

AbstractID: 6633 Title: Standard Wedge and Tray Transmission Values for Varian, Seimens, Elekta/Philips Accelerators; A Quality Assurance Tool

The Radiological Physics Center (RPC), through its on-site dosimetry reviews at institutions participating in NCI cooperative clinical trials, has accumulated wedge transmission data for approximately 5000 wedges on 1087 Varian, Siemens and Philips/Elekta accelerators since 1985 and 343 tray transmission measurements since 1995. Our standard data can be used as a quality assurance tool to predict the wedge and tray transmission for most wedges and trays in clinical use today to within $\pm 2\%$. Data presented were obtained on 11 Varian, 10 Siemens, and 6 Philips models. Photon energies ranged from 4 MV to 24 MV for 15° - 60° physical wedges. The wedge transmission values are standard for most makes and models of accelerators and exhibit a gaussian distribution with a standard deviation of $\pm 2\%$. The wedge transmission values of modern accelerators appear to be more standard than for older model accelerators. Many models of accelerators of the same manufacturer and energy have the same wedge transmission. The tray factor data have been separated into thin and thick trays. A simple linear relationship between ionization ratio and the tray factor was developed that, with the exception of two machine models, can predict the tray factor to within $\pm 1.6\%$ (1 std dev.). Since 11% of the 45° , and 60° wedges measured by the RPC since 1990 do not agree with the RPC value to within $\pm 2\%$ it is important to have a QA tool to identify potential problems.

This investigation was supported by PHS grant CA10953 awarded by the NCI, DHHS.