AbstractID: 8490 Title: Commissioning of flattening filter free Varian 600C linear accelerator

Purpose. The purpose of this study is twofold: a)to determine the dosimetric features of an unflattened 6-MV photon beam of a Varian 600C linac; and b)to compare the beam characteristics of the unflattened beam against the flattened one.
Material and methods. Comparison of measurements in water was performed for a Varian 600C linear accelerator with and without flattening filter. The measurements consisted of dose profiles (inplane and cross plane), percent depth doses, and photon beam output. The field sizes measured varied from 2cmx2cm to 40cmx40cm. All measurements were taken at 100cm SSD with an A1SL ion chamber.
Results. Our results showed a significant (about twofold) increase in the dose rate for all field sizes. Also, a steeper reduction in depth doses was observed when the flattening filter was removed. No decrease was observed in the out-of-field dose, but there was an increase of the dose in the build-up region that can be attributed to the increase of contaminant electrons.
Conclusion. Our study revealed that, for recent radiotherapy techniques, removing the flattening filter could be beneficial since there is a an increased dose rate and higher output therefore less monitor are required for each fraction leading to reduced whole body dose equivalent. On the other hand, higher skin doses are observed per monitor unit delivered but the overall skin dose for a complete treatment is comparable to the one with flattening filter since less monitor unit are required per fraction.