

## AbstractID: 5133 Title: Development of an integrated software platform for treatment documentation and outcome analysis for IGRT

**Purpose:** Information generated in IGRT is tremendous. The long-term goal of this work is to develop a software package (named RAPID, Research Analysis Platform and IGRT Databases) that is capable of storing patient diagnostic, treatment and follow-up data for IGRT, which documents treatment outcome, and allows dose-response analysis based on biophysical models. Presented here are several key components of this development.

**Method and Materials:** The RAPID consists of a database, software tools and auxiliary applications. The database, developed using FileMaker software, includes modules for storing demographics, diagnosis, treatment, and follow up data. Diagnostic and planning images of different modalities (e.g., CT, PET, MR, US) and treatment verification images (e.g., CT, US, radiography) can be stored in DICOM format. Using an integrated auxiliary application these images can be brought into the desktop. The database is integrated with another software package, CERR, developed at Washington University, allowing display of contours and dose distributions on planning images. Various software tools are developed to perform dose response analysis that is linked to documented treatment outcome. For example, treatment related toxicity definitions for a given anatomic site were incorporated into the database, allowing standardized documentation of toxicity which, in turn, facilitates dose-response analysis. Calculations of EUD, TCP and NTCP are enabled based on 3D dose distributions.

**Results:** The newly developed RAPID is found to be useful. Patient data collected in our clinic for two anatomic sites have been entered into the system. Analysis of treatment and follow-up toxicity was effectively carried out using the RAPID. With a FileMaker server installed to host the database, users can access password-protected information remotely.

**Conclusion:** We have developed a software platform, RAPID, to facilitate storage and analysis of IGRT clinical outcome data.

**Conflict of Interest (only if applicable):**