37 (3275962)		4												
		38 (1902031)		4												
MRI head without and with IV contrast	Usually not appropriate	Limited	O 0 mSv	O 0 mSv [ped]	2	n/a	0	0	0	0	0	0	0	0	0
		References		Study Quality												
		33 (3317495)		2												
		37 (3275962)		4												
		38 (1902031)		4												
FDG-PET/CT whole body	Usually not appropriate	Limited	☢☢☢☢ 10-30 mSv		2	n/a	0	0	0	0	0	0	0	0	0
		References		Study Quality												
		6 (27422453)		4												
		12 (15668281)		3												
		16 (29025377)		4												
CT head with IV contrast	Usually not appropriate	Limited	☢☢☢ 1-10 mSv	☢☢☢ 0.3-3 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0
		References		Study Quality												
		35 (3341548)		4												
		36 (22740201)		4												
CT head without IV contrast	Usually not appropriate	Limited	☢☢☢ 1-10 mSv	☢☢☢ 0.3-3 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0
		References		Study Quality												
		35 (3341548)		4												
		36 (22740201)		4												
CT head without and with IV contrast	Usually not appropriate	Limited	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0
		References		Study Quality												
		35 (3341548)		4												

36 (22740201)	4

Variant 5: Surveillance. Stage I breast cancer. Asymptomatic. Rule out bone, thoracic, abdominal, and brain metastases. Initial imaging.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
CT abdomen with IV contrast	Usually not appropriate	Limited	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0

References	Study Quality
7 (26314782)	4
8 (-3146467)	4
9 (-3146470)	4
10 (23601761)	4

CT abdomen without IV contrast	Usually not appropriate	Limited	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0

References	Study Quality
7 (26314782)	4
8 (-3146467)	4
9 (-3146470)	4
10 (23601761)	4

CT abdomen without and with IV contrast	Usually not appropriate	Limited	☢☢☢☢ 10-30 mSv	☢☢☢☢☢ 10-30 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0

References	Study Quality
7 (26314782)	4
8 (-3146467)	4
9 (-3146470)	4
10 (23601761)	4

CT chest with IV contrast	Usually not appropriate	Limited	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0

References	Study Quality
7 (26314782)	4
8 (-3146467)	4
9 (-3146470)	4
10 (23601761)	4

CT chest without IV contrast	Usually not appropriate	Limited	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0

References	Study Quality
7 (26314782)	4
8 (-3146467)	4
9 (-3146470)	4
10 (23601761)	4

CT chest without and with IV contrast	Usually not appropriate	Limited	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0

References	Study Quality
7 (26314782)	4
8 (-3146467)	4
9 (-3146470)	4
10 (23601761)	4

CT head with IV contrast	Usually not appropriate	Limited	☢☢☢ 1-10 mSv	☢☢☢ 0.3-3 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0

References	Study Quality
7 (26314782)	4
8 (-3146467)	4
9 (-3146470)	4
10 (23601761)	4

CT head without IV contrast	Usually not appropriate	Limited	☢☢☢ 1-10 mSv	☢☢☢ 0.3-3 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0

References	Study Quality
7 (26314782)	4
8 (-3146467)	4
9 (-3146470)	4
10 (23601761)	4

CT head without and with IV contrast	Usually not appropriate	Limited	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0

References	Study Quality
7 (26314782)	4
8 (-3146467)	4
9 (-3146470)	4
10 (23601761)	4

MRI abdomen without IV contrast	Usually not appropriate	Limited	O 0 mSv	O 0 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0

References	Study Quality
7 (26314782)	4
8 (-3146467)	4
9 (-3146470)	4
10 (23601761)	4

MRI abdomen without and with IV contrast	Usually not appropriate	Limited	O 0 mSv	O 0 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0

References	Study Quality
7 (26314782)	4
8 (-3146467)	4
9 (-3146470)	4
10 (23601761)	4

MRI head without IV contrast	Usually not appropriate	Limited	O 0 mSv	O 0 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0

References	Study Quality
7 (26314782)	4
8 (-3146467)	4
9 (-3146470)	4
10 (23601761)	4

MRI head without and with IV contrast	Usually not appropriate	Limited	O 0 mSv	O 0 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0

References	Study Quality
7 (26314782)	4
8 (-3146467)	4
9 (-3146470)	4
10 (23601761)	4

Tc-99m bone scan whole body	Usually not appropriate	Limited	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0

References	Study Quality
7 (26314782)	4
8 (-3146467)	4
9 (-3146470)	4
10 (23601761)	4

FDG-PET/CT whole body	Usually not appropriate	Limited	☢☢☢☢ 10-30 mSv		1	n/a	0	0	0	0	0	0	0	0	0

References	Study Quality
7 (26314782)	4
8 (-3146467)	4
9 (-3146470)	4
10 (23601761)	4

US abdomen	Usually not appropriate	Limited	O 0 mSv	O 0 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0

References	Study Quality
7 (26314782)	4

		8 (-3146467)		4											
		9 (-3146470)		4											
		10 (23601761)		4											
Radiography chest	Usually not appropriate	Limited	☢ <0.1 mSv	☢ <0.03 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0
		References		Study Quality											
		7 (26314782)		4											
		8 (-3146467)		4											
		9 (-3146470)		4											
		10 (23601761)		4											
Radiography skeletal survey	Usually not appropriate	Limited	☢☢☢ 1-10 mSv	☢☢☢ 0.3-3 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0
		References		Study Quality											
		7 (26314782)		4											
		8 (-3146467)		4											
		9 (-3146470)		4											
		10 (23601761)		4											

Variant 6: Surveillance. Stage I breast cancer. Asymptomatic. Rule out local recurrence.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
Mammography diagnostic bilateral	Usually appropriate	Limited	☢☢ 0.1-1mSv		9	n/a	0	0	0	0	0	0	0	0	0
		References		Study Quality											
		6 (27422453)		4											
Digital breast tomosynthesis diagnostic	Usually appropriate	Strong	☢☢ 0.1-1mSv		9	n/a	0	0	0	0	0	0	0	0	0
		References		Study Quality											
		6 (27422453)		4											

		57 (23345348)		2												
		58 (23620367)		2												
		59 (23255766)		3												
		60 (23844366)		3												
Mammography screening	Usually appropriate	Limited	☢☢ 0.1-1mSv		8	n/a	0	0	0	0	0	0	0	0	0
		References		Study Quality												
		8 (-3146467)		4												
		39 (17033037)		4												
		48 (18206623)		0												
		49 (22692036)		0												
		50 (17548838)		4												
		51 (16409580)		4												
		52 (18368477)		4												
Digital breast tomosynthesis screening	Usually appropriate	Strong	☢☢ 0.1-1mSv		8	n/a	0	0	0	0	0	0	0	0	0
		References		Study Quality												
		53 (23175484)		2												
		54 (24354377)		2												
		55 (24484063)		1												
		56 (24475859)		3												
MRI breast without and with IV contrast bilateral	May be appropriate	Limited	O 0 mSv	O 0 mSv [ped]	5	n/a	0	0	0	0	0	0	0	0	0
		References		Study Quality												
		61 (23889950)		3												
		62 (22476755)		4												
		63 (17392385)		4												
		64 (20651211)		3												
		65 (28655029)		4												
US breast bilateral	May be appropriate	Moderate	O 0 mSv	O 0 mSv [ped]	5	n/a	0	0	0	0	0	0	0	0	0

		References		Study Quality												
		68 (18477782)		1												
MRI breast without IV contrast bilateral	Usually not appropriate	Limited	O 0 mSv	O 0 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0
		References		Study Quality												
		61 (23889950)		3												
		62 (22476755)		4												
		63 (17392385)		4												
		64 (20651211)		3												
		65 (28655029)		4												

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.**