

Letter to the Editor

Comment on "Intercomparison on normalized head-scatter factor measurement techniques" [Med. Phys. 22, 249–253 (1995)]

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To the Editor,

I read this article with great interest and agree with the results presented. My concern is rather with the possible impression that the conclusions stated at the end of the abstract and in the discussion section of the article could leave with the reader.

As very clearly stated by the authors, their conclusions about possible inaccuracies in monitor unit calculations derived from the use of the miniphantom technique to measure normalized head-scatter factors apply to the tissue-maximum ratio (TMR) dosimetry calculations they have chosen to discuss. However, the reader should not imply from these conclusions that the miniphantom technique itself is inaccurate or that it should not be used. The important factor is the context in which the measurements are applied. To paraphrase from the last sentence of their paper: for higher energy photon beams, inaccuracies may result if head-scatter measurement techniques do not match the secondary charged particle environment at the depth of normalization used in the monitor unit calculation system.

I would suggest that there are much better places to normalize doses than at the depth of maximum dose, d_{\max} (which is field size dependent) or even at a single, nominal d_{\max} due, in particular, to the many problems with electron contamination. Many radiotherapy centers have instead chosen to use a tissue-phantom ratio (TPR) method of dosimetry, with a normalization depth beyond the depth easily influenced by contamination electrons. Under these circumstances, the miniphantom method of measuring head scatter factors (at an equivalent depth in the miniphantom) is the

preferred method, and all the arguments made by the authors regarding secondary electron mismatches work in reverse. Indeed, in this case, measurements made with the standard buildup cap could lead to inaccurate monitor unit calculations.

So, I am in full agreement with the authors in matching the head-scatter measurement technique to the dosimetry system used. However, I would also encourage people to consider using the TPR method at a deep calibration depth and, in conjunction, use the miniphantom technique to measure head scatter factors. We have used such a system at our institution to the point of even normalizing fractional depth dose curves at the phantom normalization depth (we typically use 10 cm for photon beams up to 25 MV). Beyond providing a better characterized and more clinically relevant region to normalize dosimetry, such practices more readily point out changes in the entrance dose region introduced by field and beam modifiers in the treatment gantry (scatter from trays, wedges, secondary blocks, etc.).

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