

## **“Error Analysis of In-Vivo Diode Dosimetry in a Small Clinic”**

In-vivo dosimetry can be a useful quality assurance tool to verify overall patient treatment quality with respect to calculation, setup, and delivery. For the past year, we have conducted a study in a small satellite clinic, using the Sun Nuclear QED diode detectors on each patient under treatment to verify the treatment delivery. The action level we used was 5%, plus an additional tolerance for wedged beams because of the large differences in off-axis transmission with small variations in diode placement. Our goal was to evaluate the clinical usefulness of diode dosimetry to verify patient treatments in our clinic, based on its reliability with routine clinical use. For photon beams, the most frequent discrepancy was seen with exit dose measurements, which reflect a more “realistic” dose that the patient receives due to inhomogeneities within the body that are not accounted for in the calculations. The entrance diode readings showed less discrepancy, and were beneficial in uncovering a few minor errors in treatment calculations, which we were able to correct. The electron entrance diode readings showed the most variability, due to the sensitivity to placement location and SSD, especially with small cutouts. Weekly diode dosimetry showed very little variation, indicating reproducible patient setups and treatment delivery. Although the overall error discovery rate is low, we feel that the initial diode dosimetry is necessary to help catch catastrophic errors, such as incorrect beam energy, incorrect wedge, and incorrect setup (SAD vs. SSD).