AbstractID: 8284 Title: Guidelines for clinical implementation of TG-61

The AAPM TG-61 report is a protocol utilizing air-kerma calibrated ionization chambers. It provides procedures for output calibration of kilovoltage beams with tube potential between 40 kV and 300 kV using two methods the choice of which is based on the clinical point of interest. The in-air method, suitable for dose calibrations at the surface, starts from a corrected chamber reading free-in-air and provides absorbed dose to water by making use of ratios of mass energy-absorption coefficients water to air, a chamber stem correction factor and a backscatter factor. The in-phantom method, suitable for dose measurements at 2 cm depth, starts from an in-phantom, fully corrected chamber reading and makes use of ratios of mass-energy absorption coefficients water to air and a chamber perturbation correction factor. The protocol also provides guidelines on clinical issues such as relative dosimetry, electron contamination and determining dose in different tissue equivalent materials. This paper deals with the practical aspects of a TG-61 implementation with emphasis on three areas of clinical interest: (1) absolute output calibration, (2) relative dose measurements and (3) other clinical issues. In the area of absolute calibrations we will discuss the choice of suitable chamber types, chamber calibration procedures, beam quality measurements and suitable phantoms. TG-61 will be compared with older dosimetry procedures often employed in North-America. In the area of relative dosimetry we will discuss the choice of suitable detectors and phantom materials. Other clinical issues that will be discussed are the role of electron contamination and various cone types in the calibration procedure as well as determining absorbed-dose in biological tissues based on a TG-61 calibration.

Educational objectives:
1. understand the background of an air-kerma based formalism
2. understand the criteria for the choice of a suitable ionization chamber type for absolute calibrations
3. understand the criteria for the choice of a suitable detector for relative dosimetry
4. know the significance of the dose differences observed with older protocols
5. understand the role of electron contamination in the calibration process
6. understand the dosimetry in biological tissues