AbstractID: 8906 Title: The Measurement and the Significance of Critical Structure Doses in IMRT

Kodak XV film has been used to measure multiple dose points for all treatments that have been undertaken using the NOMOS Peacock® system in our clinic since 1997. An average error, compared to the treatment planner prediction of target dose, of 0.4% with a standard deviation of 3.8%, has been observed for 562 patient's treated. More significantly, errors in critical structures such as brain stem, spinal cord and parotid glands to which low doses are usually prescribed, could not be ignored. 27% Of patients evaluated for cord doses had a measured dose differing by more than 15% to the treatment planner indicated dose, 37% for brain stem, 43% for optic chiasm and 59% for parotid. Film doses are obtained by exposing film in a custom phantom to a full treatment and dose points analyzed using the expression, Dose = $A.e^{B.(OD)}$ + C.(OD) + D, where the constants are obtained from a calibration film relating Optical Density (OD), to ionization chamber measurements of depth dose in water. Both patient film and calibration film are cut from the same sheet and processed together to reduce film and processor errors. Film measurements are corrected using a TMR ratio to account for differences in size and shape between the phantom and the patient. The densitometer is calibrated at each use, using a Kodak step tablet with 21 calibrated optical densities ranging from 0.04 to 3.02.