APPENDIX A — MRI LEXICON SUMMARY FORM

ACR BI-RADS® — MRI LEXICON SUMMARY FORM

For each of the following categories, select the term that best describes the dominant lesion feature.

BREAST TISSUE		
A. Amount of fibroglandular tissue (FGT)		
A. Almost entirely fatty		
B. Scattered fibroglandular tissue		
C. Heterogeneous fibroglandular tissue		
D. Extreme fibroglandular tissue		
B. Background parenchymal enhancement (BPE): Primarily assessed on the first post-contrast image; subtraction and MIP imaging may give additional information		
1. Level *(select one)*	a. Minimal	Includes no enhancement
	b. Mild	
	c. Moderate	
	d. Marked	
2. Symmetry	a. Symmetric	
	b. Asymmetric	
FINDINGS		
C. Masses: 3-dimensional space-occupying lesions		
1. Shape *(select one)*	a. Oval	Elliptical or egg-shaped
	b. Lobulated	One or more indentations resulting in an undulating contour
	c. Round	Spherical, ball-shaped, similar in diameter in all three axes
	d. Irregular	Neither oval, lobulated nor round, with acute angle protruding portions
2. Margin *(select one)*	a. Circumscribed	Entire margin is sharply demarcated with abrupt transition between the finding and surrounding tissue
	b. Non-circumscribed	
	i. Indistinct	Uneven edges (but not spiculated)
	ii. Spiculated	Characterized by lines radiating from the mass
3. Internal enhancement pattern *(select one)*	a. Homogeneous	Confluent uniform enhancement
	b. Dark internal septations	Dark non-enhancing lines within a mass
	c. Heterogeneous	Varied, non-uniform enhancement signal intensity
	d. Thick rim enhancement	Thick enhancement at the periphery of mass
4. T2 signal intensity	a. Hyperintense	Mass is uniformly bright; “lymph node bright”
	b. Not hyperintense	Not uniformly bright or “lymph node bright”

D. Non-mass enhancement (NME): A unique area of enhancement that is not a mass and is distinct from BPE		
1. Distribution *(select one)*	a. Diffuse	Enhancement distributed randomly through a large portion of the breast
	b. Regional	Enhancement in a large volume of tissue (typically more than one quadrant) but not diffuse and does not follow a segmental or linear distribution
	c. Focal	Localized and occupies less that one quadrant and does not follow a segmental or linear distribution
	d. Linear	Enhancement arrayed in a line or a line that branches (not necessarily a straight line)
	e. Segmental	Triangular or cone shaped region of enhancement, apex pointing to nipple, suggesting a duct or its branches
2. Internal enhancement pattern *(select one)*	a. Homogeneous	Confluent uniform enhancement
	b. Heterogeneous	Non-uniform enhancement in a random pattern, separated by normal tissue or fat
	c. Clumped	Enhancement of varying shapes and sizes with cobblestone or beaded enhancement, with occasional confluent areas
	d. Clustered ring	Rings of enhancement around ducts
E. Enhancement kinetics: Description of enhancement characteristics during injection of contrast medium		
1. Early phase	Enhancement-related signal intensity within the first 60–120 seconds after contrast injection	
	a. Slow	< 50% increase in signal intensity
	b. Medium	50–100% increase in signal intensity
	c. Fast	> 100% increase in signal intensity
2. Delayed phase	Enhancement-related signal intensity after the first 60–120 seconds after contrast injection or when the curve begins to change	
	a. Persistent	Signal intensity increases > 10% compared to early phase
	b. Plateau	Signal intensity increases or decreases ≤ 10% compared to early phase
	c. Washout	Signal intensity decreases > 10% compared to early phase
F. Lymph nodes		
1. Intramammary	a. Normal	Circumscribed, reniform, T2 hyperintense, homogeneously enhancing
	b. Abnormal	Subjectively enlarged, possibly non-circumscribed margin
2. Axillary	a. Normal	Circumscribed, reniform, homogeneously enhancing and typically T2 hyperintense
	b. Abnormal	Subjectively asymmetric in cortical thickness compared to other ipsilateral or contralateral axillary lymph nodes, lack of fatty hilum in larger lymph nodes, or have significantly increased in size or cortical thickness compared to a prior exam
3. Internal mammary	a. Normal	May measure up to 9 –10 mm if morphologically normal in screening populations
	b. Abnormal	Subjectively asymmetric in size compared to other ipsilateral or contralateral internal mammary lymph nodes; suspicious if ≥ 5mm in size in patients with current breast cancer

G. Associated Features *(select all that apply)*		
1. Nipple retraction	Nipple is pulled in; do not confuse with nipple inversion	
2. Nipple involvement	Abnormal enhancement involving the nipple when the tumor involves/directly extends into the nipple	
3. Skin retraction	The skin is pulled in abnormally	
4. Skin thickening	May be focal or diffuse; defined as being greater than 2 mm in thickness	
5. Skin involvement	Abnormal enhancement within the skin, either when tumor directly invades or without direct extension (often due to inflammatory breast cancer) via the invasion of the dermal lymphatics	
6. Pectoralis muscle involvement	Abnormal enhancement involving the underlying pectoralis major and/or minor muscle(s)	
7. Chest wall involvement	Abnormal enhancement extending into the ribs or intercostal spaces (behind the pectoralis muscle)	
8. Peritumoral edema	Hyperintense T2 signal is present in the tissue surrounding a malignant or suspicious finding	
H. Other findings, typically benign		
1. High T1 duct signal	Hyperintense signal is present in ducts on T1-weighted images before contrast administration	
2. Cysts	Circumscribed, round or oval, fluid-filled mass with a thin wall. Usually hyperintense on T2 images but may also be hypointense on T2 images and hyperintense on T1 images when their contents are proteinaceous or hemorrhagic. A cyst may have thin peripheral peri-cystic enhancement of the adjacent parenchymal tissue	
3. Postoperative fluid collections (hematoma/seroma)	Often T2 hyperintense and may also have bright signal on T1 weighted imaging due to blood or protein. A fat-fluid layer may be present. May demonstrate thin peripheral enhancement, a benign pattern	
4. Post-therapy skin thickening and trabecular thickening	May be seen following surgery and/or radiation therapy	
5. Non-enhancing mass	Solid masses that do not exhibit enhancement, distinguished from cysts as they do not contain fluid. Subtraction imaging may be useful in confirming absence of enhancement	
6. Signal void	Absence of signal due to susceptibility artifact, typically from a metallic clip or other foreign body	
7. Fat necrosis	Focal collections of fat can be present at sites of prior trauma including surgery	
8. Hamartoma	A focal area of fat and fibroglandular tissue is contained within a pseudocapsule	
9. Enhancing skin lesions	Enhancing lesions of the skin unrelated to a current or suspected breast cancer such as moles, keloids, skin-related cysts (epidermal inclusion or sebaceous) and areas of focal inflammation, all of which may normally enhance	
I. Location of finding		
1. Laterality	Describe right, left or bilateral	
2. Location in breast	Describe clock face (preferred) in whole number, or quadrant or other anatomic location	
3. Depth	Indicate depth (anterior, middle, posterior third)	
4. Distance from nipple	From base of nipple to center of finding in whole cm; include centimeters from the skin, or chest wall as appropriate	
J. Implants and other types of augmentation		
1. Implant location	a. Prepectoral	The implant is located anterior to the pectoralis muscle
	b. Retropectoral	The implant is located deep to portions of the pectoralis major muscle
2. Material	a. Saline	Indicate intact vs ruptured status
	b. Silicone	Indicate intact vs ruptured status
	c. Other implant/augmentation material	Might include autologous (such as TRAM, DIEP and other tissue flaps) tissue, non-autologous tissue (such as fat) and direct injection of materials such as silicone, paraffin, soy oil, polypropylene and polyurethane

3. Lumen type	a. Single	
	b. Double	
4. Intracapsular silicone findings *(select all that apply)*	a. Radial folds	Infolding of the intact elastomer shell. Normal finding
	b. Intracapsular silicone findings	
	i. Subcapsular line sign	Silicone is present between the fibrous capsule and collapsed implant envelope
	ii. Keyhole sign	Silicone is present within the potential space created by the apposed walls of the implant shell or envelope
	iii. Linguine sign	Multiple adjacent hypointense curvilinear lines surrounded by silicone signal
	c. Water droplets	Small drops with water signal intensity on water-specific sequences
5. Extracapsular silicone findings	a. Breast	Free silicone outside the fibrous capsule and within the breast indicates either a current or prior extracapsular (and, by definition, an accompanying intracapsular) rupture
	b. Lymph nodes	Silicone may be present in lymph nodes due to implant rupture (related to a current implant or one previously explanted), but also with intact silicone implants due to "silicone bleed"
6. Focal contour bulge		Focal bulge in the implant contour perhaps due to capsular contraction
7. Peri-implant fluid		Fluid is seen in the space between the implant shell and the capsule on water-specific sequences. A trace amount of peri-implant fluid or effusion around an implant is normal

ASSESSMENT CATEGORIES (select one)

Incomplete Assessment	Management	Likelihood of Cancer
Category 0: Incomplete: Need Additional Imaging Evaluation OR Category 0: Incomplete: Need Prior Imaging for Comparison	Recall for additional imaging Need comparison to prior examination(s)	N/A
Final Assessment	**Management**	**Likelihood of Cancer**
Category 1: Negative	Routine breast screening, including MRI if appropriate according to major guidelines	Essentially 0% likelihood of malignancy
Category 2: Benign	Routine breast screening, including MRI if appropriate according to major guidelines	Essentially 0% likelihood of malignancy
Category 3: Probably Benign	Short-interval (6-month) follow-up or continued surveillance (12-month)	≥ 0% but ≤ 2% likelihood of malignancy
Category 4: Suspicious	Tissue diagnosis	> 2% but < 95% likelihood of malignancy
Category 5: Highly Suggestive of Malignancy	Tissue diagnosis	≥ 95% likelihood of malignancy
Category 6: Known Biopsy-Proven Malignancy	Clinical follow-up with surgeon and/or oncologist, and definitive local therapy (usually surgery) when clinically appropriate	N/A