AbstractID: 5823 Title: A Technique for Tracking and Predicting Physician Referrals

Purpose: To create a tool for collecting physician referral data, identifying strengths and weaknesses in physician referral patterns, and for predicting future referrals in real-time.

Methods and Materials: Since January 2001, the referring physician was recorded for each patient that was seen for consultation in a radiation oncology department. In addition to the physician, the referring physician group was also recorded. The total referrals for each month were summed for each individual referring physician and physician group. In addition to referral data, physician hospital in-patient admitting data for oncology related diagnoses were obtained from the state's medical statistics. For physicians that have privileges at multiple hospitals, the "Market Share" was calculated. The number of referrals received each month was predicted using a locally weighted regression (*LWR*) model. The regularization parameters of the LWR model were determined through a continuous genetic algorithm that minimized the mean squared error using data not used in the LWR model. To protect confidentiality, a sample data set was crafted to simulate possible radiation oncology scenarios.

Results: The results of this study are confidential business data, and so, a sample dataset is used to demonstrate referral pattern tracking. The results concluded that 95% of patient referrals originate from one of five specialties, the largest being medical oncology (43%). The top referring group in each medical specialty was responsible for 65% of patient referrals, and refer >95% of their patients inside the same health system. The remaining 35% of the hypothetical radiation oncology's referrals are physicians who practice in multiple health systems. The *LWR* model accurately predicted the number of referrals with a mean squared error of 2.2%.

Conclusions: The collection and analysis of physician referral data provides a useful tool for maximizing radiation oncology growth and efficiency through known parameters.