Purpose: To develop a library of graphic human models that closely match patients undergoing interventional fluoroscopic procedures in order to obtain an accurate estimate of their skin dose.

Methods: A dose tracking system (DTS) has been developed that calculates the dose to the patient's skin in real time during fluoroscopic procedures based on a graphical simulation of the x-ray system and the patient. The calculation is performed using a lookup table containing values of mGy per mAs at a reference point and inverse-square correction using the distance from the source to individual points on the skin. For proper inverse-square correction, the external shape of the graphic should closely match that of the patient. We are in the process of developing a library of 3D human graphic models categorized as a function of basic body type, sex, height and weight. Two different open-source software applications are being used to develop graphic models with varying weights and heights, to 'morph' the shapes for body type and to 'pose' them for proper positioning on the table. The DTS software is being designed such that the most appropriate body graphic can be automatically selected based on input of several basic patient dimensional metrics.

Results: A series of male and female body graphic models have been developed which vary in weight and height. Matching pairs have been constructed with arms at the side and over the head to simulate the usual placement in cardiac procedures. The error in skin dose calculation due to inverse-square correction is expected to be below 5% if the graphic can match the position of the patient's skin surface within 1 cm.

Conclusions: A library of categorized body shapes should allow close matching of the graphic to the patient shape allowing more accurate determination of skin dose with the DTS.

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