Comparison between TG-51 and TG-21: The results of TG-51 beta testing.

A new protocol for clinical reference dosimetry of external beam radiation therapy, has been developed by the AAPM Task Group 51 (TG-51) to replace the previous protocol (TG-21). The TG-51 protocol is based on an absorbed dose to water calibration factor ($N_{D,W}$) and an energy-dependent correction factor, k_Q. The TG-21 protocol is based on an exposure (air kerma) standard and multiple energy-dependent correction factors. Because of these dosimetry differences, and the incorporation of updated physical data, the results of clinical reference dosimetry based on TG-51 are expected to be somewhat different from those based on TG-21. The Radiological Physics Center (RPC) has conducted a systematic comparison between these two protocols, in which photon and electron outputs following both protocols are compared under identical conditions. Multiple chamber types (cylindrical) used in this study were selected from the list given in the TG-51 report, covering the majority of current manufacturers. Comparison shows discrepancies somewhat larger than expected, 1% or more difference for all beams for some chambers. The publishing of TG-51 has been delayed while these results are reconsidered. Comparison with any revisions will be included, if available.

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