AbstractID: 7333 Title: Microcalcification Detectability for Four Mammographic Detectors: Flat-Panel, CCD, CR and Screen/Film

Amorphous silicon/cesium iodide (a-Si:H/CsI:Tl) flat-panel based full-field digital mammography (FFDM) systems have recently become commercially available for clinical use. Some investigations on physical properties and imaging characteristics of these tpyes of detectors have been conducted and reported on. In this perception study, a phantom containing simulated microcalcifications of various sizes was imaged with four detector systems: a flat-panel based, a charge coupled device (CCD) based, a high resolution computed radiography (CR) and a conventional screen/film system. The images were reviewed by mammographers as well as non-radiologist participants. Scores reflecting confidence levels were given and recorded for each detection task. The results were used to determine the minimum detectable calcification size. Receiver Operating Characteristics (ROC) analysis was also performed to evaluate and compare the overall detection accuracy for these four detector systems. Differences in microcalcification detectability were found to be insignificant for the larger group (150 - 160 μm in size) or smaller group (112 - 125 μm in size). For calcifications of 125 - 140 μm in size, the flat-panel system was found to have the best performance: the smallest minimum detectable calcification size and the highest detection accuracy in the ROC analysis. The screen/film system was ranked the second with a performance significantly better than those of the CR or the CCD systems. In the ROC analysis, the CCD system showed better detection accuracy than the CR system. However, no significant difference was observed in the minimum detectable calcification size between the CCD and the CR systems.