# Monte Carlo simulations of dose distributions for 4 and 10 MV photon beams from a Varian Clinac 2100C accelerator

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This study shows detailed characteristics of dose distributions for realistic incident photon beams. It provides more comprehensive information for radiotherapy photon beams including incident photons as well as contaminating electrons and positrons in a radiation beam for different field sizes and beam energies. The EGSnrc Monte Carlo code, BEAMnrc has been used to simulate 4 and 10 MV photon beams from a Varian Clinac 2100C accelerator. A simulated realistic beam is stored in a phase space files, which contains details of each particle's complete history including where it has been and where it has interacted. The phase space files are used to calculate depth-dose components from different particles as well as calculated surface dose and contribution from different particles to surface dose across the filed. The accuracy of a simulated beam is verified by the excellent agreement between the Monte Carlo calculated and measured dose distributions. At 4 MV, the incident charged particles contribute 6% to 26% of maximum dose at the surface when the field size increased from 10 x 10 to 40 x 40 $cm^2$. Similarly, their contributions at 10 MV are up to 7% and 22% of maximum dose at the surface for 10 x 10 $cm^2$ and 40 x 40 $cm^2$ fields respectively.