

MRI prognostication in syndromes associated with frontotemporal lobar degeneration

Abdulwarrith Olawale¹, P. Simon Jones¹, David J. Whiteside¹, Alexander Murley¹, Katherine Stockton¹, Ian Coyle-Gilchrist¹, Michelle Naessens², Matthew Rouse², Hugo Paula¹, James Rowe^{1,2}
1. Department of Clinical Neurosciences, University of Cambridge. 2. Medical Research Council Cognition and Brain Sciences Unit, Cambridge, UK.



Frontotemporal lobar degeneration (FTLD)-associated syndromes

FTLD-associated syndromes affect:

Behaviour, Speech and language and Movement¹

- 1. Behavioural variant Frontotemporal dementia
- 2. Primary progressive aphasia (semantic variant)
- 3. Primary progressive aphasia (non-fluent variant)
- 4. Corticobasal syndrome
- 5. Progressive supranuclear palsy

They have:

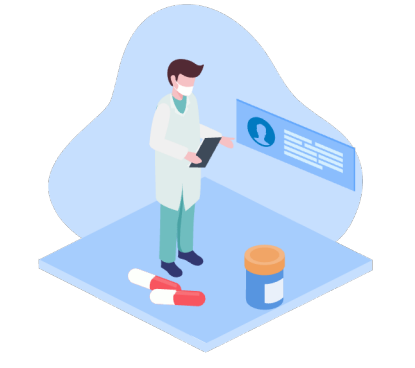
- no effective disease-modifying treatment.
- challenges for clinical trials, including²:
 - low prevalence
 - variable prognosis: 1-15 years from onset.¹

They need better markers for prognosis



The goal: better prognostic models

- ↓ Sample size requirement
- ↑ Power of clinical trials
- More efficient trials.



122 participants + 92 healthy volunteers underwent T1w 3T-MRI (PRISMA, 1mm³)

Cambridgeshire and Norfolk, England

Can 3T MRI volumes/thickness predict time to death in FTLD-syndromes?

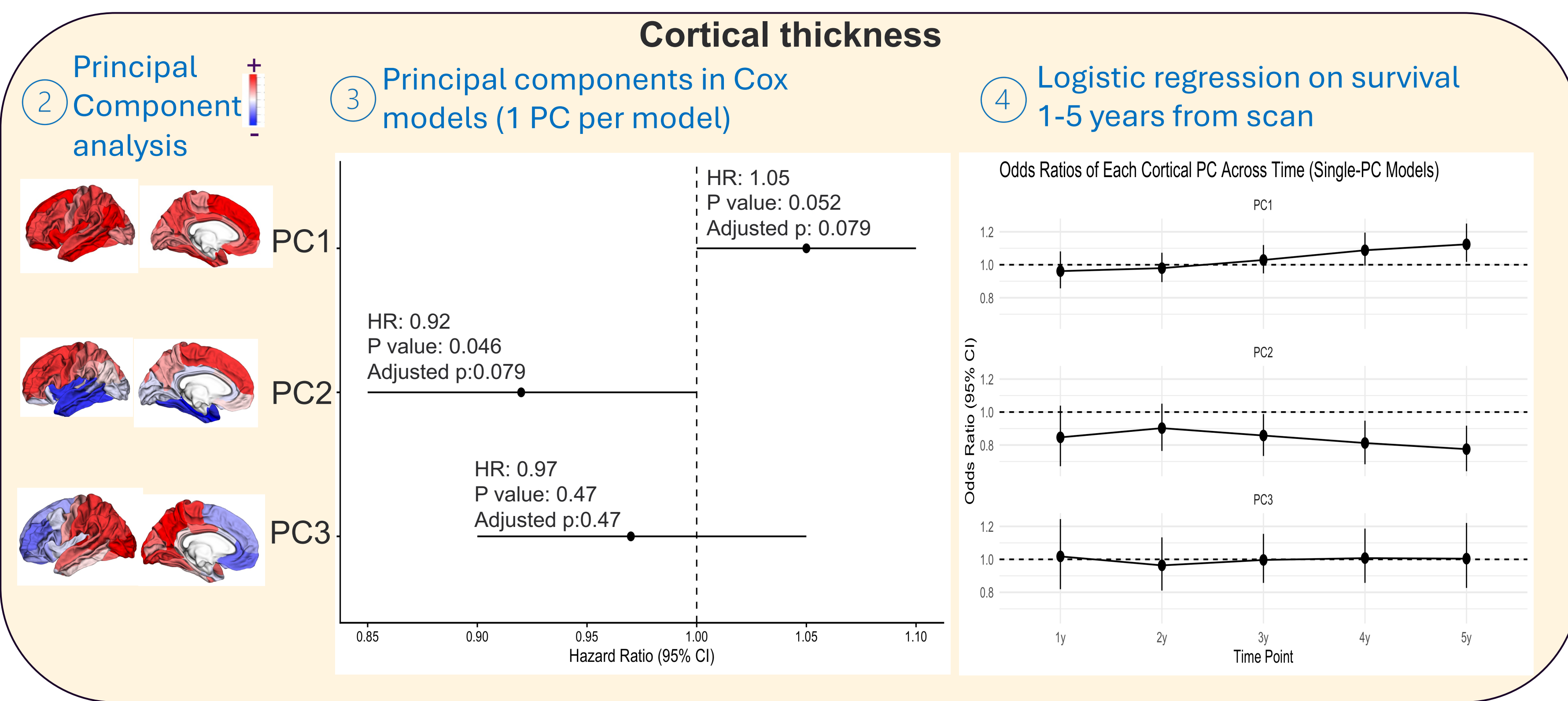
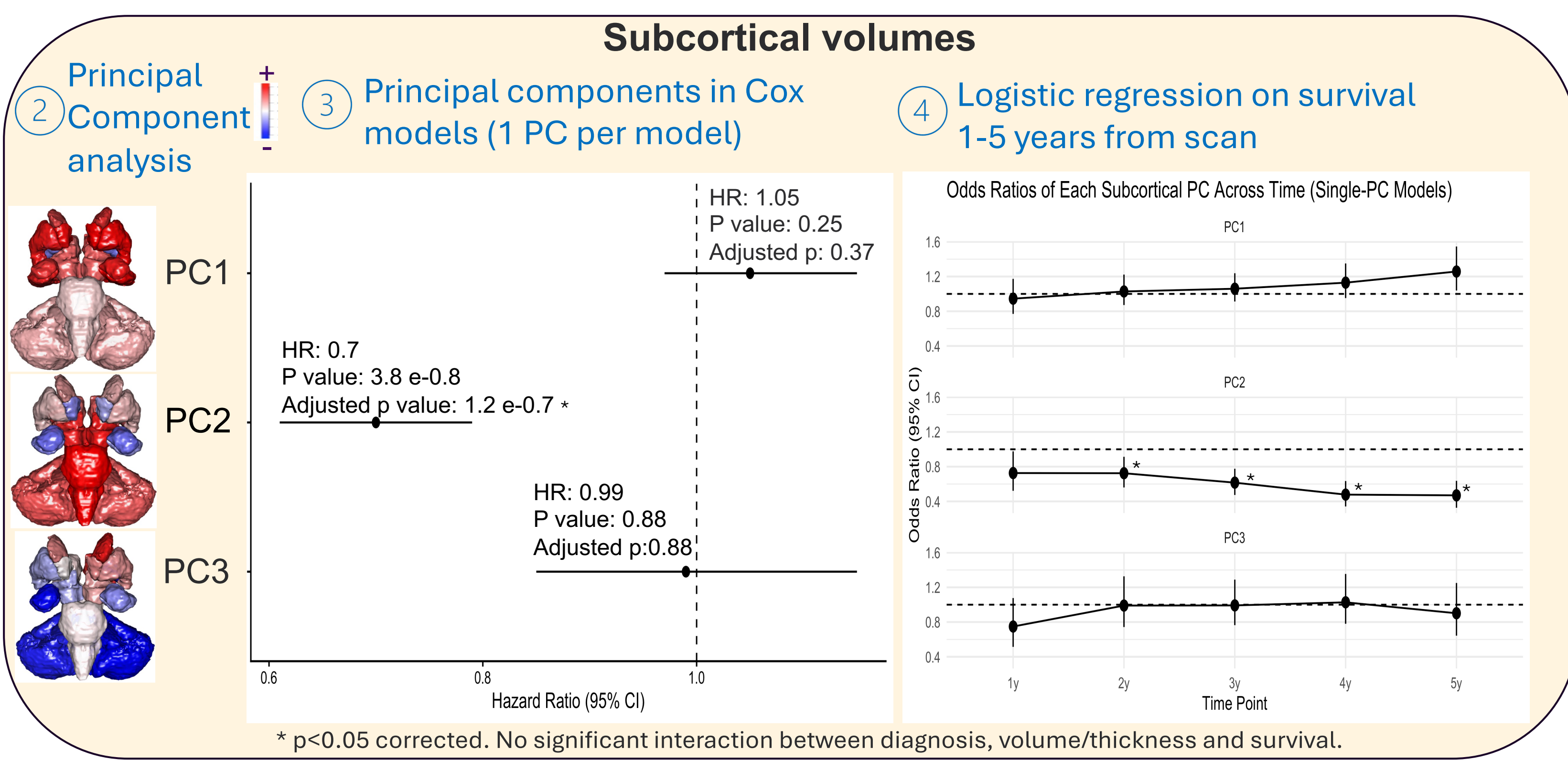
Our approach

- 1. Subcortical grey matter regional volumes (Freesurfer segmentation) → W-scores derived for each patient's MRI (correcting for age, sex and TIV)
- 2. Cortical regional thickness measures (Desikan-Killiany atlas) → W-scores derived for each patient's MRI metrics

Steps 1 to 4

Results

① Univariate Cox proportional hazards: Brainstem* (HR: 0.63), Left and Right Pallidum* (0.76, 0.77), Left and Right Ventral Diencephalon* (0.72, 0.76), Left and Right Amygdala* (1.2, 1.2), Right insula* (1.24)



Conclusion: Subcortical atrophy (worse than expected for age, sex and TIV) predicts higher risk of death. This risk is present irrespective of diagnosis within the FTLD spectrum and it accumulates over 5 years from the time of scan.

References:1. Coyle-Gilchrist et al, Neurology, 2016. PMCID: PMC4854589. 2. Boxer et al, Alzheimers Dement, 2020. PMCID: PMC6949386

★ Participants
★ Families
★ Rowe Group.

ALZHEIMER'S RESEARCH UK FOR A CURE

National Institute for Health and Care Research