

Purpose: Diagnostic reference levels (DRLs) represent an efficient criterion for radiation protection of patients and for procedure optimization. The aim of our study was to establish local DRLs for typical fluoroscopic examinations in our institution.

Methods: Three standard fluoroscopic procedures were considered in the survey: upper GI series, double contrast barium enema, and single contrast barium enema. The examinations were performed at four hospital sites in eight different rooms, including image-intensified systems and flat panel detector based rooms. The dose area product (DAP) was calculated from the recorded total fluoroscopy time, the FOV size, and the entrance exposure rate measured on the surface of the 20 cm water phantom. The survey included studies performed by seventeen radiologists on 280 average size patients. Local DRLs were determined as the third quartile (75th percentile) of the DAP distribution for each procedure. A one-way ANOVA test was used to determine significance of the differences between the fluoroscopic systems and the radiologists.

Results: Radiation dose to a patient in the rooms with flat panel detectors was up to 2.6 times lower than in the II-based rooms. However, patient dose was affected not only by the performance of the system and total fluoroscopy time, but also by the chosen fluoroscopic mode. All differences between the rooms and the radiologists were significant at 95% confidence level. We had to accept the variations due to the fact that fluoroscopic examinations are patient and radiologist dependent. All local DRLs were below national values.

Conclusions: We have established local diagnostic reference levels for standard fluoroscopic procedures in our institution. All values were lower than the national DRLs for those examinations. In order to implement ALARA in practice, it is important that all performing radiologists are familiar with the dose reduction options available on fluoroscopic systems existing in the institution.