

ADNI PET CORE

Boston
April 2017



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ADNI Florbetapir scan counts

Number of Florbetapir scans	N	SMC	EMCI	LMCI	AD	Total
1	265	104	302	223	198	1093
2	215	77	219	153	51	715
3	127	1	115	72	7	322
4	7	0	3	7	1	18

2148

ADNI AV1451 scan counts

Number of AV1451 scans	N	SMC	EMCI	LMCI	AD	Total
1	34	11	23	22	10	100
2	3	2	3	4	0	12

112

Amyloid Imaging

Followup
N=700

Florbetapir

or

New
(N=300)

Florbetaben

Every 2 Years

Florbetapir

or

Florbetaben

Tau Imaging

All
(N=1000)

[¹⁸F]AV1451

80% of Amyloid Positive
20% of Amyloid Negative

3 additional scans
over 4 years

[¹⁸F]AV1451

[¹⁸F]AV1451

[¹⁸F]AV1451

20% of Amyloid Positive
80% of Amyloid Negative

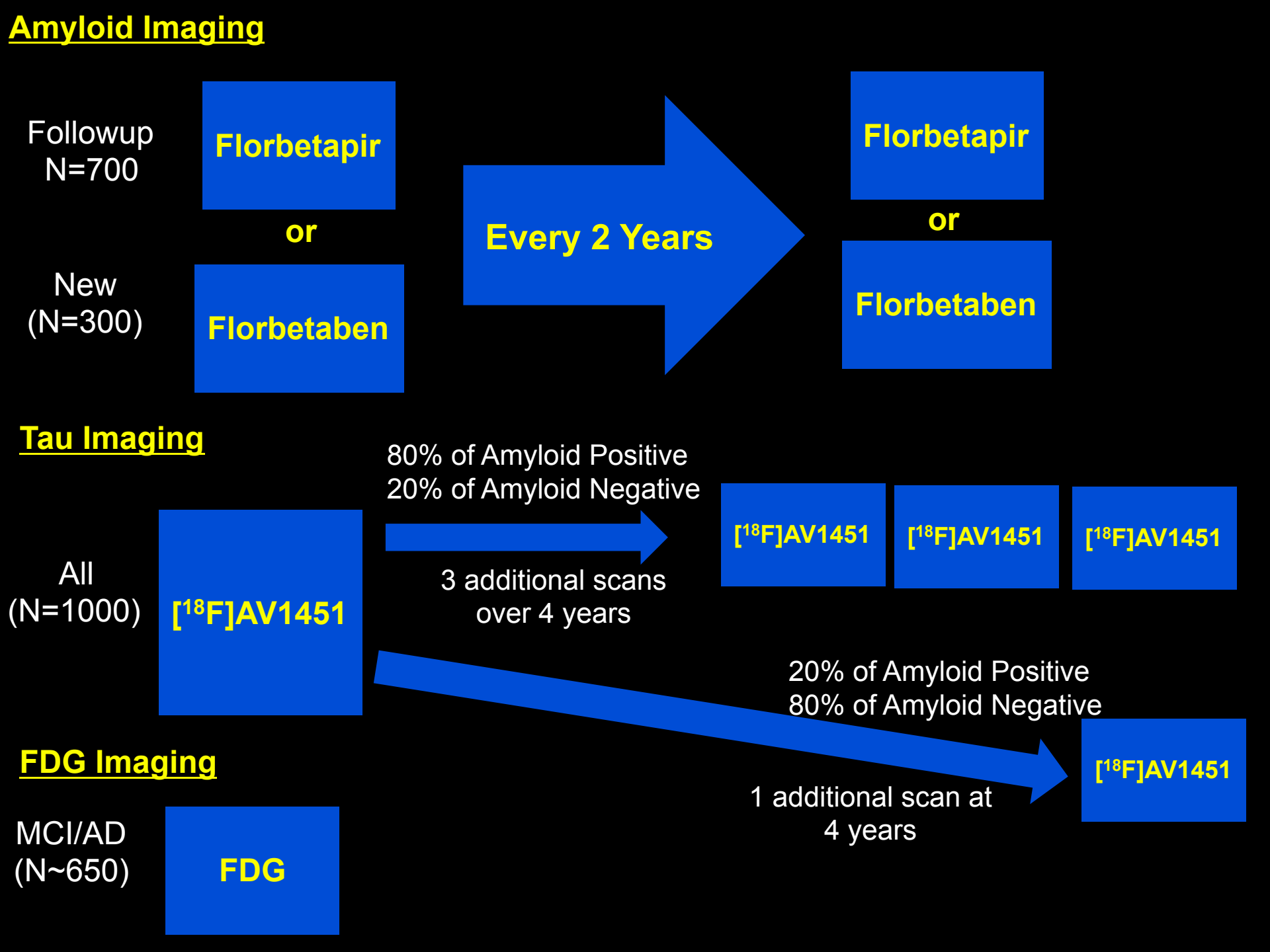
[¹⁸F]AV1451

FDG Imaging

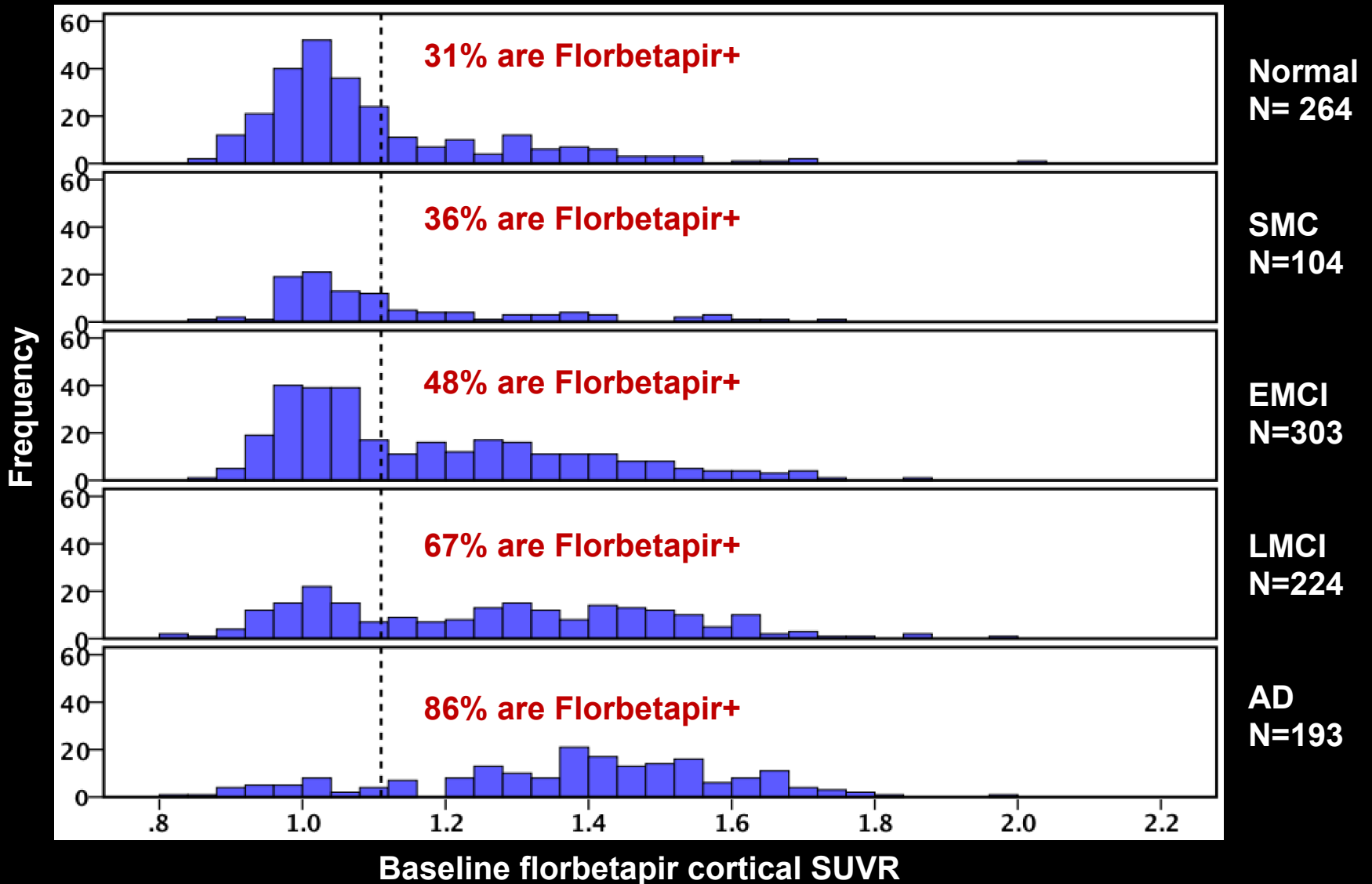
MCI/AD
(N~650)

FDG

1 additional scan at
4 years



Baseline Florbetapir Distribution

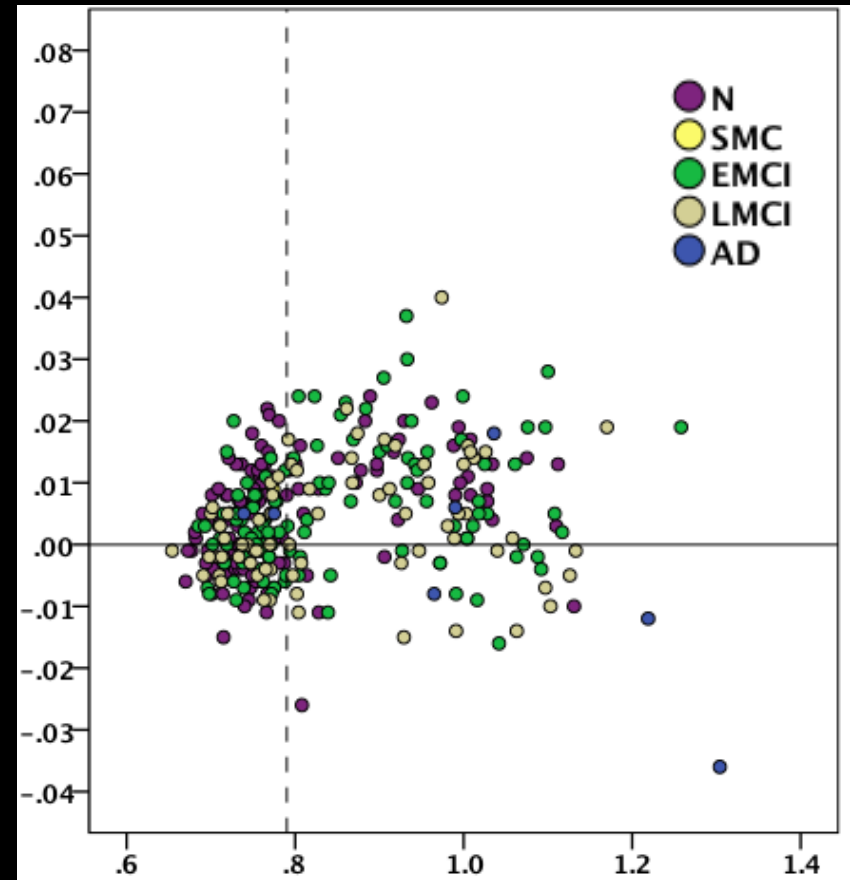
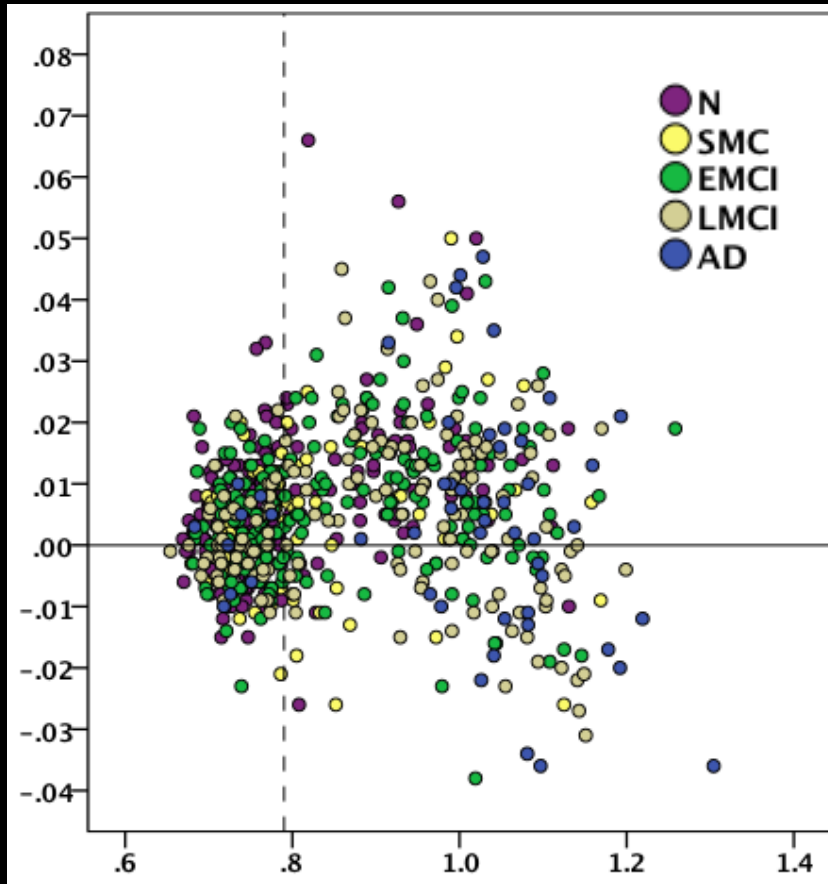


Florbetapir rate of change

≥ 2 florbetapir scans

3 florbetapir scans

Florbetapir annual change

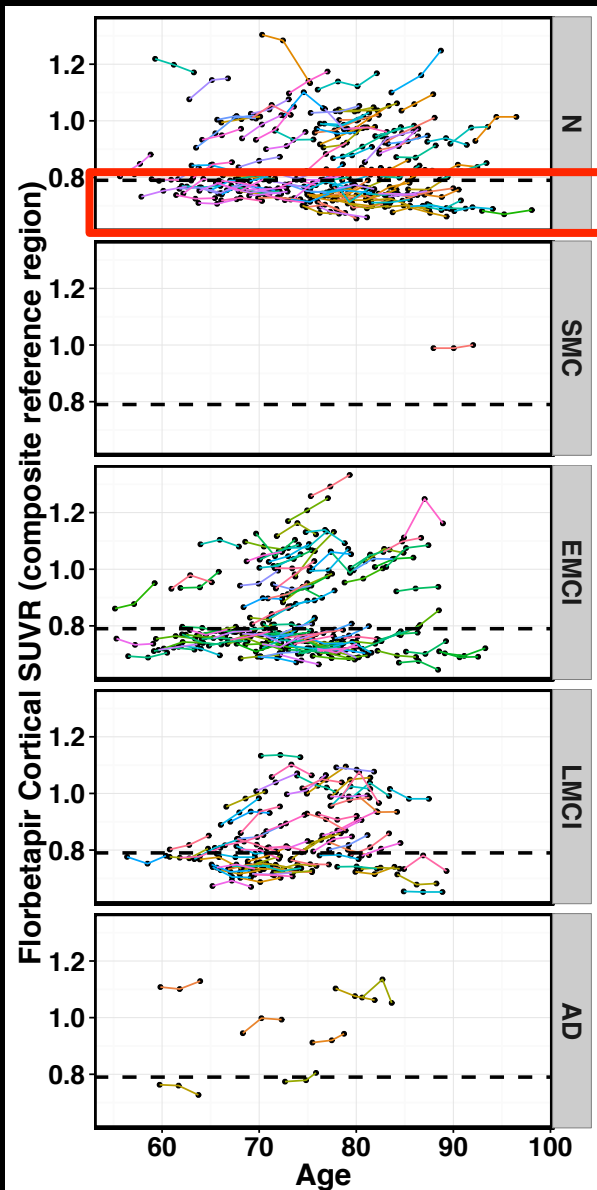


**Baseline florbetapir SUVR
(composite ref region)**

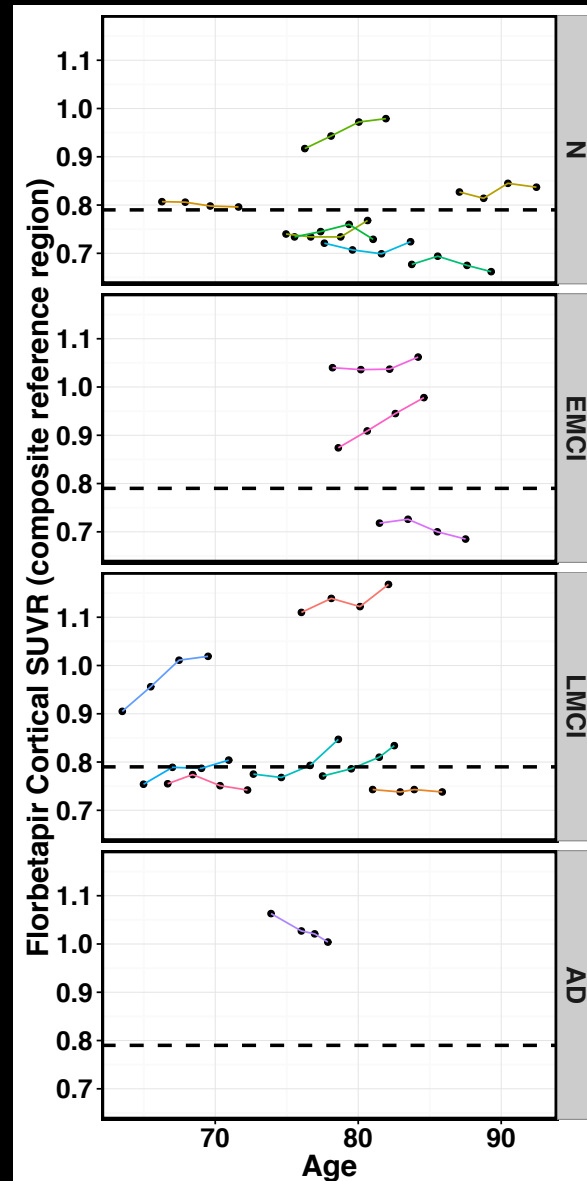
**Baseline florbetapir SUVR
(composite ref region)**

Florbetapir trajectories by diagnosis

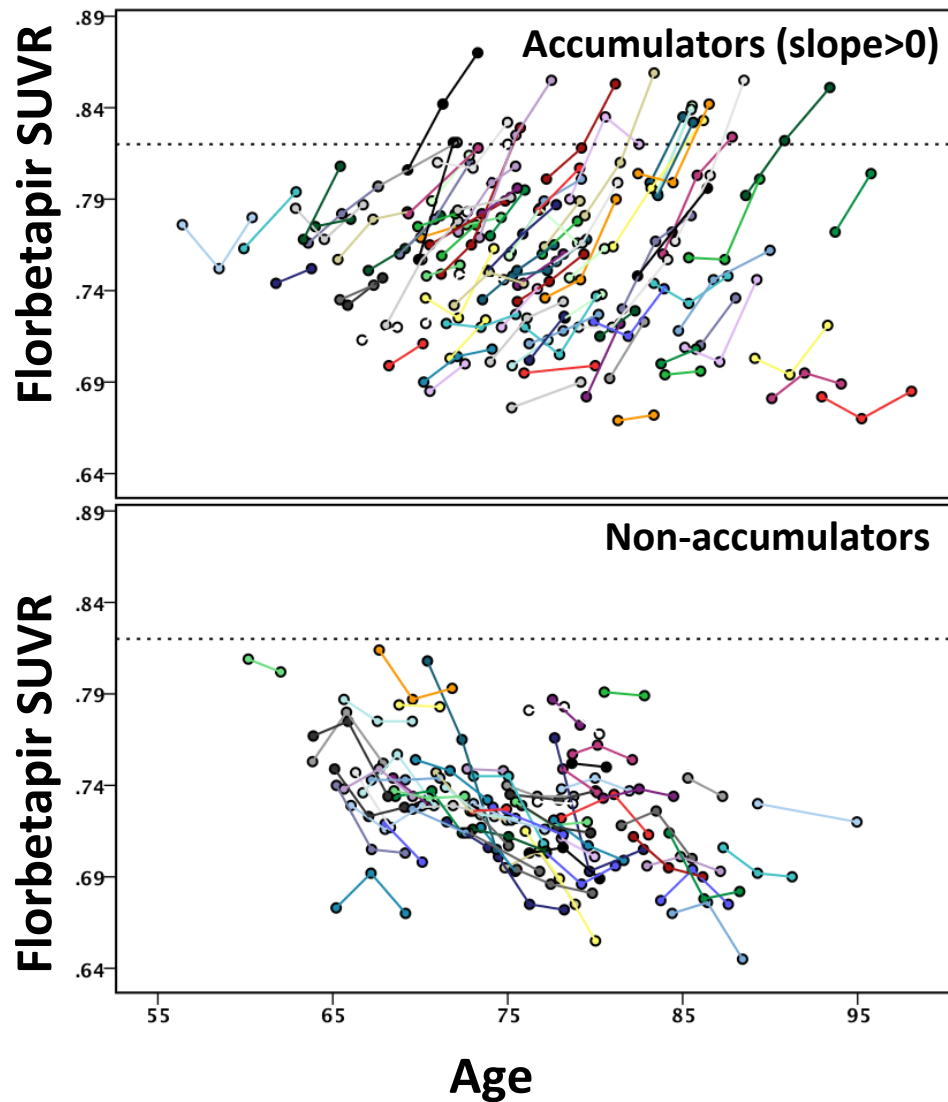
3 florbetapir scans (N=322)



4 florbetapir scans (N=18)

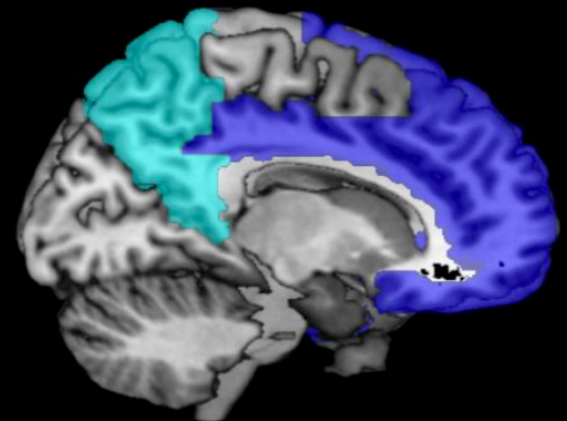
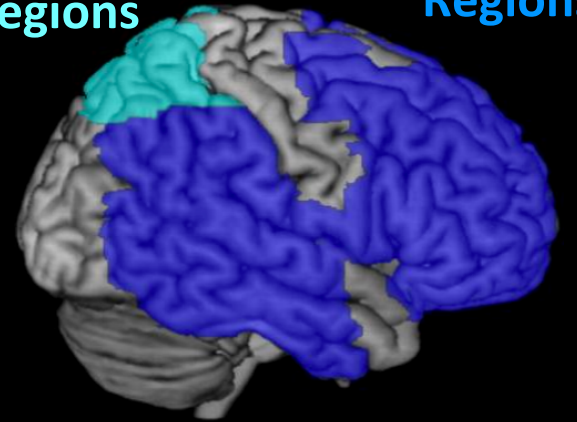


Florbetapir change in amyloid-negative normals

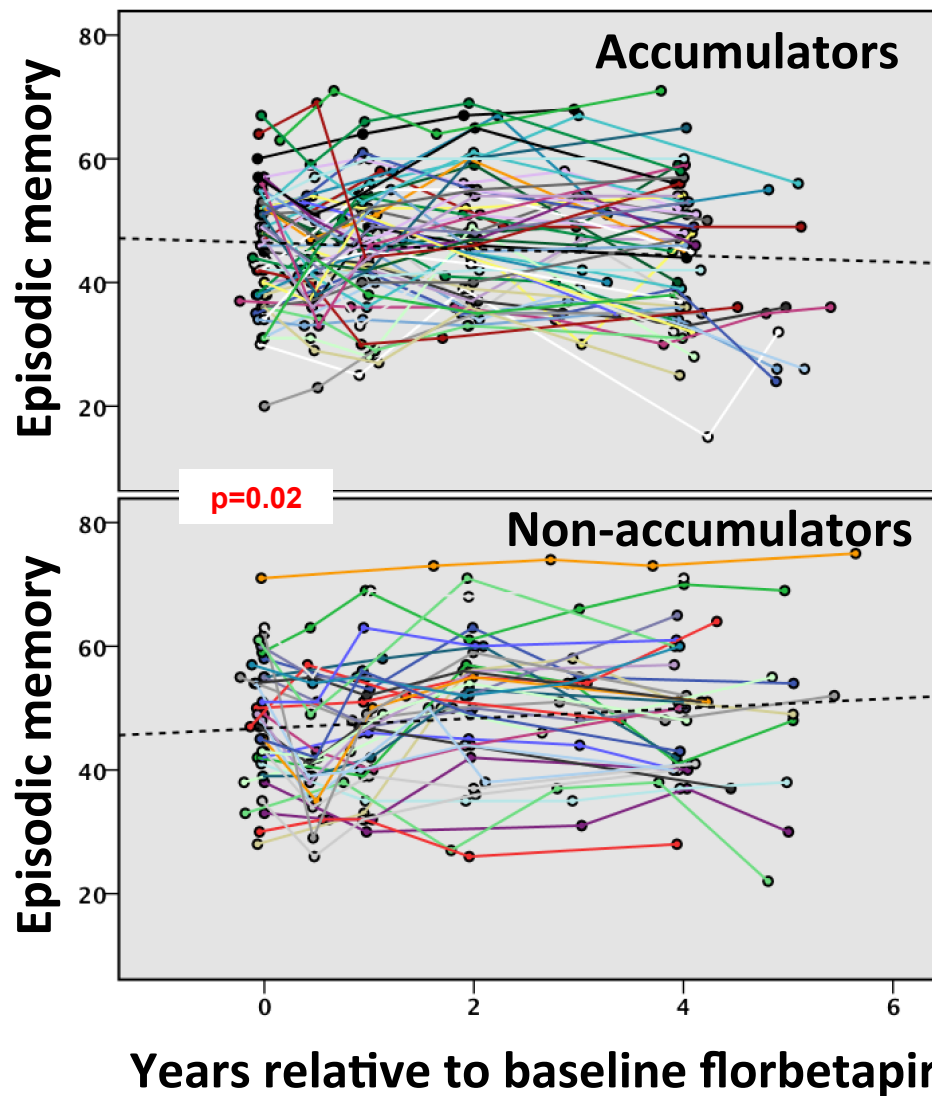


Early
Accumulation
Regions

Cortical
Summary
Regions

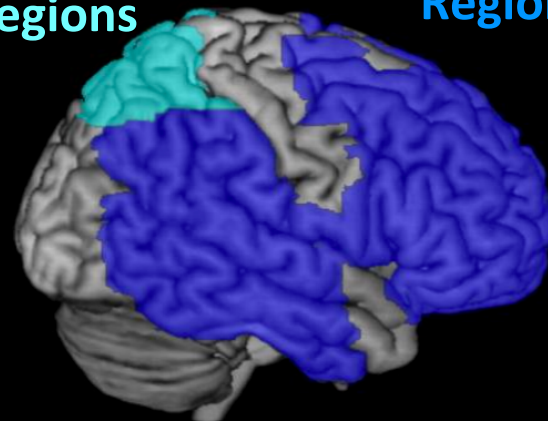


Negative normal accumulators are more likely to experience cognitive decline



Early
Accumulation
Regions

Cortical
Summary
Regions



AV1451 PET SUVR quantification

Medial
temporal

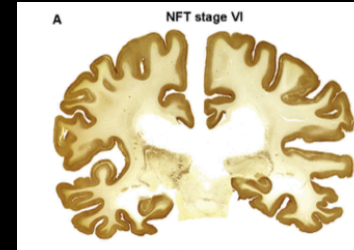
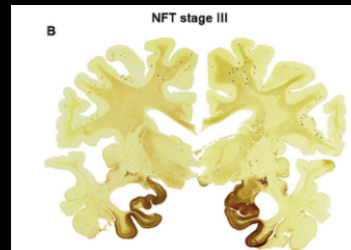
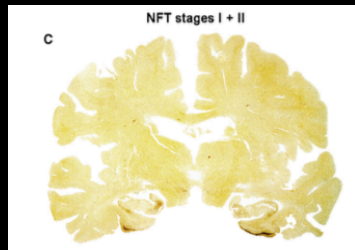
Infero-
lateral temporal

Neocortical

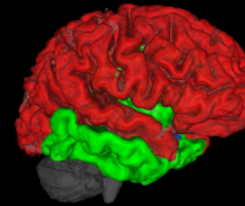
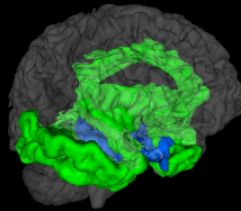
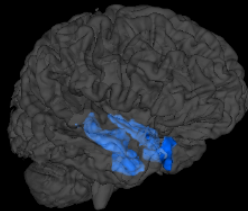
Braak I/II

Braak III/IV

Braak V/VI



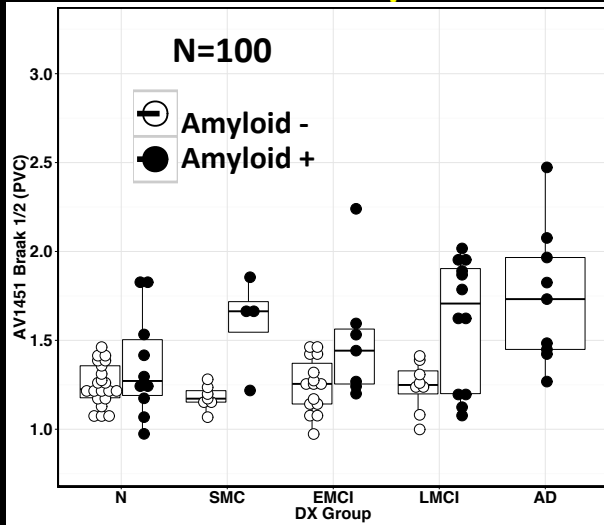
Braak
staging
approach



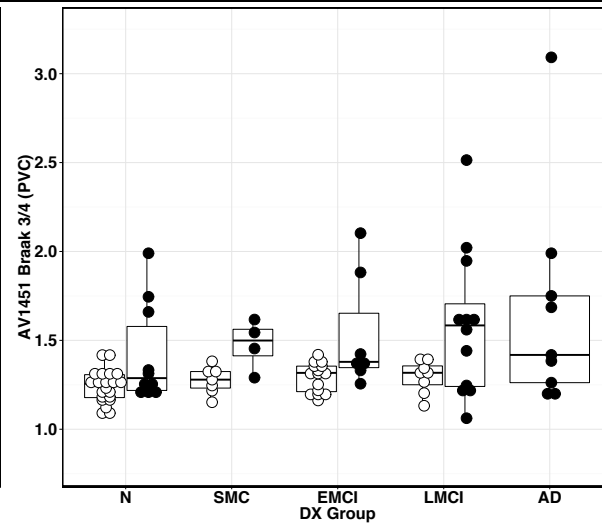
Schwarz et al. Brain 2016, Schöll, Lockhart, et al. Neuron 2016; Maass et al. in revision

ADNI AV1451 PET summary – Braak Staging

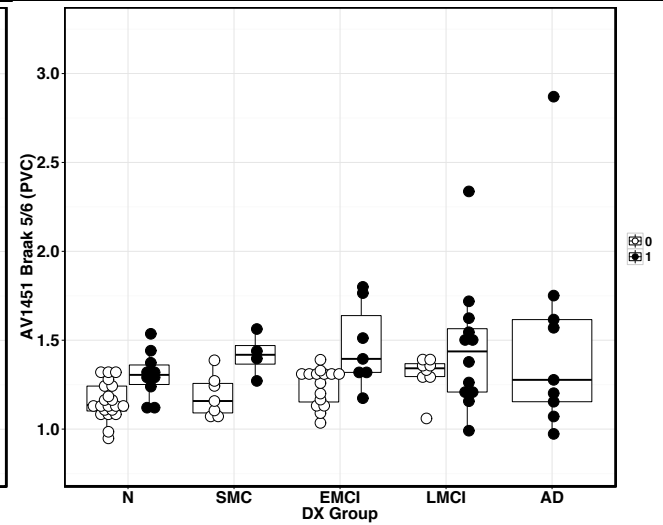
Medial temporal



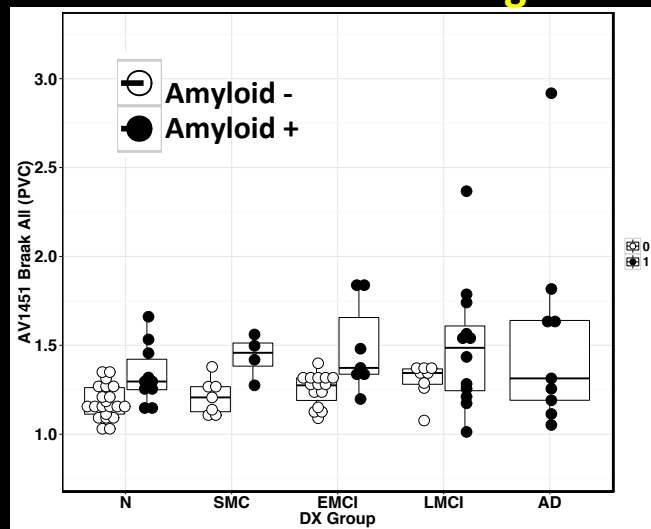
Inferolateral temporal



Neocortical



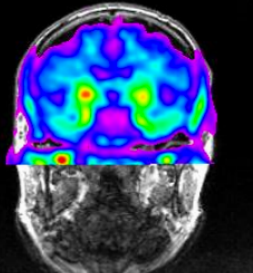
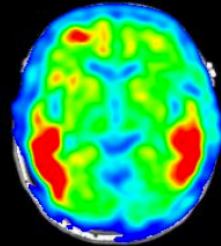
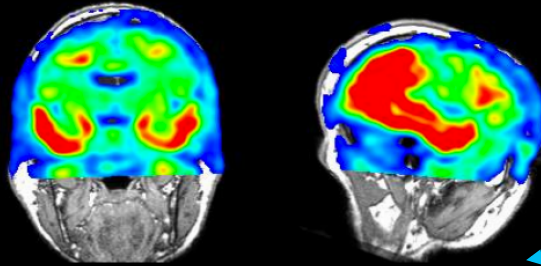
Whole brain average



RID 4521

74 yo APOE4+ male

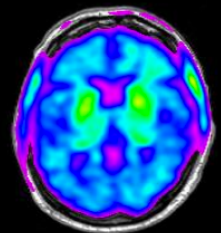
- Recently converted from MCI
- MMSE=14
- ADAS-cog=37
- Florbetapir SUVR = 1.61



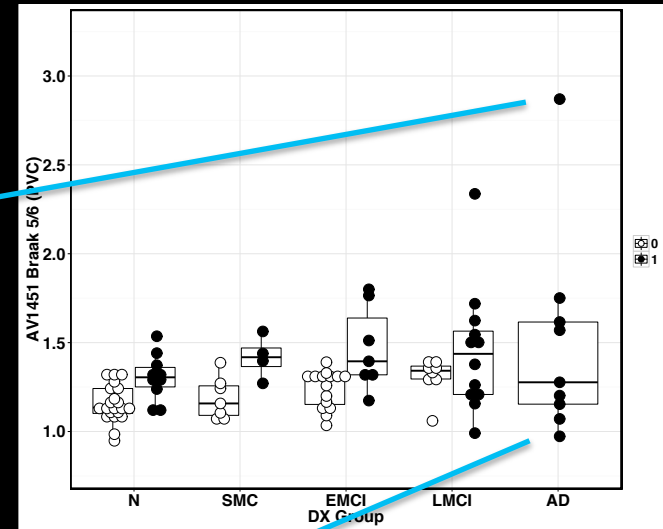
RID 4765

80yo APOE4+ male

- Recently converted from EMCI
- MMSE=20
- ADAS-cog=19
- Florbetapir SUVR = 1.32



Neocortical

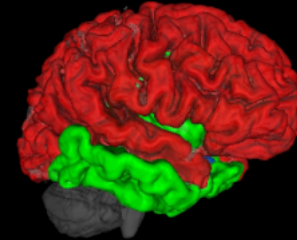
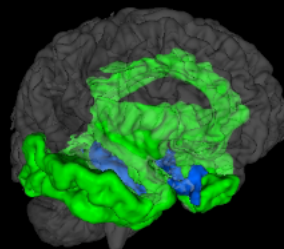
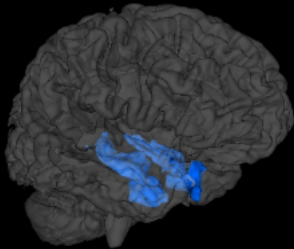
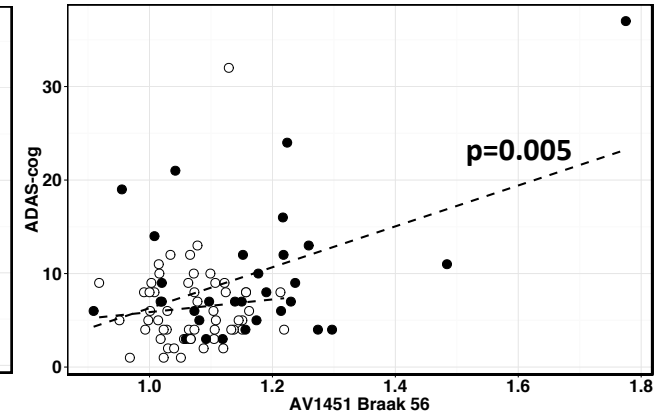
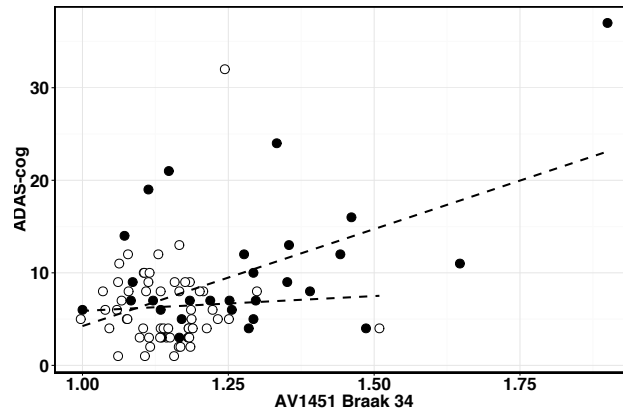
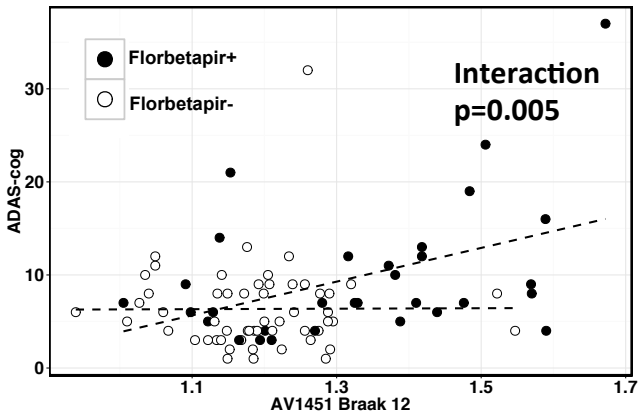


AV1451 tau and cognitive performance

Medial temporal

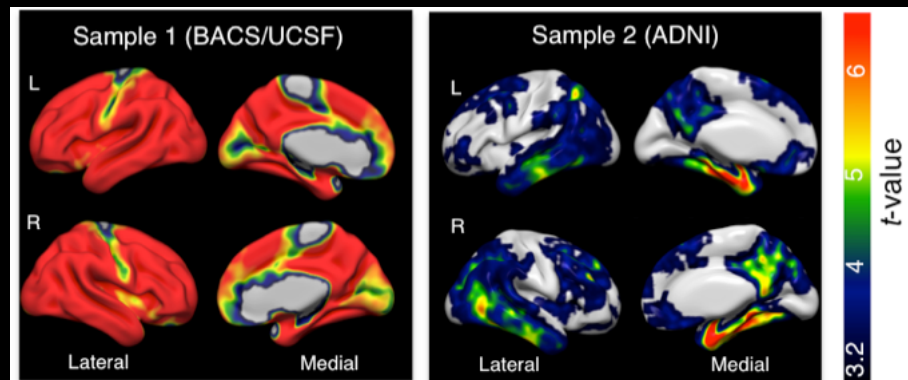
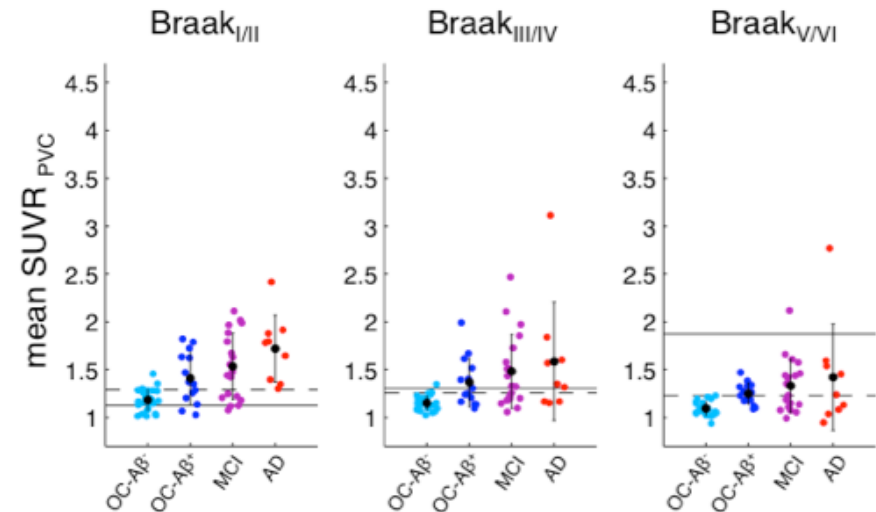
Inferolateral temporal

Neocortical



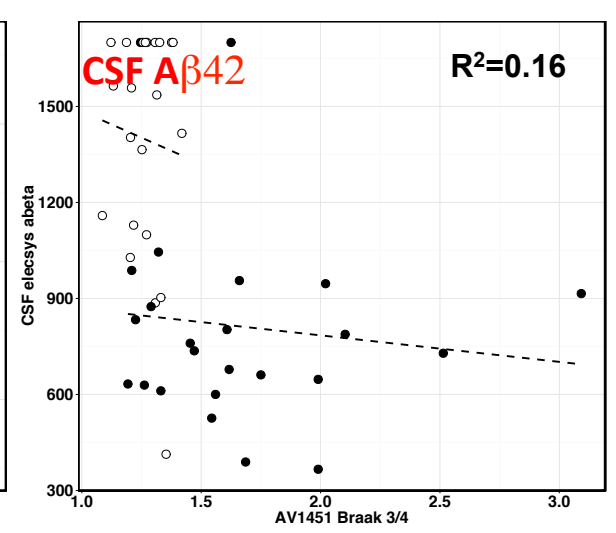
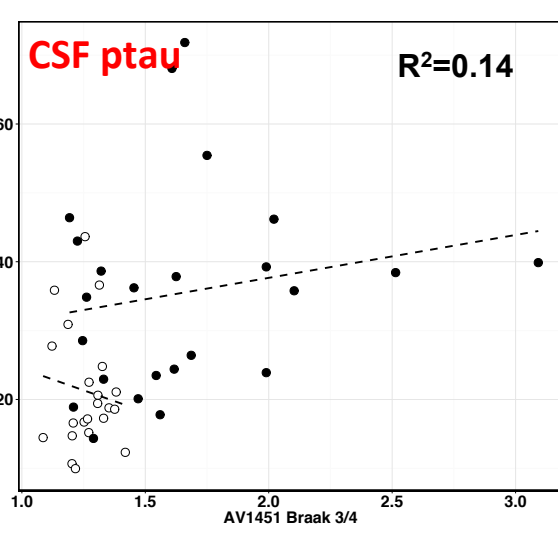
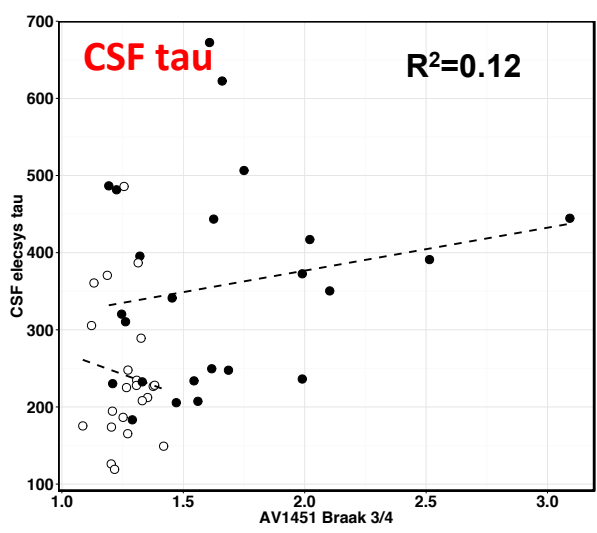
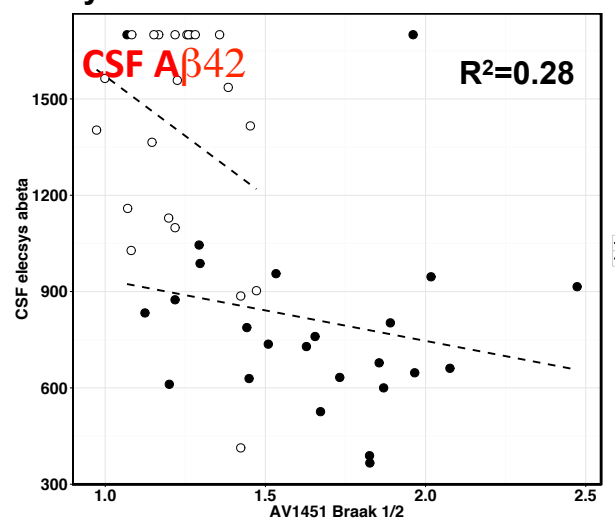
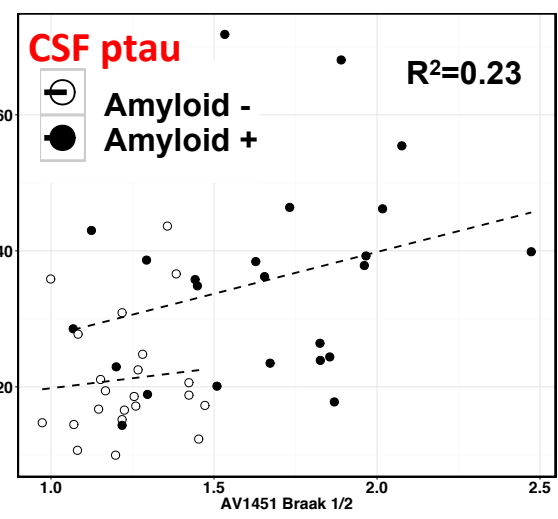
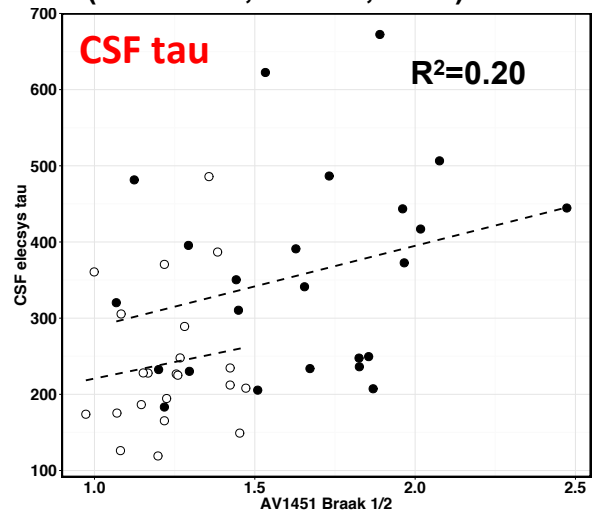
AV1451 comparison in 2 samples

Sample 2 (ADNI)



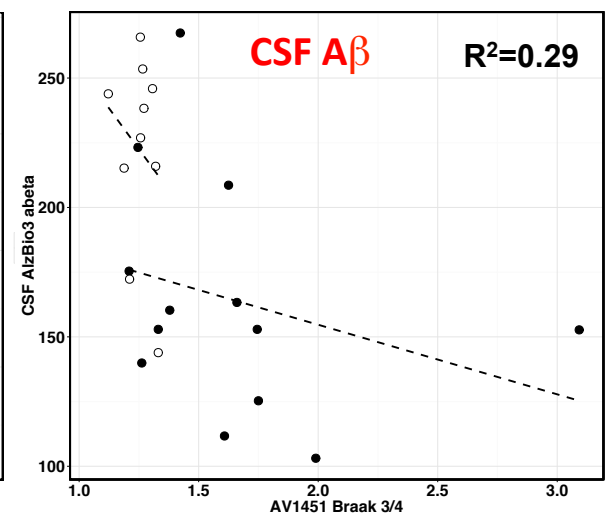
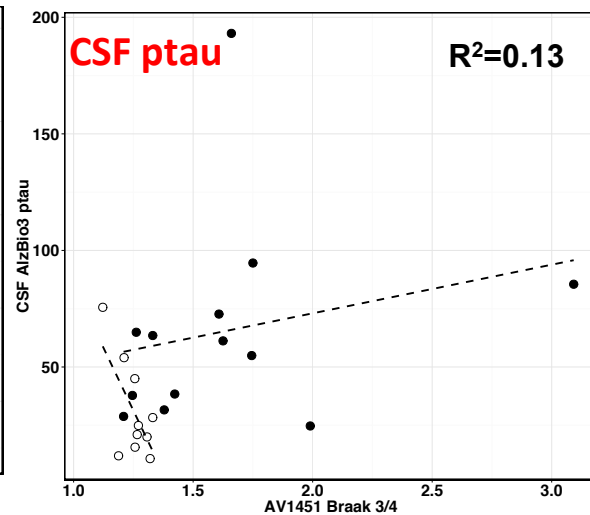
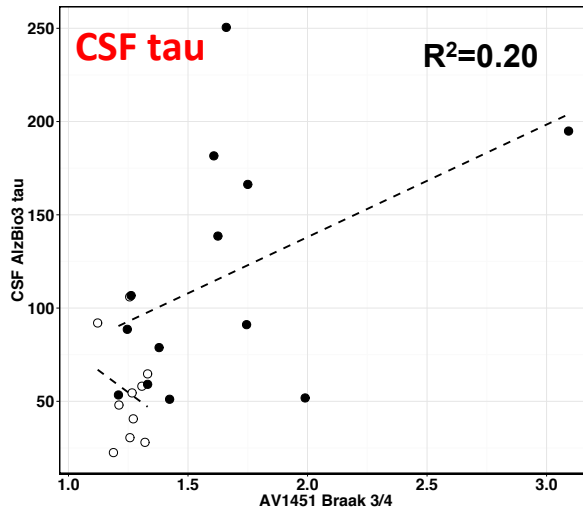
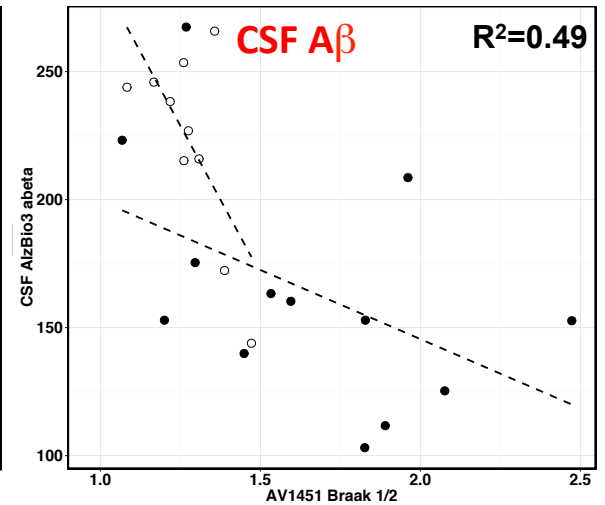
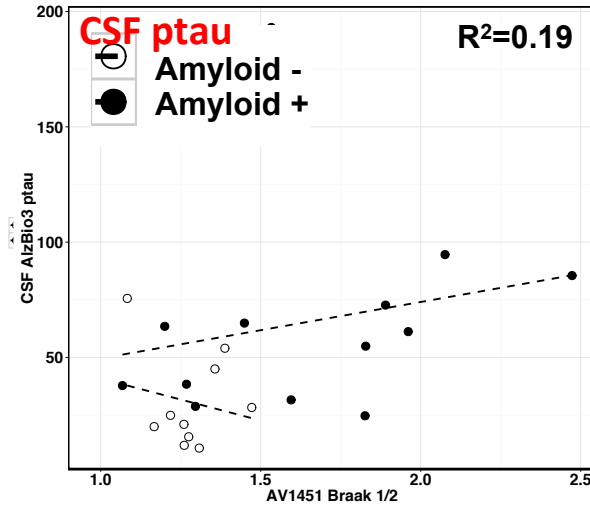
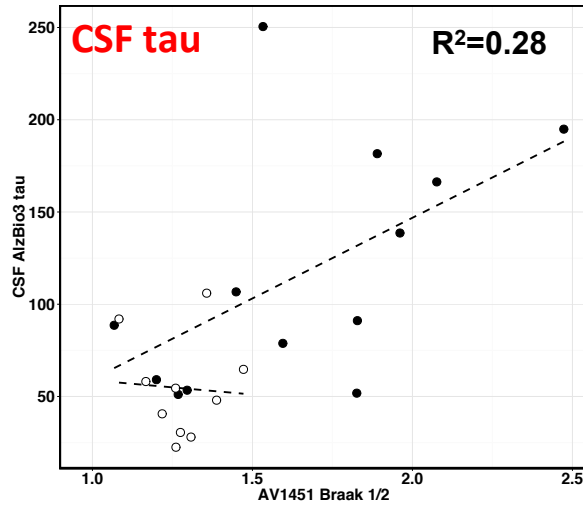
U Penn CSF Elecsys and AV1451

N=49 (22 N/SMC, 21 MCI, 6 AD) with AV1451-PET and CSF measurements within 1.5yrs



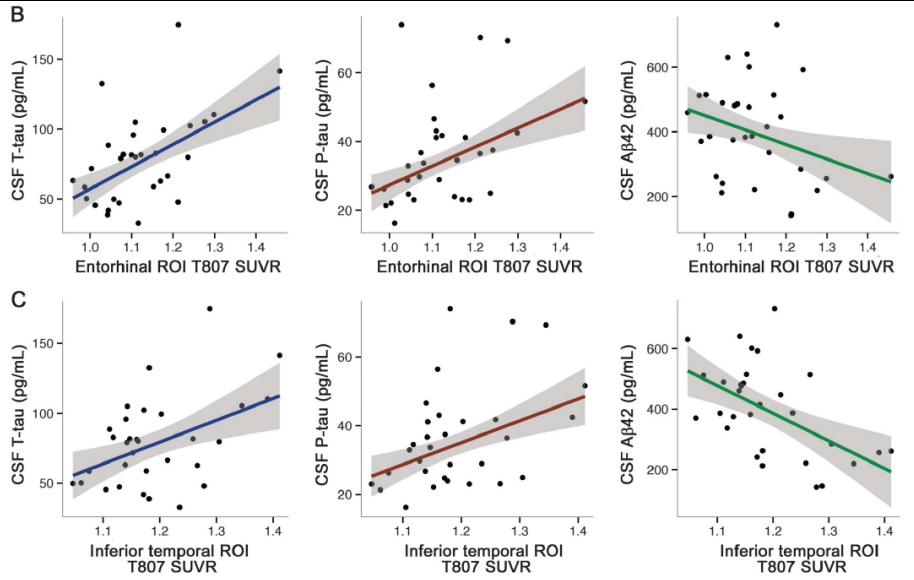
U Penn CSF AlzBio3 and AV1451

N=24 (11 N, 10 MCI, 3 AD) with AV1451-PET and CSF measurements within 3 yrs



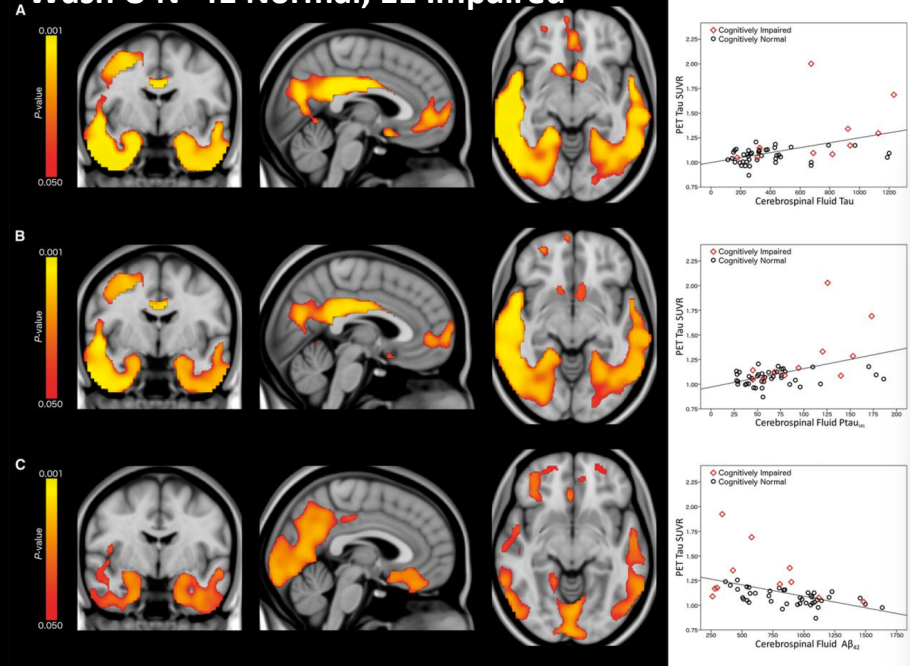
Recent AV1451-CSF tau studies

Harvard Aging Brain Study N=31 Normals



Chhatwal et al. Neurology 2016

Wash U N=41 Normal, 11 Impaired



Gordon et al. Brain 2016

Upcoming PET Core work

Pipeline for florbetaben +/- categorization for ADNI3 tau scanning schedule

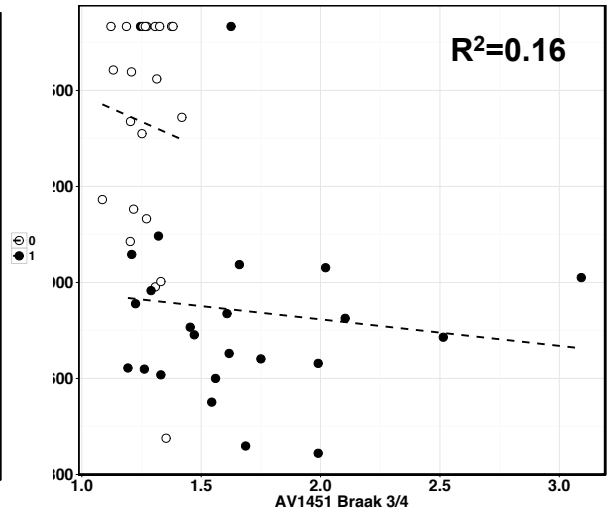
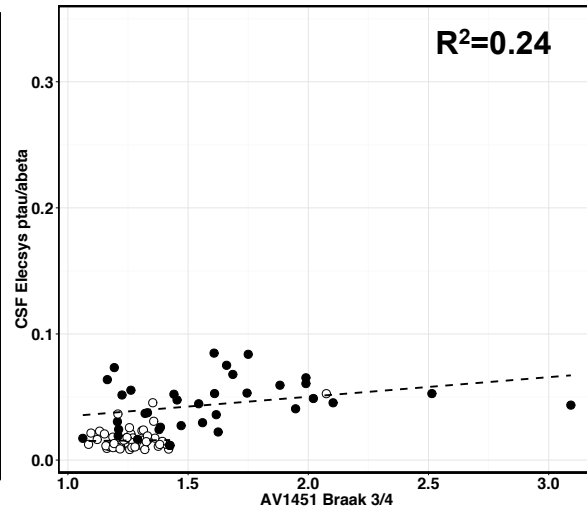
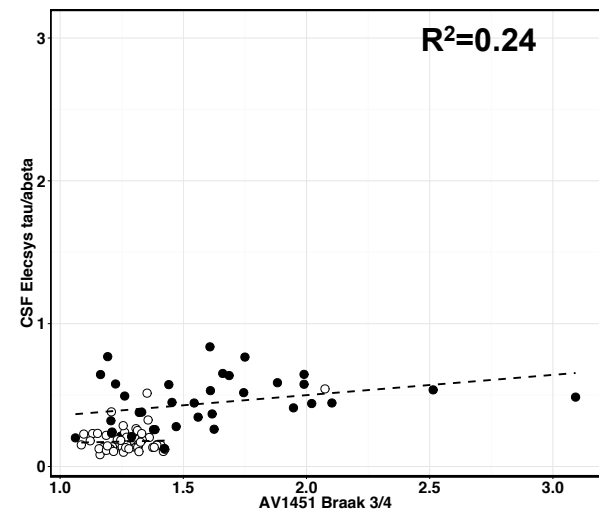
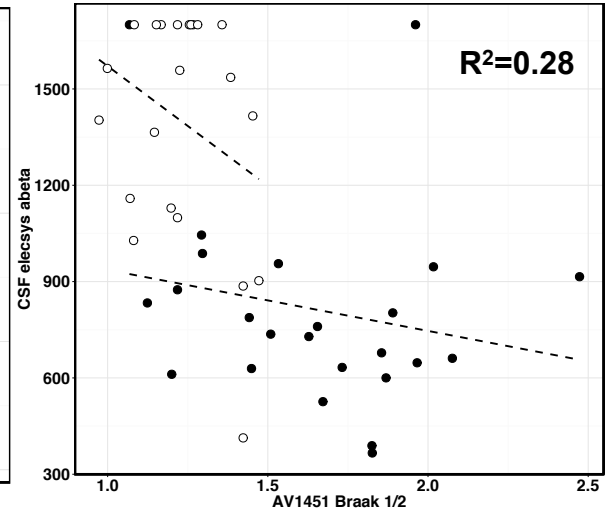
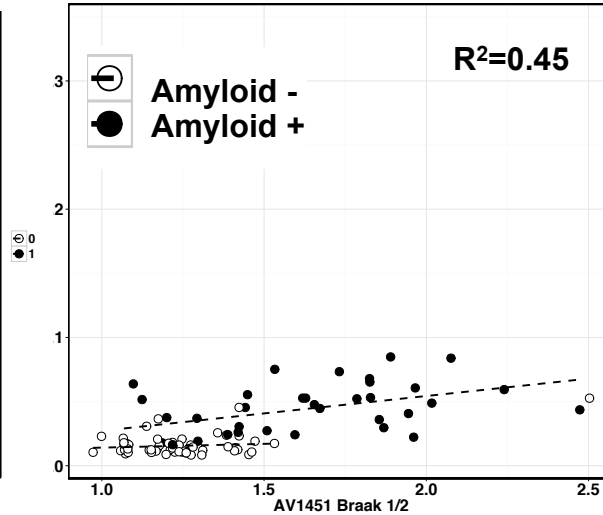
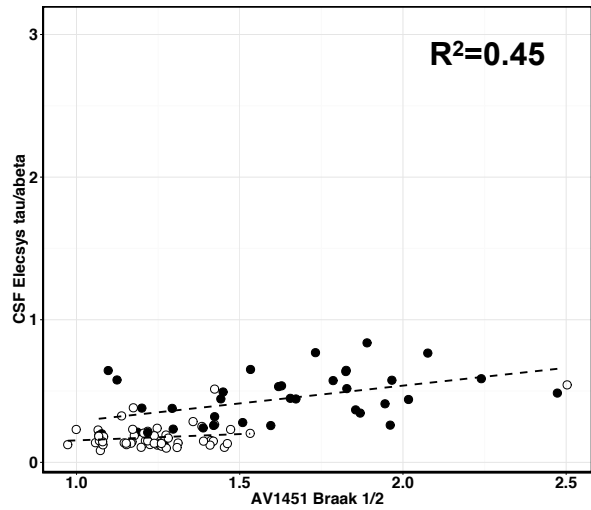
AV1451 quantification methods

Cross-sectional and longitudinal relationships between florbetapir, AV1451, CSF, cognition

Thank you

CSF Elecsys and AV1451

N=49 (22 N/SMC, 21 MCI, 6 AD) with AV1451-PET and CSF measurements within 1.5yrs

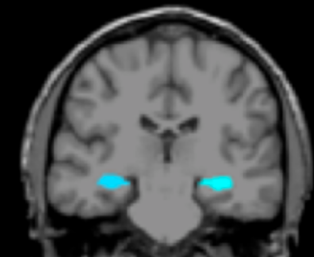
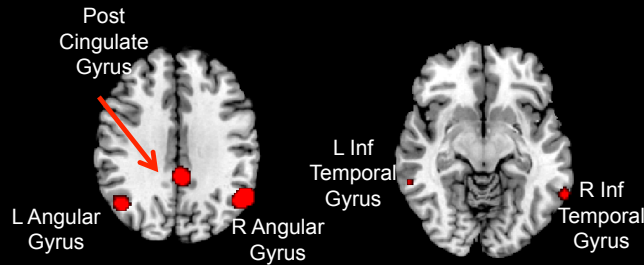
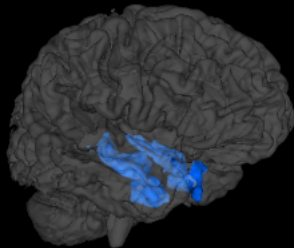
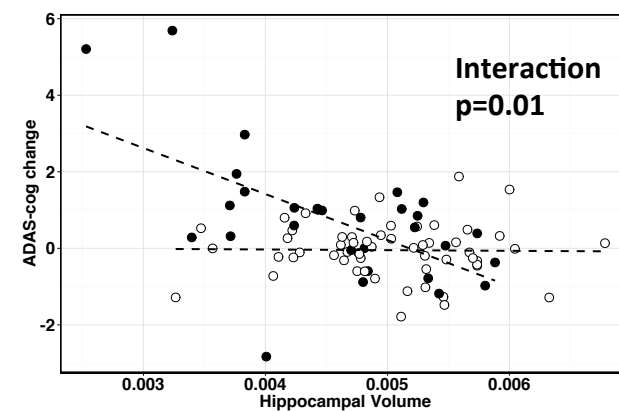
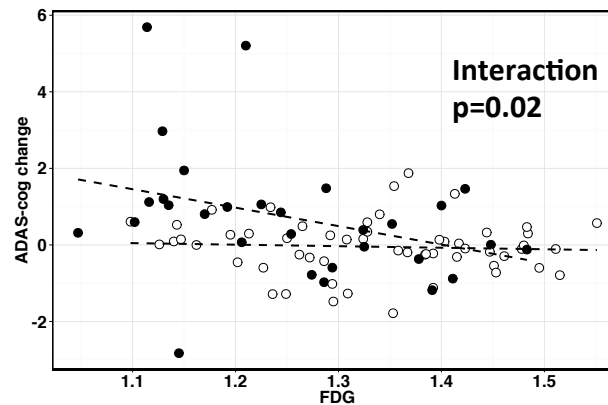
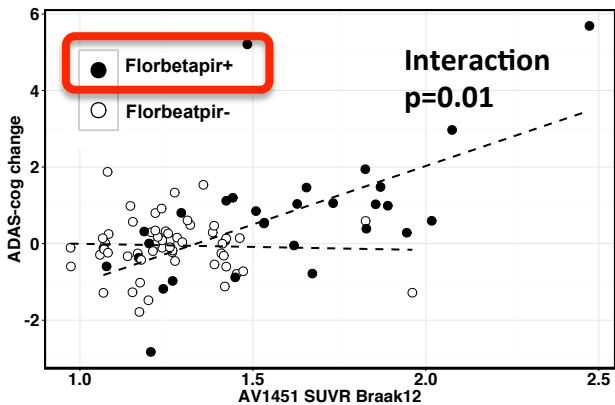


Tau, neurodegeneration & cognitive change

Entorhinal/hippocampal
Braak I/II

FDG

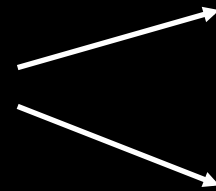
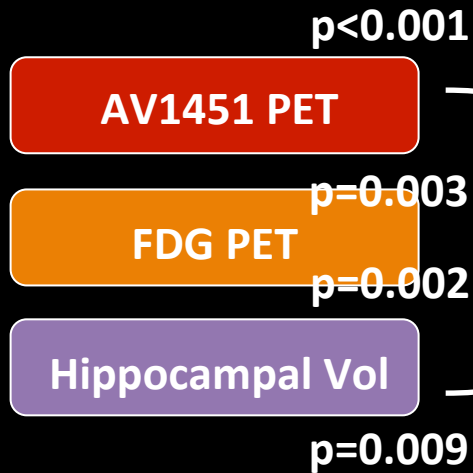
Hippocampal volume



Florbetapir+ only

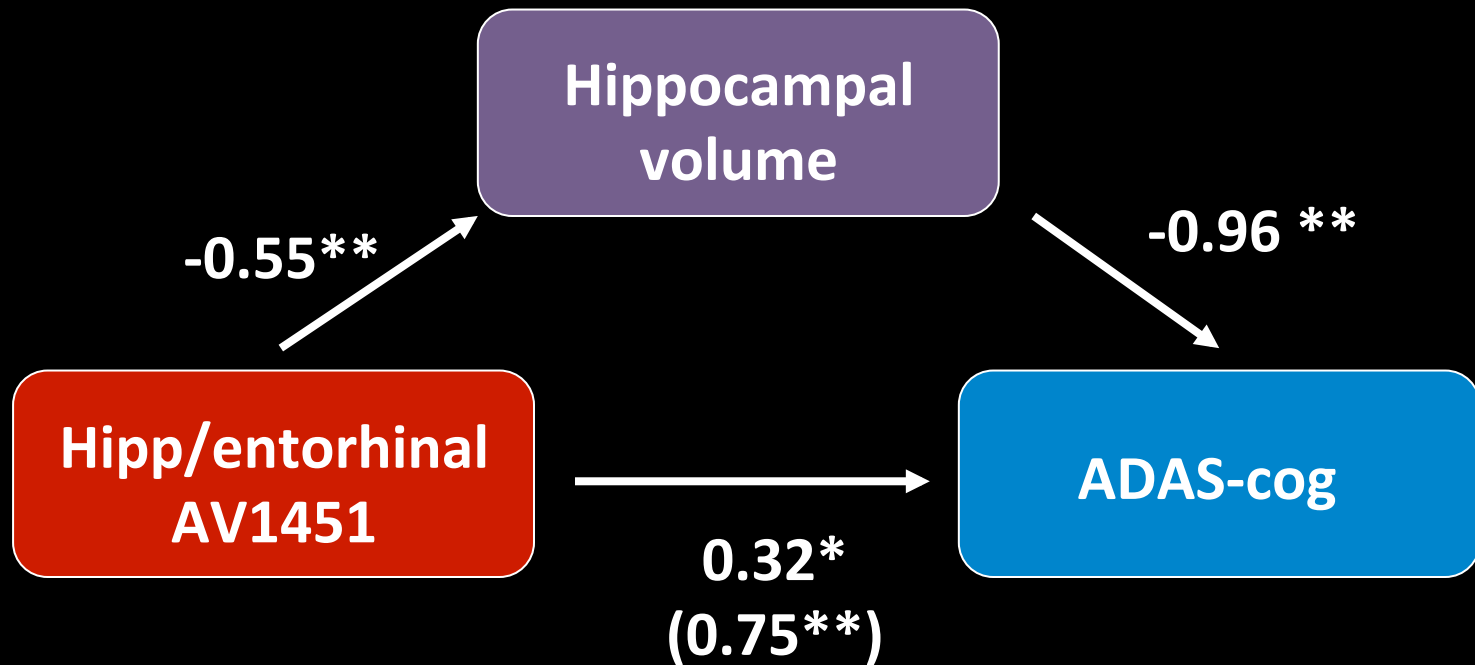
Age
Sex
Education
ApoE4

+



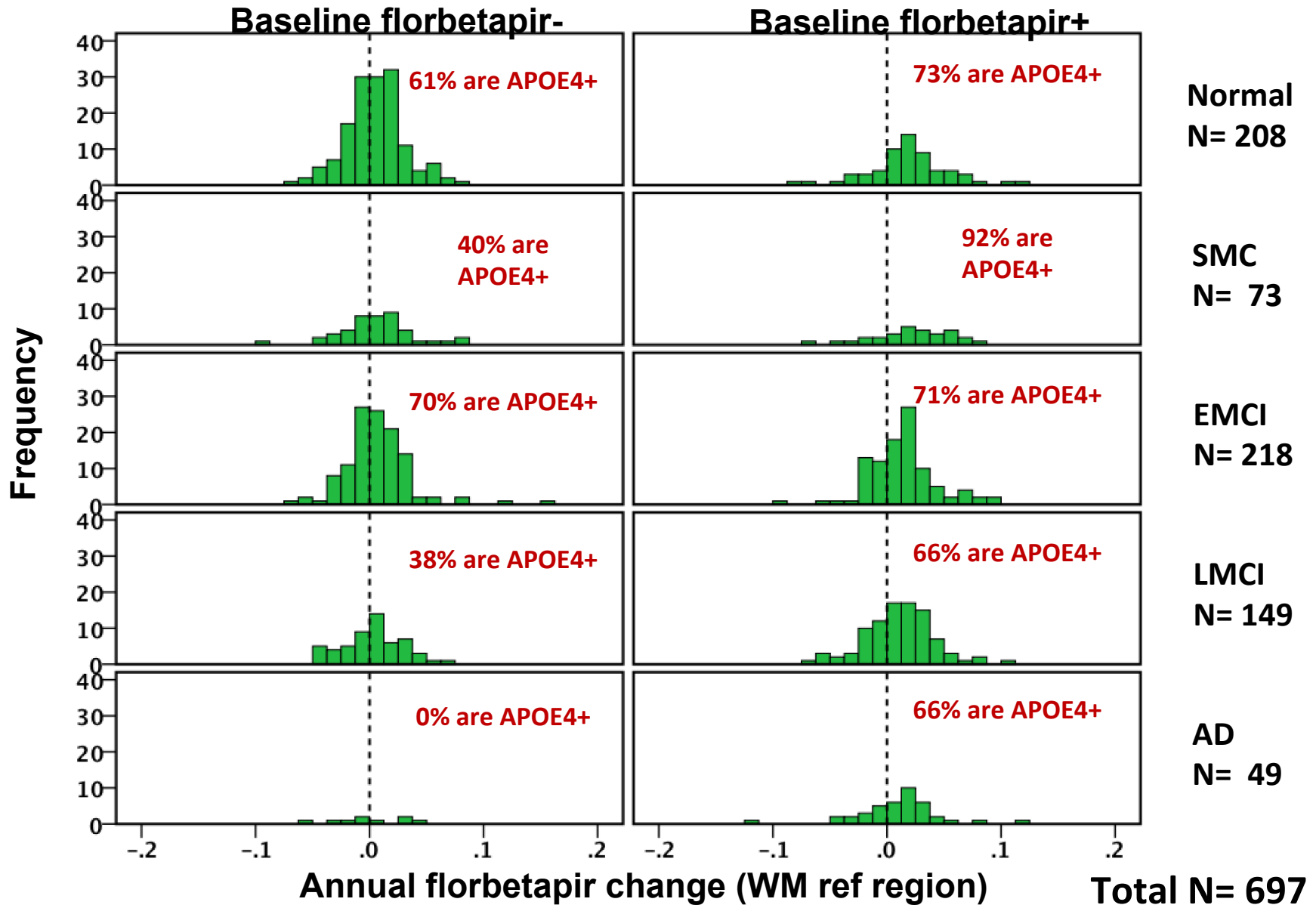
ADAS-cog

Long ADAS-cog



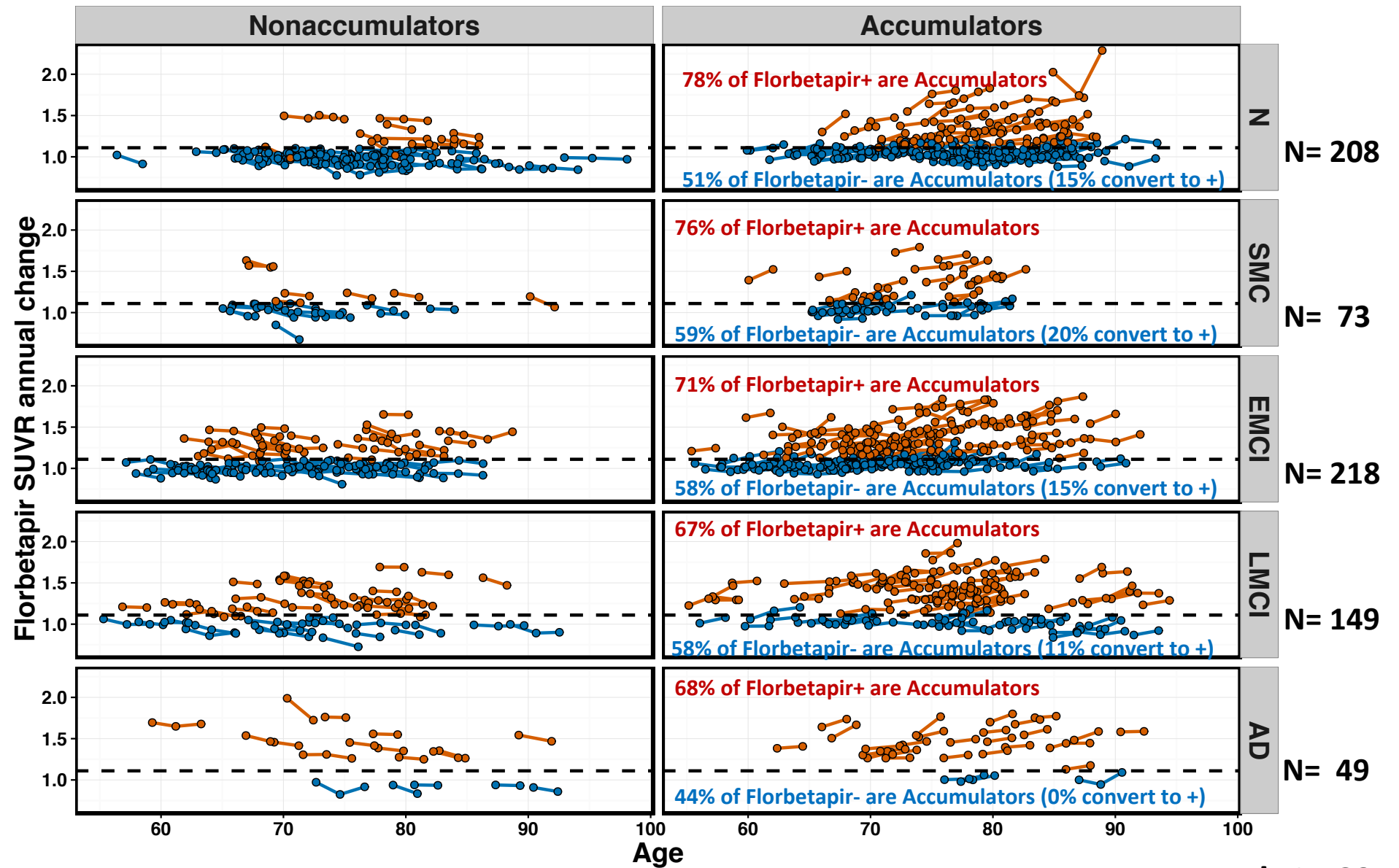
Indirect effect: 0.29 [0.09,0.60]

Florbetapir annual change distribution



≥2 yr Florbetapir Trajectories

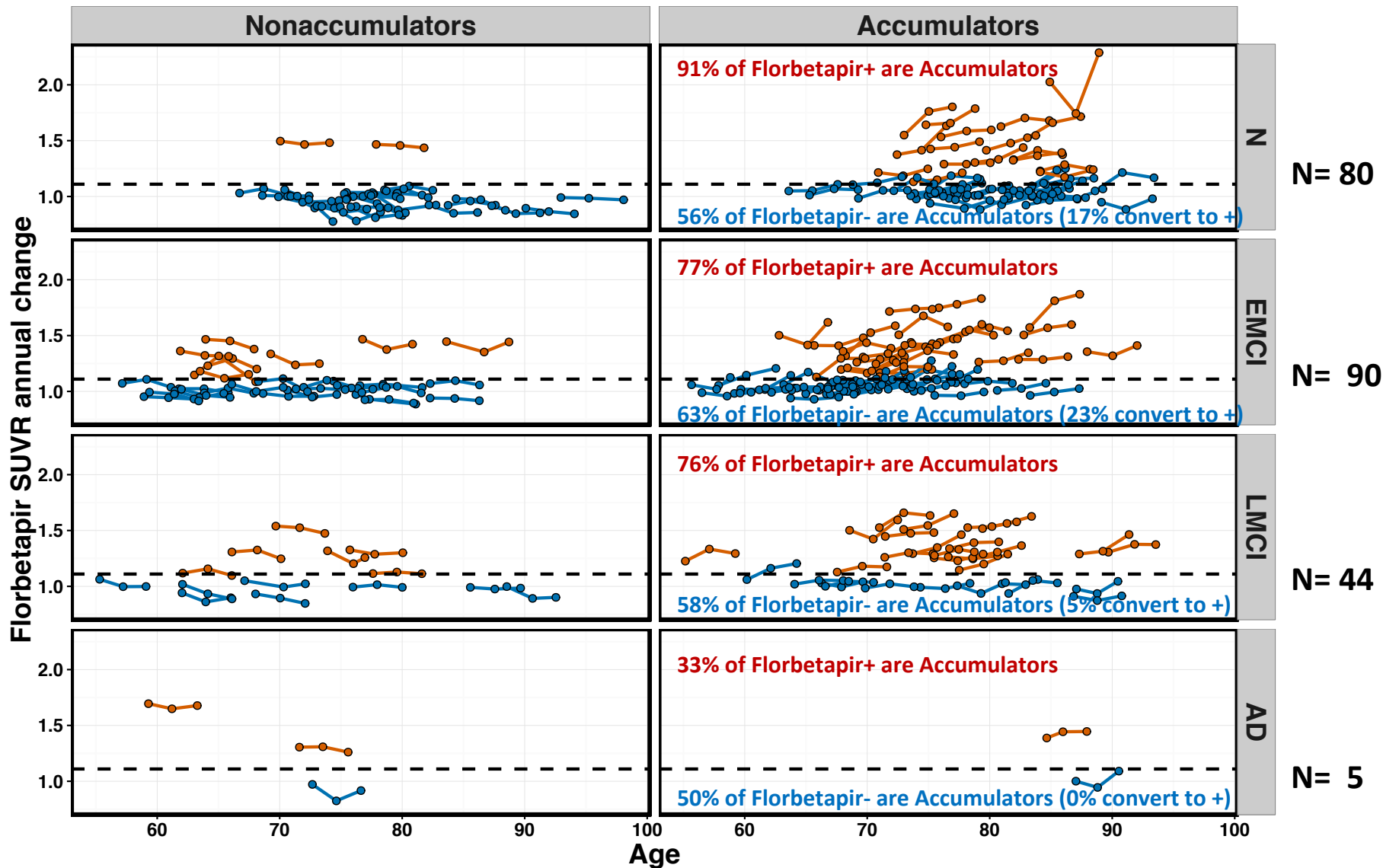
- Baseline florbetapir -
- Baseline florbetapir +



Total N= 697

≥4 yr Florbetapir Trajectories

- Baseline florbetapir -
- Baseline florbetapir +



Total N= 219

ADNI FDG scan counts

Number of FDG scans	N	SMC	EMCI	LMCI	AD	Total
1	343	106	306	409	241	1408
2	258		167	279	112	816
3	92		1	181	75	349
4	85			162	58	305
5	72			146		218
6	39			105		144
7	25			56		81
8	5			28		33
9				5		5
Total	919	106	474	1371	486	3359

A second (or third?) tau tracer in ADNI?

Strong commitment to adding a second tau tracer to ADNI3 - As of today, no additional tracers available for summer 2017 startup

Requirements for a tau tracer

Preclinical/clinical supportive data

Regulatory pathway

Manufacture at no cost to ADNI

Distribution to a substantial proportion of sites