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REVIEW / *Breast Imaging*

BI-RADS® fifth edition: A summary of changes

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Abstract The Breast Imaging Reporting and Data System (BI-RADS®) is a standardized system of reporting breast pathology as seen on mammogram, ultrasound, and magnetic resonance imaging. It encourages consistency between reports and facilitates clear communication between the radiologist and other physicians by providing a lexicon of descriptors, a reporting structure that relates assessment categories to management recommendations, and a framework for data collection and auditing. This article highlights the changes made to the BI-RADS® atlas 5th edition by comparison with its predecessor, provide a useful resource for a radiologist attempting to review the recent changes to the new edition, and serve as a quick reference to those who have previously become familiar with the material.

The Breast Imaging Reporting and Data System (BI-RADS®) is a standardized system of reporting breast pathology encountered on mammography, ultrasound, and magnetic resonance imaging (MRI). This structured system encourages consistency between reports and facilitates clear communication between the radiologist and other physicians by providing a lexicon of descriptors, a reporting structure that relates assessment categories to management recommendations, and a framework for data collection and auditing [1—3]. Published by the American College of Radiology (ACR), the initial edition of BI-RADS® was created in 1993 [1]. The second, third, and fourth editions were released in 1995, 1998,

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and 2003 respectively [2]. Each edition was built on previous work by clarifying previous terms with an aim toward risk stratification. Furthermore, the inclusion of ultrasound and MRI descriptors promoted congruence across modalities. Artist renderings of pathology, which appeared in the third edition of the lexicon also assisted learning and understanding the framework.

The hiatus between the 4th and 5th lexicon allowed several questions pertaining to the reproducibility of assessment and frequency of certain descriptor use to be evaluated and published. The 5th edition of BI-RADS® released in 2013 ushered in numerous changes geared toward these goals. These changes include multiple new descriptors added in recognition of the increasing risk of malignancy an image finding represents, historic descriptors removed due to underutilization or redundant application, and name changes to pre-existing descriptors to align descriptions across the three imaging modalities [1,2]. Moreover, newer technology such as shear-wave elastography has been incorporated into the descriptors. Finally, images acquired directly from mammography, ultrasound, and MRI replace artist rendering to demonstrate pathology in the 5th edition.

The purpose of this paper was to summarize the changes introduced within the newest edition of BI-RADS®. It is the hope of the authors that this review will provide a useful resource for a radiologist attempting to review the recent changes to the new edition and serve as a quick reference to those who have previously become familiar with the material.

Mammography

Breast composition

Breast composition or density is a comparison of the relative amounts of fat *versus* fibroglandular tissue in the breast. In the 4th edition of lexicon, composition was associated with percent values of fibroglandular tissue as assessed by the radiologist.

The terms available to describe breast composition on a mammogram no longer include percentage quartiles (Table 1). Radiologists' assessment of numeric quartiles has consistently been mismatched with automated volume calculations particularly as fibroglandular volume increases [4].

Table 1 Summary of changes within mammography between the BI-RADS® 4th and 5th editions [3].

	4th edition	5th edition
Breast composition	Previously based on percentages (A) Almost entirely fat (less than 25%) (B) Scattered fibroglandular densities (25—50%) (C) Heterogeneously dense (50—75%) (D) Extremely dense (greater than 75%)	Percentages removed: (A) The breasts are almost entirely fatty (B) There are scattered areas of fibroglandular density (C) The breasts are heterogeneously dense, which may obscure small masses (D) The breasts are extremely dense, which lowers the sensitivity of mammography
Masses	Historically masses: shape: lobular	Removed in the 5th edition
Calcifications: typically benign: rim and lucent-centered calcifications	Historically rim, eggshell or lucent-centered calcifications	Renamed to calcifications: typically benign: rim
Calcifications: suspicious morphology	Historic categories removed: intermediate concern, suspicious calcifications and higher probability malignancy	Now a single category calcifications: suspicious morphology
Asymmetries	Historically special cases: global asymmetry and focal asymmetry	Asymmetries: (A) Asymmetry (B) Global asymmetry (C) Focal asymmetry (D) Developing asymmetry
Intramammary lymph node and solitary dilated duct categories	Historically located within special cases	New separate categories
Skin lesion	Historically located within associated features	New separate category
Location of lesion: distance from the nipple	Historically only depth was available to describe distance from the nipple	New in 5th edition
Use of radiopaque markers		Definition of use expanded
Assessment categories 3, 4, and 5		Assigned after diagnostic workup completed (not appropriate for screening examinations)

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