

AbstractID: 5406 Title: A comparison of full-field digital and screen-film mammography dose

Purpose: To determine whether mammograms acquired with a full-field digital mammography (FFDM) unit using automatic exposure control (AEC) reduce patient radiation dose and exposure time as compared to screen-film mammograms.

Method and Materials: Exposure techniques and mean glandular dose (MGD) for FFDM and screen-film mammography was compared for breast tissue equivalent attenuation slabs of varying thickness (2-8 cm) and glandular content (0-100%). FFDM images were acquired with a Lorad Selenia unit with AEC set to the manufacturer's recommended levels. Screen-film mammograms were acquired with a Lorad M-IV unit and Kodak Min-R 2000 screen-film system with AEC adjusted for an ACR accreditation phantom optical density of 1.8 OD. In addition, a patient survey including 150 mammograms compared the FFDM exposure techniques and MGD with the patient's corresponding screen-film mammogram acquired 1 year prior. A 50% glandular tissue content was assumed.

Results: For breast tissue equivalent attenuation slabs 4 cm thick or more, FFDM AEC was found to call for higher x-ray beam energy exposures than screen-film, resulting in lower MGD (mean 40%) and exposure time (mean 50%). Below 4 cm, FFDM kVp was lower than screen-film, causing higher MGD (mean 15%) and exposure time (mean 20%). For the patient survey, FFDM resulted in a significantly lower MGD (mean 35%) and exposure time (mean 52%) than the corresponding screen-film mammogram. Similar to the attenuation slabs, the FFDM dose and exposure time were generally higher than screen-film for 2-4 cm compressed breast thickness and lower than screen-film for 4 cm and above.

Conclusion: FFDM using manufacturer's recommended dose settings results in significant dose reduction as compared to screen-film mammography, particularly for 4 cm compressed breast thickness and above.