Development of a web-based dosimetry training tool for therapy and dosimetry education

**Innovation/impact:** Clinical dosimetry is an important part of training programs at all levels of radiation oncology. Busy clinics and expensive equipment often mean that dosimetry tools are not readily available to students. To address this need and supplement existing educational programs, we are developing a web-based dosimetry training tool that includes didactic content, student assessment, and a fully-featured treatment planning system for guided hands-on treatment planning exercises. Using outside expert and student evaluators and applying qualitative and quantitative evaluation techniques from educational research, the clinical dosimetry training tool is being developed into a robust, generalizable, and user-friendly system that can be distributed to radiation oncology training programs worldwide.

The scarcity of treatment planning resources for teaching purposes makes obtaining hands-on experience difficult for students in many programs. PLanUNC, our in-house, open source, and freely distributable treatment planning system can be coupled with didactic content and student assessment tools to provide a useful supplement for clinical dosimetry education (NCI grant 5R25-CA134307). We are evaluating and developing the system in two phases: qualitative evaluation and quantitative assessment.

The qualitative evaluation (Fall 2010 – Fall 2011) consisted of assessments of preliminary training modules and exercises by reviewers from other institutions. This included expert reviewers (radiation therapy program directors) and student reviewers (students enrolled in radiation therapy school). Expert reviewers assessed the appropriateness and completeness of the didactic content. Student reviewers completed three modules under observation and were interviewed in-depth afterwards. The observation stage assessed the tools for usability, flow, and completeness of information (for example, we observed and recorded how many times a student needed to return to a previous page to complete a task/understand a concept). The interview process assessed the modules for content, usability, and level-appropriateness. Reviewer feedback was used to modify existing modules and redirect modules under development. Improvements included streamlining the treatment planning interface, moving some treatment planning tools away from PLanUNC and into portable web-based applications, and the development of brief task-based instructional videos to assist students in navigating the treatment planning system.

The quantitative evaluation phase (expected May 2012) will involve deploying educational modules to partner institutions (University of Virginia, Virginia Commonwealth University, Howard University, and the University of Southern Maine). Therapy and dosimetry students early in their dosimetry training will complete a variety of modules. Pre- and post-module tests will be used to assess student learning and retention. Additional qualitative evaluations will assess the quality of the interactivity and the degree of student engagement.
To facilitate interactivity and user flexibility, some features of PLanUNC were modified for display and use on portable devices.

Educational modifications include a simplification of the interface, disabling features not required for a particular lesson, and content highlighting.

Students receive immediate feedback along with explanations of the correct answer.