

OCCUPATIONAL RADIATION DOSES IN INTERVENTIONAL RADIOLOGY: SIMULATIONS

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Reliable methods to assess the effective dose in interventional radiology are needed. With this in mind, the relationship between the personal dose equivalent, $H_p(10)$, the reading of a personal dosimeter and the effective dose of the radiologist were studied using Monte Carlo simulations. In particular, the protection provided by a lead apron was investigated.

Our results indicate that a 0.35 mm thick lead apron and thyroid shield reduce the effective dose, on average, by a factor of 27. Without the thyroid shield the effective dose reduces by a factor of 15. The dosimeter reading, when the dosimeter is worn above the apron and a thyroid shield is used, overestimates the effective dose on the average by a factor of 130. Without the thyroid shield the average overestimation is 69. The simulations show that these conversion coefficients are sensitive to changes in irradiation conditions, in particular in projection and X-ray tube voltage.

Our study indicates that, even though large variations are present, the often-used conversion coefficient from the dosimeter reading to the effective dose, around 1/30, generally overestimates the effective dose by a factor of 2 or more.

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