

AbstractID: 9812 Title: Treatment Planning System Verification

The validation and verification of the treatment planning process is the responsibility of the medical physicist. This process is often limited to the commissioning of the treatment planning computer but with the complexity of modern radiation therapy treatment, it must include an evaluation of the total dose delivery system. The arrival of a new planning system offers the physicist the opportunity to assess and possibly improve this process. This presentation will review the guidelines presented in the AAPM TG53 report on quality assurance for radiation therapy treatment planning but with emphasis on dose and treatment plan verification. One of the first issues that should be considered is the dose algorithm offered in the planning system for photon and electron dose calculations. The physicist needs to understand the dose algorithm and how it is implemented in the treatment planning computer to be able to evaluate the differences between the measured and calculated dose. This comparison is often done within the planning system using tools that are provided by the vendor. But the ability of the planning system to correctly calculate dose and the associated dose distributions is dependent on completeness and accuracy of measured beam data used during the commissioning of the planning system. The geometric parameters associated with all devices used in the planning process need to be consistent and evaluated for accuracy. The problems associated with different scale and coordinate systems can cause significant dose errors in the implementation of treatment plans. The display of beam divergence, beams eye views, digital reconstructed radiographs and patient reconstructions on planning system and on hard copy need to be validated. The individual processes need to be tested including the transfer of data from the planning system to the treatment machine, printers, and other devices. Dose measurements specifically designed to verify individual beams and field arrangements should be performed. An additional test should include the measurement of dose but for a complete treatment plan starting with the beginning of the planning process and including all the various steps that a patient follows. Tests need to be designed for routine quality assurance often a test designed to evaluate many individual parts of the process. Documentation of the validation and verification tests should be available for review. The process should be repeated when a major change is made in equipment or software. The physicist in the careful review of individual patient plans evaluates the treatment planning process.

Educational Objectives:

1. To review the guidelines presented in the AAPM report of TG 53 on quality assurance for radiotherapy treatment planning.
2. To present methods of evaluating dose calculations and treatment plans.