RTOG-0522 TRIAL

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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 NCI Archive (DICOM)
  - Digital data integrity, protocol compliance QA
  - RT data (CT, Structures, Doses) format conversion
  - Data (DICOM and CERR) upload to **NCIA**

- **ACRIN 4500:** Quantitative PET (PET/CT) images submitted to ACRIN, forwarded to **NCIA**

Specific Aims

- **Specific Aim 1:** **Review** dosimetric and imaging information on the subset of patients receiving IMRT and the complete set of FDG-PET/CT scans

- **Specific Aim 2:** **Combine** dosimetric and imaging information on the subset of patients receiving IMRT and the complete set of FDG-PET/CT scans

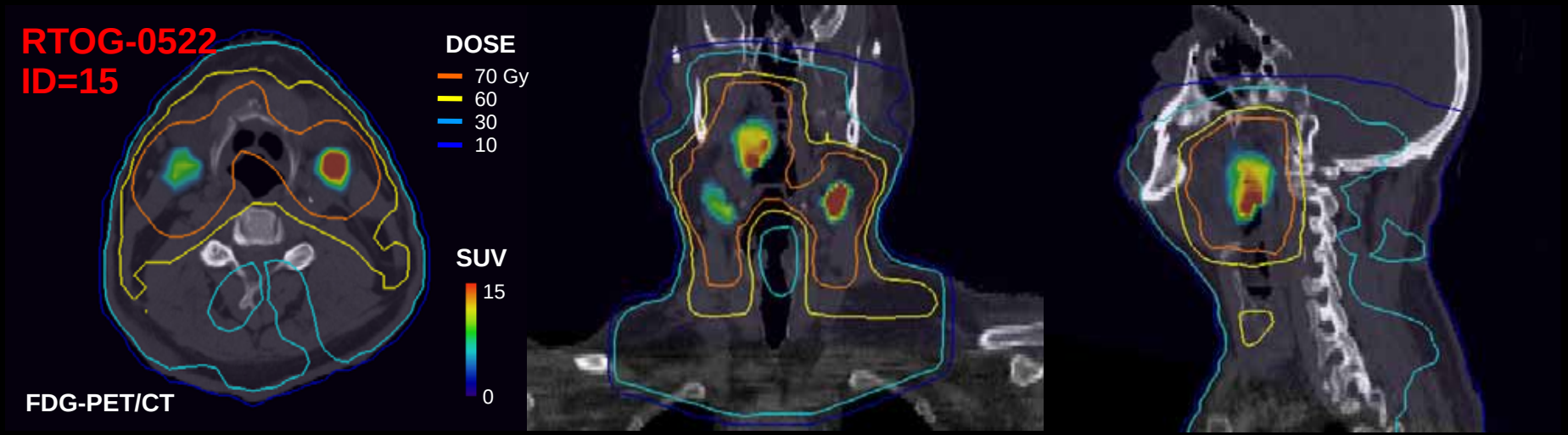
- **Specific Aim 3:** **Reanalyze** dosimetric and imaging data to establish variability of the assessment at participating institutions compared to the centralized assessment

- **Specific Aim 4:** **Investigate** feasibility of using the combined dosimetric and imaging data for new applications

Work so far

- First case pt **ID=15** (MDAnderson)
  - Problems in the header of imaging data
  - RTDose data inconsistent between ITC and NCIA
- Second case pt **ID=9** (Moffitt Cancer Center)
  - Remaining issues with the RTDose data, but most likely due to incompatibility of different versions of CERR, Matlab, Java

Pre and post-treatment FDG PET



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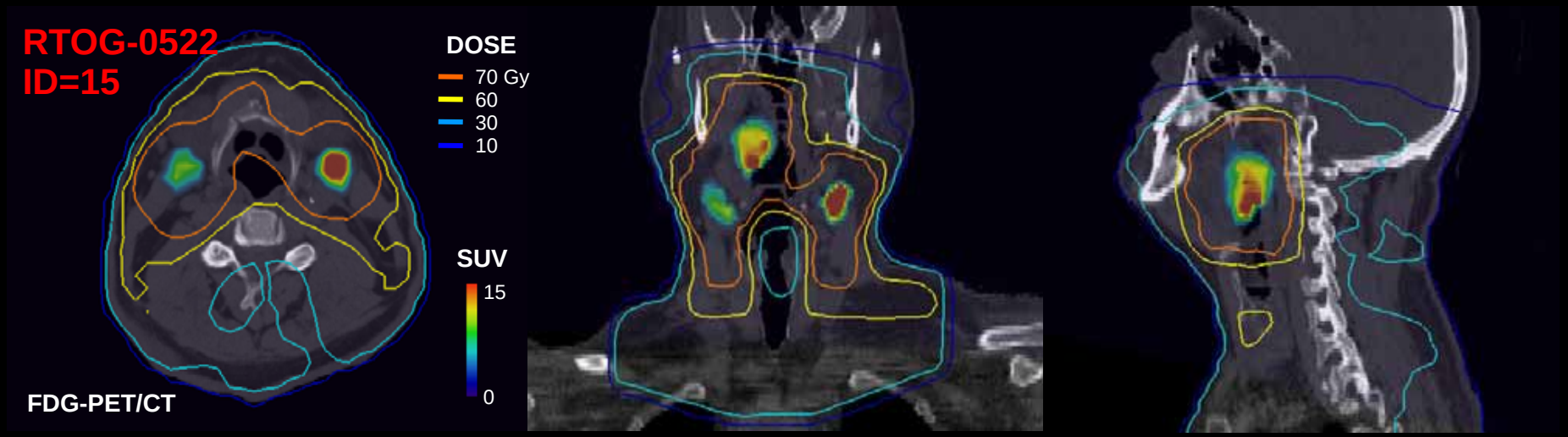
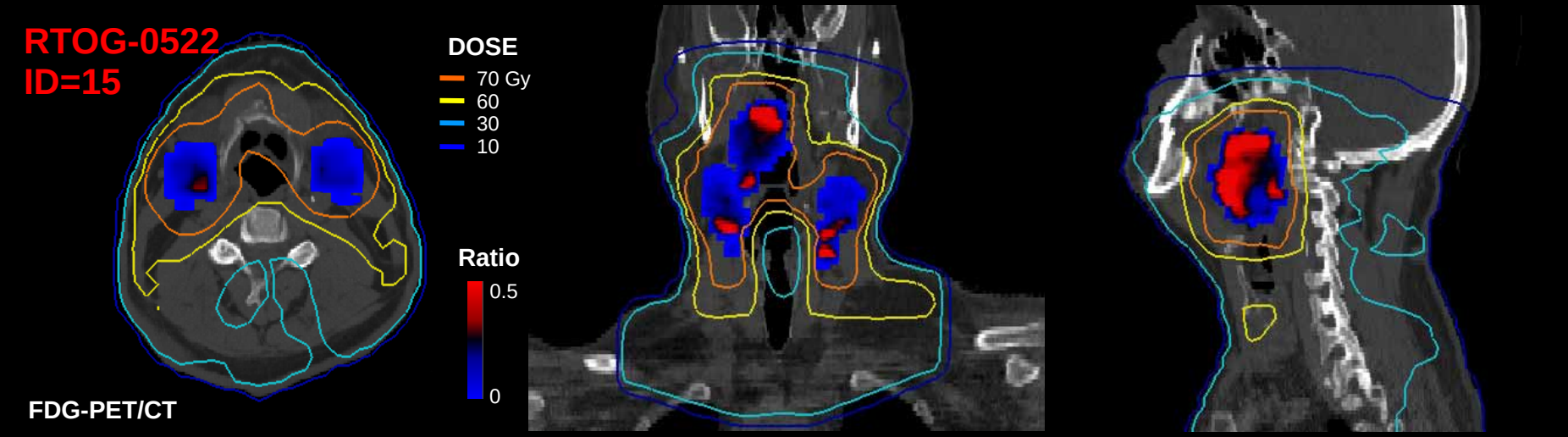
Treatment response





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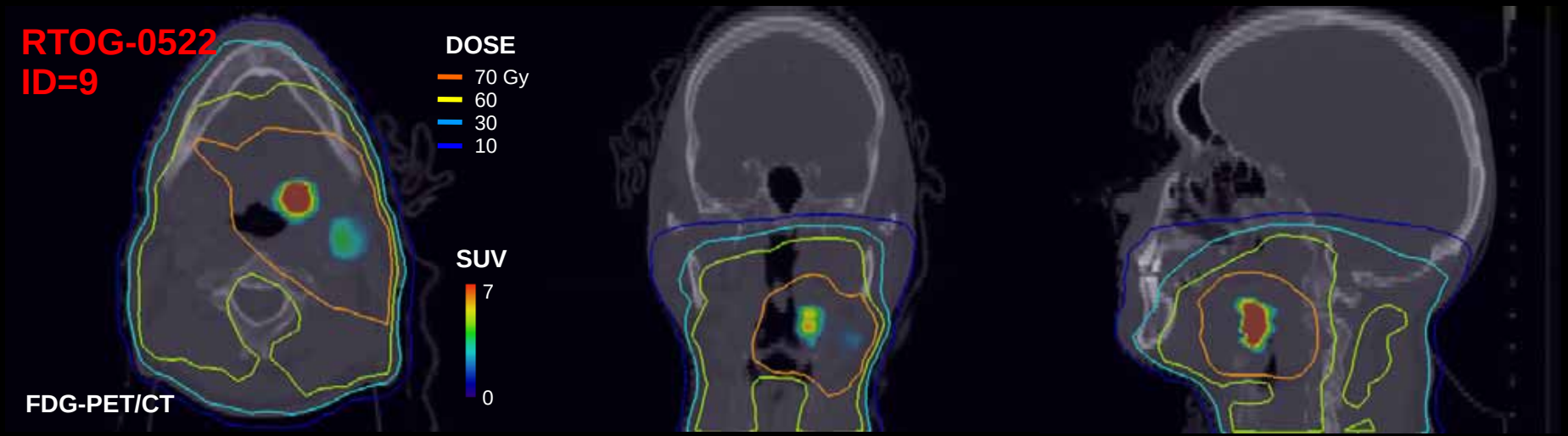
Pre and post-treatment FDG PET



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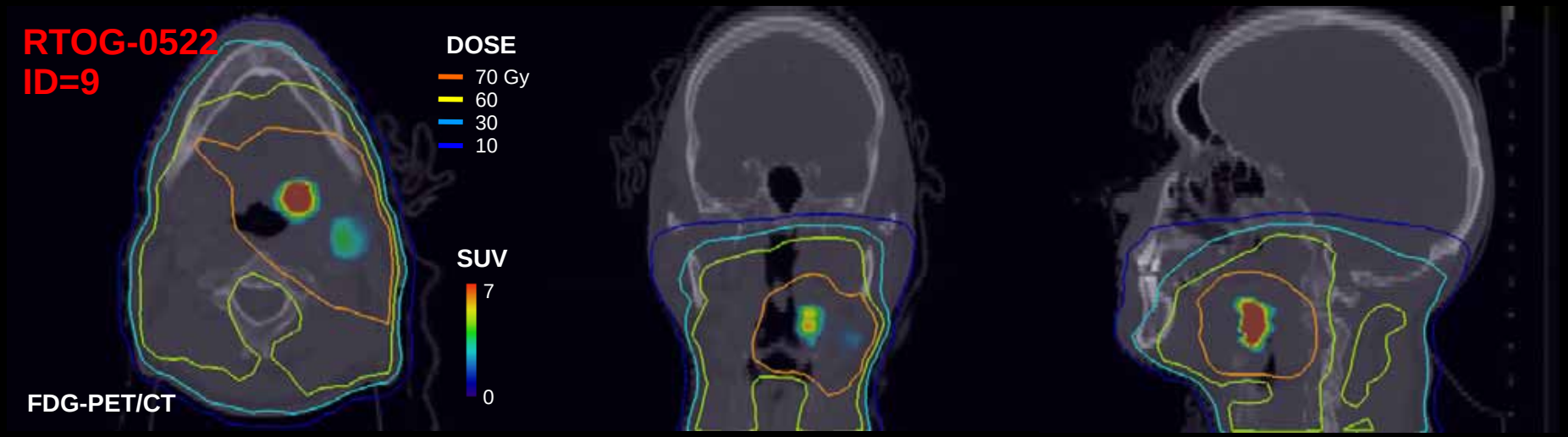
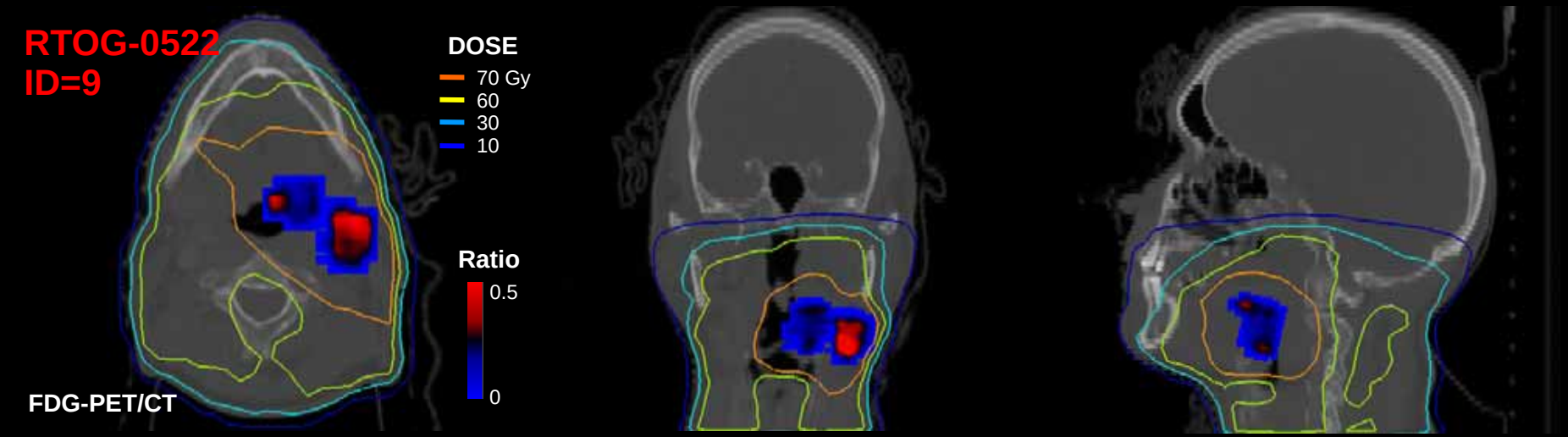
Treatment response





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Remaining issues

- **Need to validate DICOM header information prior to processing.** For instance, sliceThickness in DICOM is different than the actual slice thickness for CT images (ID=09).

- **Missing field (StartDate) and corrupted modality (RTStruct).** Present in the first case (ID=15), but not in the second case (ID=09). RT dataset for the first case needs to be fixed.

- **Importing data into CERR.** Loading RT dataset into CERR caused some problems with DICOM(J) import option, while importing the data with DICOM requires RTPlan in order to import RTDose.

Conclusions

- We have managed to successfully combine both, the imaging and dosimetry data !!!
- **Work so far** identified some technical issues
  - De-identification at NCIA
  - Software version sensitivity in CERR
- **Future work – short term:**
  - Work around the current issues
  - Make the process more robust
  - Review more cases
  - Make CERR the main platform
- **Future work – long term:**
  - Specific Aim 3: Reanalyze the data
  - Specific Aim 4: New applications

Thanks everyone
to make this possible !