

One of the most challenging second check calculations in radiation therapy is the Volumetric Modulated Arc Therapy (VMAT) calculation, with trade names such as RapidArc, Monaco with VMAT by Elekta, and SmartArc. The challenge has to do with the fact that the treatment planning systems only provide a physical average depth and effective depth. This is not adequate because the beam does not have a constant output as it rotates around the patient. A correct solution requires that the depth and effective depth for every control point be known and the treatment planning systems do not provide this.

These second check calculations can now be performed *quickly, easily, and effectively* with RadCalc's Regions of Interest (ROI) Module. A Regions of Interest tab was added to RadCalc's Photon Calculations for this purpose.

To perform these calculations, the CT structures are exported along with the plan file from the VMAT calculation to the RadCalc software. Average densities for the various structures can be either imported (depending on the planning system) or manually entered.



Next, the "Compute All Beams" button is clicked and RadCalc will compute an independent depth and effective depth value for each individual control point as well as the dose comparison for all imported calculation points. Additionally, an average depth and effective depth are determined by weighting the individual control point values according to the fractional number of monitor units. These averages are presented as information to the user.

Users can also utilize the Volume Average Dose Tool to analyze the variation in dose (at a given distance) around the primary calculation point. This tool is very effective for obtaining a good comparison with the planning system when the calculation point is in a high dose gradient or the planning system is using a large dose grid.

Two of the best benefits of the ROI module are: 1) No manual entry of the depth and effective depth is required

for both conventional calculations and VMAT calculations. 2) The entire process for VMAT calculation verification takes less than a minute.

If you are interested in trying the Regions of Interest Module, please contact technical support for a free 30 day DEMO license. You must be currently using RadCalc version 6.1 Build 2.0 or above in order to use this module. Please contact Sales for a price quote.

