In post surgical irradiation of the breast, portals are designed to confine the radiation beam to the target and wedging is used to achieve a uniform dose in the irradiated volume. The degree of wedging is conventionally determined through a trial and error approach employing sophisticated dose calculations and subjective selection of the "optimum" dose distribution.

Improvements in the quality of the plan and the efficiency with which it is generated could accrue if a simple automated method for optimizing the degree of wedging was used to determine this setup parameter and full dose calculations used only as confirmation of the actual dose distribution. We have used a fast pencil beam method to determine the fluence distribution within the breast and automatically sought the effective wedge angle which yielded the highest uniformity (smallest standard deviation) in the fluence values for points on a 5 mm grid within the breast but excluding the buildup region. The same wedge angles were used to generate dose distribution using full dose computation and the standard deviation of the Dose Volume Histogram used as the statistical parameter to minimize. We find that our simple automated fluence based approach can find the same minimum a plot of uniformity versus effective wedge angle as full dose computation for a range of breast sizes with and without lung. This approach could lead to higher quality and more efficiently generated plans for irradiation of the breast.

The support of the Northern Cancer Research Foundation is gratefully acknowledged.