



Enhancing Breast Radiology Education through Interactive Web-based Learning: A Single-Center Initiative at UCLA Health Radiology



Fadi Dahoud, BS. Lucy Chow, MD. Milan Carter, BS. Parsa Asachi, BS. Hsu Yungchow, Cheryce Fischer, MD. Bo Li, MD.

Department of Radiology, UCLA

Introduction

The field of radiology is rapidly evolving, with increases in image volume and the continual development of new technology. However, the approach to medical education has changed less in comparison, mainly relying on a didactic approach.

Thus, innovations in teaching are needed to provide comprehensive, case-based, and interactive learning experiences to medical students, residents, and fellows.

Recognizing this need, the UCLA Breast Radiology Department created a dedicated website for Breast Imaging education with a goal to create a free and open-access resource in the form of comprehensive, bite-sized, and interactive articles.

Methods

- A website was created and named "Breast Imaging Teaching Resource" (Figure 1) under UCLA Health / Radiology Department with a dedicated website manager who performs coding and uploading of content.
- A medical students coordinate the entire initiative as well as fine tunes articles under the guidance of two fellowship-trained Breast imaging radiologists who oversee the initiative.
- During the beginning of a resident's breast imaging rotation, he/she/they is/are greeted and briefed about the initiative by one of the medical students and is then paired with a fellowship-trained breast imaging faculty mentor.

- The article drafting process begins by:
 - The resident selecting a topic from an already established comprehensive list (Figure 2) of pertinent breast imaging topics. Topics have been created to create a solid foundation for breast imaging and for board review preparation.
 - The finalized article is then published on the website AFTER it has been reviewed by the paired faculty member to ensure that it is up-to-date and to evaluate its accuracy.

These articles are then organized under six major sections found on the website main page (Figure 1):

1. Screening Mammograms
2. BI-RADS Terminology
3. Diagnostic Workup Strategies
4. Interesting Cases
5. Additional Resources
6. Pathology

We will soon include a 7th section describing Procedures.

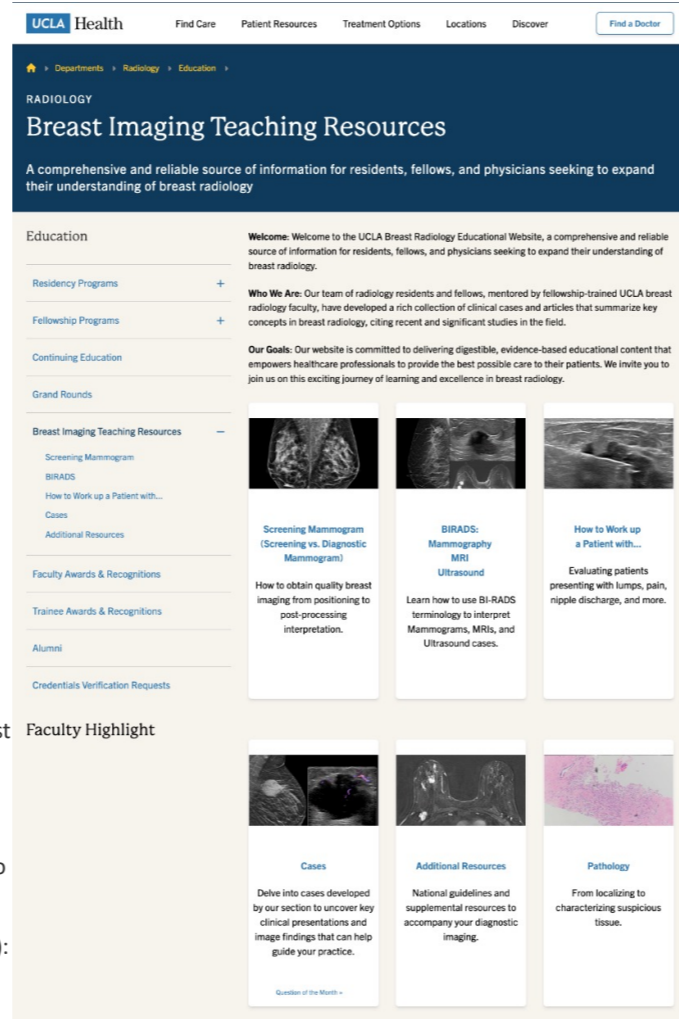


Figure 1. Format of the home page of the UCLA Health Breast Imaging Teaching Resource. Showing: The mission of the initiative, Our mission, Our goals as well as the six sections that the finalized articles are published under.

Topic	Published
Home Page	Published
Screening Mammogram: High Risk Patient Population (Who is high risk for breast cancer?)	Published
Regulations and Standards	Published
Positioning and Technique	Published
2D vs 3D Tomosynthesis	Published
Anatomy	Published
How to Read a Mammogram	Published
Lesion Localization	Published
BI-RADS: Mammography	Published
Breast Composition: The Impact of Dense Breasts	Published
Masses	Published
Calcifications	Published
Architectural Distortion	Published
Asymmetries	Published
BI-RADS: Ultrasound	Published
Basics of Breast Ultrasound	Published
Masses	Published
Calcifications	Published
Associated Features on Ultrasound	Published
BI-RADS: MRI	Published
MRI Indications	Published
MRI Sequences and How to Read a Breast MRI, and BI-RADS	Published
MRI Findings: Foci and Masses	Published
MRI Findings: Non mass enhancement	Published
MRI Findings: Kinetics	Published
MRI Pre-Surgical Findings and Workup	Published
MRI Post-Surgical Findings	Published
MRI of the Implants	Published
How to Work up a Patient With:	Published
Palpable Lump	Published
Pain	Published
Nipple Discharge	Published
Skin Changes	Published
Cases:	Published
Simple cyst, clustered microcysts, complicated cyst	Published
Implants	Published
Lymph nodes, intramammary	Published
Lymph nodes, axillary	Published
Vascular abnormalities (AVM, pseudoaneurysm, Mondor disease)	Published
Postsurgical fluid collection	Published
Fat Necrosis	Published
Skin lesion	Published
Solitary Dilated Duct / Ductal ectasia / Proliferative Ducts / Intraductal findings	Published
Architectural distortion	Published
Skin retraction / thickening / invasion and nipple retraction / inversion	Published
Pectoralis muscle invasion	Published
Chest wall invasion	Published
Fat necrosis	Published
Hematoma / Seroma	Published
Hemangioma	Published
Invasive Ductal Carcinoma	Published
Invasive Lobular Carcinoma	Published
Mastitis	Published
Inflammatory Carcinoma	Published
Page's Disease	Published
Accessory Breast Tissue	Published
Idiopathic Granulomatous Mastitis	Published
Malignant male Breast lesions	Published
Stenosis	Published
Non breast finding seeking on breast imaging	Published
Benign Male breast lesions	Published
Fibroadenoma / Phyllodes	Published
DCIS	Published
Papillary Carcinoma	Published
IDC Other Carcinoma Subtypes (mucinous, etc)	Published
Sarcoma	Published
Lymphoma of the Breast	Published
Metastases from non breast primary	Published
FEA	Published
LCIS	Published
Radial Scar	Published
ALH	Published
ADH	Published
"Breast Lesions in Female Transgender Patients"	Published
Benign	Published
Malignant	Published
High risk lesions	Published
How to perform: Wire localization	Published
How to perform: Stereotactic (Mammographic) guided biopsy	Published
How to perform: Ultrasound guided Biopsy	Published
How to perform: Wire free localization	Published
How to perform: MRI guided Biopsy	Published
How to perform: Ductograms	Published
Pathology	Published
Procedures	Published

Figure 2. A list of the topics residents can pick from when choosing which idea they would like to write about. Check marks next to topics indicate the articles published already on the website.

Results

Over 46 articles on various breast imaging topics have been published in the past 2 years.

Articles are concise, case-based, and include descriptive content along with HIPPA compliant images and medical illustrations, creating effective teaching tools for reading, lectures, and solving diagnostic dilemmas.

Articles have been discussed during and have served as patient education materials.

The initiative includes a mentorship program providing residents with feedback from faculty, enhancing their knowledge in specific interest areas.

Survey conducted based on resident feedback have shown an increase in knowledge following the completion of an article. Creation of these articles also gives the opportunities for residents to earn authorship on current and future publications.

Discussion

The UCLA Health Breast Imaging Radiology Department has developed an innovative approach to breast imaging education, utilizing technology and mentorship to enhance the educational experience for residents and medical students.

This initiative promotes self-directed learning through active participation and knowledge sharing under expert guidance.

This model serves as both an up-to-date reference for learners and a tool for patient education, facilitating knowledge dissemination within and beyond the institution.

Access to the educational website is free, offering barrier-free education globally.