

AbstractID: 5920 Title: Implementation of MINERVA/PEREGRINE as an ATC review tool

**Purpose:** To test the feasibility of a system of software (MINERVA/PEREGRINE) developed by the Idaho National Laboratory (INL) and the Lawrence Livermore National Laboratory (LLNL) for supporting quality assurance (QA) review of cooperative-group clinical trials treatment planning data within the Advanced Technology QA Consortium (ATC).

**Method and Materials:** MINERVA is an open architecture, open source code system, designed to accommodate any computation engine through a plugin structure. MINERVA supports two types of data storage - relational databases and XML files. Patient data is stored in a relational database. XML-based import/export tools have been developed to transfer patient information between QA Centers and reviewers. Tools have been implemented as plugins to allow addition of more advanced tools. The research version of the LLNL PEREGRINE Monte Carlo code has been relocated to UC Davis Medical Center. The basis has been created for an integration of PEREGRINE with ITC, and it has been integrated with MINERVA as a calculation engine.

**Results:** MINERVA supports submission of digital treatment planning data using RTOG format. Ability to import DICOM-RT objects that satisfies the ATC DICOM conformance statement is needed. MINERVA provides display of DVHs and axial patient images with overlaid organ-at-risk/target-volume contours, as well as user-defined isodose curves. Users can edit contours, recalculate DVHs for these user-defined structures, and display point doses. Test cases for several body sites have been calculated using PEREGRINE to demonstrate feasibility. We believe that the use of Monte Carlo simulation will become a key tool for credentialing and QA review of clinical trials treatment planning and verification data in the near future.

**Conclusion:** The MINERVA/PEREGRINE software system appears to be well suited to meet the needs regarding QA of data submitted for future ATC-supported clinical trials.

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

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