STATISTICAL ANALYSIS TO ESTABLISH THE RELATIONSHIP BETWEEN RADIATION CONSUMPTION AND ENERGY USE FOR MEDICAL X-RAYS

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Current methods for estimating the amount of radiation used to produce an X-ray image are poor. Knowing this amount is an essential step in the development of a complete life-cycle analysis (LCA) of medical imaging procedures. The work presented is the outcome of research that employs statistical and probabilistic methods to process an image from an actual X-ray to determine a more accurate estimate of radiation used to create that image. The X-ray source, the interaction of the X-ray photons from source to target, and the interaction between photons and soft and hard tissue were simulated to obtain a result. The level of radiation absorbed by the patient is described using a correlation function between a non-filtered X-ray image and a filtered X-ray image.