

UI for Radiation Therapy Cohort Selection

Computer Integrated Surgery II

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Introduction

- We have developed a User Interface to easily create cohorts of patients from a database(Oncospace) of patients undergoing radiation therapy.
- We worked specifically with Head and Neck patient data (1,550 patients) with up to 6 years follow up data
- Variables of interest include *static variables* such as : Age, Diagnosis (ICD9), Regions of Interest
- *Longitudinal variables* of interest included toxicities and their accompanying grade and date.
- Our project hopes to aid the application of big data in improving the outcomes of patient care and research

The Problem

- This data can be used for a significant amount of applications in regards to research and clinical care. Decision support includes toxicity prediction, data-driven quality control, and treatment adaptation. Research applications for this data include performing clinical trials and answering biological questions.
- Gaining all the benefits from the data available requires an easy to use system that can relay the information desired in a comprehensive format.
- On the Oncospace site their only exists a Free Text SQL Query as means of selecting cohorts which does not standardize means of selection and requires knowledge of language

Our Implementation

- Framework written in Java and Html utilizing JSF and Hibernate to connect to backend.

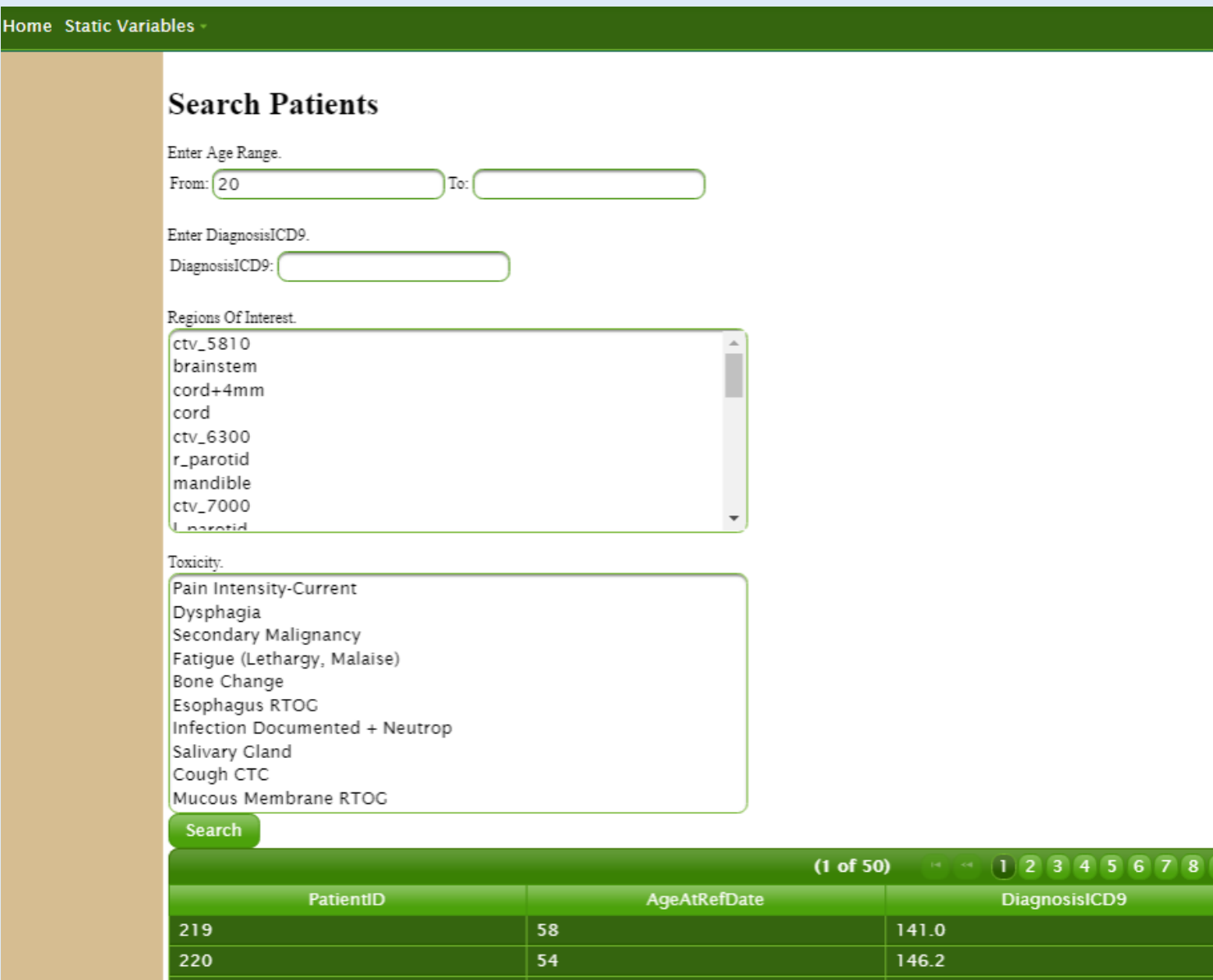


Figure 1: Image of static variable selection that produces patient data

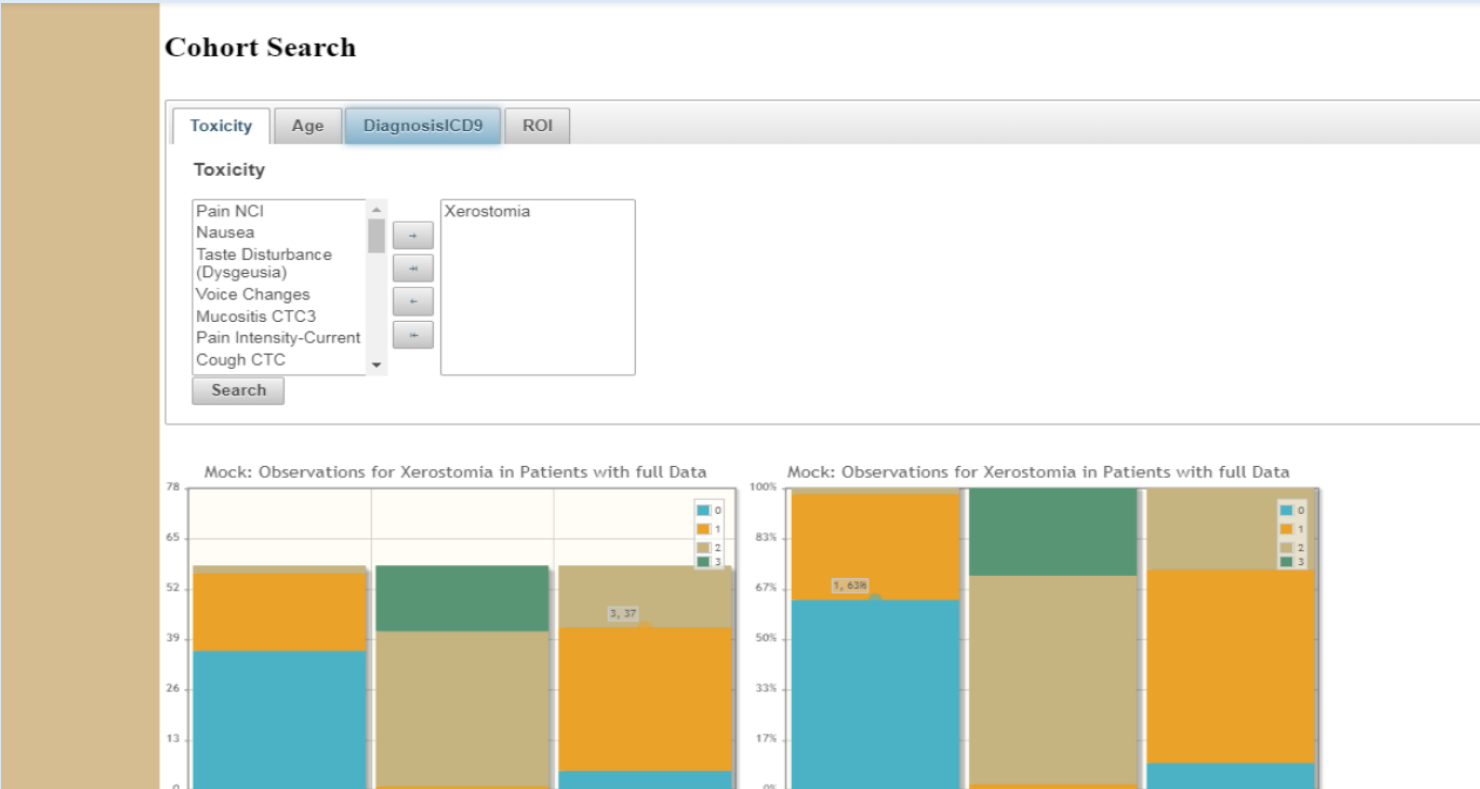


Figure 2: Visualizations of discrete toxicity grades within 3 periods

Double Search

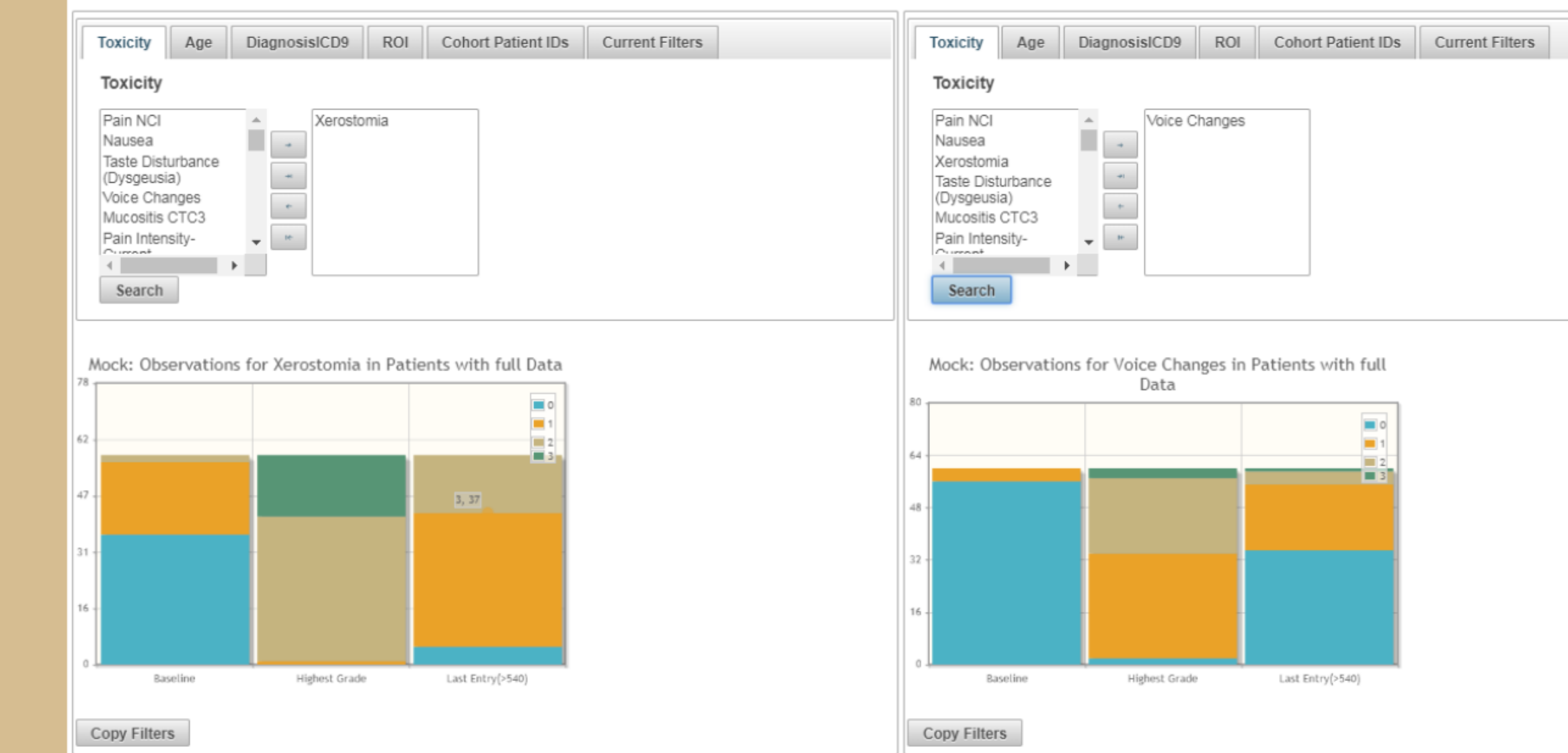


Figure 3: Ability to compare two separate cohort visualizations with a double search

Design Details

- **Toxicity**
 - The grades of toxicities are continuous and discrete and can be visualized in a stacked bar chart or line plot
- **Regions of Interest**
 - Multiple ROI's can be select to ensure patients have that included in one of their representations at least
- **Age**
 - Can be set between two specific values
- **ICD9**
 - Can give list of code the to filter patients by
- **Double Search**
 - Perform separate searches, use visuals as comparison
- **Import/Export**
 - Save patient cohort data into multiple forms
 - Export specific filters performed as text file/can import

Future Work

- Calculations of derived variables (area of region of interest irradiated to certain amount)
- Option to bifurcate on specific variable for comparison within visual
- Graphical Selection of new search parameters for data exploration
- Extension of application to mobile

Lessons Learned

- Familiarization with data is key component to being able to implement effective solution and code
- Documentation can be tool in development and planning

Credits

- Domonique Carbajal: SQL background commands and documentation management
- Keefer Chern: Main frontend programmer and frame development

Acknowledgements

- Oncospace and JHMI
- Thank you to Dr. McNutt and Pranav for their support and vision in developing this project.

