AbstractID: 3639 Title: Quantifying Breast Density for Improved Evaluation of Breast Cancer Risk

Purpose: To quantify a preliminary relationship between breast density and acoustic velocity using ultrasound computed tomography. The existence of such a relationship may provide quantitative prognostic information that can be used to determine breast cancer risk.

Method and Materials: A sample of female patients was imaged using the CURE, or Computerized Ultrasound Risk Evaluation, device. The mammographic densities of each patient were assigned by a certified radiologist on a 1 (fatty) to 4 (dense) scale. Regions of interest (160 mm^2) were selected contralateral to present anomalies in multiple adjacent slices centrally located on the breast, away from the chest wall and nipple regions. The minimum, maximum, mean, and standard deviation of the acoustic velocity were recorded for each slice.

Results: This statistical information was then correlated against breast density to investigate the presence of meaningful relationships. Initial assessment of this sample suggests that the maximum sound speed values increase with increasing mammographic density, while the minimum values appear to decrease with increasing density. The mean sound speed shows a weak but steady trend with increasing density. The behavior of these correlations suggests that the intrinsic scatter of sound speeds within the breast tissue is a strong function of the mammographic breast density. However, these relationships are statistically weak due to a small sample size, and further investigation will be required to strengthen this association.

Conclusion: This preliminary examination suggests that a quantifiable relationship between breast density and sound speed may exist. If these results are further validated in larger studies, then it may be possible to utilize CURE measurements to assess breast cancer risk with a quantitative score. Results will be available for forty additional patients in July, and a more definitive conclusion regarding these findings can then be provided.

Conflict of Interest (only if applicable):