AbstractID: 6500 Title: Clinical Implementation of Portal Dosimetry - Establishing Action Levels

Purpose: To establish clinical action levels and methods to improve agreement between the measured dose and the portal dose prediction (PDP) for IMRT QA using Portal Dosimetry.

Method and Materials: 1152 treatment fields were evaluated. The maximum gamma (γmax), average gamma (γavg), and percent of the field area with a gamma value greater than 1.0 (γ% > 1) were documented for each treatment field. The mean values for each parameter and associated standard deviations (SD) were tabulated. Several strategies were considered to improve agreement between measured dose and PDP.

Results: Clinical action levels were based on the mean parameters for our institution. Clinical Action Levels: 1) The average γmax, γavg, and γ% > 1 for all fields for a given treatment plan must be within 1SD of the mean institutional values, and 2) No more than 25% of the fields for a given treatment plan can have γmax, γavg, or γ% > 1 values in excess of 2SDs from the institutional mean. If the plan fails either of the above conditions, the QA must be repeated after applying one of the below troubleshooting techniques. Effective Trouble Shooting Techniques: 1) Verify linac output. 2) Portal dosimeter can be recalibrated. 3) The plan can be recalculated at a lower dose rate—effective for plans with significant modulation and a small number of monitor units. 4) On rare occasions, a completely new plan is required.

Conclusion: These data have been used in our clinic to set clinical tolerance limits for evaluating IMRT QA using Portal Dosimetry; They also provide valuable trouble-shooting tools to improve the results of IMRT QA for individual patients. IMRT fields which are not within the tolerances must be evaluated very carefully to ascertain the nature of the disagreement and whether it is acceptable to treat a patient with those fields.