Oncospace Consortium: A Shared Radiation Oncology Database System Designed for Personalized Medicine and Research

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Purpose/Objectives

The Oncospace Consortium aims to

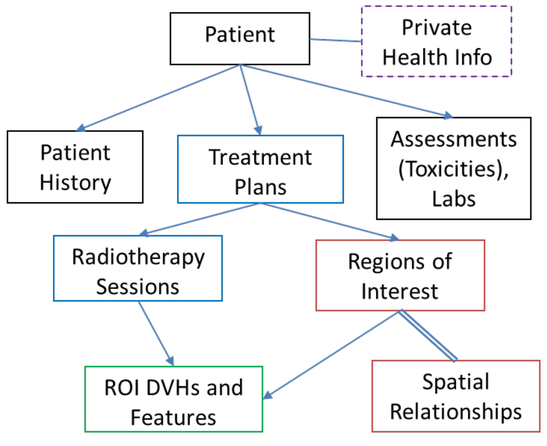
- Develop tools and data representations to standardize RT data collection and analysis across institutions
- Combine data for greater statistical accuracy in research and higher quality treatment planning solutions
- Improve RT practice through cooperative research – propose and answer common clinical questions with shared data

Materials/Methods

Oncospace Dx Rx Tx

The Consortium is built on individual instances of Oncospace at participating institutions. The system consists of:

- Onco_DB: A database designed for the storage and retrieval of RT planning metadata, spatial relationships for anatomical structures of interest, patient medical, social, and family history, and assessments of treatment outcomes.



- Oncospace website: A set of analysis tools which display information such as DVH-OVH or DVH-Toxicity relationships, data inventory or trends in treatment outcomes.
- Oncolink: Tools for import of planning data, in Pinnacle or DICOM format, and assessment data.

Results

- Four consortium members have installed a local instance of the Oncospace system (Figure 1).
- Created a Consortium SVN repository, used to deliver system. Members have full commit privileges. Development on branches and code review before merge to trunk.
- Members have imported hundreds of treatment plans (DVHs and spatial relationships) via Oncolink, and thousands of outcome assessments.
- Monthly teleconferences to discuss potential research opportunities and data collection priorities.

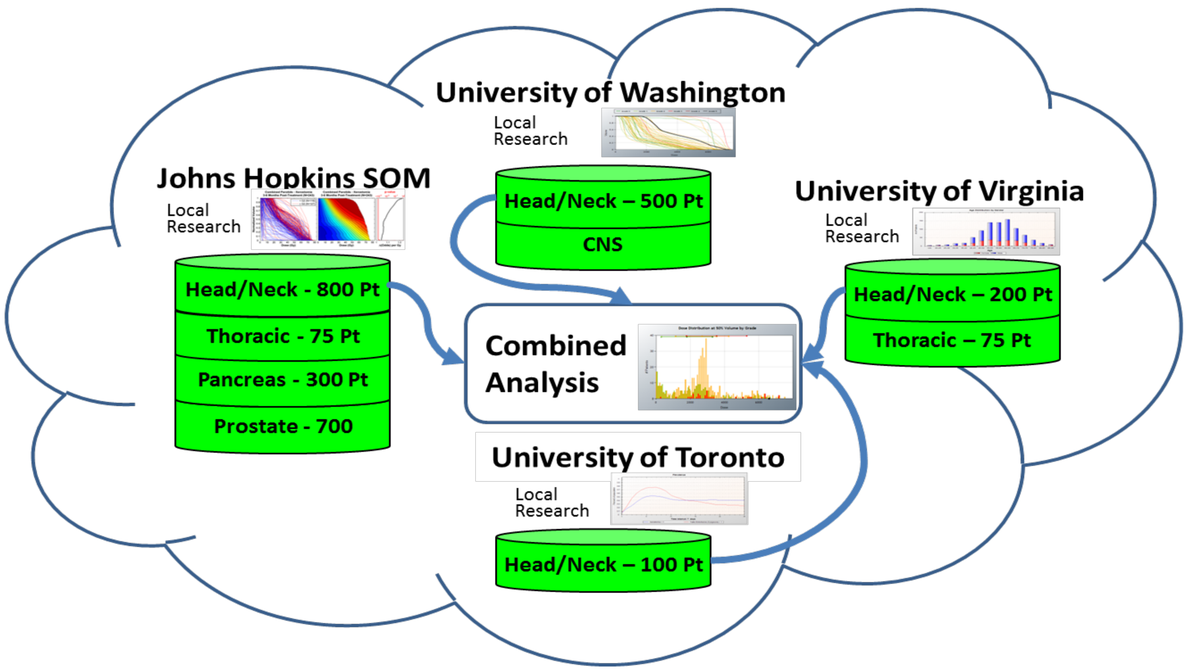


Figure 1: A federated model that allows each institution to have full control and access over their own data, while also allowing sharing of limited, controlled data between institutions via designated webservers.

Shared RT Data Analysis

DVH vs Toxicity (Figure 2)

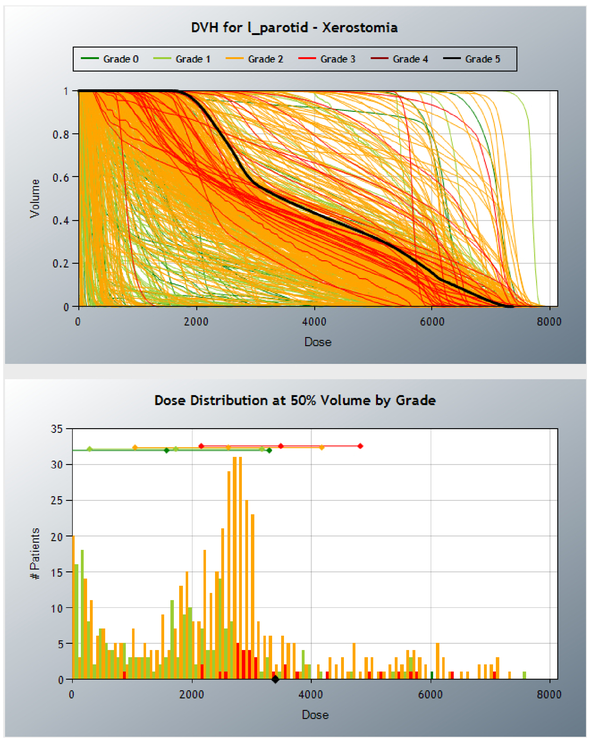


Figure 2: Combined DVH curves for all left parotids color coded by maximum Xerostomia score, with single UW patient highlighted in black. Mean, and Std. Dev. plotted above Dose Distribution.

DVH vs OVH (Figure 3)

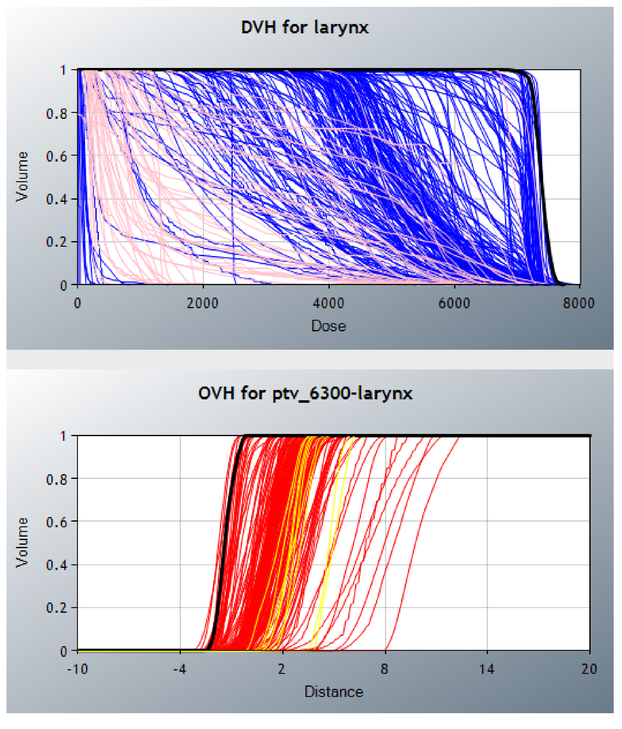
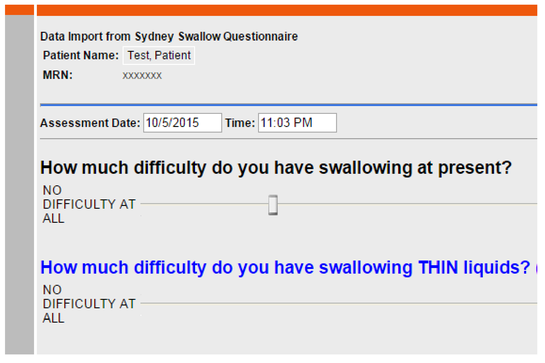


Figure 3: Combined UW (pink) and JHU (blue) DVH curves for larynx. A single high dose JHU patient is highlighted in black. Spatial relationship between target PTV and OAR is plotted below (UW=yellow, JHU=red) .

Cooperative Research

Multi-institutional trial implementing the Sydney Swallow Questionnaire built on the Oncospace Consortium



Conclusions

Radiation Therapy data that can be used for research, treatment, and quality purposes can and has been collected and shared using the Oncospace Consortium model.

Acknowledgements

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