AbstractID: 8956 Title: Tolerance limits and action levels for planning and delivery of IMRT

IMRT requires much more diligence in understanding the whole planning and delivery process, associated quality assurance procedures, and quality assurance tolerance limits with action levels over and beyond what is currently understood for 3DCRT using MLC. The results of a survey by AAPM IMRT Subcommittee show that each institution delivering IMRT has taken a very disparate approach in establishing tolerance limits and action levels for IMRT planning and delivery QA. However, there is a consensus that the parameters that need monitoring in IMRT include: agreement between calculated and measured dose, MLC functional performance for leaf position and reproducibility accuracy, and beam output stability for low MU.

We propose that the agreement between calculated and measured dose value should be reported in terms of confidence limits, Δ as: $\Delta = \left| \text{Mean deviation} \right| + 1.96 \times \text{SD}$. The mean deviation is calculated separately for multiple points in the high dose and low dose regions. The confidence limit of 3%, 10%, and 4% are recommended for high dose small gradient, high dose large gradient, and low dose small gradient respectively. The MLC leaf position accuracy and leaf position reproducibility should be within 1 mm and .2 mm respectively. The beam output and symmetry (for <2 MU) should be within 2%. These tolerance limits will ensure overall uncertainty (random and systematic) in delivered dose to less than 5%. This assumes that set-up uncertainties (inter and intra fraction) and organ motion are adequately accounted for in clinical margins.

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