

# The Australian Imaging Biomarkers and Lifestyle Flagship Study of Ageing



*(AUSTRALIAN ADNI)*

July 2013 UPDATE – Imaging  
Christopher Rowe MD – *Neuroimaging stream leader*





The Australian Imaging  
Biomarkers and  
Lifestyle Flagship Study  
of Ageing.

June 2013 ↓

October 2006 ↓

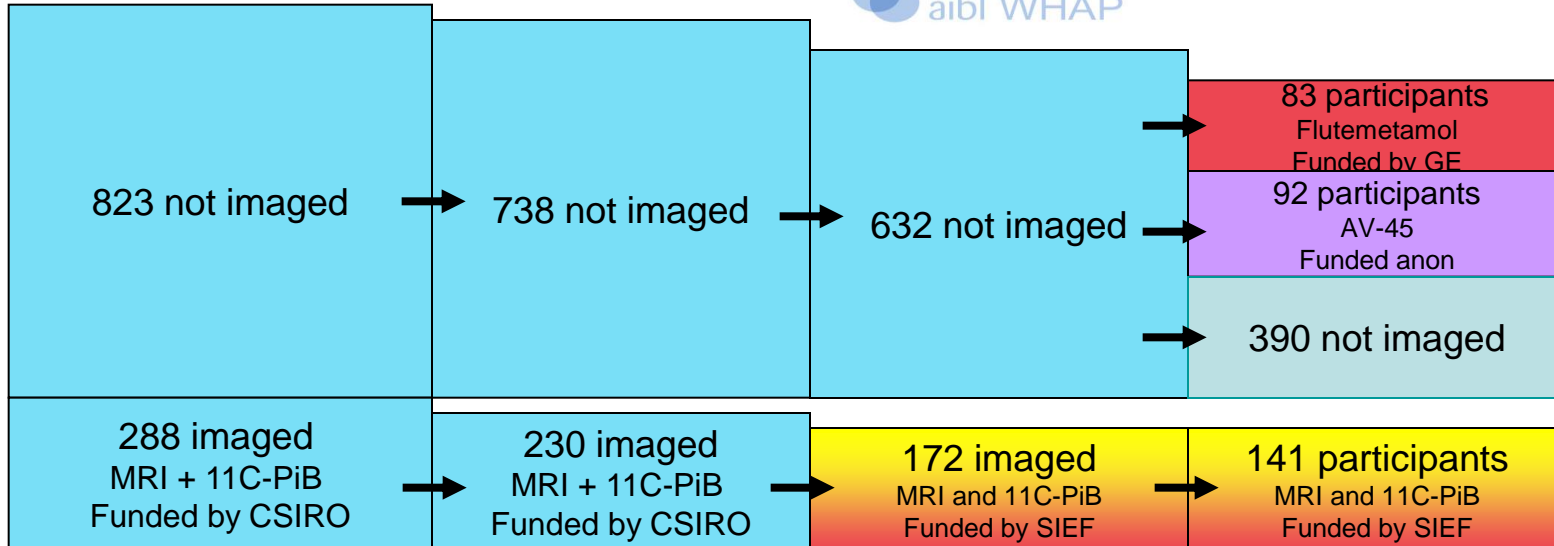
Replacement  
MCI and sMC

58 new participants  
AV-45  
Funded anon

102 new participants  
Flutemetamol  
Funded by GE

Women's  
Healthy Aging  
Program

105 new participants  
Florbetaben  
Funded by Bayer/Piramal



0 yrs

1112 recruited

1.5 yrs

968 remain

3 yrs

824 remain

4.5 yrs

718 remain plus  
268 new



The Australian Imaging  
Biomarkers and Lifestyle  
Flagship Study of Ageing.

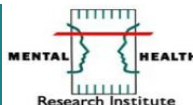
## 3 year Data Release

221 subjects (HC, MCI, AD) with baseline  
PiB PET and MRI now with 3 year clinical  
data

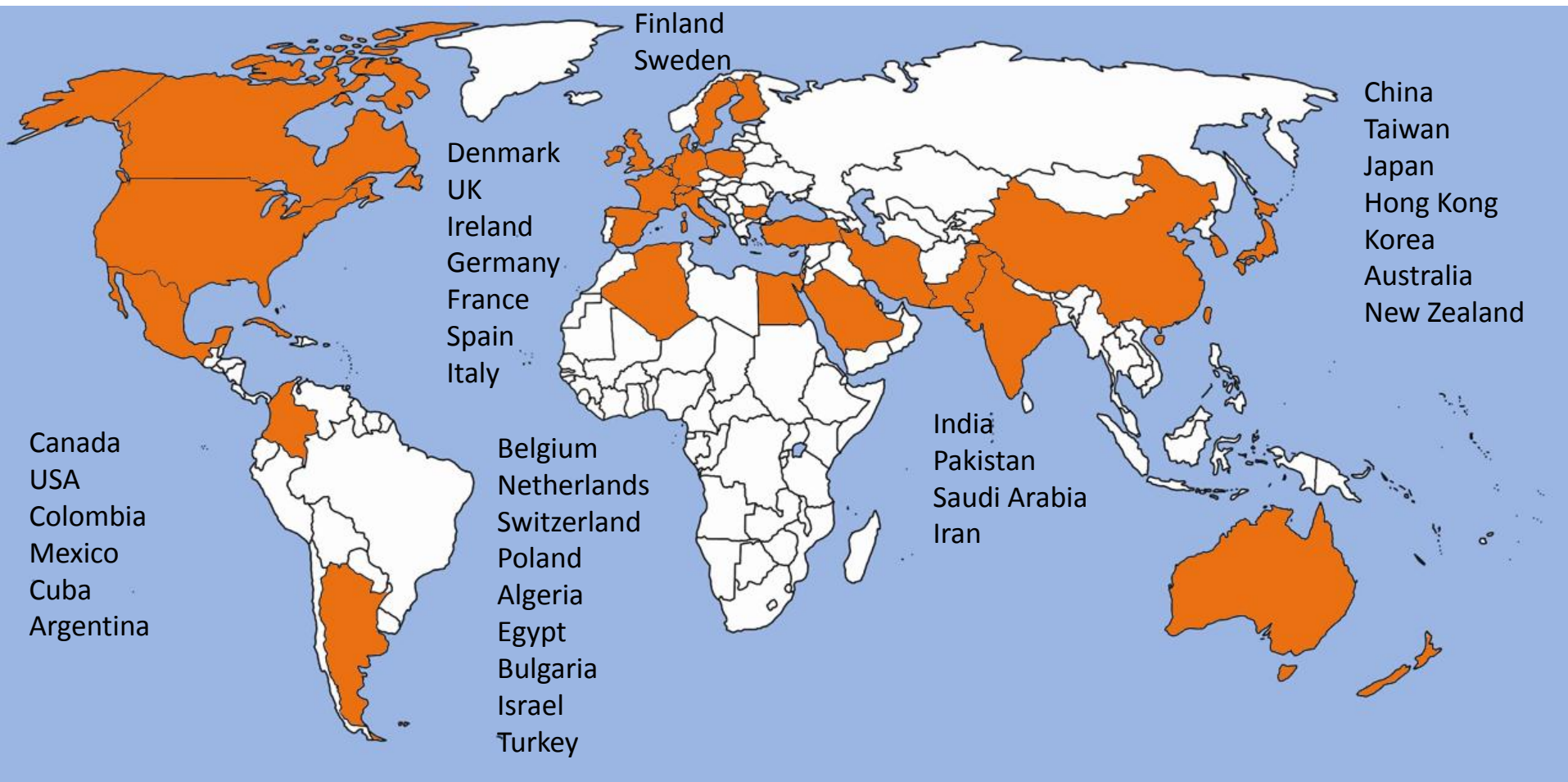
- 1.5 and 3 year PiB PET in 173 with MRI in  
148

[www.adni.loni.ucla.edu](http://www.adni.loni.ucla.edu)

- *Data and Samples*  
- *Access Data*



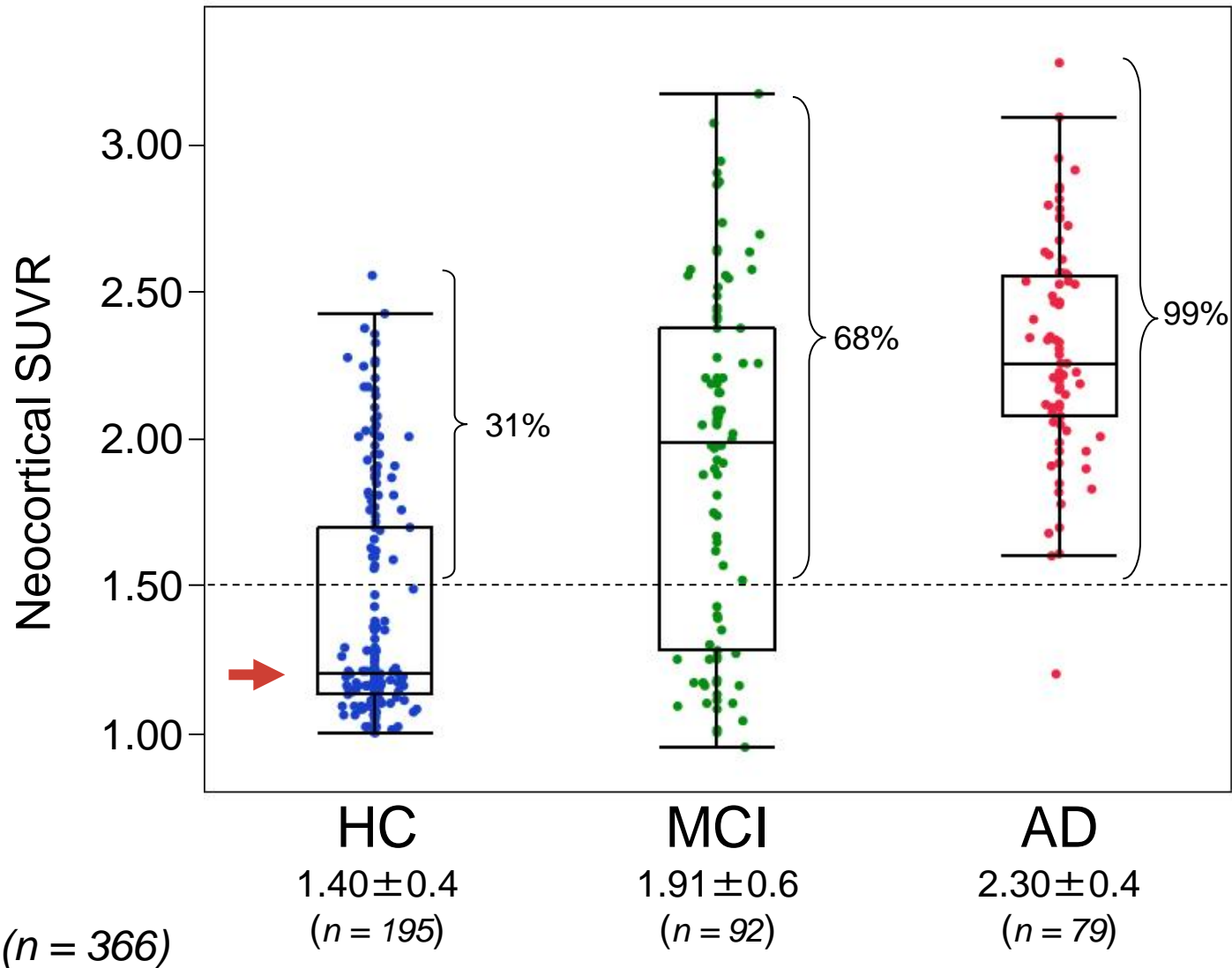
# 540 research groups granted access to AIBL@LONI through ADNI website



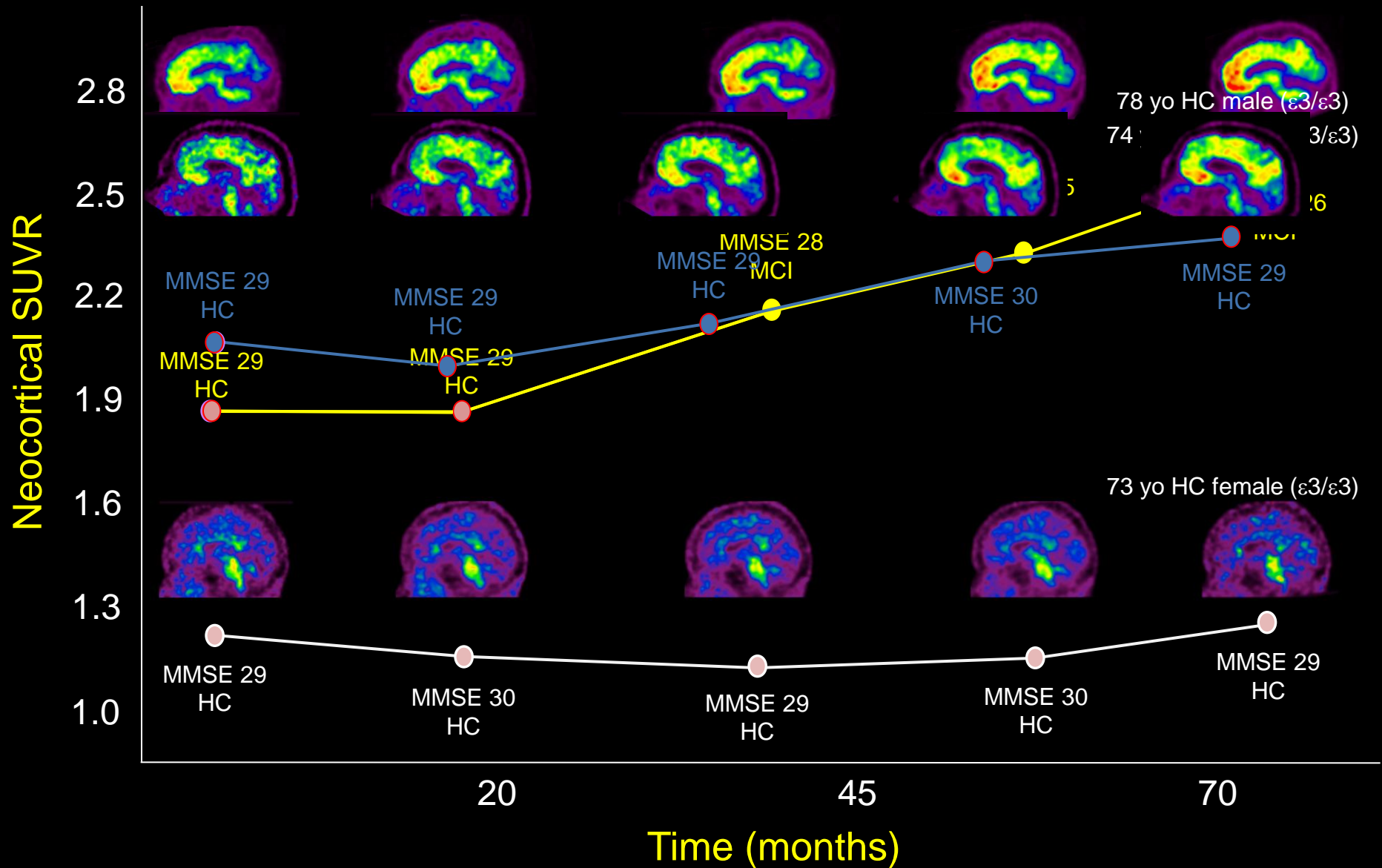
## Includes access granted to the following companies:

Abbott Labs, Abiant, ADM diagnostics, Astra Zeneca, Avid, BioClinica, Biogen Idec, Bristol-Myers Squibb, Cogstate, Cytokinetics, Eisai, Elan, Eli Lilly, GE Health Care, General Resonance, Genetech, Imorphics, Iris Biotechnologies, Janssen, Johnson Johnson, M and M Scientific, Merck & Co, Mimvista, Pentara Corp, Pfizer, Philips, Predixion software, Rancho Biosciences, Servier, Siemens, Soft team solutions, UCB, United Biosource Corp.

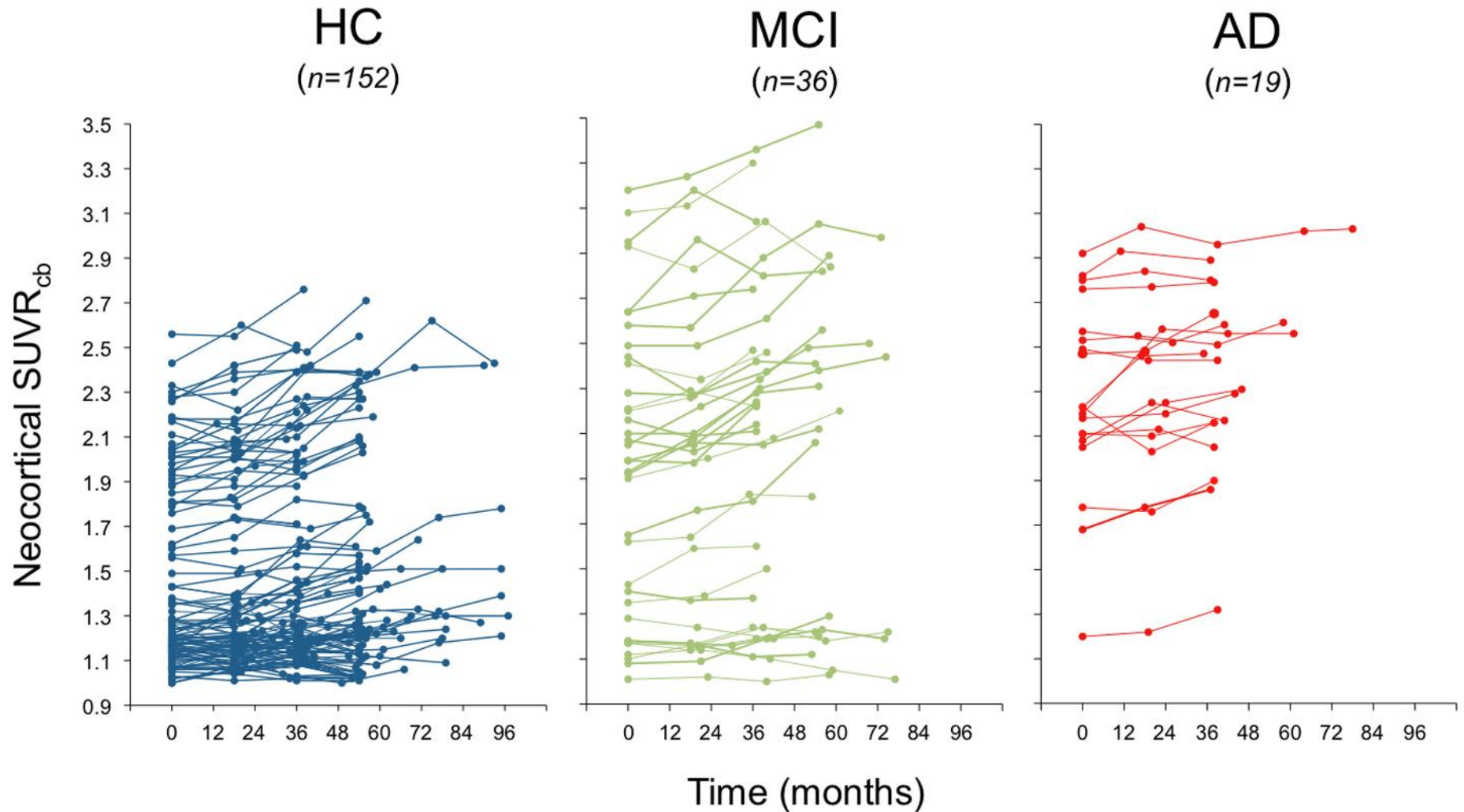
# PiB neocortical SUVR



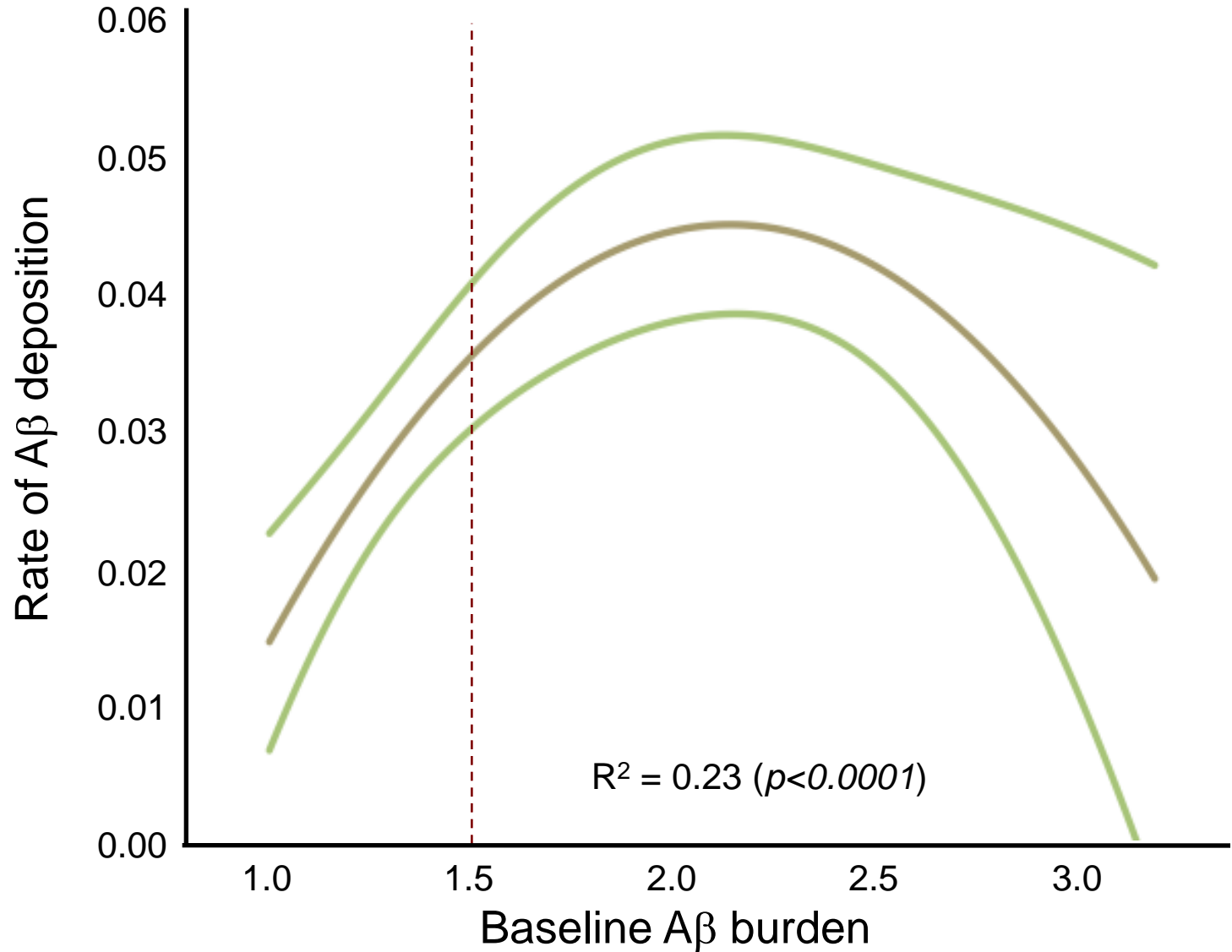
# Longitudinal PiB PET 6-year follow-up



# Changes in A $\beta$ burden over time



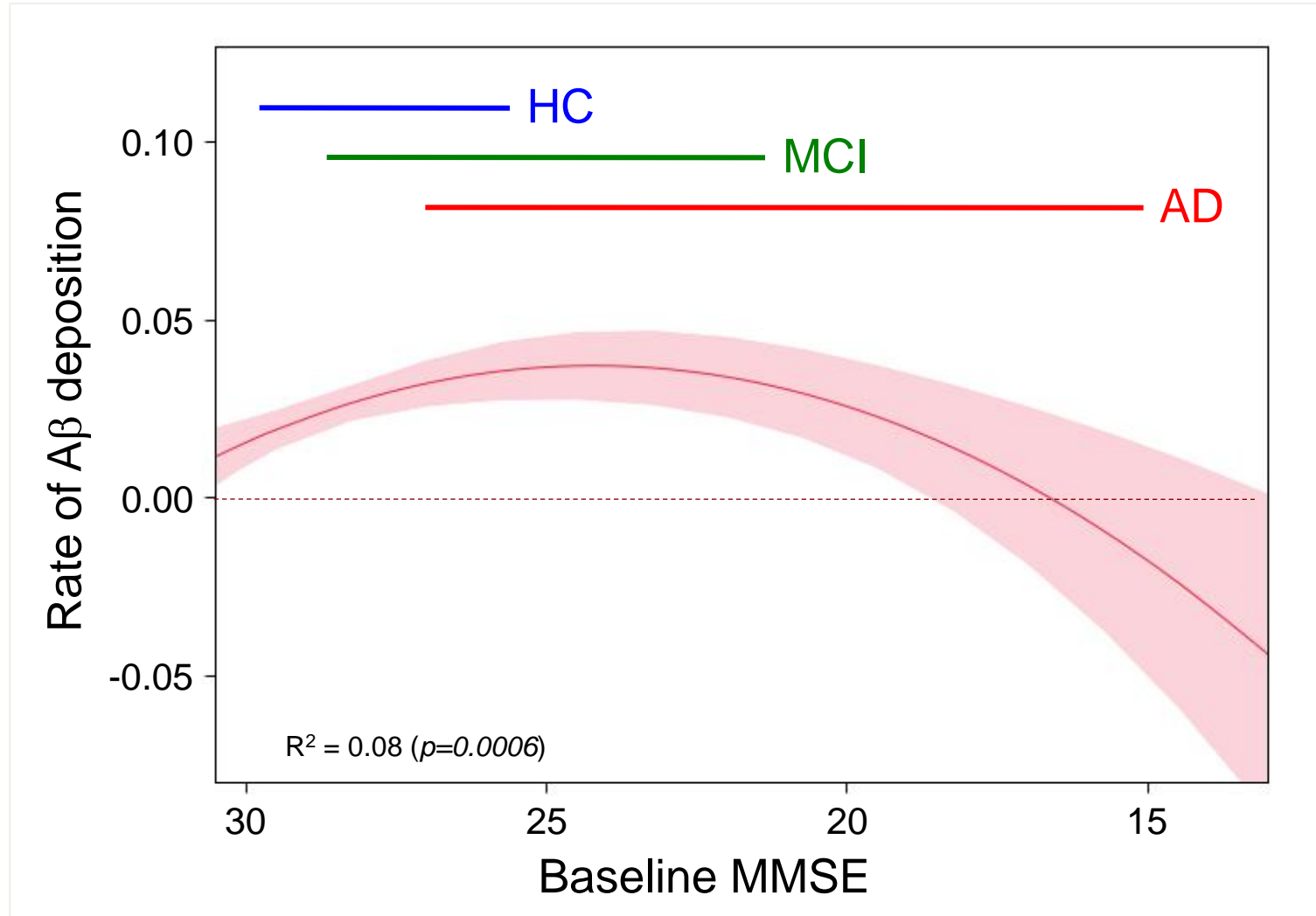
# Relation between baseline A $\beta$ burden and rates of A $\beta$ deposition 3-5 year follow-up



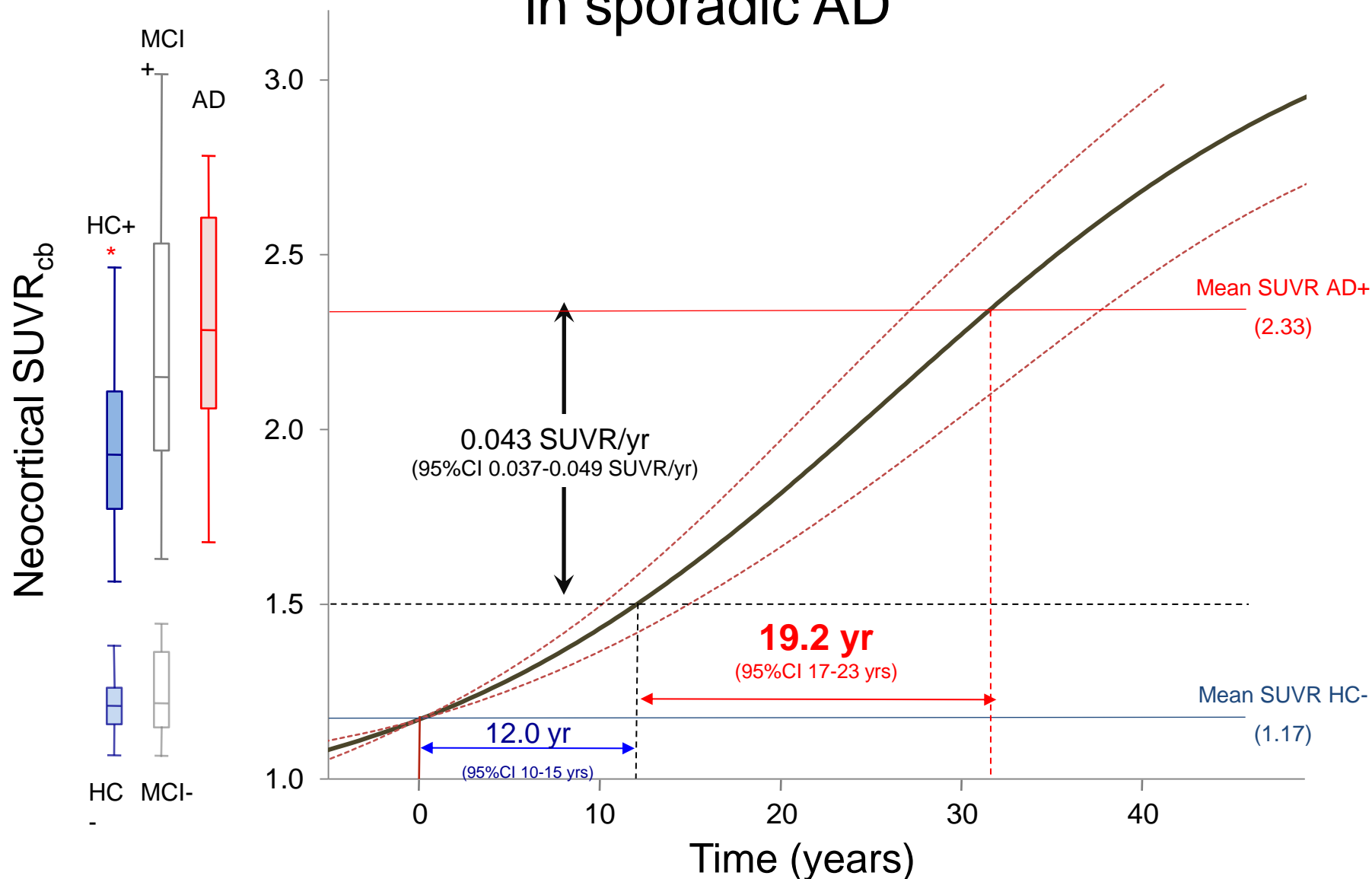


# Rate of A $\beta$ deposition vs MMSE

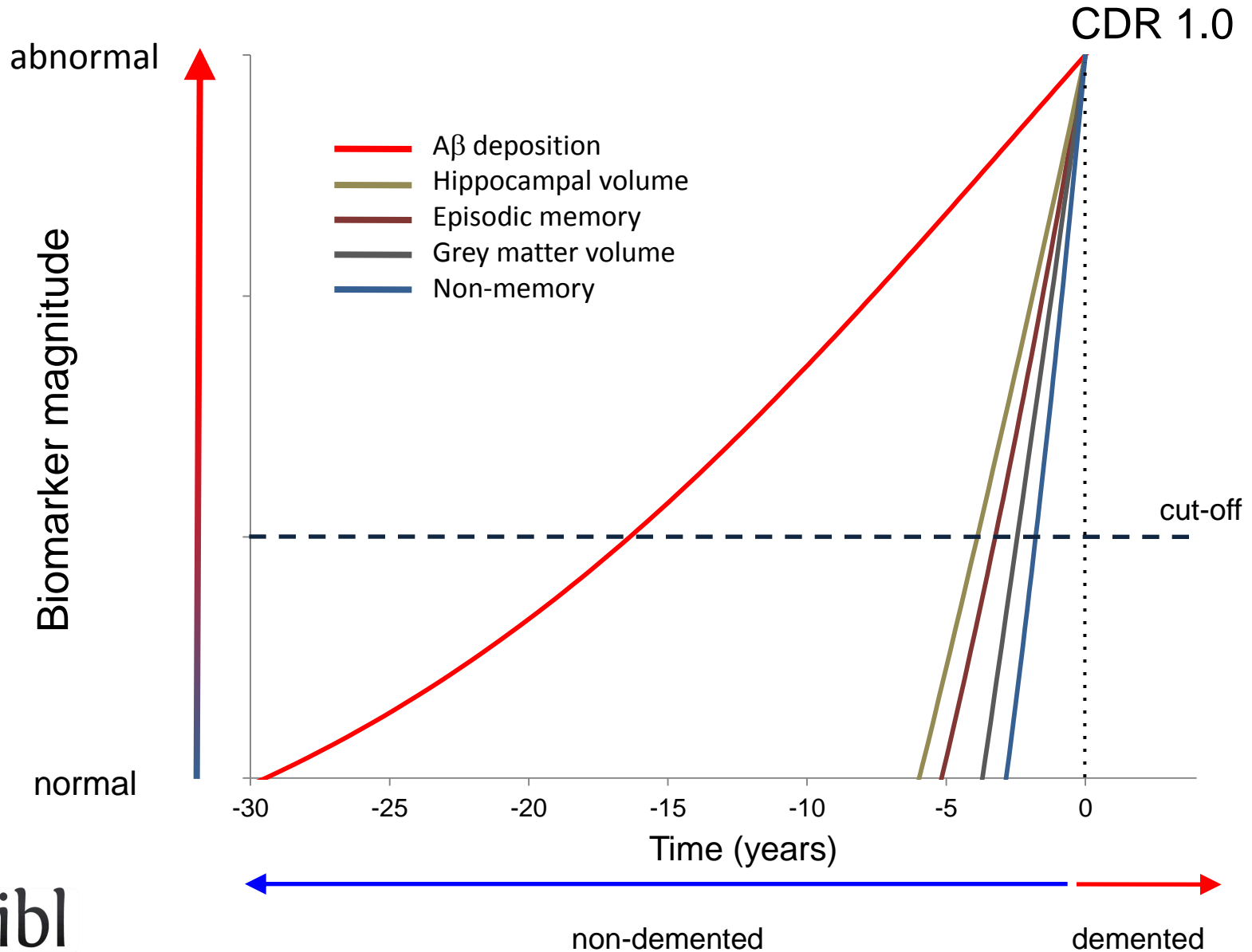
3-5 year follow-up



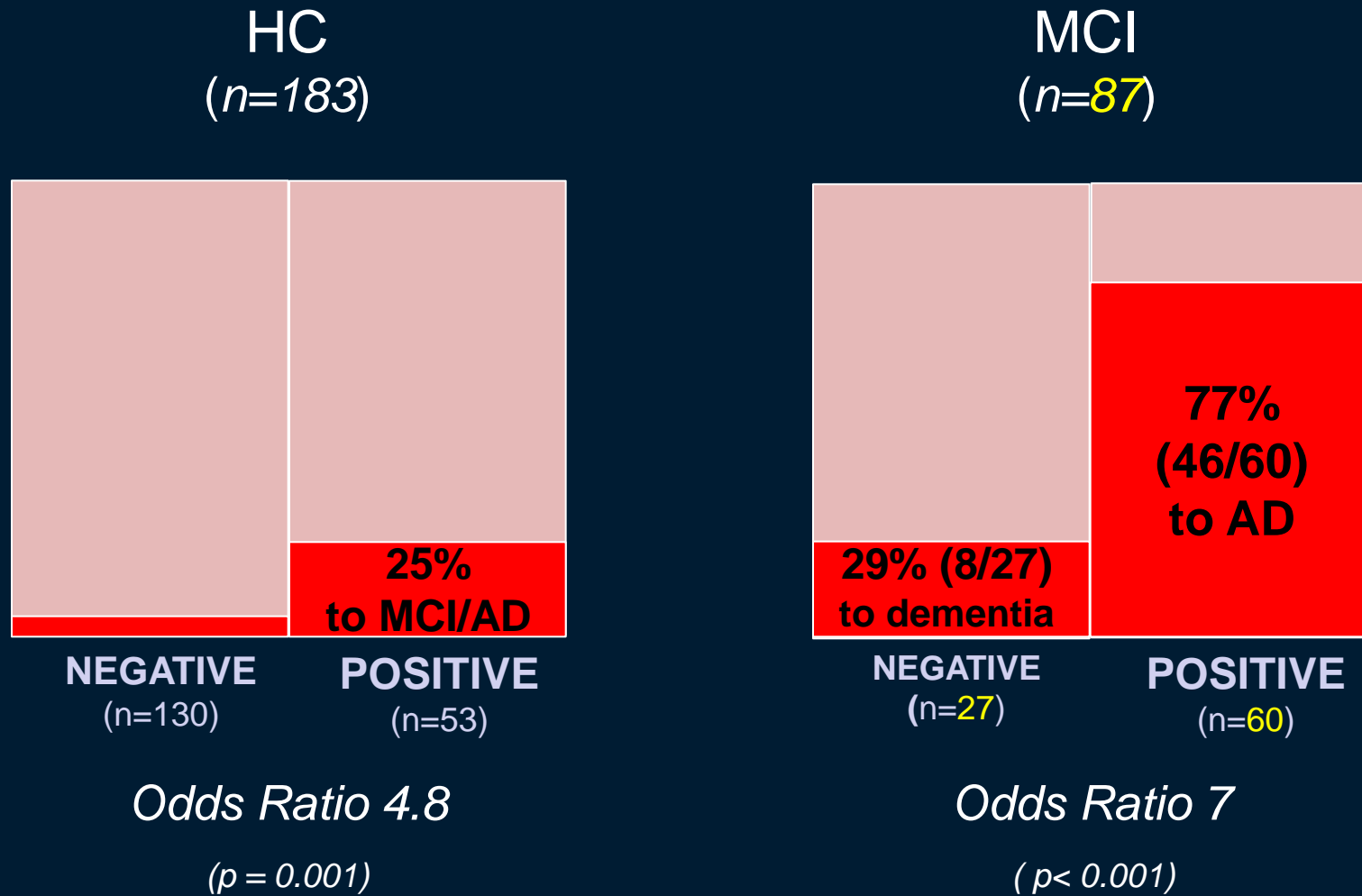
# The natural history of A $\beta$ deposition in sporadic AD



# Relationship between “abnormality” and CDR of 1.0



# Risk of decline over 3 years: Positive vs negative amyloid scan

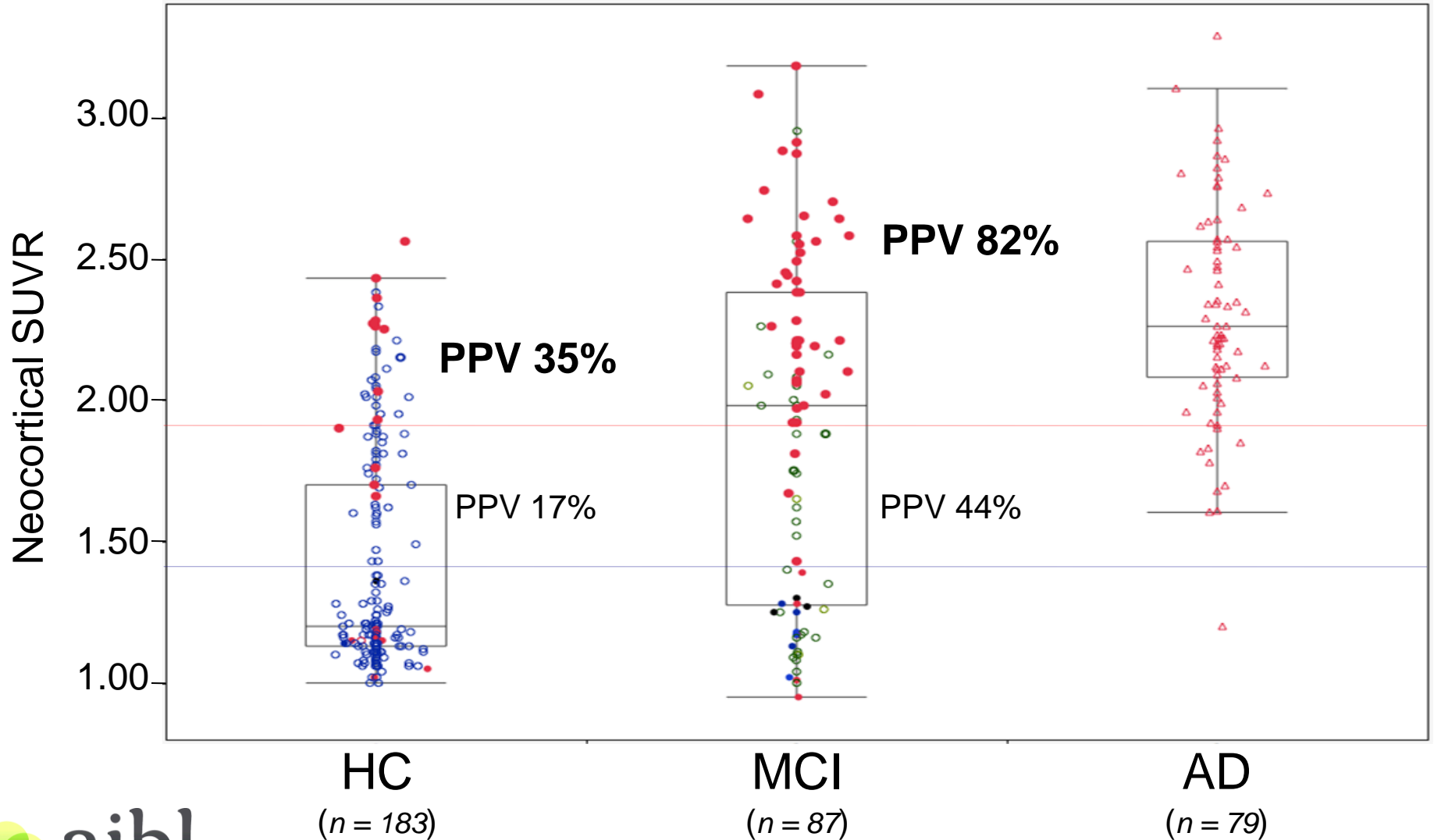


*(OR increases to 14 if non-AD dementia removed)*

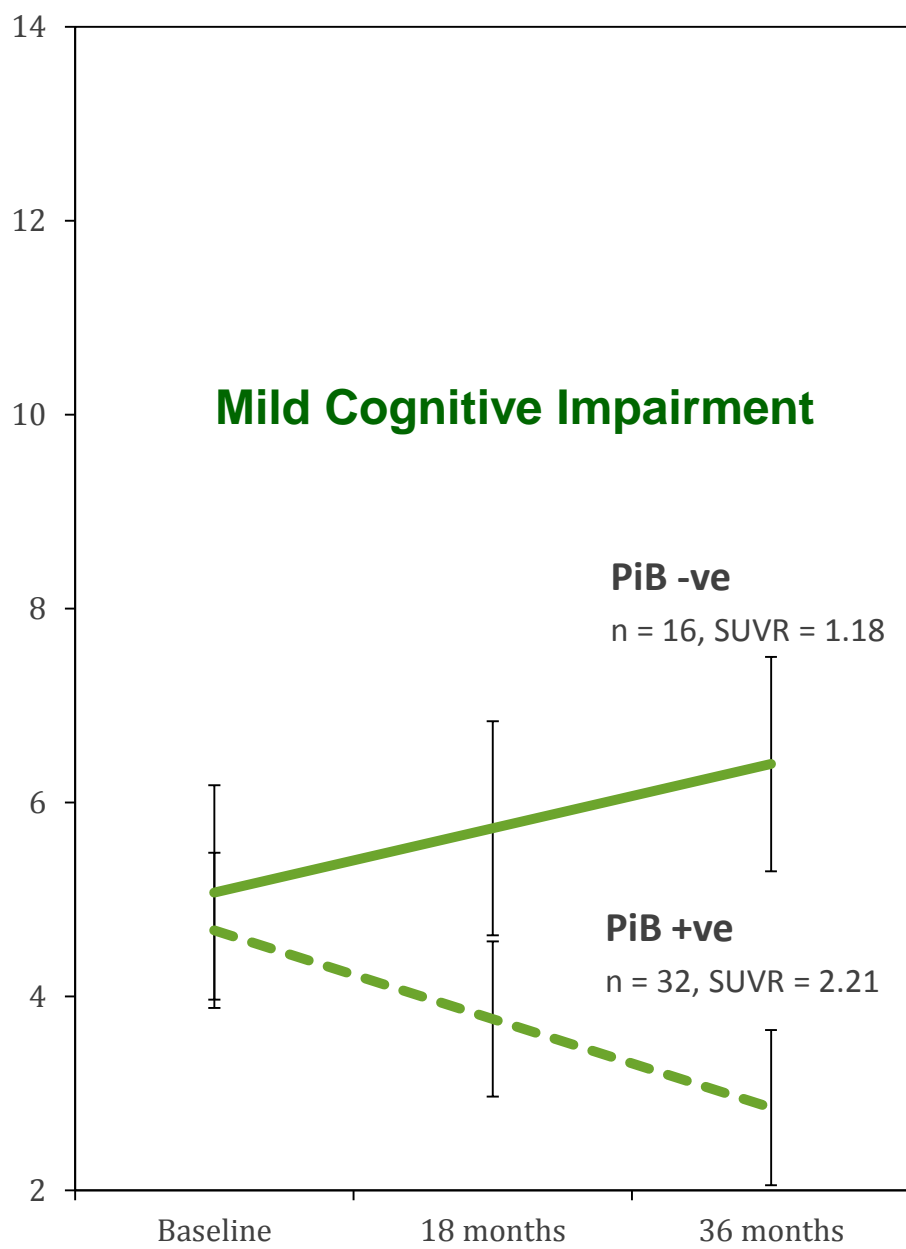
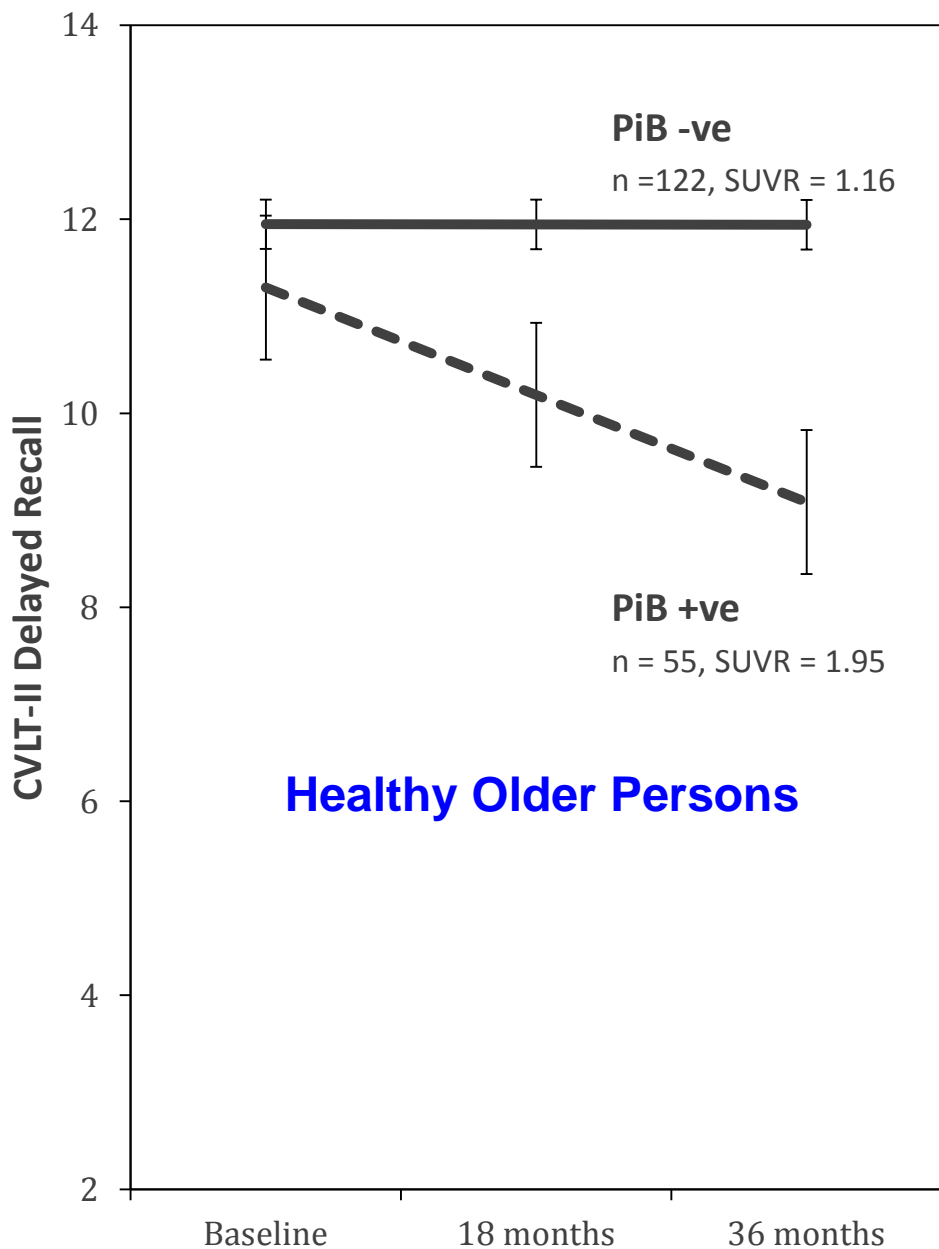
# MCI to AD over 3 years (n=87; 59% progressed)

	MCI positive for marker	Odds Ratio	PPV	NPV
HV	48	4	0.67	0.65
ApoE- $\epsilon$ 4	50	5	0.74	0.66
CVLT<-1.5	61	11	0.80	0.74
PiB	60	15	0.77	0.82
PiB+ $\epsilon$ 4	47	16	0.79	0.81
PiB+HV	35	44	0.83	0.90
PiB+CVLT	43	na	0.86	1.00

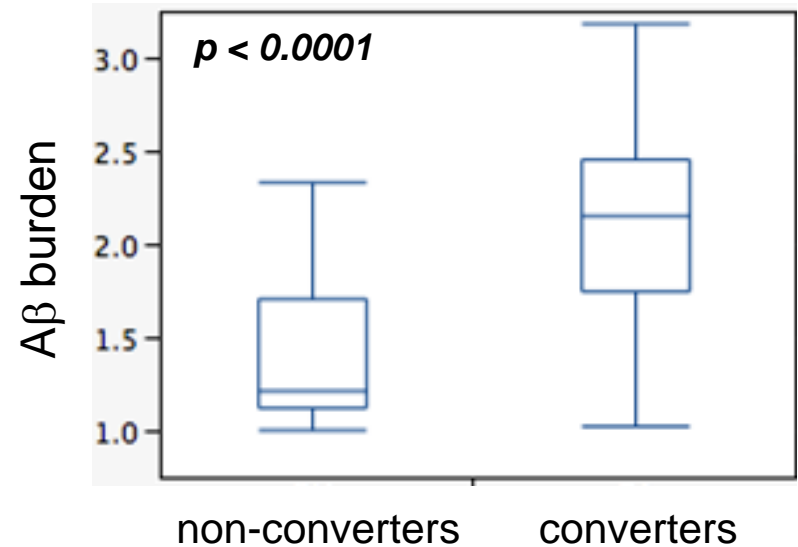
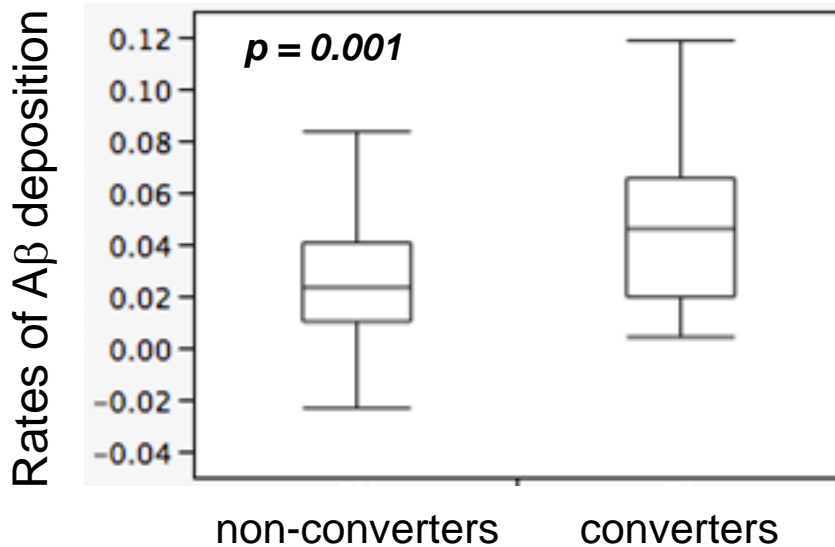
# Predictive value of low (<1.4) vs intermediate vs high (>1.9) PiB binding



# CVLT-II Delayed Recall over 36 mths



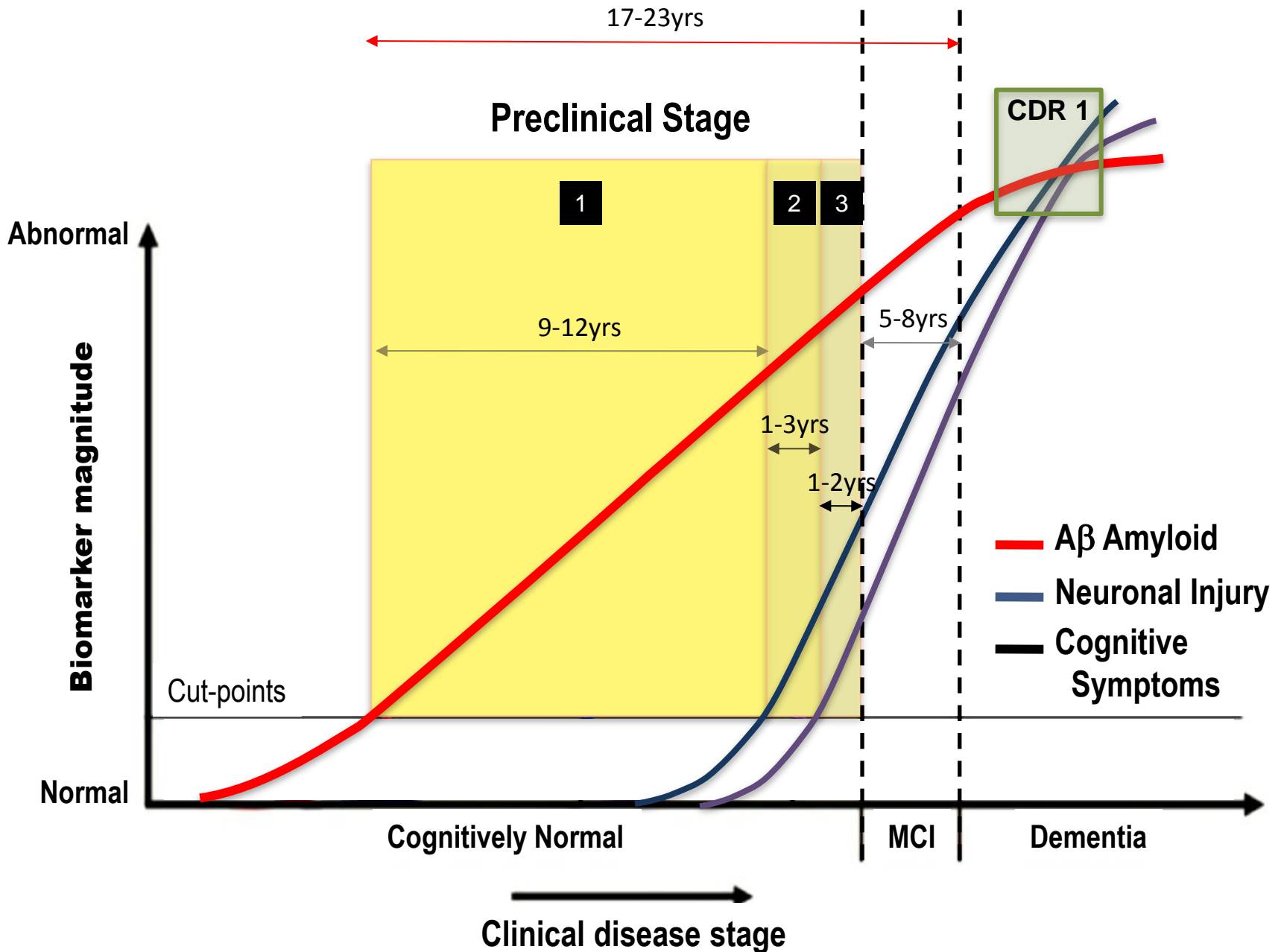
# Initial A $\beta$ burden is a better predictor of progression from MCI to AD than the rate of A $\beta$ accumulation



**OR = 5.4**

**OR = 15**





## HC to MCI or AD over 3 years (n=183; 13% progressed)

	HC positive for marker	OR	PPV	NPV
HV	46	2.2	0.20	0.90
e4	74	2.1	0.18	0.91
EM<-0.5	22	4.2	0.32	0.90
PiB	53	4.8	0.26	0.93
PiB+e4	34	5.7	0.29	0.93
PiB+HV	17	10	0.47	0.92
PiB+EM	10	16	0.50	0.94

AIBL composite EM Z-score <-1 (n=49), OR 11, PPV 35%, NPV 96%  
without correction for age or education.

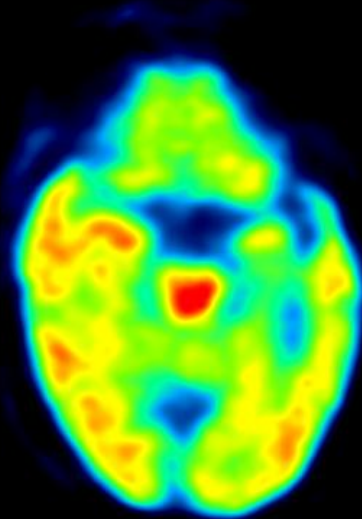
## *Future Directions for AIBL Imaging*

- Further refine prognostic value and comparative effectiveness of imaging biomarkers
- Replace  $^{11}\text{C}$ -PiB with  $^{18}\text{F}$ -NAV4694
- Add Tau imaging
- Create a new pool of amyloid scan positive HC and MCI for early intervention trials
- Use AIBL infrastructure to support the A4 and DIAN therapy trials

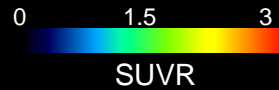
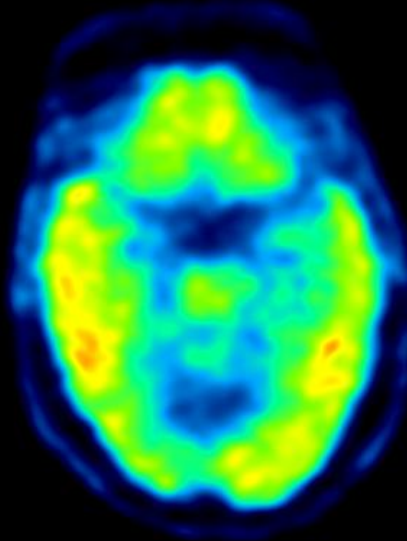


# Tau, A $\beta$ and glucose metabolism in Alzheimer's disease patient

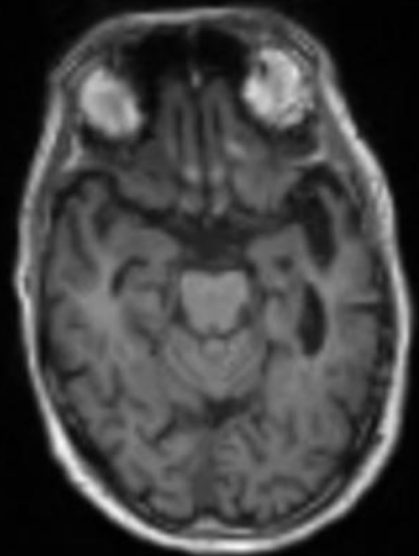
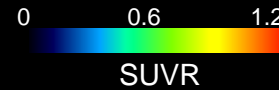
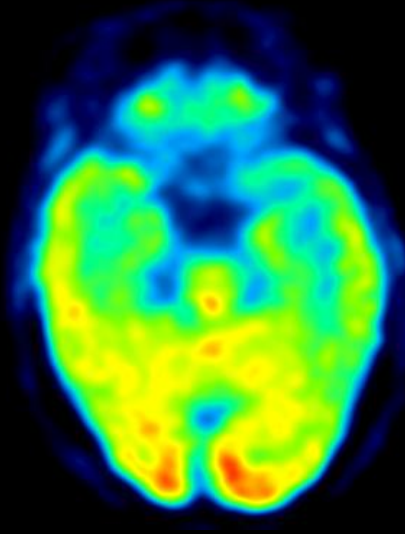
[ $^{18}\text{F}$ ]THK-5105



[ $^{11}\text{C}$ ]PiB



[ $^{18}\text{F}$ ]FDG



# Acknowledgements and thanks



AIBL is a large collaborative study and a complete list of contributors and the management committee can be found at [www.aibl.csiro.au](http://www.aibl.csiro.au)



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FUND