

While screening mammography has been shown to be an effective method for the early detection of breast cancer, currently, 5-30% of women with breast cancer have a mammogram that is interpreted as normal. Misses in screening mammography can be attributed to observational errors and/or interpretation errors. It has been reported that interpretation errors (when the radiologist sees the cancer but reports as benign) are the cause of 54% of missed cancers. In addition, only 10-40% of women who have a biopsy actually have breast cancer; with biopsies being expensive, invasive and traumatic to the patient. In addition, there is large inter-observer variability in the interpretation of mammographic lesions. Computer-aided diagnosis (CAD) can be defined as a diagnosis made by a radiologist who takes into consideration the results of a computerized analysis of medical images and uses them as a "second opinion" in making diagnostic decisions. The final diagnosis is made by the radiologist. The potential benefit of CAD in mammography is large since breast cancer is a leading cause of death in women, and CAD gives an opportunity to increase the detection and diagnosis of early breast cancer. This presentation will first review the rationale for computer-aided diagnosis in screening and diagnostic mammography. In addition, methods for computer assistance to physician's diagnostic and decision making will need to satisfy various requirements including accuracy levels, user-friendliness, speed, and patient satisfaction before acceptance becomes widespread. Thus, the final portion of the presentation will include a discussion on the implementation and clinical use of CAD, including prospects for the future.

Conflict of Interest Statement: M. Giger is a shareholder in R2 Technology, Inc, Los Altos, CA.

Educational objectives:

1. Become acquainted with the rationale for computer-aided diagnosis.
2. Learn the current status of CAD as it relates to screening and diagnostic mammography.
3. Appreciate the requirements for ultimate clinical implementation and acceptance of CAD.