

Abstract

AAPM Task Group 71 has defined the nomenclature and methodology for performing monitor unit (MU) calculations for photon and electron beams. Calculations within this protocol are made using the dose per MU under normalization conditions that is determined for each user's beams. For both photon and electron beams, this normalized dose per MU and associated dosimetric functions are determined using flat, water phantom data.

The requirement of an independent verification of the monitor units calculated to deliver the prescribed dose to a patient has been a mainstay of radiation oncology quality assurance. However, in a modern clinic using CT/MR/PET simulation, computerized 3D treatment planning, heterogeneity corrections, and complex calculation algorithms such as convolution/superposition and Monte Carlo, the purpose of and methodology for the MU verification have come into question. In addition, since the verification is often performed using a simpler geometrical model and calculation algorithm than the primary calculation, guidelines are needed to help the physicist set clinically reasonable action levels for agreement. The AAPM Task Group 114 report re-evaluates the purpose and methods of the "independent second check" for monitor unit calculations for non-IMRT radiation treatment in light of the complexities of modern day treatment planning. The report provides recommendations on how to perform verification of MU calculations in a modern clinic and on the establishment and implementation of action levels for agreement between primary calculations and verification.

Learning objectives:

- 1) Understand the current-recommended nomenclature, methodology, and measurements required to perform MU calculations within the TG71 protocol.
- 2) Know the components of a good monitor unit verification program.
- 3) Be able to apply the action level guidelines for agreement between primary and verification monitor unit calculations presented in the TG114 report.