

This work is a study of lung dose-distributions for the two major total body irradiation protocols used at the University of Minnesota. These techniques utilize either bi-lateral or antero-posterior fields. The lateral field technique uses the arms as a partial compensator to shield the lungs while the antero-posterior technique reduces lung dose by using 50% transmission blocks in conjunction with electron boost fields to the chestwall beneath the blocks. Both techniques utilize extended source to axis distances (SADs) to provide full body beam coverage, nominally 400cm SAD.

We have measured the dose distribution for each technique in an anthropomorphic phantom using thermoluminescent dosimetry. These distributions were used to model beams for extended distances in the ADAC Pinnacle three-dimensional radiation therapy treatment planning system. Dose volume histograms were then generated for each treatment technique and analyzed for the phantom and nine additional patients. These results were correlated with clinical complication data for 447 cases.