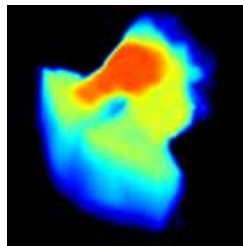


Project: RTOG 0522

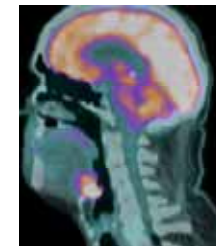
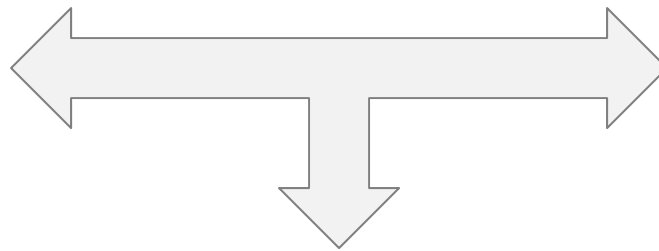
- Data integration with ATC and ACRIN



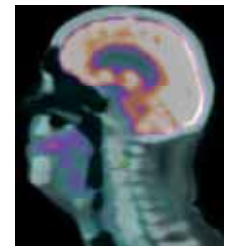
CT Sim



RT Dose



Pre-Tx

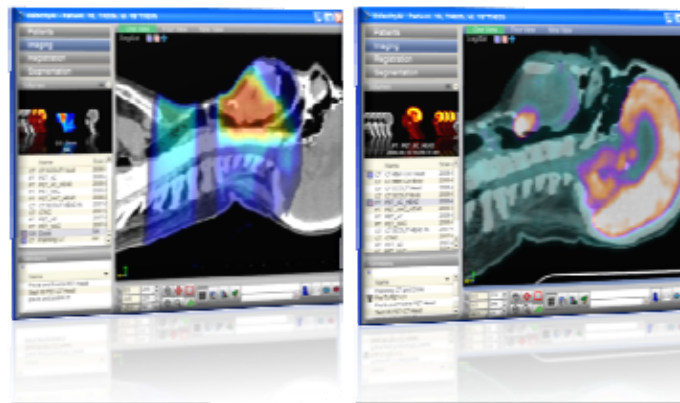


Post-Tx

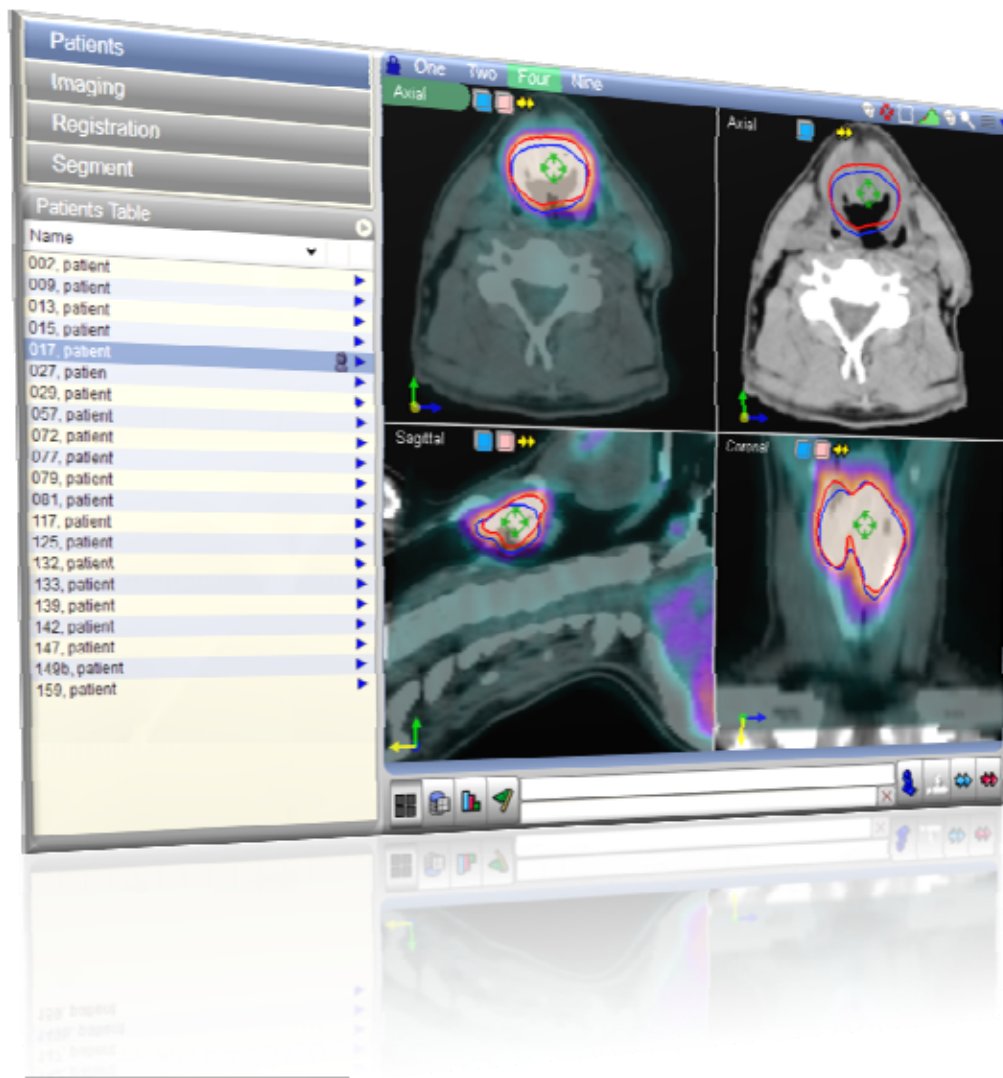
ATC DB

RT & Image Integration

ACRIN DB



Data Acquisition



- NCI Archive (NCIA) initially used in Dec 2009
- Access to twenty-one (21) RTOG 0522 cases provided by ATC via ftp access
- Inconsistencies with ACRIN PET/CT data

Data Integrity

Patient #	CTSim	Struct	Dose	Pre-Tx PET/CT	Post-Tx PET/CT
002	Yes	Yes	Yes	No CT	No CT
009	Yes	Yes	Yes	No CT	No CT
013	Yes	Yes	Yes	No CT	No CT
027	Yes	Yes	Yes	None	Yes
072	Yes,	Yes	Yes	None	Yes
117	Yes	Yes	Yes	Yes	Yes (No SUV)
133	Yes	Yes	Yes	Bad CTs	Bad CTs
139	Yes,	Yes	Yes	No CT	None
142	Yes	Yes	Yes	Yes	Yes (No SUV)
147	Yes	Yes	Yes	No CT	None

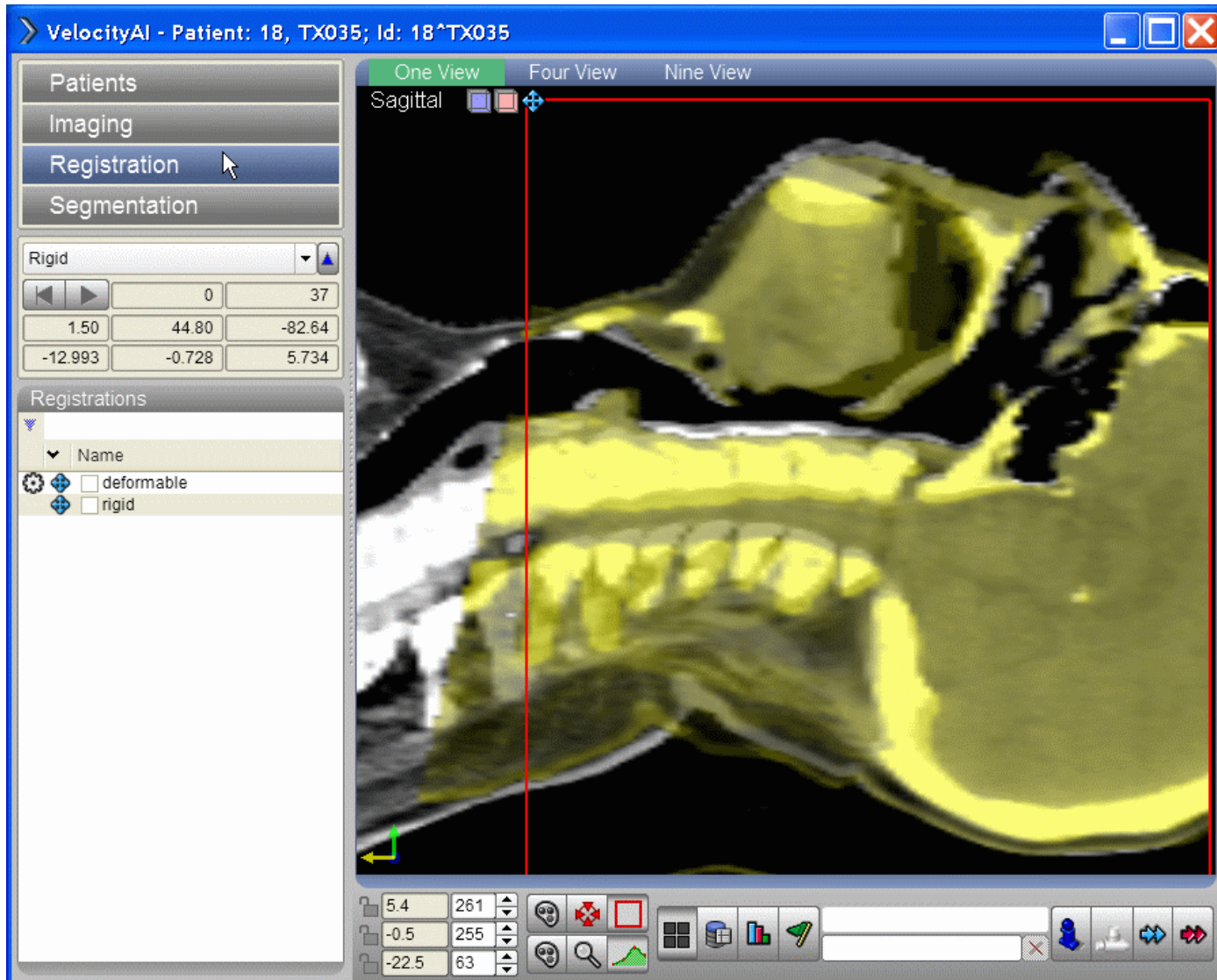
Acceptable Cases:

015, 017, 029, 057, 077, 079, 081, 125, 132, 133, 139, 149, 159

Longitudinal Response Assessment

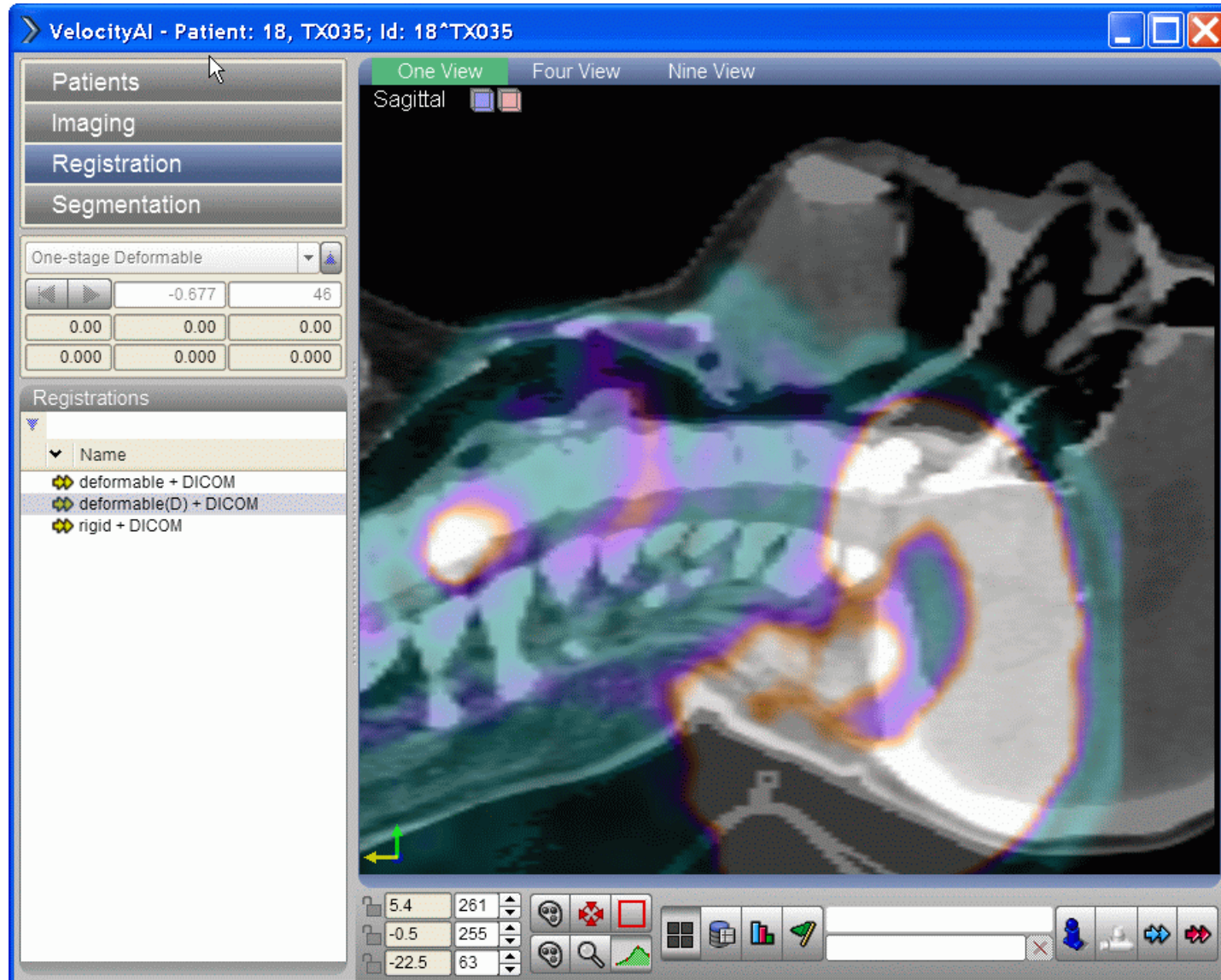
- Objective: Integration of RT specific data with pre-treatment and post-treatment PET-CT data.
- Significance: Use multiple PET-CTs performed in non-treatment position and deform it to the treatment position. Important for voxel-to-voxel mapping.
 - *RTOG 0522 Secondary Aims*
 - Correlate pre-treatment PET scan findings with disease-free survival, overall survival, and local-regional control in patients participating in this component of the trial.
 - Correlate post-treatment PET scan findings with nodal response and nodal relapse in patients participating in this component of the trial

Voxel Tracking Registration



Deformable PET-CT to PET-CT Image Registration

PET/CT Voxel Tracking

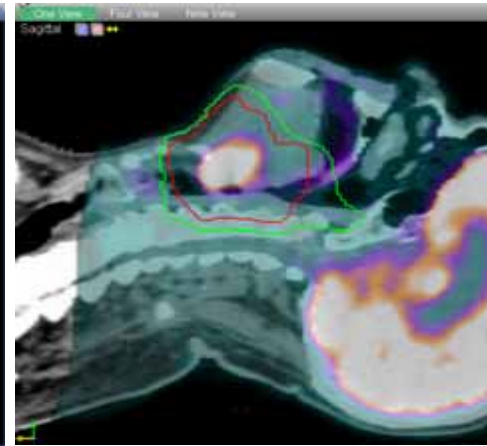
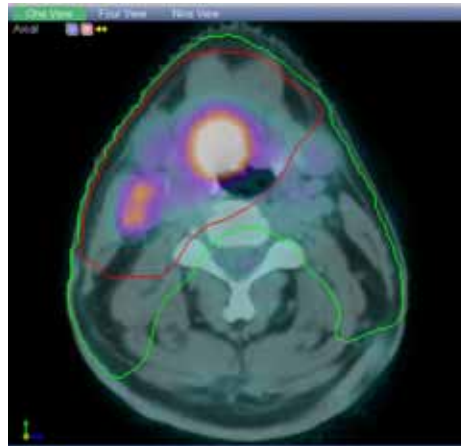


Deformable PET-CT to PET-CT Image Registration

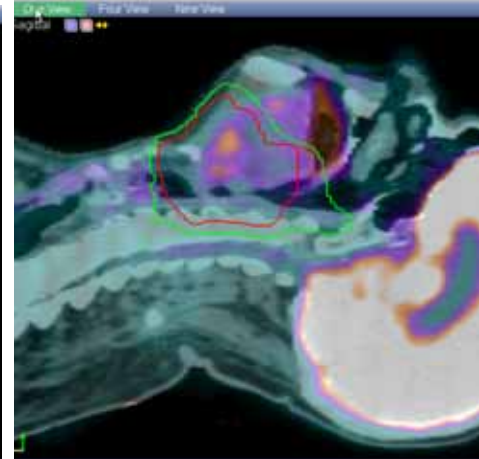
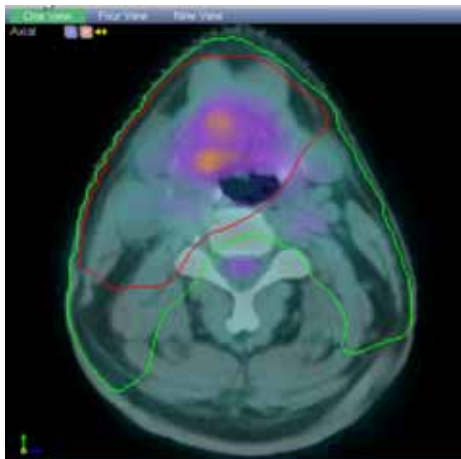
Therapy Response Assessment

Therapy response assessment using RT specific data with PET-CT pre-treatment and post-treatment images

**Pre-Tx PET fused w/
Planning CT and Dose**



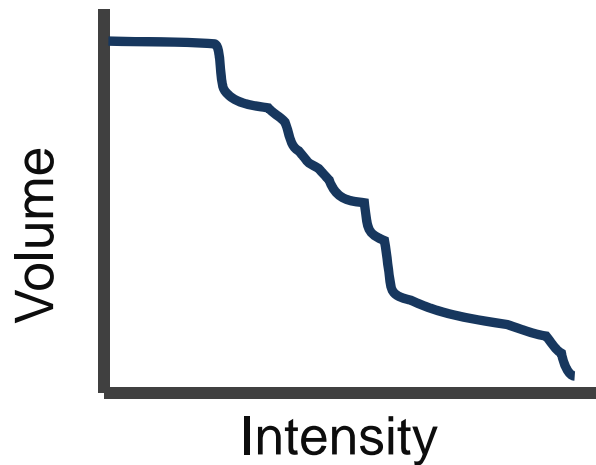
**Post-Tx PET fused w/
Planning CT and Dose**



Therapy Response Assessment

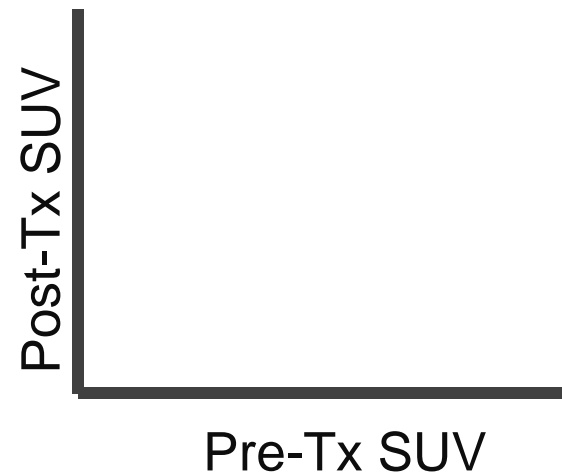
Volume Analysis

Voxels are accumulated in their respective metabolic intensity value bins



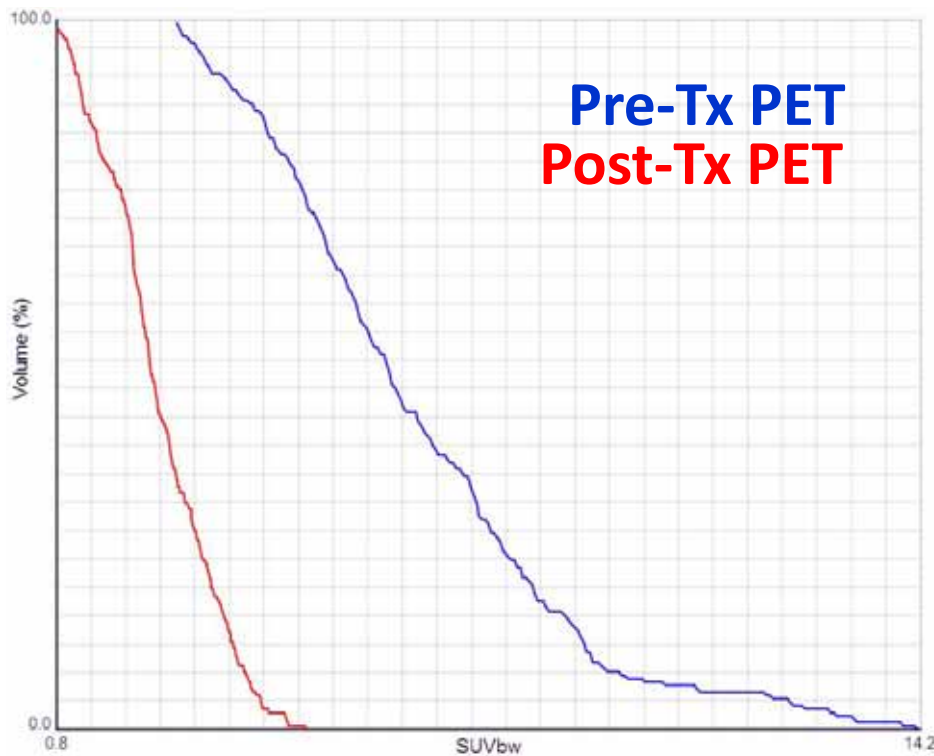
Voxel Map Analysis

Analyze voxel-to-voxel changes in pre-tx and post-tx images

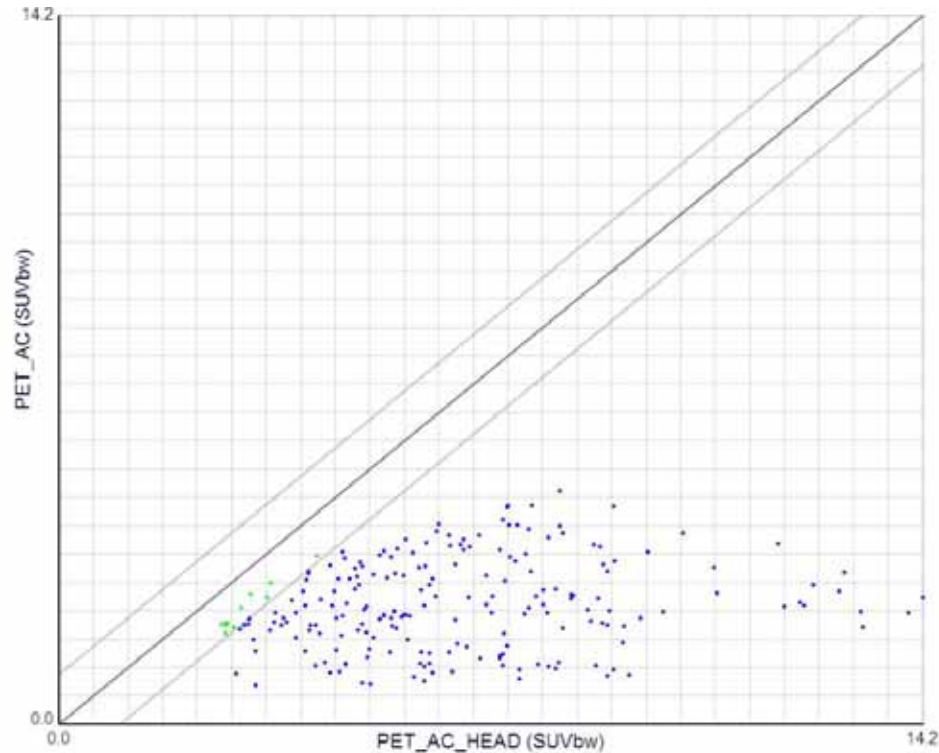


Therapy Response: RTOG 0522

Compute volumetric and voxel response maps for quantitative assessment.



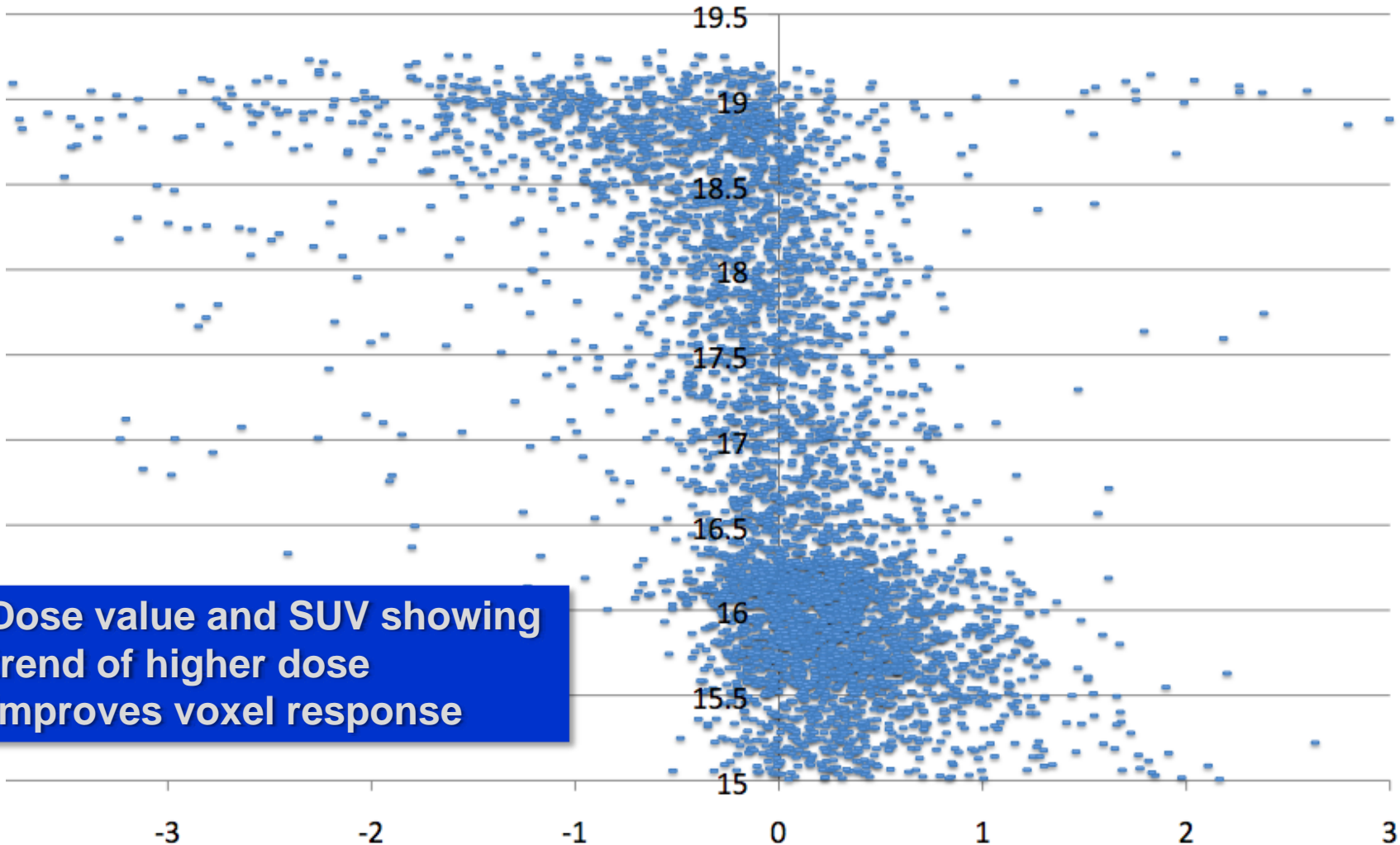
Metabolic Volume Histogram (MVH)



Voxel Map Response (VMR)

ECRS: Change in SUV vs Dose

DOSE in GY



Dose value and SUV showing trend of higher dose improves voxel response