Purpose: To improve treatment planning for Total Body Irradiation by using CT-based phantoms to create a DRR to design lung compensator blocks and to calculate the thickness of these blocks.

Methods and Materials: Phantoms were constructed using both the prone and supine CT-scans of the patient, and a bitmap was created for each of the two field (Anterior and Posterior) by calculating the tissue-equivalent thickness of the patient along the ray from the source to the virtual film position, which gives the proper scaling and angular divergence of the projection (which commercial TPS systems would not for this geometry). The images could then used by the oncologists to create the outline of the lung compensator blocks. The block thickness was then calculated by computing the average tissue deficit under the block relative to the thickness of the treatment center (prescription point). Thirteen patients were then dual planned with the existing film-based method as well as the new CT-Based method, and the DVHs of these treatments were created using a new EGS++ application.

Results: A comparison of the calculated thickness showed that the CT-based method called for slightly thicker block thicknesses compared to the film method (leading to a dose difference of 1-5%), which lead to a more uniform lung-dose according to the MC simulations.

Conclusion: A user-friendly CT-based planning method has been clinically implemented which improves the uniformity of the treatment, better achieving the prescribed dose.