

AbstractID:9695 Title : Preliminary study of the accuracy of an automated segmentation algorithm for sonographic breast lesions across different patient populations

**Purpose:** To determine the accuracy and variability of an automated sonographic breast lesions segmentation algorithm when it is used across different patient populations. **Method and Materials:** Two sonographic databases containing images of breast lesions were collected: one consisting of 456 lesions (145 malignant, 311 benign) from patients in Asia (database A), and one consisting of 433 lesions (127 malignant, 306 benign) from patients in the United States (database B). The same model of ultrasound scanner was used to generate the images in both databases. Our average radial derivative-based segmentation method was used to segment all the lesions in each database by using the center of each lesion as the starting seed point. The amount of overlap between the automated segmentation and an outline drawn by a radiologist was calculated for each lesion using  $O = \text{area}(S \cap R) / \text{area}(S \cup R)$  where  $S$  is the automated segmentation and  $R$  is the radiologist-drawn outline. An overlap value of less than 0.4 is considered to be poor. **Results:** In database A, 85% of the lesions had an overlap value of 0.4 or greater. In database B, 80% of the lesions had an overlap value of 0.4 or greater. The automated segmentation performed better on the Asian database ( $p$ -value=0.003). **Conclusion:** While the automated segmentation algorithm performs well on both databases, the disparity in performance raises interesting questions. The difference in performance could be the result of variation in the different radiologist-drawn truths, differences in clinical imaging protocol, or even differences between the breast anatomy of the American and Asian populations. Further investigation is necessary to determine both the cause and magnitude of the variability. **Conflict of Interest:** Research supported in part by NIH. Some authors receive royalties, research funding, and/or are stockholders in Hologic.