

AbstractID: 1874 Title: Organ Dose Assessment In The Slot-Scan And Wide-Beam Digital Chest Radiographic Systems

We have developed a method to measure the EDE for chest radiographic systems. The dose performance was evaluated with an adult female anthropomorphic phantom (CIRS, Inc. Norfolk, VA) and thermoluminescence dosimeters (Harshaw TLD-100, Thermo Electron, Santa Fe, NM). The phantom was placed in either posteroanterior (PA) or left-lateral (LAT) orientation. Two commercial chest DR systems were used: a slot-scan DR system (Thorascan, Delft Instrumentenets, Delft, the Netherlands) and a wide-beam flat-panel DR system (GE Medical Systems, XQ/i, Milwaukee, WI). Organ doses were measured at 117 and 140 kVp for the slot-scan system and 120 and 140 kVp for the wide-beam system. The LAT lung dose ratio was 4.2 at 117 kVp and 3.7 at 140 kVp for the slot-scan system, and 3.7 at 120 kVp and 4.3 at 140 kVp for the wide-beam digital system. Similarly, the LAT 9 o'clock breast dose ratio was 5.4 at 117 kVp and 5.1 at 140 kVp for the slot-scan system, and 5.8 at 120 kVp and 4.8 at 140 kVp for the wide-beam system. The LAT EDE for the slot-scan system was a factor of 1.6 higher than that in the PA position at 117 kVp, and 2.8 at 140 kVp. This factor is notably higher (i.e., 3.7 and 4.9 at 120 kVp and 140 kVp respectively) for the wide-beam system tested. Historically, skin surface dose has been used in the chest radiography; however, our direct organ dose measurements provided deeper insights to the dosimetry of modern chest DR systems.