KU LEUVEN

The role of PET-MRI neuroimaging in the differential diagnosis of Late-Life Depression & Alzheimer's Disease

Louise Emsell

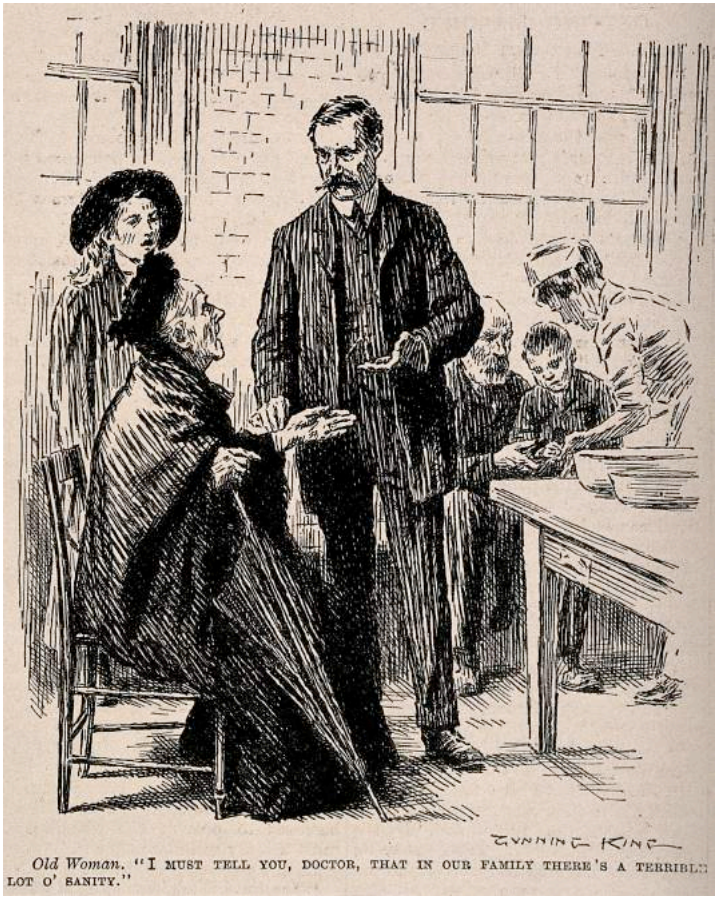

energy
apathy
suicidal
fatigue
interest
disturbed
concentrating
depressed
appetite
sleep
poor
difficult
lack
sleep
psychomotor
forgetfulness
diminished
agitation
confusion
ideation
mood

Diagnosis?

Alzheimer's Disease

Alzheimer type dementia with depressive symptoms

Depression



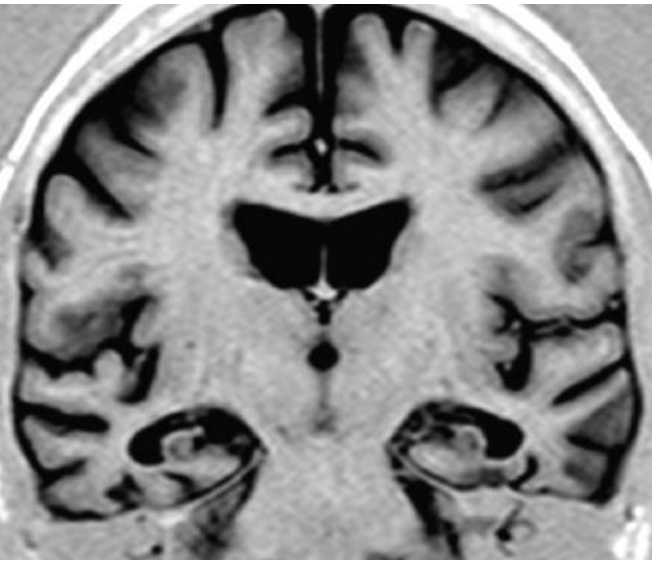
Old Woman. "I MUST TELL YOU, DOCTOR, THAT IN OUR FAMILY THERE'S A TERRIBLE LOT O' SANITY."

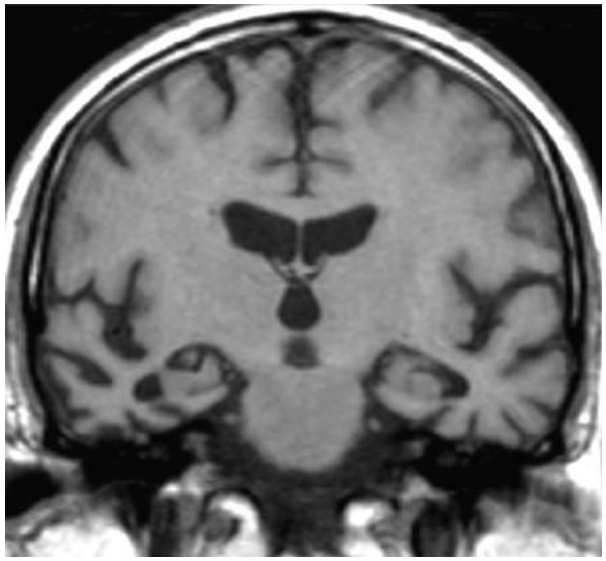
MRI findings

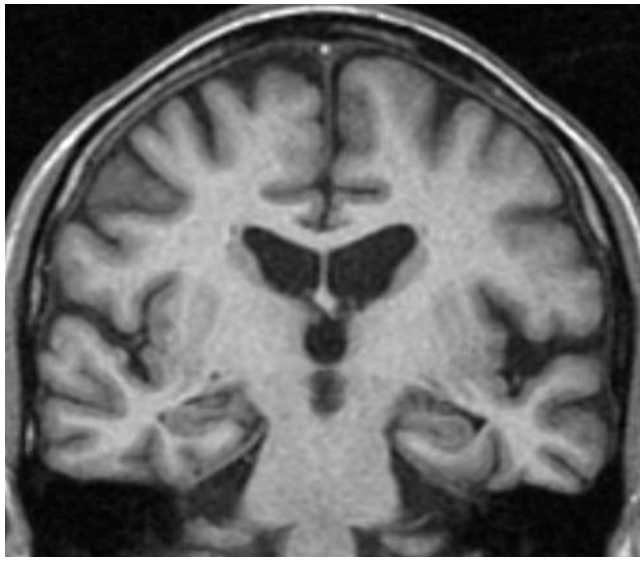
(probably) AD

?

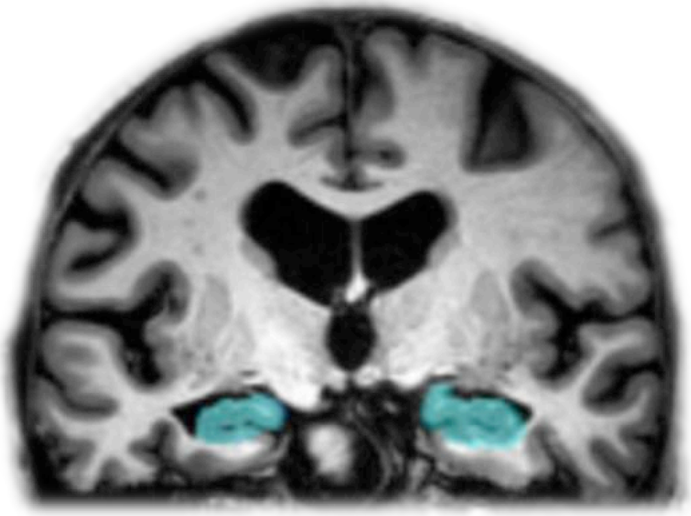
(probably) depression

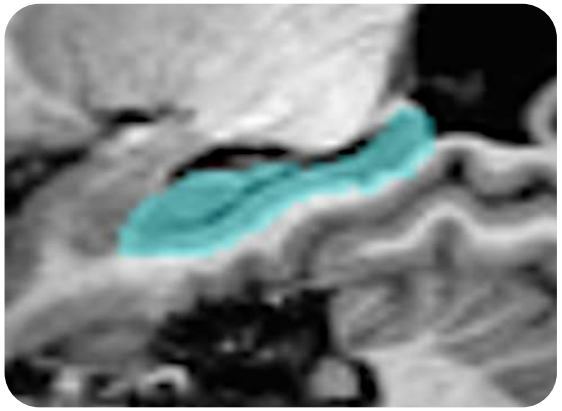






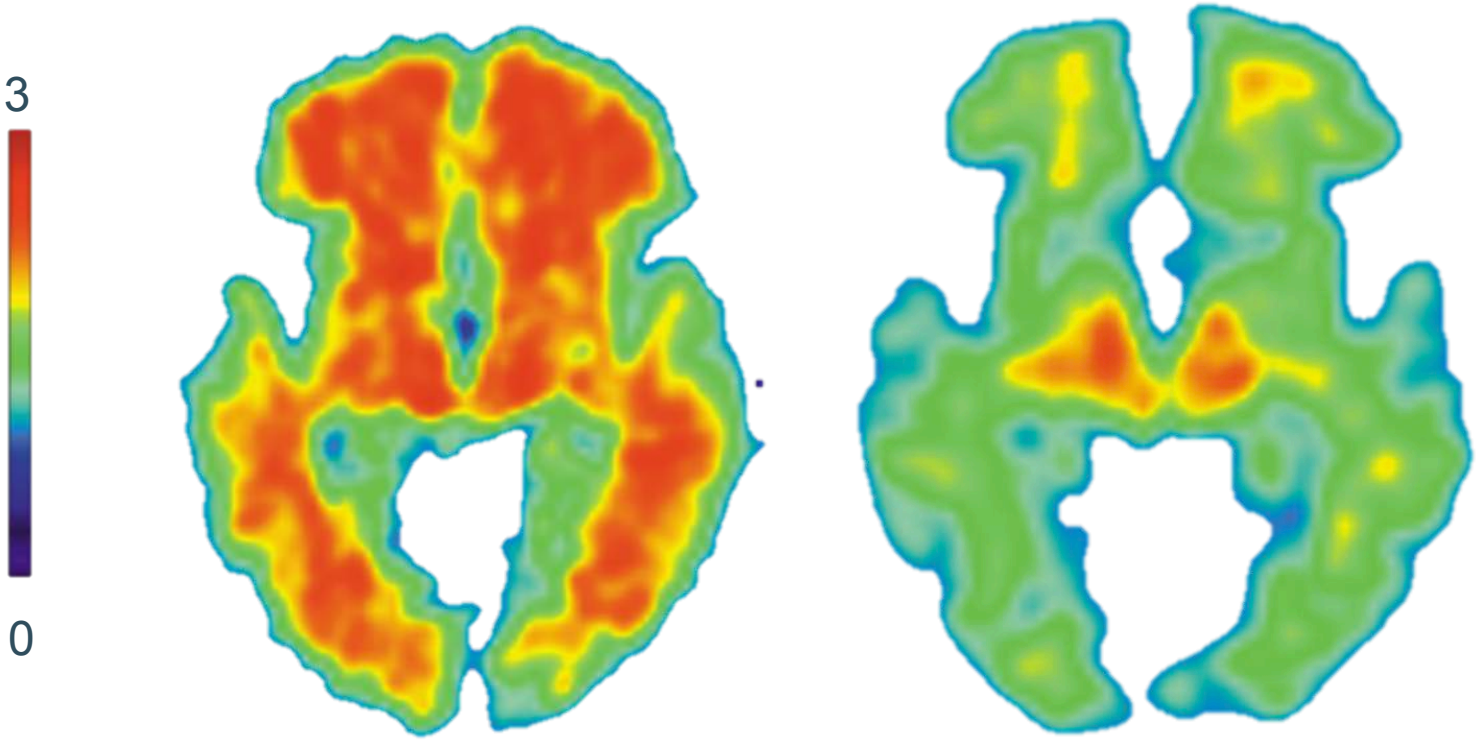
Quantitative imaging - hippocampus





Quantitative imaging - PET

Amyloid imaging with ^{18}F-flutametamol

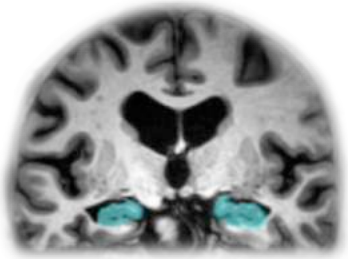


SUVR

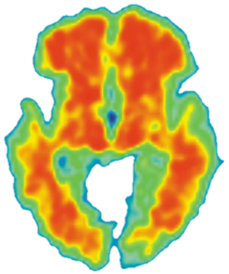
Amyloid positive

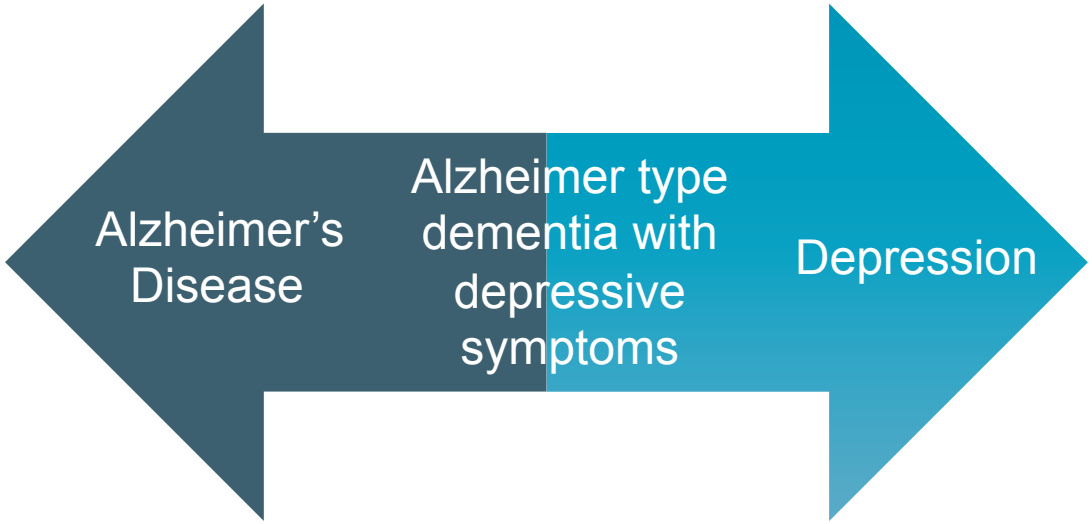
Amyloid negative

Study goal



"Develop an optimal imaging protocol to differentiate AD and depression"





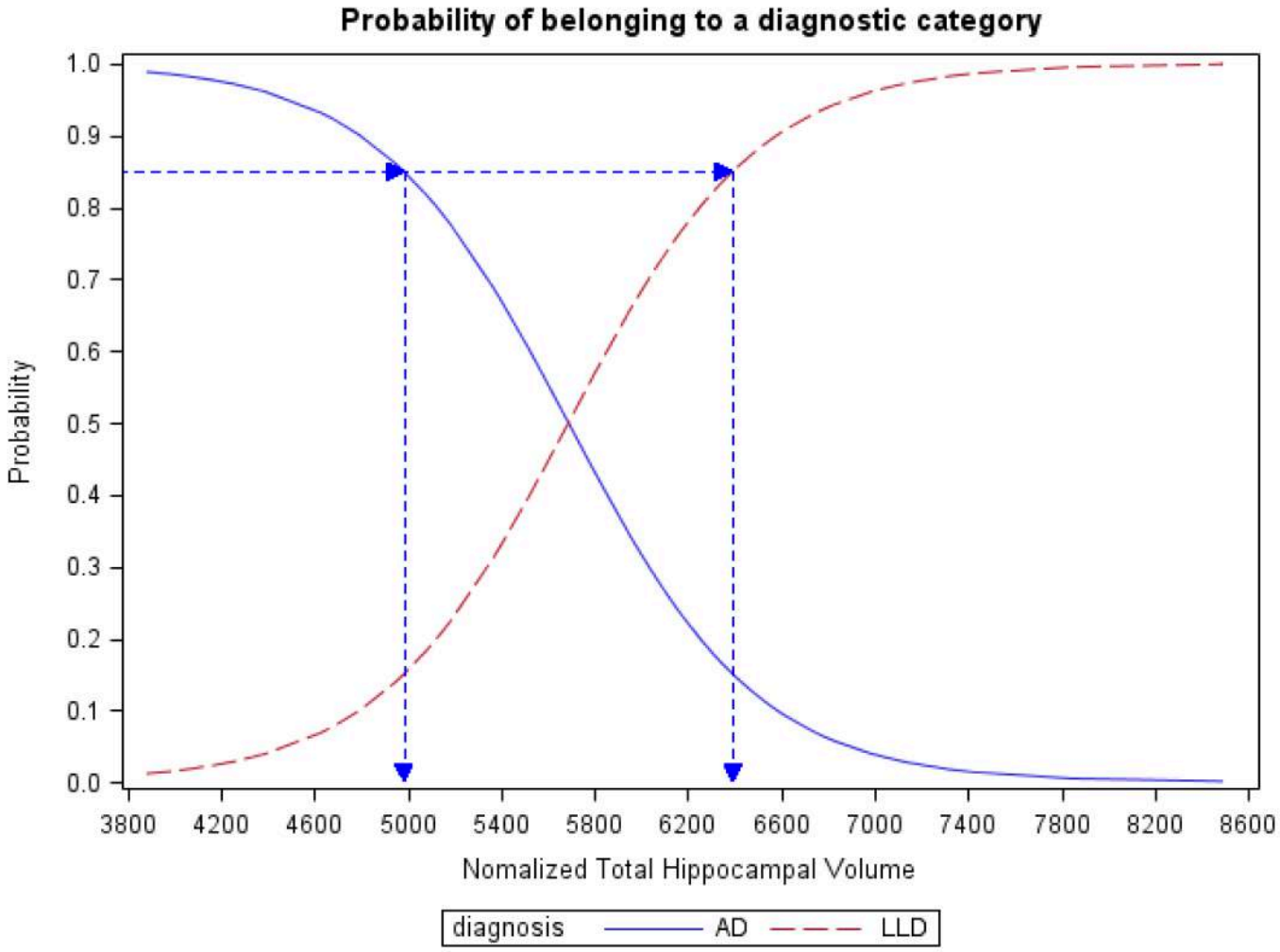
Methods

- Subject groups:
  - 41 subjects with depression
  - 27 subjects with AD
- Both groups matched for age (AD:70yrs, LLD:72yrs)
- Imaging:
  - Normalized Total Hippocampal Volume (MRI)
  - Amyloid SUVR (PET)
- Statistics:
  - Logistic regression

Results (i)

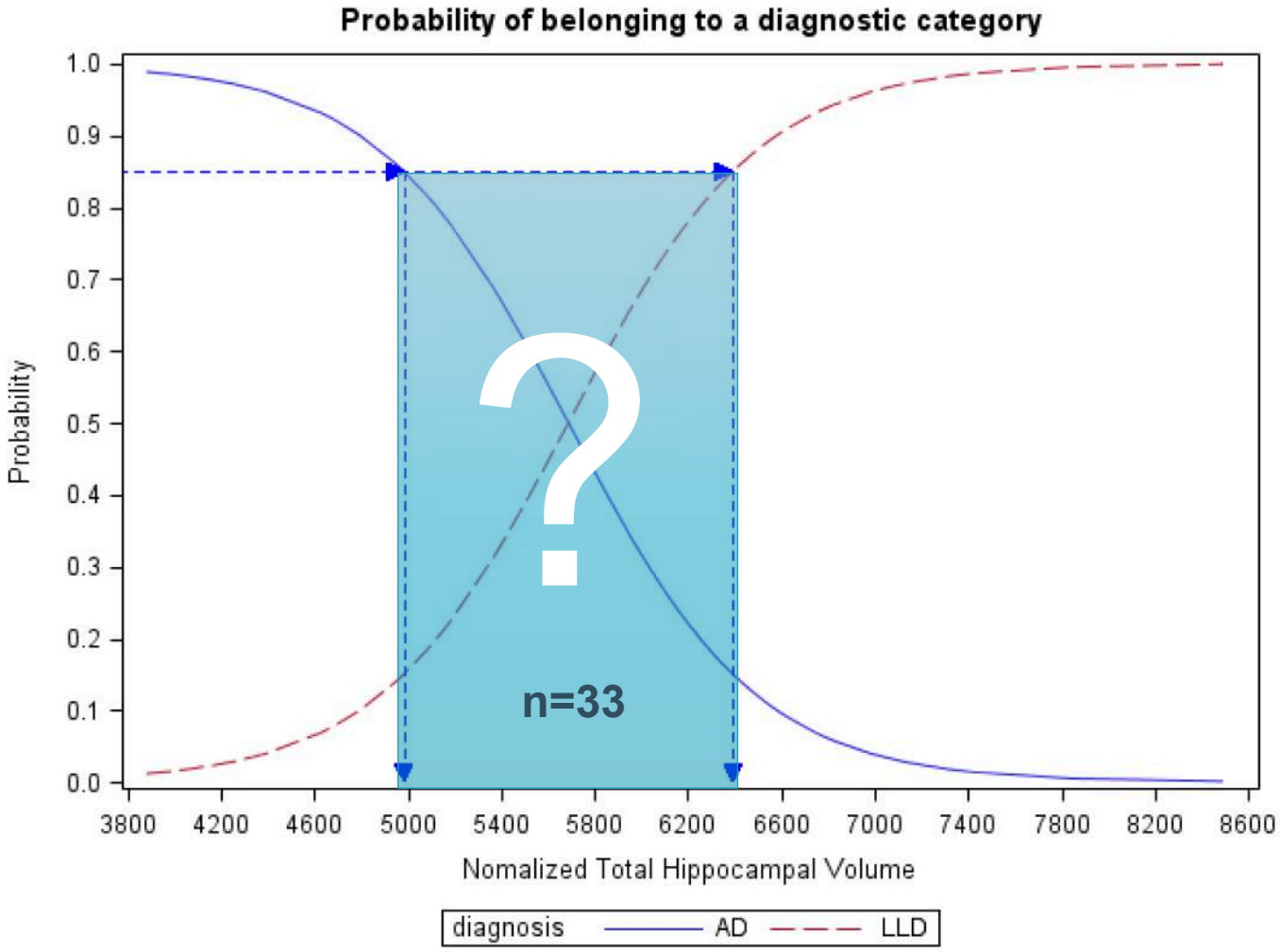
Use of hippocampal volume to discriminate groups

- Hippocampal volume is a significant predictor of diagnostic category.
- For a probability of 85% to classify patients, we have to use a cut-off value of 4983 mm^3 and 6393 mm^3 respectively



AD more likely

Depression more likely



AD more likely

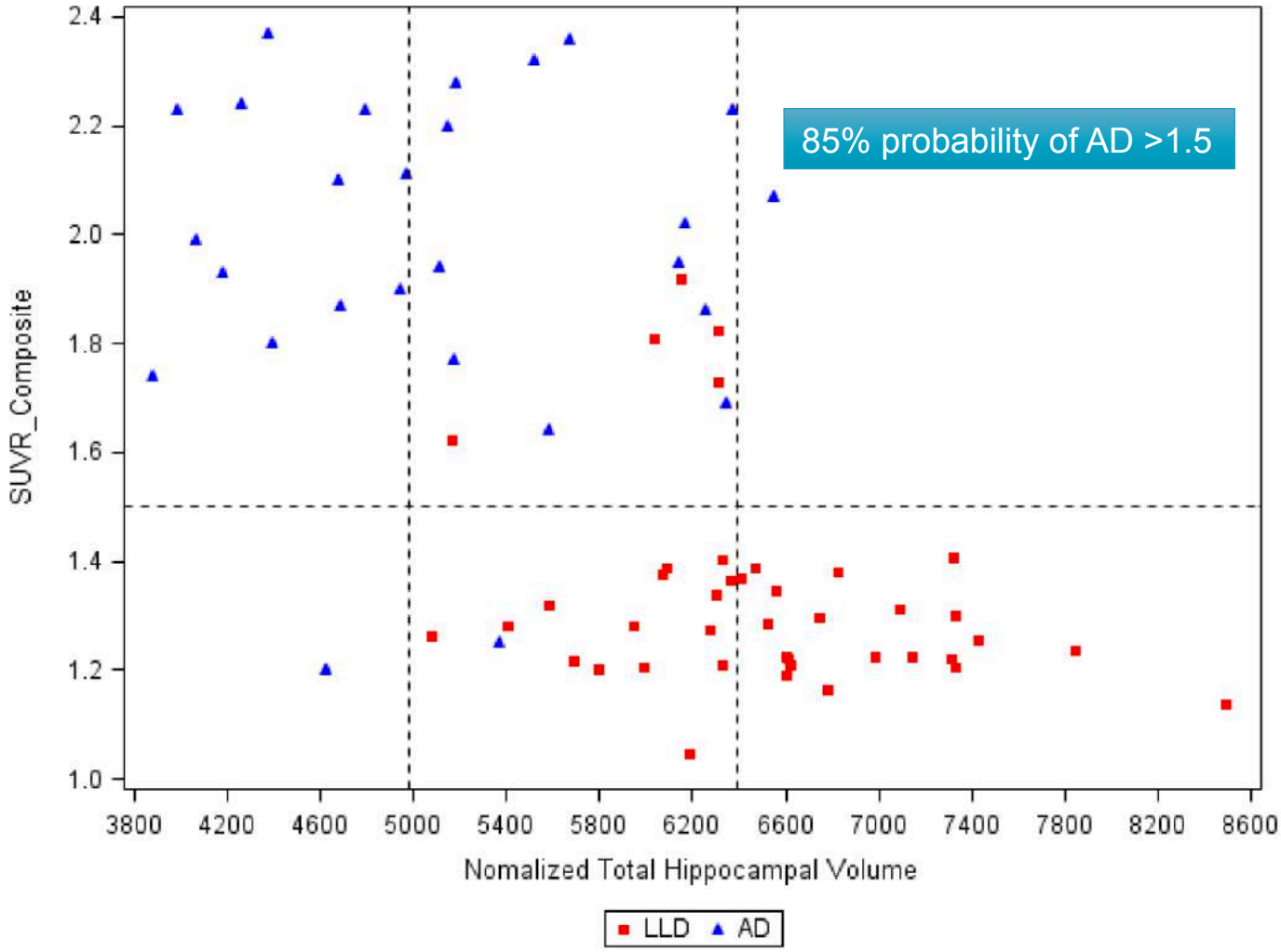
Depression more likely

Results (ii)

Adding amyloid PET to the hippocampal volume

AD more likely

Depression more likely



Results (summary)

- This two-step procedure of using hippocampal volume and amyloid:
  - sensitivity to detect AD is 0.93
  - specificity to detect AD is 0.88
- In total 90 % of the patients are correctly classified.
  - 2 subjects with AD are incorrectly classified as having depression
  - 5 subjects with depression are incorrectly classified as having AD.

Conclusion

- A high probability of classification between depression and AD can be obtained using a two step approach using hippocampal volume and amyloid PET
- Hippocampal volume, using a more cost-effective MRI approach, can be used in the first step to already classify 51% of the subjects
- The remaining 49% of the subjects can be further classified using amyloid PET

Thank you!

UPC-KU Leuven &
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