Entrance surface dose and image quality: comparison of adult chest and abdominal X-ray examinations in general practitioner clinics, public and private hospitals in Malaysia

Type: Article

Abstract:

This study was undertaken to compare the entrance surface dose (ESD) and image quality of adult chest and abdominal X-ray examinations conducted at general practitioner (GP) clinics, and public and private hospitals in Malaysia. The surveyed facilities were randomly selected within a given category (28 GP clinics, 20 public hospitals and 15 private hospitals). Only departmental X-ray units were involved in the survey. Chest examinations were done at all facilities, while only hospitals performed abdominal examinations. This study used the x-ray attenuation phantoms and protocols developed for the Nationwide Evaluation of X-ray Trends (NEXT) survey program in the United States. The ESD was calculated from measurements of exposure and clinical geometry. An image quality test tool was used to evaluate the low-contrast detectability and high-contrast detail performance under typical clinical conditions. The median ESD value for the adult chest X-ray examination was the highest (0.25 mGy) at GP clinics, followed by private hospitals (0.22 mGy) and public hospitals (0.17 mGy). The median ESD for the adult abdominal X-ray examination at public hospitals (3.35 mGy) was higher than that for private hospitals (2.81 mGy). Results of image quality assessment for the chest X-ray examination show that all facility types have a similar median spatial resolution and low-contrast detectability. For the abdominal X-ray examination, public hospitals have a similar median spatial resolution but larger low-contrast detectability compared with private hospitals. The results of this survey clearly show that there is room for further improvement in performing chest and abdominal X-ray examinations in Malaysia.

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