

Abstract

Method to QA 3-D treatment planning systems

In recent years, the use of 3-D treatment planning systems in conjunction with dedicated CT scanners has increased dramatically. This has consequently increased the demands for quality assurance of treatment planning systems. Previously, a simple verification of the beam data residing in the 2-D planning system would usually suffice. However with the new 3-D systems, the accuracy of the entire process must be assessed in addition to the accuracy of the beam model. This study presents a method to evaluate the overall accuracy of the entire planning chain, i.e. CT to final plan using a series of specially designed phantoms, consisting of a simple slab geometry phantom, a chest phantom and a pelvic phantom. The phantoms are constructed from water equivalent, lung equivalent, and bone equivalent materials with equivalence defined for CT energies through 18 MV x-ray energies. The study will show the results of testing of equivalence of the materials and results of measurements with 6 MV and 15 MV x-rays in conjunction with a common, commercial 3-D planning system. Discussion will indicate the potential sources of error in the CT to final plan chain, including the need to QA not only the treatment planning algorithm but also the accuracy of the beam model as compared to measured data.