Purpose: Develop a decision support tool that aids dosimetrist, physicians, and physicists in assessing and improving plan quality through comparison to plans previously used in similar clinical situations.

Methods: Software was developed to capture and store DVHs and other clinically relevant treatment plan characteristics in a database. In addition to the plan DVH, the database contains a total of 24 plan characteristics including fractionation, prescribed dose, treatment volume, prior surgery, tumor position, and smoking history. DVH and other plan data was captured from the treatment planning system via exported dicom RT files. Structures in the plan were automatically matched by name to a list of standard structures using a system of regular expressions. Additional fields were entered manually using a simple java interface. As a support tool, a plan under development can be quickly compared to similar plans in the database based on selected plan characteristics. A plot displaying the current and historical DVHs provides an easy visual comparison. Our interface also provides statistics for comparison for each dose/volume level such as average, minimum, maximum and standard deviation.

Results: DVHs from 111 lung SBRT plans treated from 2009-2011 were imported in accordance with an approved IRB protocol. As an example of data comparisons that can be easily performed to guide plan evaluation, we examined plans prescribing 5400cGy in 3 fractions and found that tumors >7.5cc (n=34) had an average PTV coverage of 94.2% (range: 73.5-95.0%), and tumors ≤7.5cc (n=35) had an average PTV coverage of 94.9% (range: 81.6-99.6%).

Conclusion: A searchable DVH database was constructed to provide planners, physicists, and physicians with a straightforward means of comparing plans against historic distributions of DVHs. In the future, outcome data will be included in the database to strengthen its functionality as a decision support and research tool.