Purpose:To compare the similarity of measured, calculated and verified electron dose distribution in Varian Trilogy.

Methods:Percentage depth doses (PDDs) and transverse dose profiles (TDPs) were measured and calculated by electron beams with different energies (6, 9, 12, 16 and 20 MeV respectively), which were produced by the accelerator. The PDDs and TDPs were also experimentally determined. And according to the electron energies, both measurements and calculations were done in the central axis of the beam for the PDDs and at different depths in water for TDPs. The electron beams obtained with have been modeled by pencil bean convolution (PBC). Then the PDDs and TDPs were verified by phantom. Finally, the measured, calculated and verified electron dose distribution of PDDs and TDPs were compared.

Results:The deviations of measurements, calculations and verifications were generally less than ±2% with applicator, which shows that the values used in this work for the energy and spatial distribution of the initial electron beam as well as the modeling and verification parameters are realistic.

Conclusions:The accelerator modeling proposed in this work gives accurate phase-space data files which can be used for fully characteristic determination for all clinical beams produced by the accelerator.