Purpose: To determine the accuracy of VMAT treatment planning and delivery for patients undergoing radiotherapy in the head and neck.

Method and Materials: A dosimetric study of a typical head and neck treatment plan has been carried out using Chamber, film and TLD™s placed inside an anthropomorphic phantom. Lateral and AP port films were taken to verify the isocenter prior to treatment. Multiple treatments were performed to assess the reproducibility and uncertainty in the TLD measurements. Gafchromatic film was used between the phantom slices and then analyzed as an independent check on the TLD results. The two data sets, from TLDs and films, were then compared with the treatment planning system dose calculations.

Results: The measured dose to the primary planning tumor volume agrees with the planning system within 2%. The comparison of the measured dose to the secondary tumor volume ranges from 3-6% and the spinal cord comparison ranges from 3-10%.

Conclusion: This new Smart Arc treatment, VMAT, has great benefits to the patient in that patient motion and internal motion of the tumor is dramatically reduced. Challenges arise in predicting the dose near heterogeneities between the treatment planning system and actual measurement.