Supplementary material for Wright P, et al. Isocentric integration of intensity-modulated radiotherapy with electron fields improves field junction dose uniformity in postmastectomy radiotherapy. Acta Oncol 2014; 53:1019–26.

Supplementary Table I. Results of a 3 mm displacement of the electron field for the IMRT with electron plans.

	Lateral shift			Medial shift		
	Min	Mean	Max	Min	Mean	Max
Change in local maxima	+ 3%	+ 7%	+ 12%	0%	- 1%	- 4%
Change in D90% coverage*	- 1.6%	+ 0.4%	+ 1.6%	- 1.4%	- 2.2%	- 3.7%

*Change in the percentage of the PTV covered by the 90% isodose as compared with no displacement of the electron field border.

Appendix

The standard electron/photon mix

The standard electron/photon mix at TUH combines two anterior and posterior photon fields with a medial anterior electron field. This technique is non-isocentric to avoid collisions between the treatment couch and the gantry in its posterior position, while enabling the anterior electron field and the required applicator to fit in front of the patient independently of their habitus. The SSDs used are 104 cm and 100 cm for the anterior and posterior beams, respectively. The glenohumeral joint and thyroid are spared by shaping the photon fields with MLCs according to anatomical landmarks seen on digitally reconstructed radiographs. The spinal cord dose is reduced by collimating the PA-field to 1 cm laterally of the spinal cord. Electron field energy is selected based on chest wall thickness and the field is shaped with a Lipowitz' alloy block. If the patient anatomy requires the electron field is split into two fields and multiple energies used. When applicable, dose conformity is improved with the use of 3 mm, 6 mm or 9 mm tissue equivalent bolus.

The standard tangent technique

The standard tangent plans consisted of two opposing tangential fields on the chest wall matched with

an anterior and one posterior field covering the superior PTV. The common isocenter and match line between the four fields were set level with the upper lung apex. Beam angles for the anterior tangential fields were set to 45–55° offset from the vertical. Collimator rotation was 12–23° and 4–19° in the anterior and posterior fields, respectively, such that the heart and ipsilateral lung were maximally spared. Dose homogeneity at the match line was improved by shifting the MLCs in opposing anterior and posterior tangential fields. Static Field-in-Field segments were used to improve overall conformity and to avoid global maximums outside the PTV.

PTV homogeneity and conformity estimates

PTV dose homogeneity estimates were based on the tolerance range (TR) [14]:

$$TR = \frac{\text{standard deviation of the target volume dose}}{\text{average target volume dose}} \quad (1)$$

Dose conformity was tested with the dice similarity coefficient (DSC) defined as:

$$DSC = \frac{TV_{90\%} \cap PTV}{TV_{90\%} \cup PTV} \quad (2)$$

where $TV_{90\%}$ is the 90% isodose volume.