# APPENDIX A — ULTRASOUND LEXICON SUMMARY FORM

## ACR–BI-RADS® — ULTRASOUND SUMMARY LEXICON FORM

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

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| **BREAST TISSUE** | | |
| **A. Tissue composition:** The background echotexture of the breast may affect the sensitivity of breast sonograms for lesion detection. *(select one)* | | |
| **1. Tissue pattern** | a. Homogeneous background echotexture — fat | Fat lobules and uniformly echogenic bands of supporting structures comprise the bulk of breast tissue |
| | b. Homogeneous background echotexture — fibroglandular | A thick zone of homogeneously echogenic fibroglandular parenchyma is present beneath the isoechoic layer of subcutaneous fat lobules |
| | c. Heterogeneous background echotexture | The breast echotexture is characterized by multiple small areas of relative increased and decreased echogenicity |
| **2. Glandular tissue component** | a. Minimal | GTC is < 25% of the overall fibroglandular tissue (FGT) |
| | b. Mild | GTC is between 25% to 49% of overall FGT |
| | c. Moderate | GTC is between 50% to 74% of overall FGT |
| | d. Marked | GTC is ≥ 75% of overall FGT |
| **FINDINGS** | | |
| **B. Masses:** A mass is 3-dimensional and occupies space. In 2D ultrasound, it should be seen in two different planes; with volumetric acquisitions, in three planes. | | |
| **1. Shape** *(select one)* | a. Oval | Elliptical or egg-shaped |
| | b. Lobulated | Generally oval shape but exhibits one or more indentations resulting in an undulating contour |
| | c. Round | Spherical or ball-shaped |
| | d. Irregular | Neither oval, lobulated or round with acute angle protrusions |
| **2. Orientation** *(select one)* | a. Parallel | The horizontal dimension of the mass is greater than the anteroposterior dimension in all US orientations |
| | b. Non-parallel | The anteroposterior dimension of the mass is equal to or greater than the horizontal dimension in any ultrasound orientation |
| **3. Margin** *(select one)* | a. Circumscribed | Well-defined, with a sharp transition between the mass and the surrounding tissue. For a mass to be described as circumscribed at ultrasound, the entire margin must be sharply defined |
| | b. Non-circumscribed | Any portion of the margin is non-circumscribed |
| | i. Indistinct | All or some portion of the margin is poorly defined or fuzzy with no sharp demarcation from the surrounding tissue |
| | ii. Angular | Some or all of the margin has sharp corners, often forming acute angles |

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| | iii. Microlobulated | Characterized by short-cycle 2–3 mm undulations or ripples. Microlobulated describes the margin while lobulated describes the shape of a mass |
| | iv. Spiculated | Characterized by sharp lines radiating from the mass, often a sign of malignancy |
| **4. Echo pattern** *(select one)* | a. Anechoic | Without internal echoes |
| | b. Hyperechoic | Having increased echogenicity relative to fat or equal to fibroglandular tissue |
| | c. Isoechoic | Same echogenicity as subcutaneous fat and may be relatively inconspicuous |
| | d. Hypoechoic | Less echogenic than fat but not anechoic (i.e., darker gray than fat but not black) |
| | e. Heterogeneous | Displays a mix of echo patterns |
| | f. Mixed solid and cystic | Contains both solid (iso-, hypo-, or hyperechoic) and cystic or fluid (anechoic) components. The important feature is the solid component |
| **5. Posterior features** *(select one)* | a. No posterior features | No shadowing or enhancement deep to the mass |
| | b. Enhancement | An echogenic column deep to the mass is brighter than that seen in the adjacent tissue at a similar depth |
| | c. Shadowing | The area posterior to the mass (shadowing column) is darker than the tissue at the same depth to either side of the mass; edge shadows should be disregarded |
| **C. Non-mass lesions:** A discrete finding that can be identified as distinctly different from normal tissue, is seen in 3 dimensions but lacks the discrete margination of a mass and cannot be assigned a specific shape. *(select one for each category)* | | |
| **1. Distribution** | a. Regional | A large geographic area that does not conform to a linear or segmental distribution |
| | b. Focal | A small, confined area |
| | c. Linear | A longitudinal area arrayed in a line that may conform to a ductal distribution |
| | d. Segmental | A triangular area with base toward the pectoralis muscle and apex toward that nipple that conforms to a segment of the breast |
| **2. Echo pattern** | a. Hyperechoic | Echogenicity is increased relative to fat, often equal to fibroglandular tissue |
| | b. Heterogeneous | Echogenicity that is a mixture of echogenic patterns |
| | c. Hypoechoic | Echogenicity that is decreased relative to fat; darker gray than fat but not black |
| **3. Posterior features** | a. No posterior features | No shadowing or enhancement posterior to the lesion |
| | b. Enhancement | Tissue posterior to the lesion appears brighter and hyperechoic compared to the tissue at the same depth on either side of the lesion |
| | c. Shadowing | Tissue posterior to the lesion appears darker and hypoechoic compared to the tissue at the same depth on either side of the lesion |
| **D. Calcifications:** Calcifications can be recognized as echogenic foci, particularly when in a hypoechoic mass, non-mass lesion or distended lactiferous duct. High-frequency, high-resolution transducers can depict both micro and macrocalcifications, but morphology will not be as readily discernible as at mammography, and correlation with mammography is required for precise analysis. *(select all that apply)* | | |
| **1. Macrocalcifications** | Calcifications that are large enough to attenuate the US beam and are typically associated with posterior shadowing | |
| **2. Microcalcifications** | Tiny echogenic foci on US which are most conspicuous when located within a hypoechoic mass, non-mass lesion or duct | |
| **3. Calcifications in a mass or non-mass lesion** | Calcifications within benign or malignant masses and non-mass lesions depicted on US | |

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| **4. Calcifications outside of a mass or non-mass lesion** | Calcifications situated in fat or fibroglandular tissue which are often less conspicuous than when present within a mass or within a non-mass lesion | |
| **5. Intraductal calcifications outside of a mass** | Calcifications within a lactiferous duct | |
| **E. Associated features** *(select all that apply)* | | |
| **1. Echogenic pseudocapsule** | | Thin white line surrounding an otherwise circumscribed margin which must be uniformly thin and, importantly, must be visible around the entire margin of the mass |
| **2. Echogenic rind** | | A thick echogenic band surrounding all or part of a mass or non-mass lesion which disrupts the texture of the normal tissue surrounding |
| **3. Architectural distortion** | | Thin lines radiating from a point and/or focal retraction or straightening of the breast parenchyma, representing distortion of tissue planes |
| **4. Duct changes** | | Manifested by cystic dilation of a duct or ducts involving irregularities in caliber and/or arborization, extension of duct(s) to or from a malignant mass, or the presence of an intraductal mass, thrombus, or detritus |
| **5. Skin changes** *(select one)* | a. Skin thickening | Focal or diffuse skin thickening-more than 2 mm in thickness (up to 4 mm in the periareolar area and inframammary fold) |
| | b. Skin retraction | The skin surface is concave, indented, and appears fixed |
| **6. Edema** | | Characterized by interconnected, arborizing hypoechoic or anechoic lines, representing either dilated lymphatics or interstitial fluid |
| **7. Vascularity** *(select one)* | a. Avascular | No vascularity on color or power Doppler |
| | b. Internal vascularity | Blood vessels are present within the finding |
| | c. Peripheral hypervascularity | A high number of blood vessels around the margin of a breast abnormality |
| **8. Elasticity assessment** *(select one)* | | Stiffness as a feature of masses may be considered along with their much more important morphologic characteristics |
| | a. Soft | The finding stiffness is soft; tend to be benign, though there are exceptions |
| | b. Intermediate | Mixed hard and soft stiffness |
| | c. Hard | Hard stiffness; tend to be malignant, though there are exceptions |
| **F. Special cases:** Cases with a unique diagnosis or pathognomonic findings. *(select all that apply)* | | |
| **1. Simple cyst** | | Mass that is circumscribed, round or oval, circumscribed, anechoic, characterized by thin wall and often shows posterior enhancement |
| **2. Clustered microcysts** | | Consists of a cluster of anechoic masses, with thin (< 0.5 mm) intervening septations and *no discrete solid* component within any of the locules |
| **3. Complicated cysts** | | Characterized by homogeneous low-level internal echoes; may have layered appearance which may shift slowly with changes in the patient's position; may contain echogenic foci that appear to scintillate as they shift |
| **4. Mass in or on skin** | | These masses are clinically apparent and may include sebaceous or epidermal inclusion cysts, keloids, moles, pimples, neurofibromas, and accessory nipples |
| **5. Foreign body** | | May include biopsy marker clips or localization seeds, surgical clips, wires, retained catheter sleeves, cardiac devices, injected or leaked silicone or paraffin, metal or glass related to trauma |

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| **6. Implants** | | Both silicone and saline within normal implants will appear anechoic with a curvilinear echogenic capsule |
| **7. Postsurgical changes, including fluid collection** | | Some changes involve fluid collections, especially postoperative seromas that appear entirely cystic or may have septations, internal debris or contain both cystic and solid-appearing components, but they should be avascular. Most other postsurgical findings, especially those involving scar tissue, may display suspicious findings, such as shadowing, hypoechogenicity, irregular shape, occasionally spiculated margin, and/or architectural distortion |
| **8. Fat necrosis** | | May be related to surgical or non-surgical breast trauma and has a variety of appearances on US |
| **9. Post-traumatic (non-surgical changes)** | | Findings consistent with a hematoma in the acute phase that will evolve over time, or fat necrosis which is seen later in the evolution of post-trauma changes |
| **10. Abscess** | | Typically present with a palpable breast lump associated with pain, swelling, and erythema |
| **11. Vascular abnormalities** | a. AVMs (arteriovenous malformations/ pseudoaneurysms | Usually benign. May be developmental (AVMs) or acquired (pseudoaneurysms) |
| | b. Superficial thrombophlebitis (Mondor's disease) | Typically presents as a palpable cord with or without associated pain |
| **G. Lymph nodes** *(select all that apply)* | | |
| **1. Intramammary** | | May exist throughout the breast, but most commonly seen in the upper outer quadrant (especially the axillary tail). May be seen adjacent to blood vessels. The usual size of normal ranges from 3 to 4 mm up to approximately 1 cm, but they may be larger. |
| **2. Axillary** | a. Level I | Lateral to the lateral margin of the pectoralis minor muscle |
| | b. Level II | Posterior to the pectoralis minor muscle, or between the pectoralis major and pectoralis minor muscles (also known as interpectoral node or Rotter's node) |
| | c. Level III | Medial to the medial margin of the pectoralis minor muscle |
| **3. Internal mammary** | | Using the sternum and ribs as landmarks, internal mammary spaces 1 through 4 may be imaged with ultrasound |
| **4. Supraclavicular** | | Tumor involvement of the ipsilateral supraclavicular node(s) is the highest N stage that is still confined to regional disease (N3c) |
| **H. Location of finding** | | |
| **1. Laterality** | Indicates right or left breast | |
| **2. Location in breast** | Clock face (preferred) or quadrant (for large findings) | |
| **3. Depth and/or distance from nipple** | Distance from nipple is measured from base of nipple to center of finding | |

| **ASSESSMENT CATEGORIES** (select one) | | |
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| **Incomplete Assessment** | **Management** | **Likelihood of Cancer** |
| Category 0: Incomplete: Need Additional Imaging Evaluation<br>OR<br>Category 0: Incomplete: Need Prior Imaging for Comparison | Recall for additional imaging<br><br>Need comparison to prior exam (s) | N/A |

| Final Assessment | Management | Likelihood of Cancer |
|---|---|---|
| Category 1: Negative | Routine screening | Essentially 0% likelihood of malignancy |
| Category 2: Benign | Routine screening | 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 |