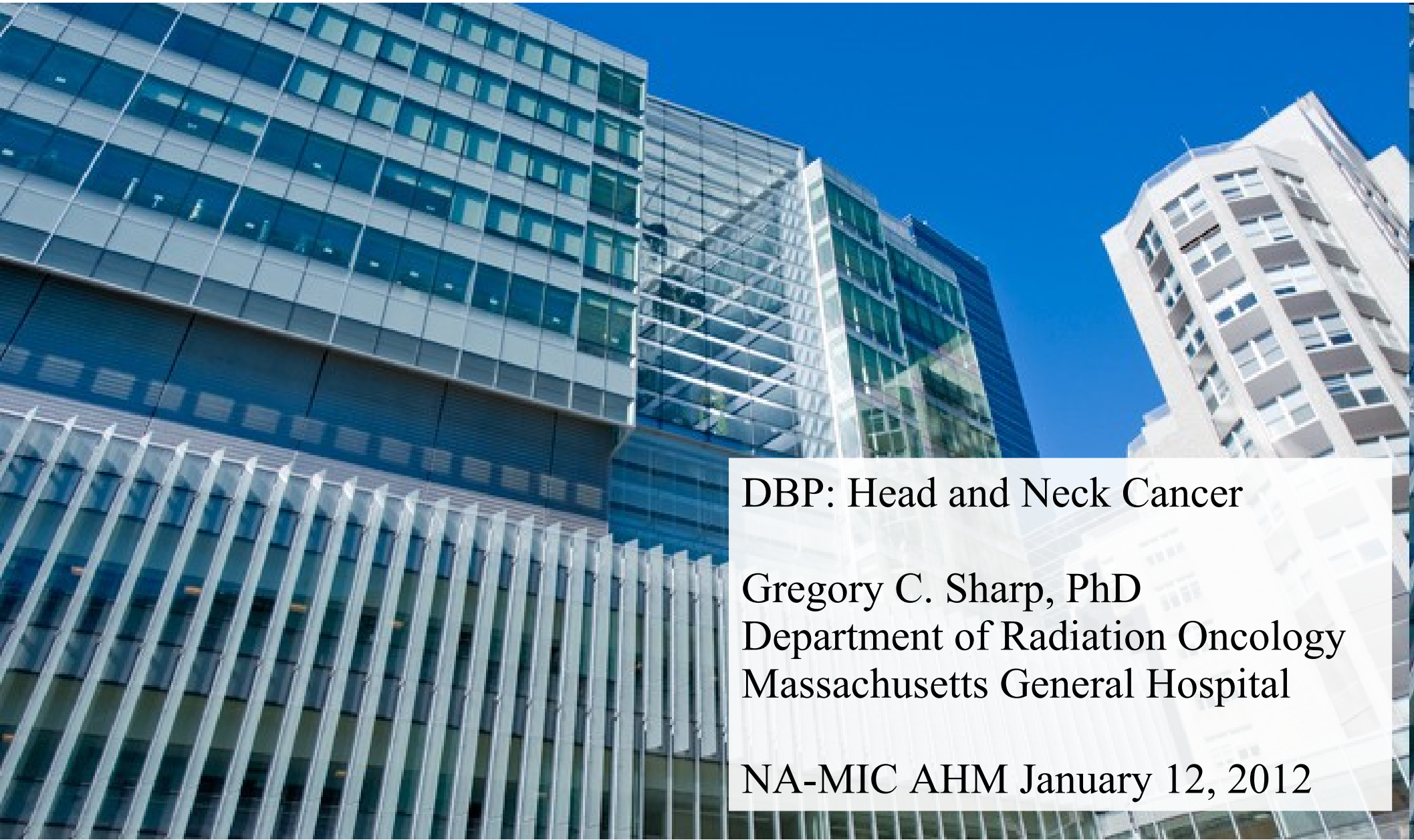
MASSACHUSETTS
GENERAL HOSPITAL

RADIATION ONCOLOGY

National Alliance for Medical Image Computing



DBP: Head and Neck Cancer

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Massachusetts General Hospital

NA-MIC AHM January 12, 2012

Head & neck cancer: Statistics

- Between 4-6% of all new cancer cases
- About 60,000 new cases per year
- 60% present with advanced disease
- 5 year survival: 57%
- Multimodal treatment

Head & neck cancer sites

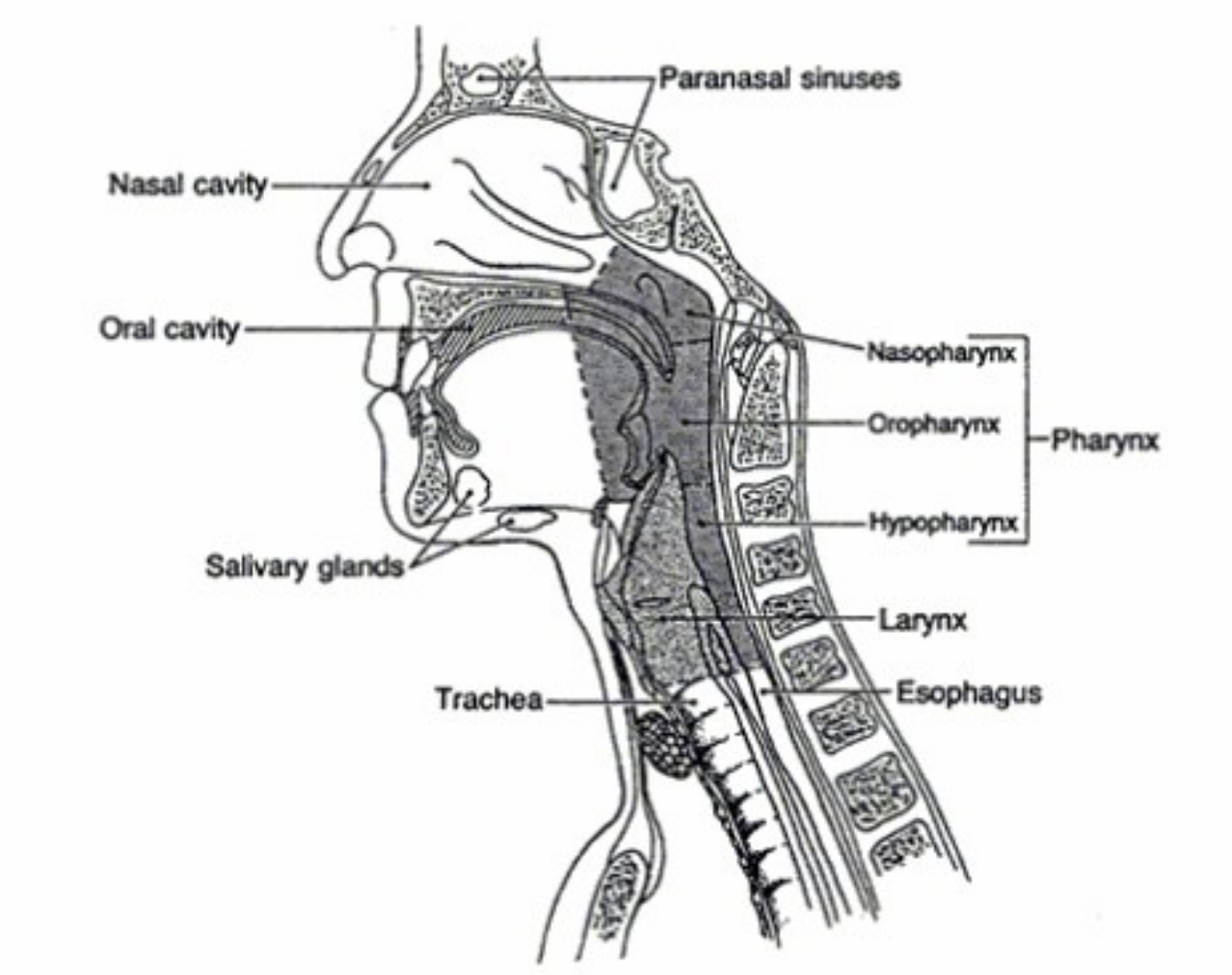
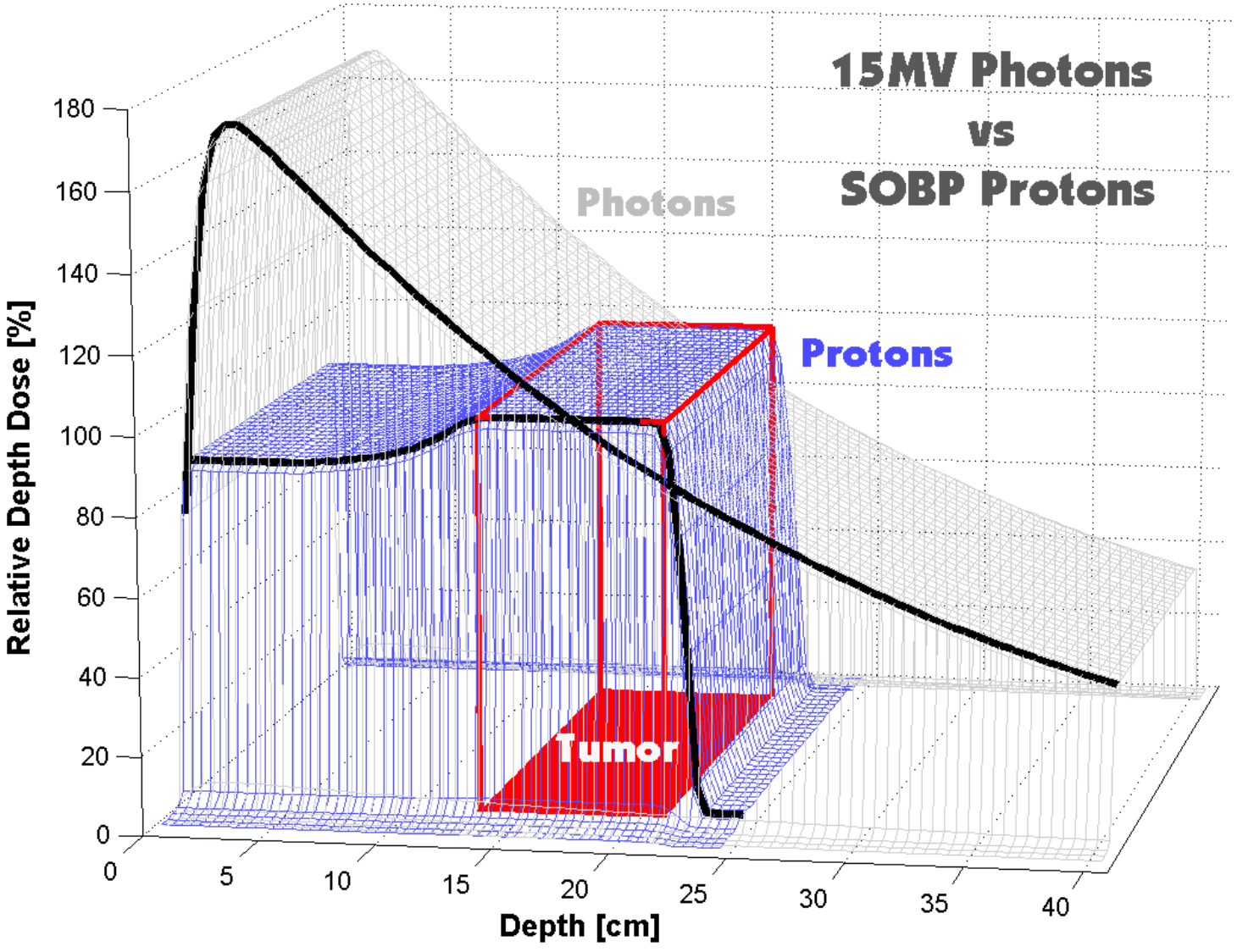
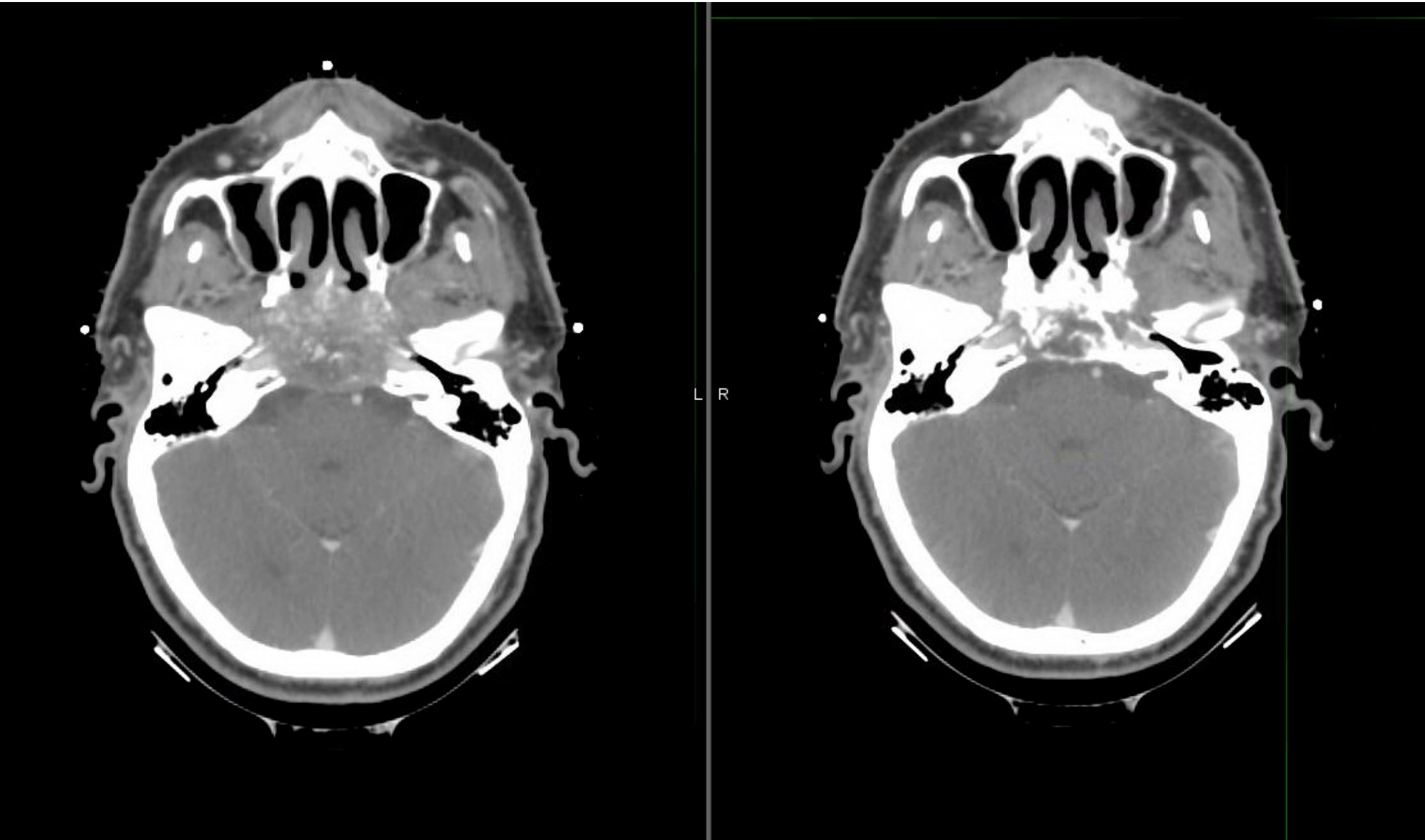


Image credit: American Cancer Society (www.cancer.org)

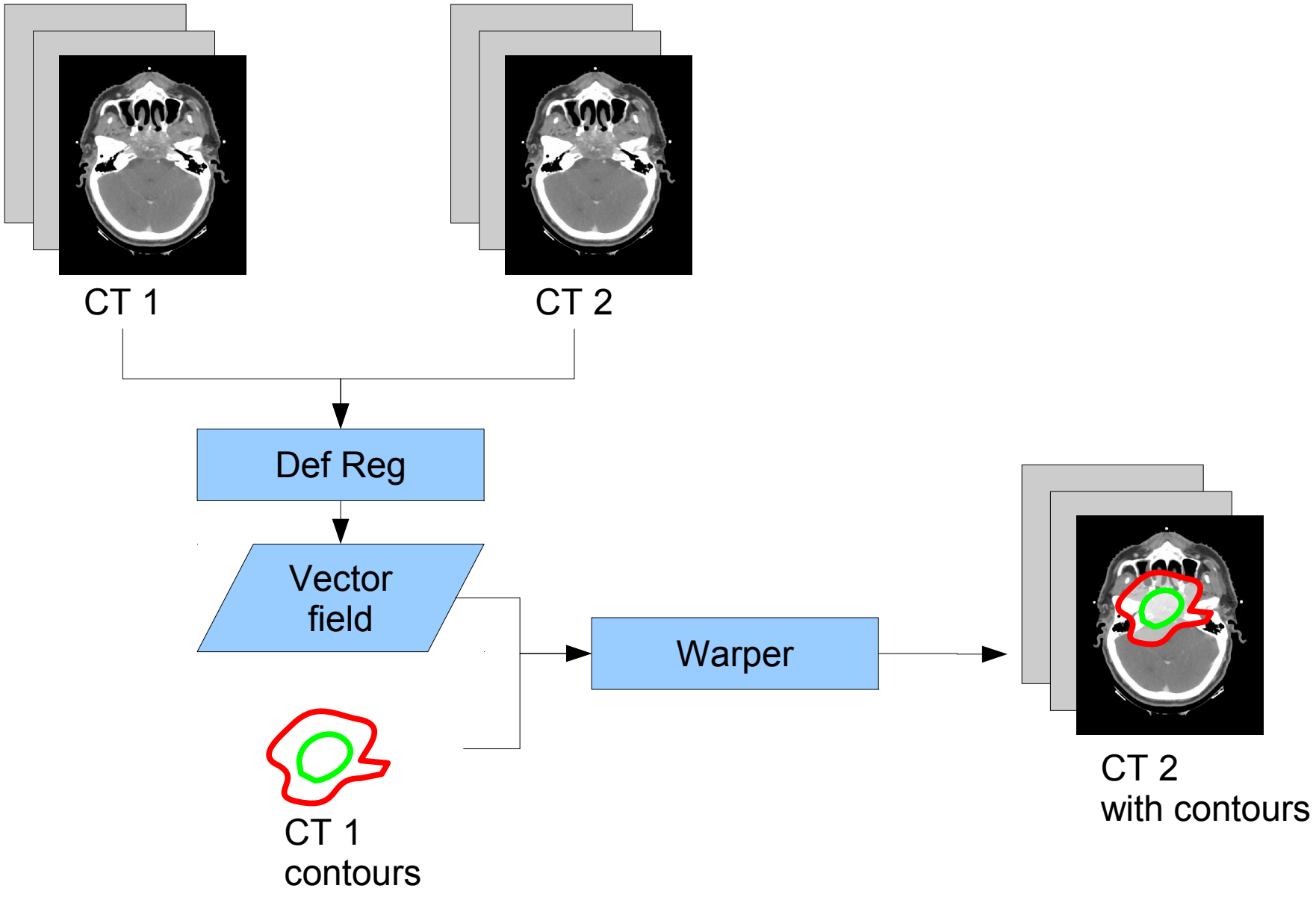
Proton therapy



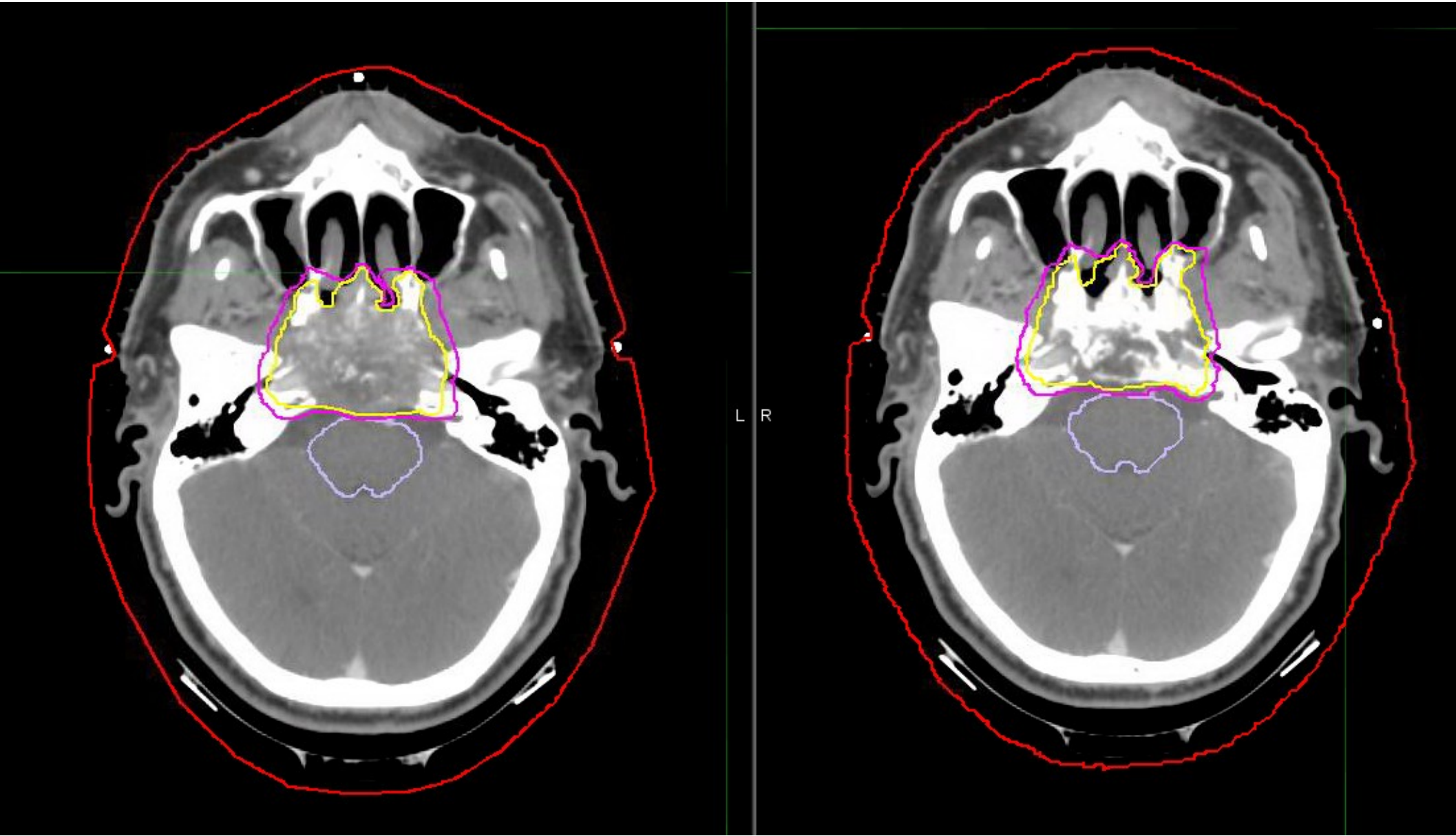
Anatomic change



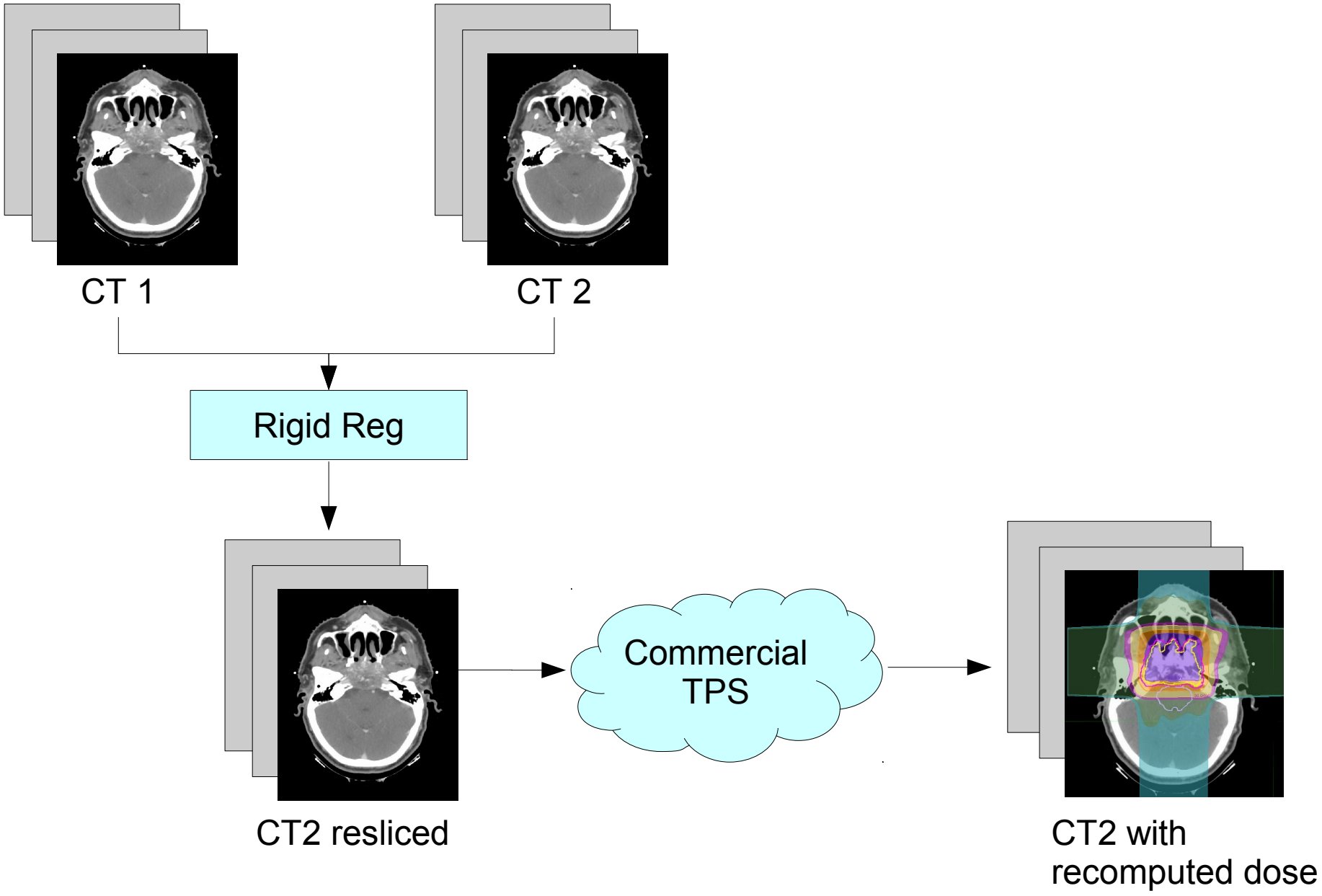
Recontouring



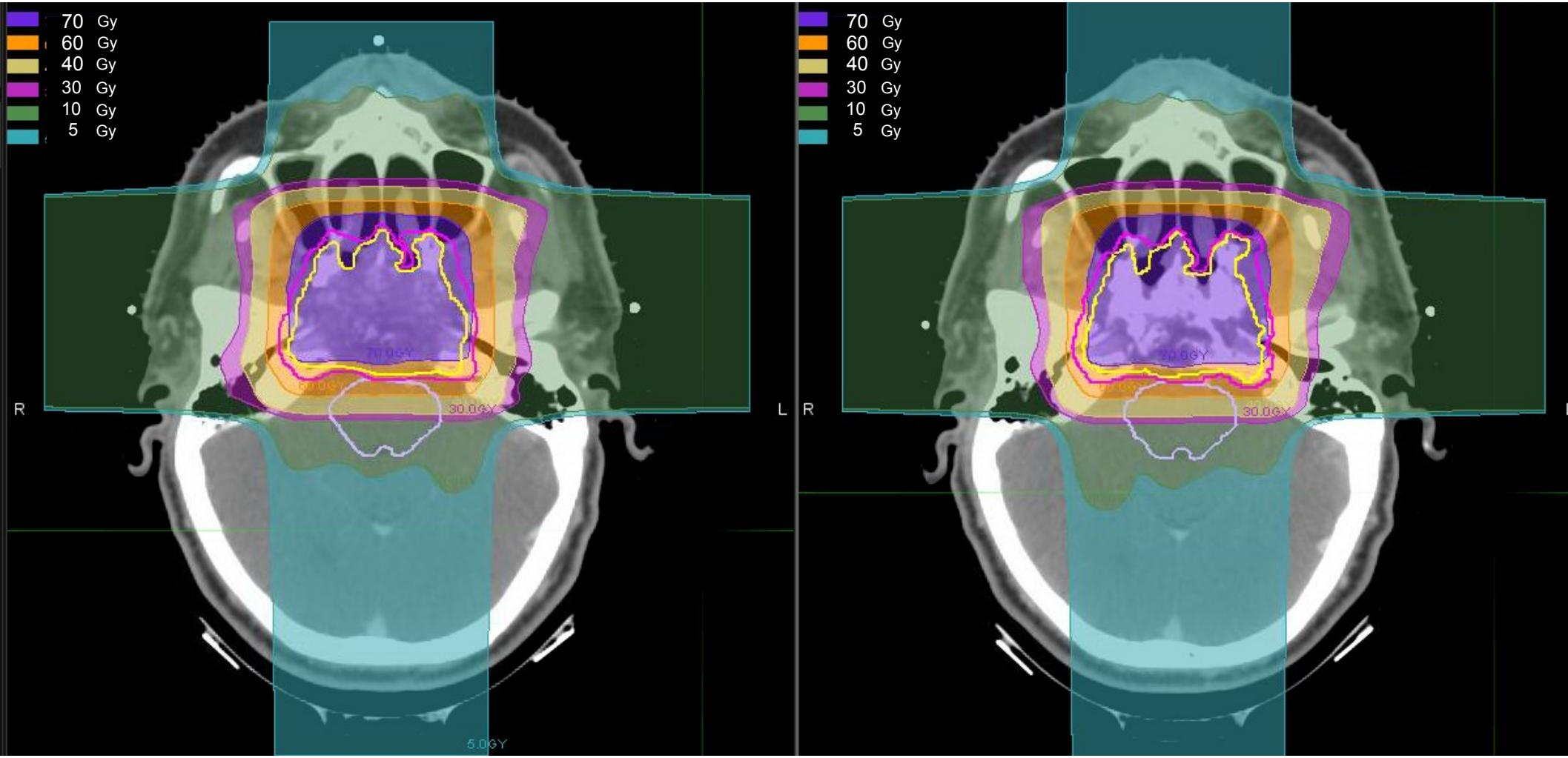
Recontouring



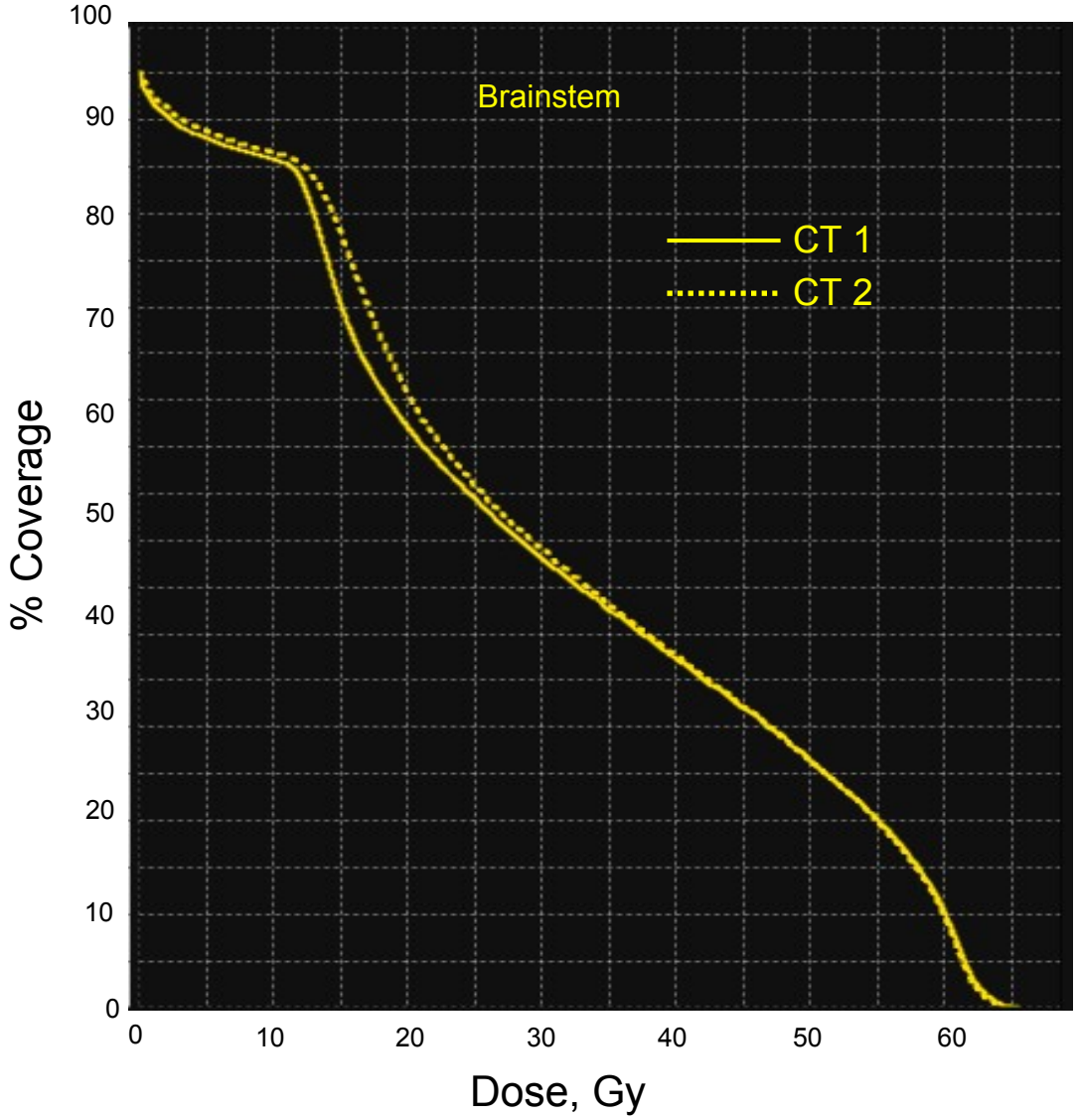
Beam placement



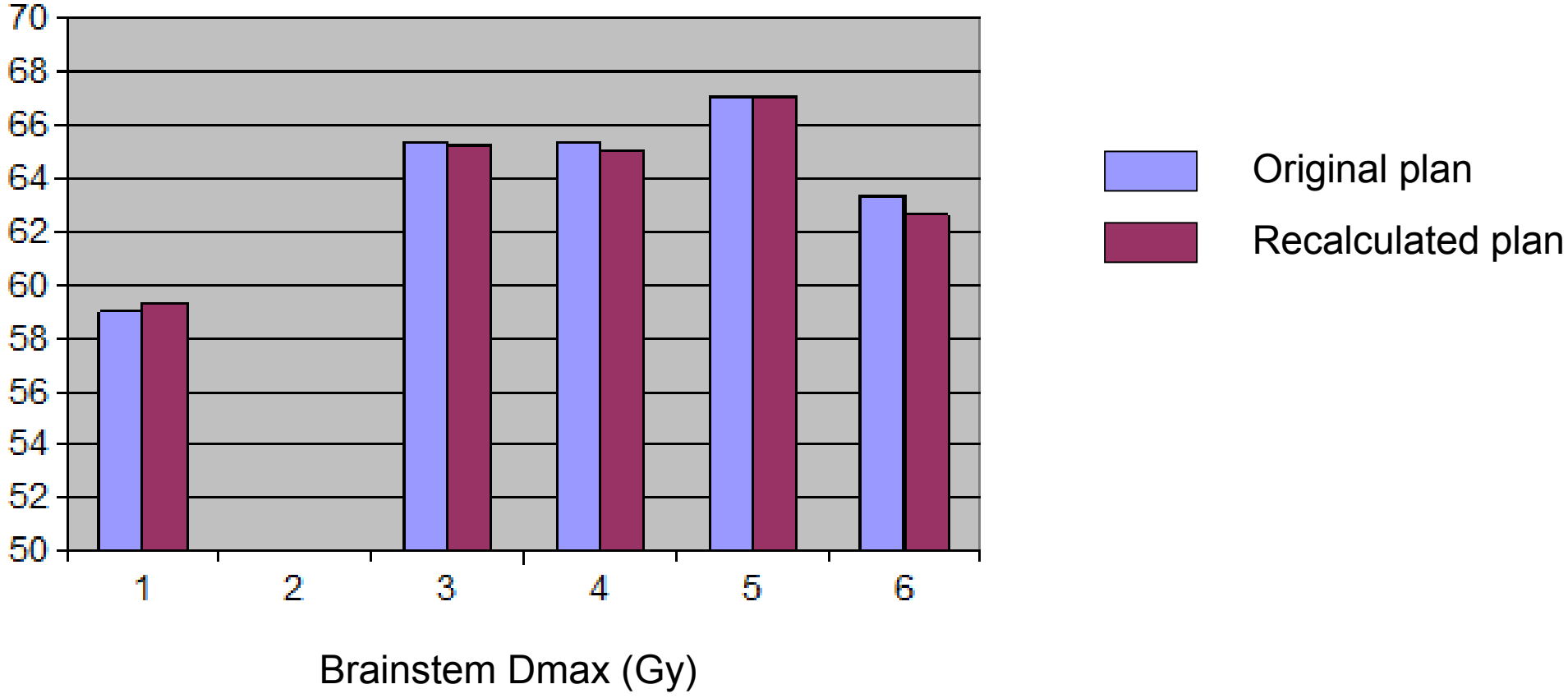
Dose recalculation



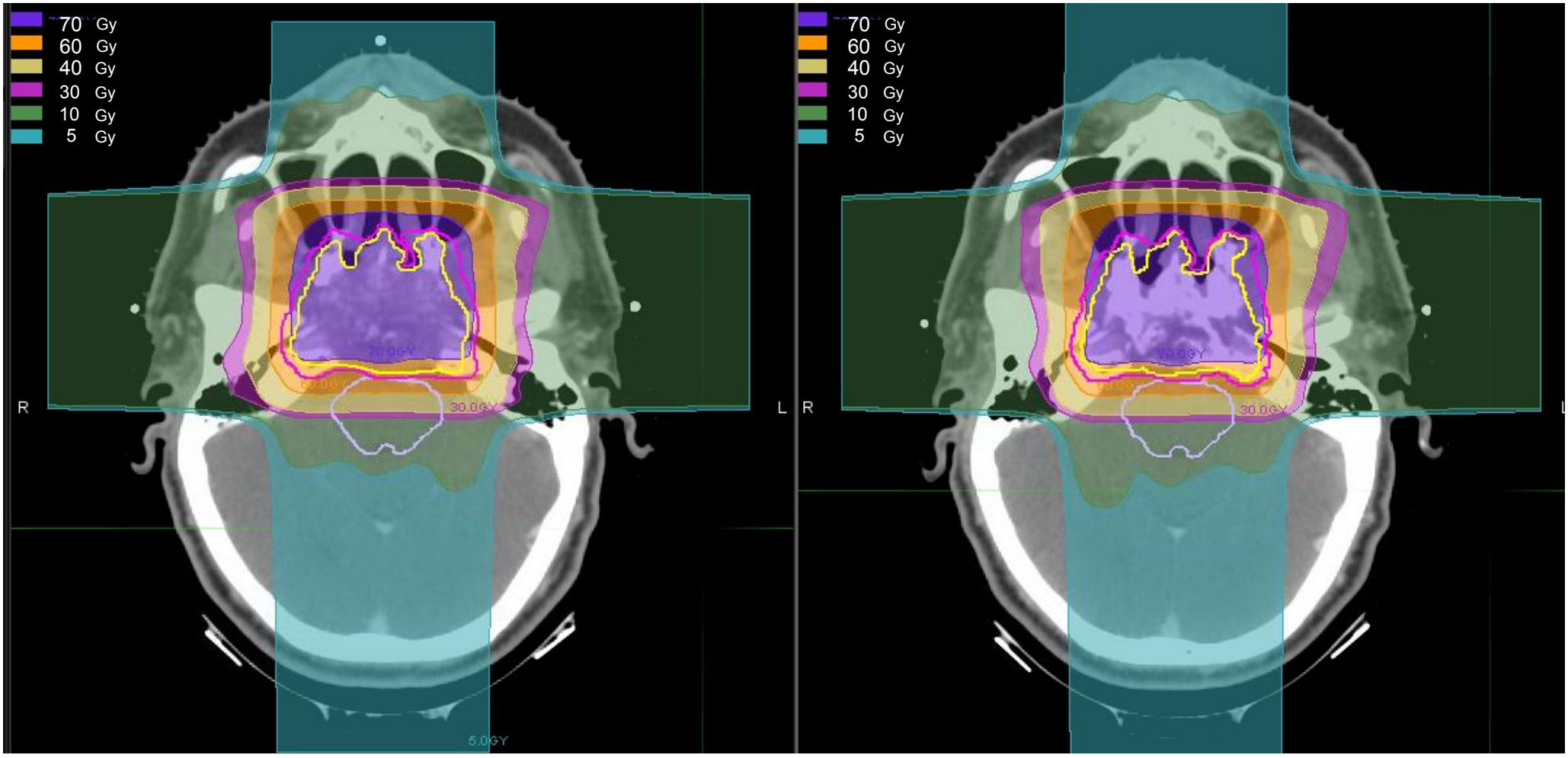
Dose recalculation



Dose recalculation



Dose recalculation



Moving forward

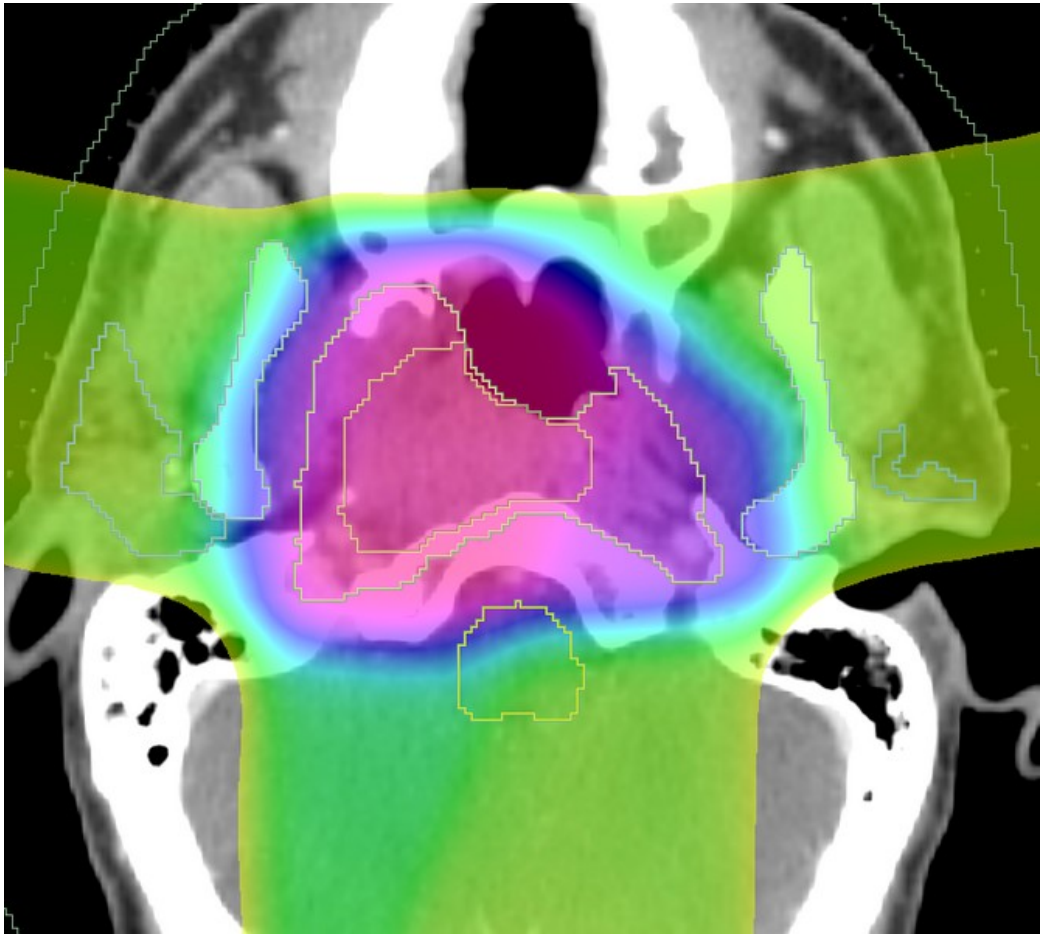
- Automatic segmentation
  - Atlas-based segmentation (head and neck)
  - Intra-subject segmentation (head and neck)
  - Interactive segmentation
- Automatic registration
  - Hybrid image/pointset methods (prostate)
  - Sliding organs (thorax)

Engineering plan

- Support for adaptive radiotherapy in NA-MIC
- Four goals
  - DICOM-RT interchange
  - Structure and dose warping
  - Interactive deformable registration
  - Plan review

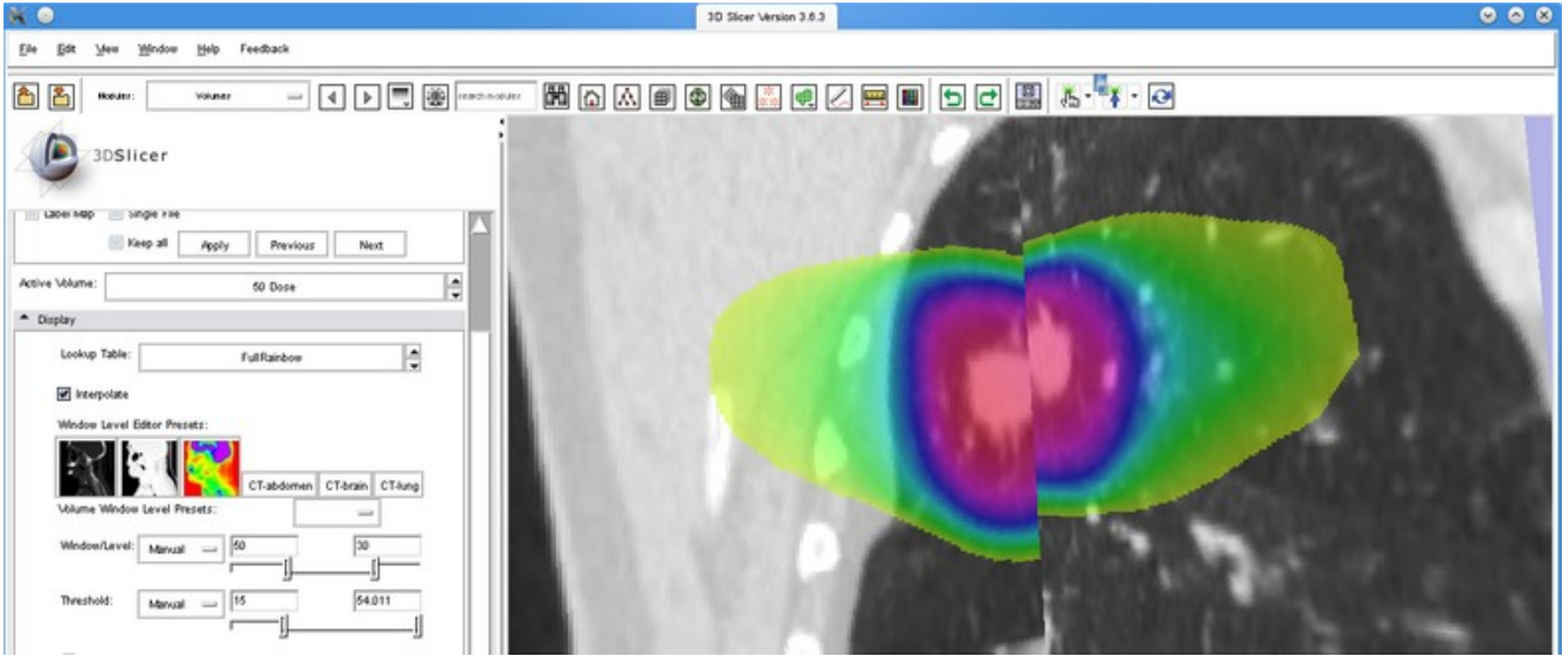
DICOM-RT interchange

- Current Status
  - Two CLP modules
  - NA-MIC tutorial
- Outstanding Issues
  - Points of interest
  - RT Plan support
  - Nested structures
  - Structure names
  - others…



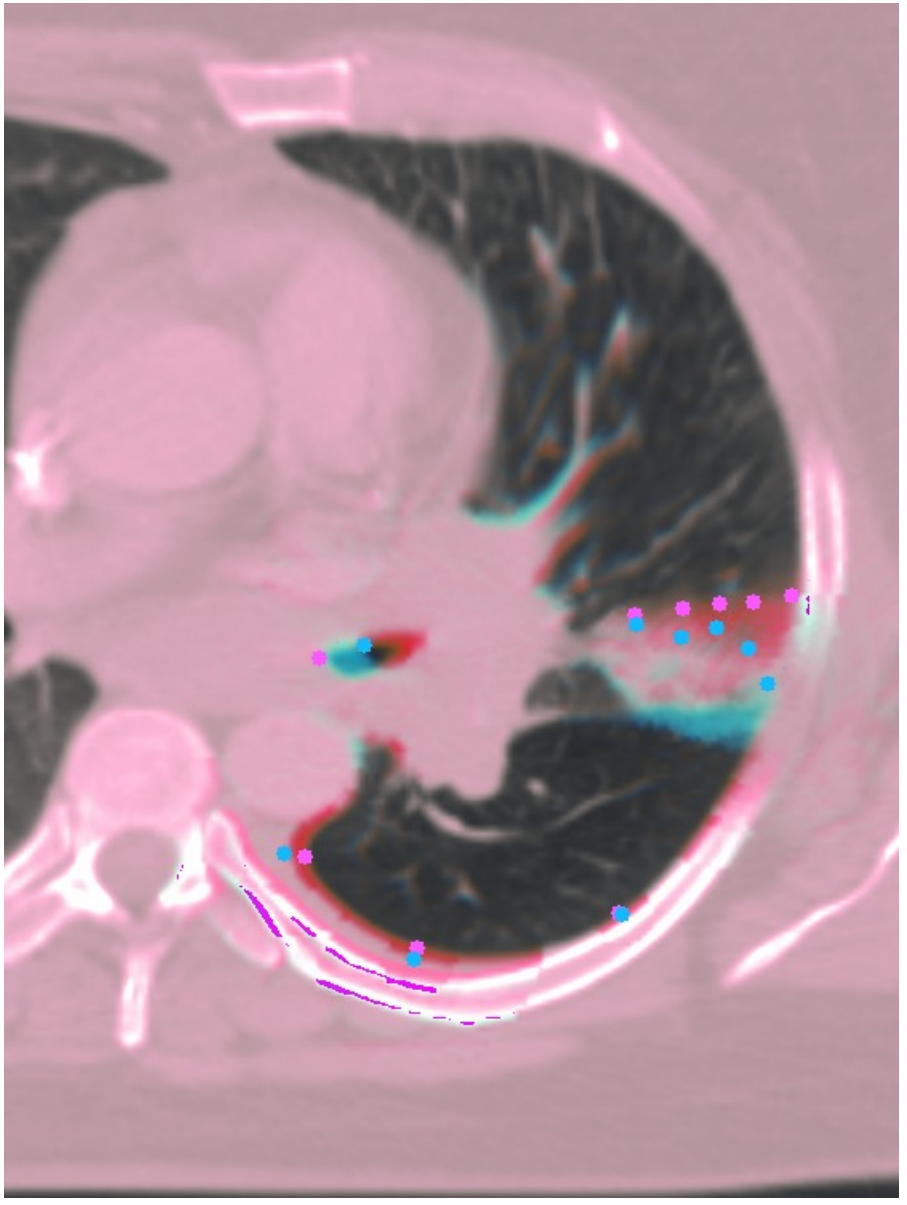
Structure set and dose warping

- Current status
  - Command line module
  - NA-MIC tutorial
- B-spline or Vector field
- Compatible with DICOM-RT import/export



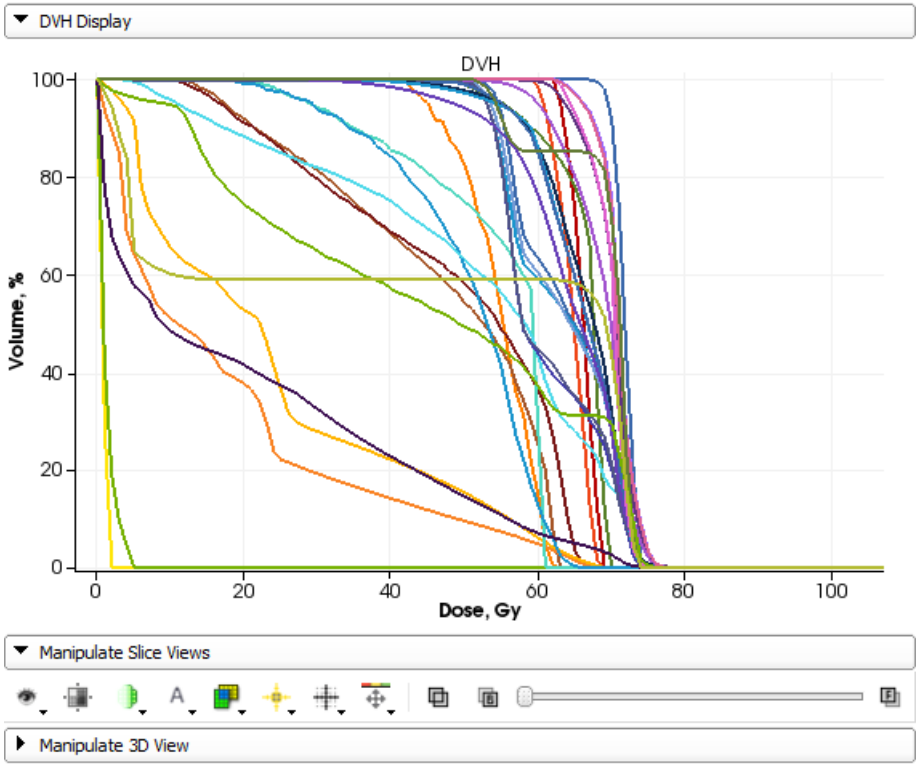
Interactive deformable registration

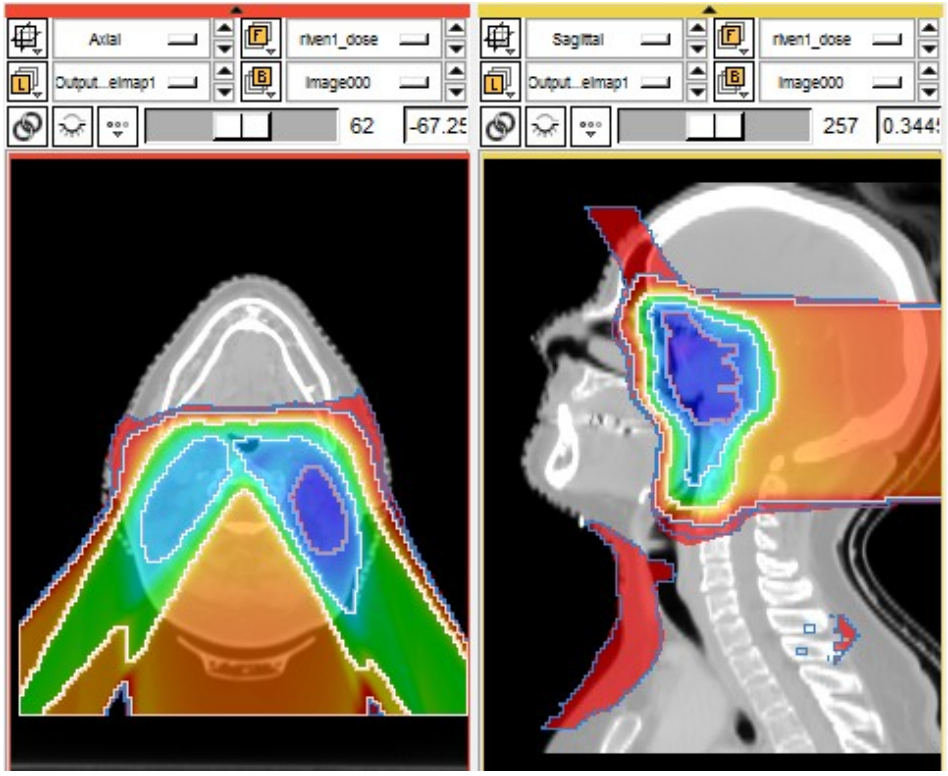
- Current status
  - Command line module
  - NA-MIC tutorial
  - Three RBF types
  - Regularization
  - Vector field export

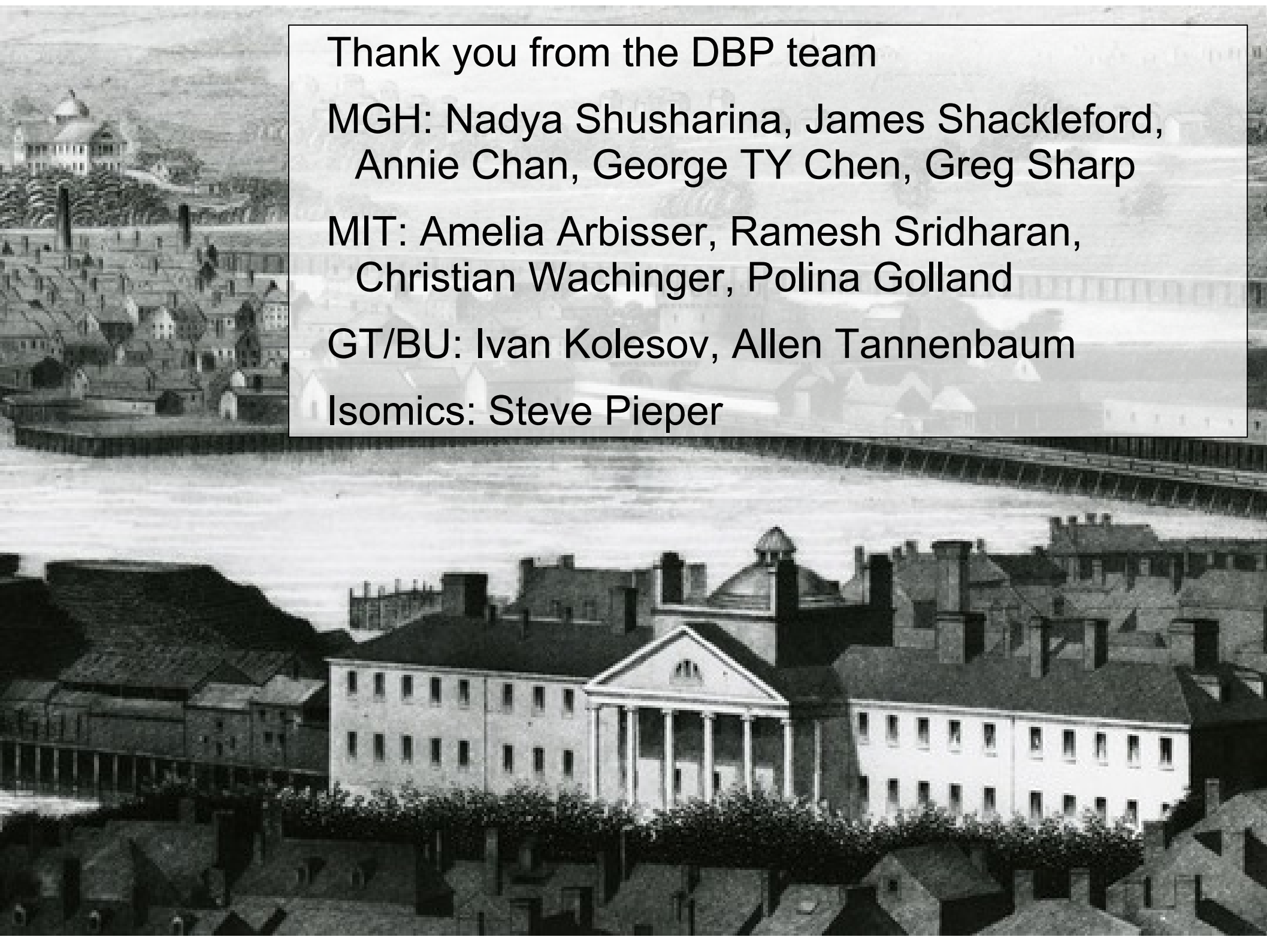


Plan review

- Current status (WIP)
  - Dose volume histogram module (Pinter)
  - Dose comparison/isodose module (Shusharina)







Thank you from the DBP team

MGH: Nadya Shusharina, James Shackleford, Annie Chan, George TY Chen, Greg Sharp

MIT: Amelia Arbisser, Ramesh Sridharan, Christian Wachinger, Polina Golland

GT/BU: Ivan Kolesov, Allen Tannenbaum

Isomics: Steve Pieper