



NATIONAL
CANCER
INSTITUTE

RTOG
RADIATION THERAPY
ONCOLOGY GROUP



ACRINTM
AMERICAN COLLEGE OF
RADIOLOGY
IMAGING NETWORK

RTOG-0522 TRIAL

Robert Jeraj, Chihwa Song, **University of Wisconsin**
John Freymann, Justin Kirby, Brian Hughes, Carl Jaffe,
Vikram Bhadrasin, Jim Deye, **NIH/NCI**
Walter Bosch, Joe Deasy, Yu Wu, Divya Khullar,
Jim Purdy, **ATC/ITC, Washington University**
Anthony Levering, **ACRIN**
Betty O'Meara, Mike Gillin, **RTOG**
Kian Ang, **MD Anderson**

RTOG 0522/ACRIN 4500

- A unique opportunity to investigate concurrent advanced **treatment dose plans and imaging**:
 - IMRT
 - FDG PET (before/after RT)
- **High QA** of both components
- **The problem**: both components collected independently
- **The question**: Can we use the combined data?

Two independent channels

- **RTOG 0522:** CT, Structures, Doses, Plans submitted to **ITC** (DICOM or RTOG Data Exchange), forwarded to **NBIA** (previously NCIA)
 - Digital data integrity, protocol compliance QA
 - RT data (CT, Structures, Doses) format conversion
 - Data (DICOM and CERR) upload to **NBIA**
- **ACRIN 4500:** Quantitative PET (PET/CT) images submitted to ACRIN, forwarded to **NBIA**

Specific Aims

- **Specific Aim 1: Combine** dosimetric and imaging information on the subset of patients receiving IMRT and the complete set of FDG-PET/CT scans
- **Specific Aim 2: Review** dosimetric and imaging information on the subset of patients receiving IMRT and the complete set of FDG-PET/CT scans
- **Specific Aim 3: Reanalyze** dosimetric and imaging data to establish variability of the assessment at participating institutions compared to the centralized assessment
- **Specific Aim 4: Investigate** feasibility of using the combined dosimetric and imaging data for new applications

Work so far

- **Technical glitches** obtaining dosimetry and imaging data from NBIA **resolved**
- **27 complete NBIA datasets** (imaging, dosimetry) analyzed
- Starting to test **data integrity** and **data quality**

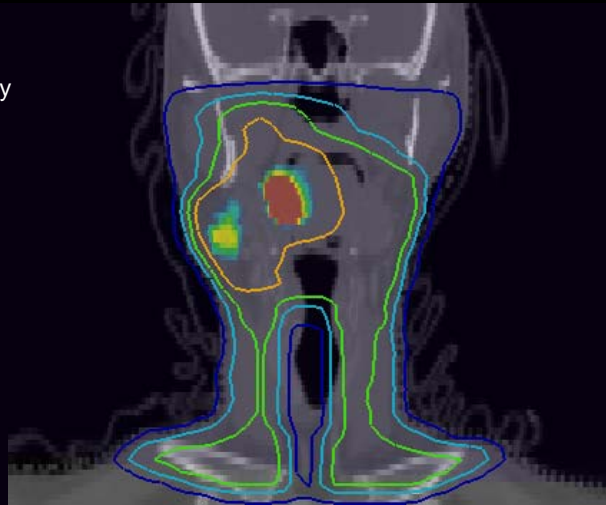
Pre and post-treatment FDG PET

RTOG-0522
ID=3

FDG-PET/CT

DOSE
70 Gy
50
30
10

SUV
5
0

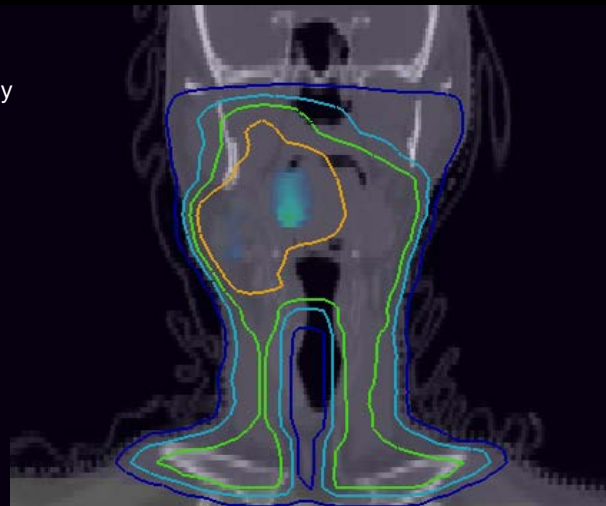


RTOG-0522
ID=3

FDG-PET/CT

DOSE
70 Gy
50
30
10

SUV
5
0



Treatment response

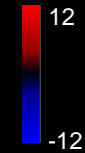
RTOG-0522
ID=3

FDG-PET/CT

DOSE



Diff



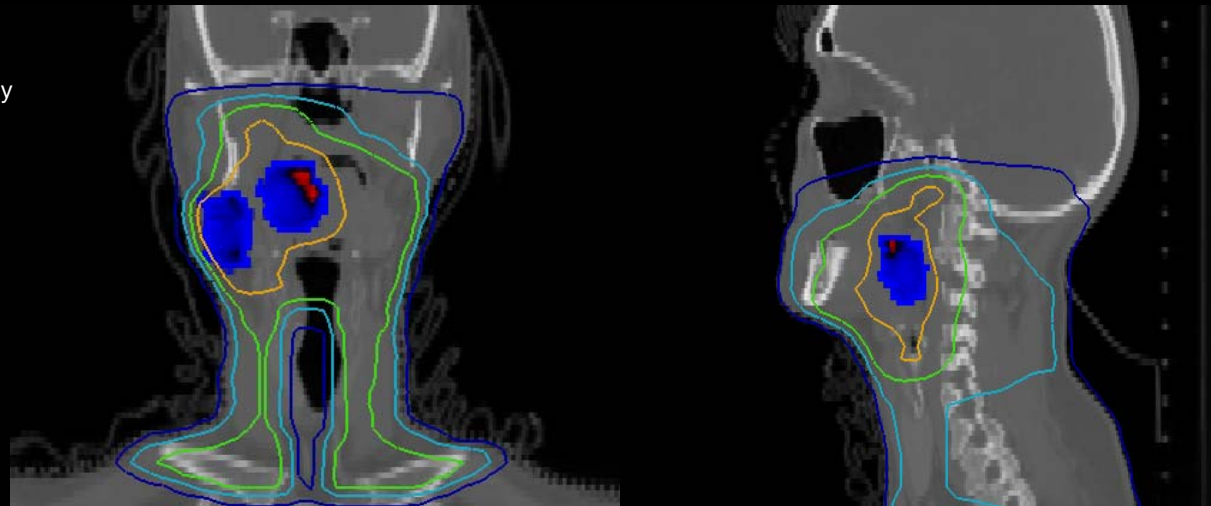
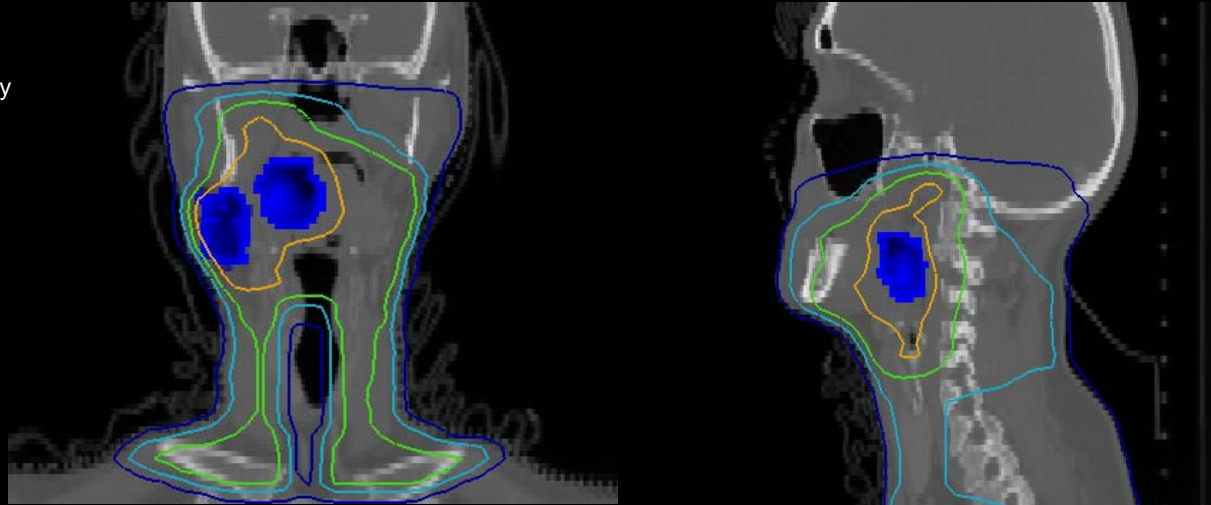
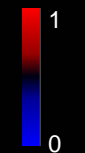
RTOG-0522
ID=3

FDG-PET/CT

DOSE



Ratio



Pre and post-treatment FDG PET

RTOG-0522
ID=2

DOSE

70 Gy
50
30
10

SUV

5
0

FDG-PET/CT

RTOG-0522
ID=2

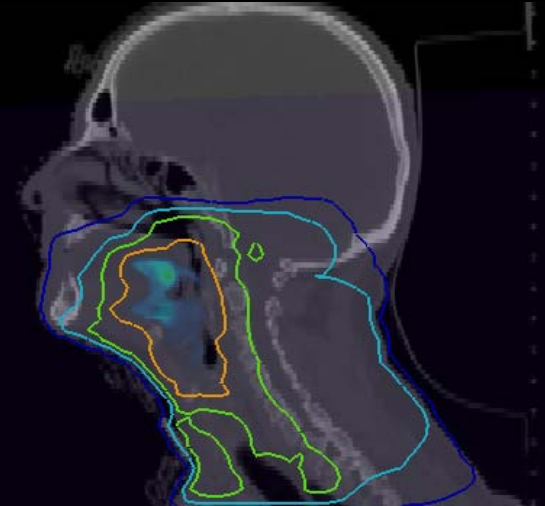
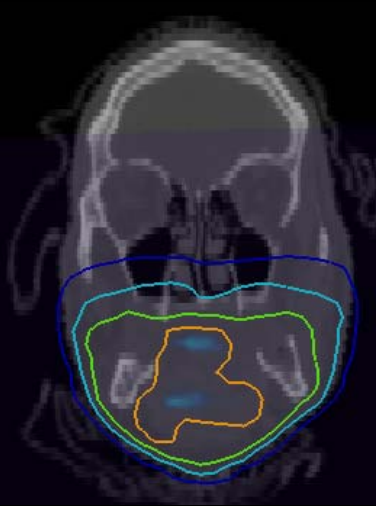
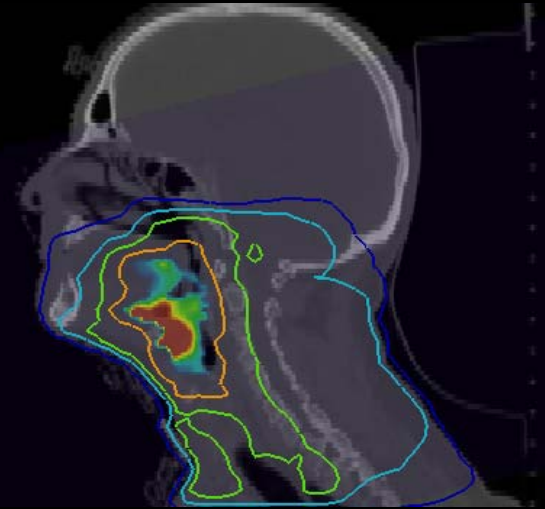
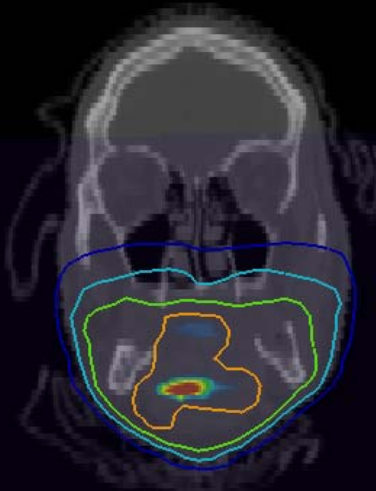
DOSE

70 Gy
50
30
10

SUV

5
0

FDG-PET/CT



Treatment response

RTOG-0522
ID=2

FDG-PET/CT

DOSE



Diff



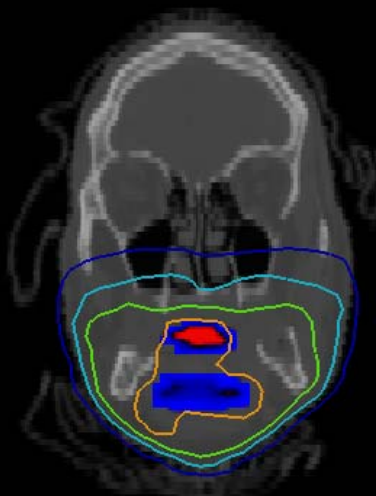
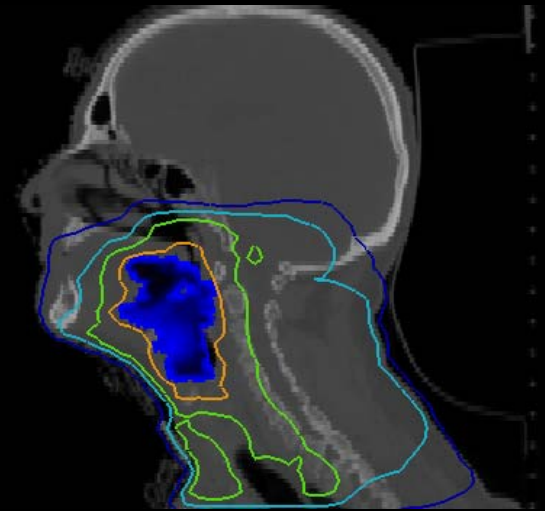
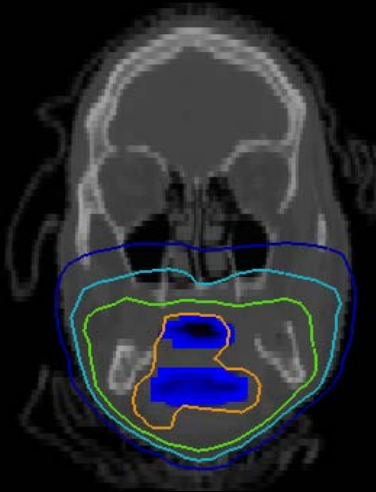
RTOG-0522
ID=2

FDG-PET/CT

DOSE



Ratio



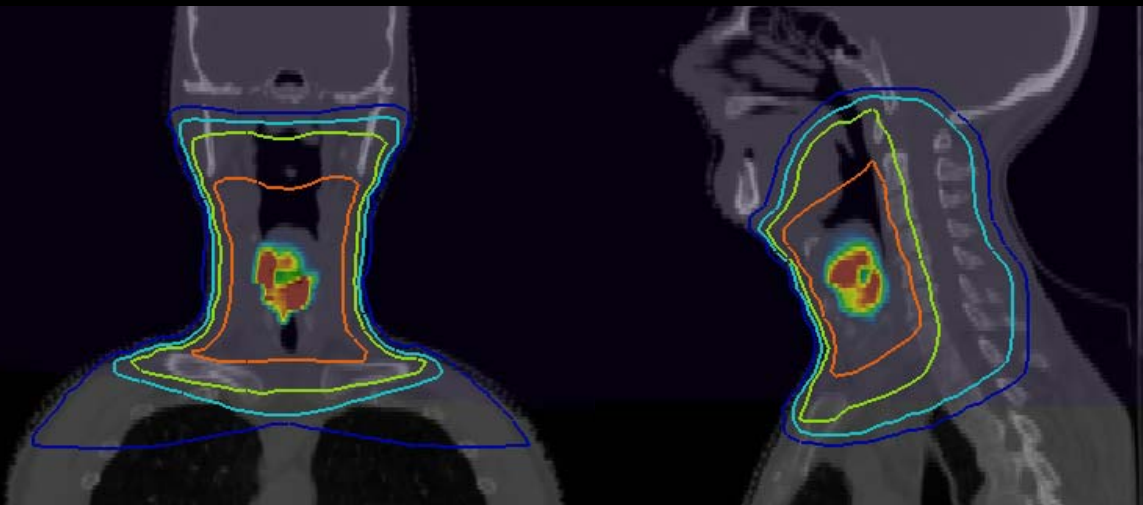
Pre and post-treatment FDG PET

RTOG-0522
ID=17

DOSE
70 Gy
50
30
10

SUV
16
0

FDG-PET/CT

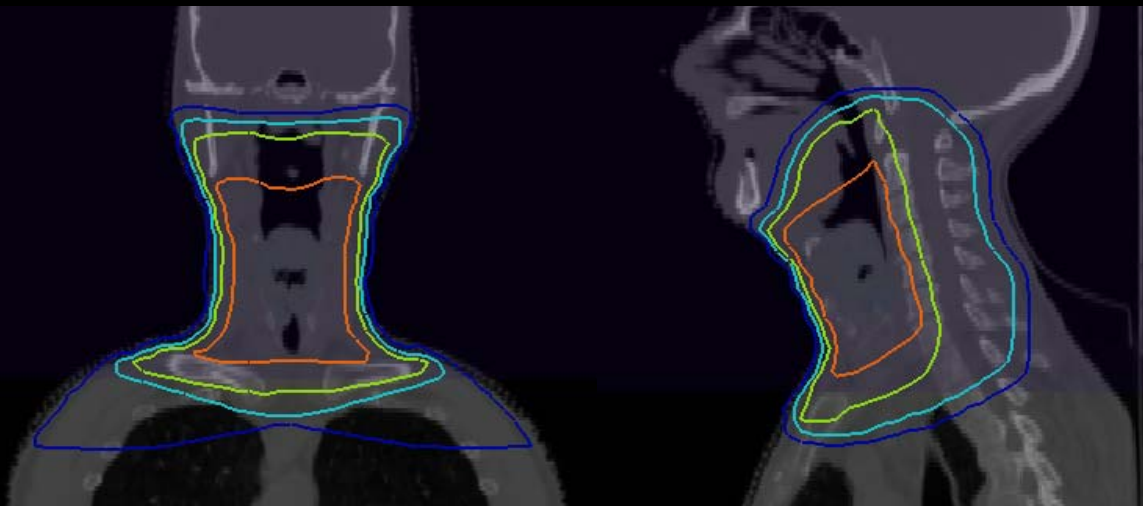


RTOG-0522
ID=17

DOSE
70 Gy
50
30
10

SUV
16
0

FDG-PET/CT



Treatment response

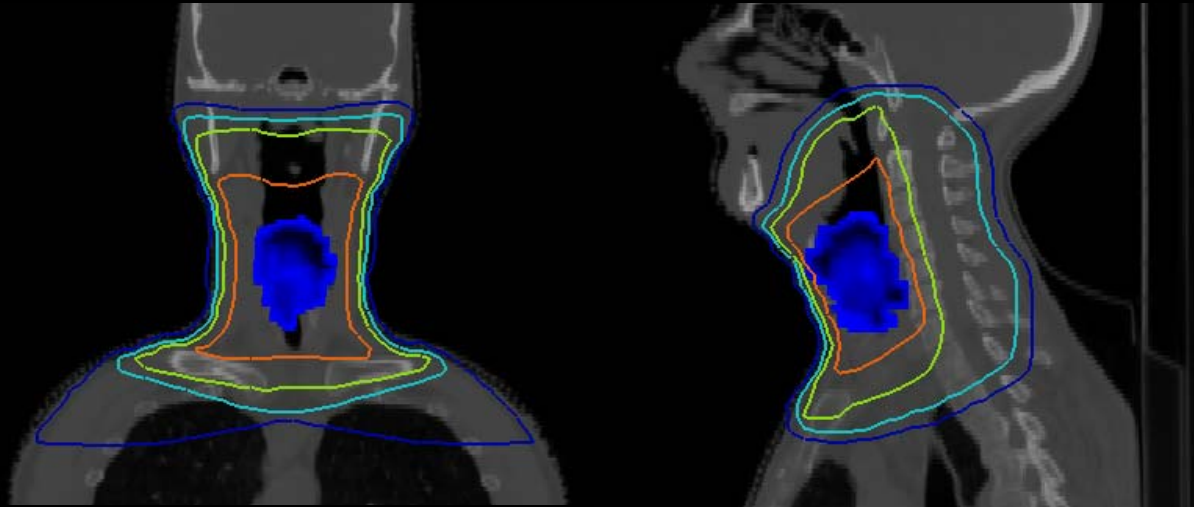
RTOG-0522
ID=17

FDG-PET/CT

DOSE



Diff



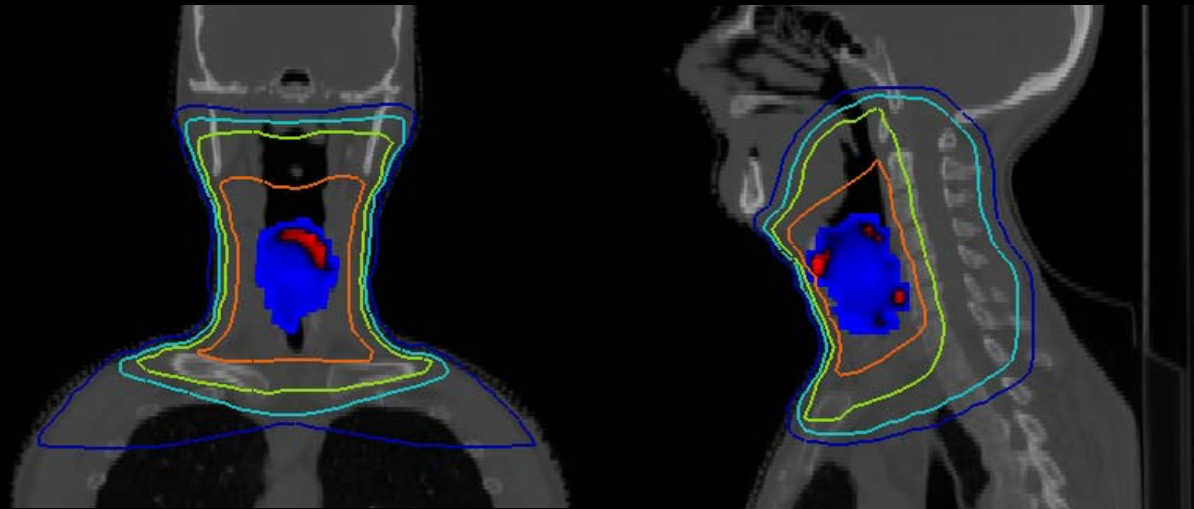
RTOG-0552
ID=17

FDG-PET/CT

DOSE



Ratio



Progress since the last RTOG mtg

- Data integrity verification process started at NBIA
- Resolved initial de-identification issues
 - Some tags contained values too long to insert into database
 - Modified schema to include important tags that were initially being stripped from the data
- NBIA updated to NCIA 4.1
- 16 completed cases currently in NBIA

Remaining challenges

- Automate patient ID mapping between sites
- Eventually setup CTP at remote sites to allow direct submission to NBIA rather than FTPing to NCI

NCIA 4.1 Features

- Updated Cedara I-Response client for visualization available at <http://gforge.nci.nih.gov/frs/download.php/4838/I-ResponseR2.0.zip>
- New search feature which allows you to search by Patient/Subject UID. You can search for more than one patient UID at a time by inserting commas between each UID in the list.
- New “CTP” image submission back end for improved stability and performance.
- Backend optimizations to improve system performance

Conclusions

- Successfully combination of both, the imaging and dosimetry data !!!
- **Work so far** identified some technical issues
 - Software upgrades in CERR
 - Software upgrades at NBIA
- **Future work:**
 - Improve the submission workflow
 - Make the submission process automatic
 - Test the automatic submission process
 - Review all the cases
 - Make the data available for research
 - U01 proposal

**Thanks everyone
to make this possible !**