

AbstractID: 10781 Title: International comparison of Varian LINAC commissioning data for a common independent monitor unit calculator

**Purpose:** (1) To compare the commissioning data from 10 different Varian high energy LINACs installed in North America. (2) To illustrate the need for proper documentation of methods used in data collection, and (3) To demonstrate a simple independent Monitor Unit calculator that is based on data from institutions other than the one the patient plan was created under.

**Materials and Methods:** Commissioning data from different Varian LINACs (2100C, 2100CD, EX, iX, Trilogy) were collected using different water scanners and ion chambers at each institution. A single common data set was extracted to create an independent Monitor Unit calculator using Microsoft Excel. This calculator was used to provide a true independent second check of patient plans from several treatment planning systems with beam energies of 6, 15 and 18 MV.

**Results:** PDD and profile data were found to be within approximately 1% when the collected data was taken using the same measurement techniques. Output and wedge factors were found to be within approximately 3%, and it is speculated that this spread is due primarily to differences in ion chamber size and measurement geometry. The independent monitor unit calculator was found to be accurate to within 3% for over 6000 patient plans from various treatment planning systems.

**Conclusions:** The results of the comparison show that it is critically important that proper documentation methods and measurement techniques be standardized. This will help to ensure continuity between physicists and provide the highest possible accuracy of the treatment planning system. Standardization would likely decrease the risk of errors by providing for independent checks between institutions and “golden” data. Based on this study, it is speculated that differences seen between datasets are due to differences in measurement technique and the lack of documentation rather than variations in LINAC output characteristics.