

AbstractID: 13262 Title: Entrance skin air kerma of National Lung Screening Trial chest x-ray exams

Purpose: The National Lung Screening Trial (NLST) was designed to compare lung cancer specific mortality of low-dose CT and PA chest x-ray exams. The entrance skin air kerma (ESAK) of NLST participants' chest x-ray exams was estimated. **Methods and Materials:** During the screening period of 2002-2007, acquisition parameters were available on 68,810 exams of the 73,733 chest x-ray exams. Acquisition parameters included the tube potential, exposure time-current product (mAs), and detector system (screen-film, photo-stimulable phosphor, flat-panel receptors) in addition to the participant gender. Yearly measurements of source-image distance, radiation output (mR/mAs), half-value layer for the nominal kVp of the chest x-ray were performed on the x-ray systems used at each of the 33 Trial sites. The ESAK was calculated for each exam and summaries of ESAK were compared to the NEXT 2001 survey of PA chest exams. **Results:** Ninety-five principle x-ray resources were identified. Our case average ESAK (0.22 mGy) was two times the NEXT value. Our x-ray-resource coefficient of variation was comparable to NEXT. The ESAK of photo-stimulable phosphor system, which constituted 38% of the detector systems, was 0.32 mGy. The average height of NLST participants was 1.73 m and their average weight was 83.6 kg, values stated for the NEXT study were 1.7 m. and 74 kg, respectively. **Conclusions:** Entrance skin air kerma was twice that report by the NEXT. This difference was attributed to increased use of photo-stimulable phosphor detectors, which were setup with an average sensitivity less than screen-film detectors.