

The Association Between Hippocampal Subfield Volumes And Pollution In A Cohort Of Patients With Dementia In South London

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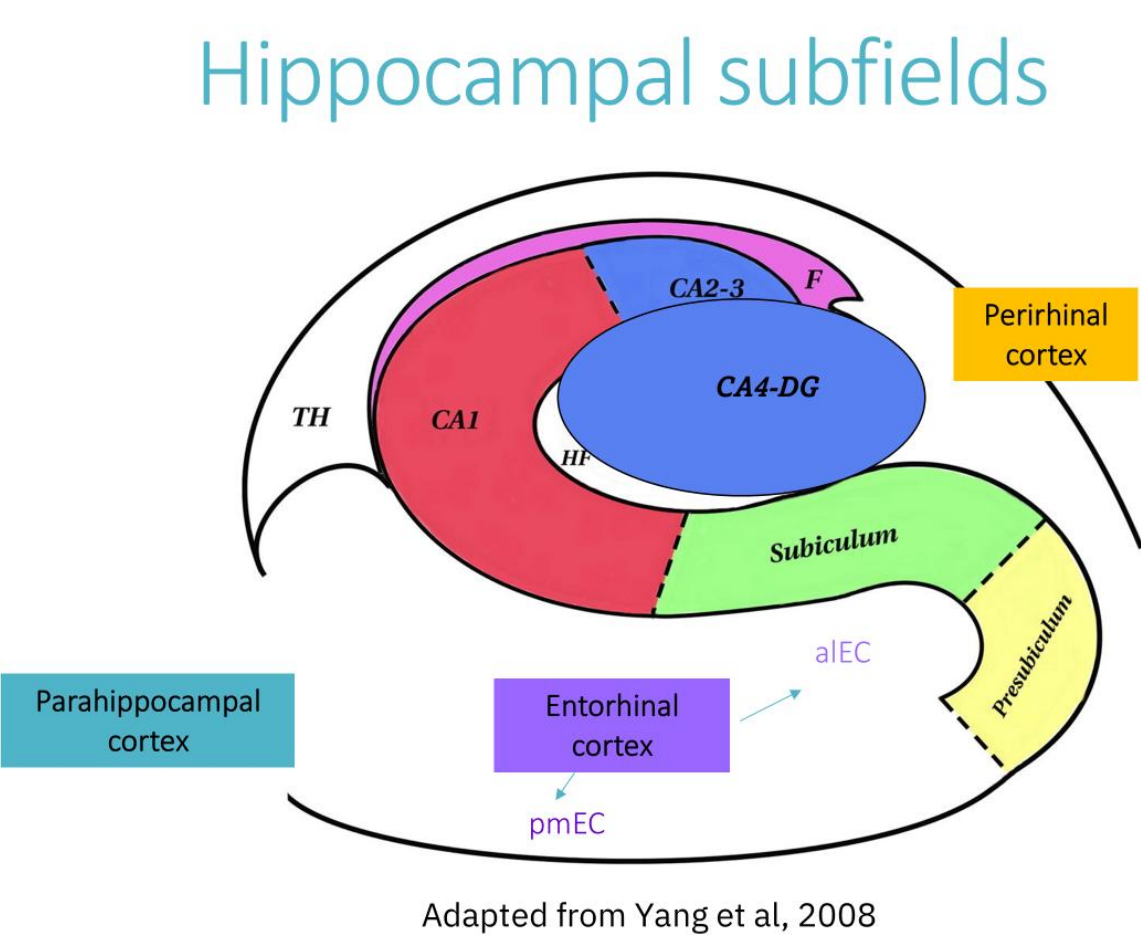
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Air pollution exposure is not associated with hippocampal subfield specific atrophy- other mechanisms for the link between air pollution and dementia need to be investigated.

INTRODUCTION

- Air pollution is a known dementia risk factor- mechanisms are unclear [1,2,3] Both are increasing.
- Air pollution = associated with hippocampal atrophy



- In Alzheimer's disease, hippocampal subfield specific atrophy is seen in early stages of disease [4]
- Particulate matter(PM2.5) pollution exposure is associated with hippocampal subfield cornu ammonis(CA)1 trophy [5]
- Novel machine learning allows visualisation of subfields from routine clinical 1.5T MRI data [6]

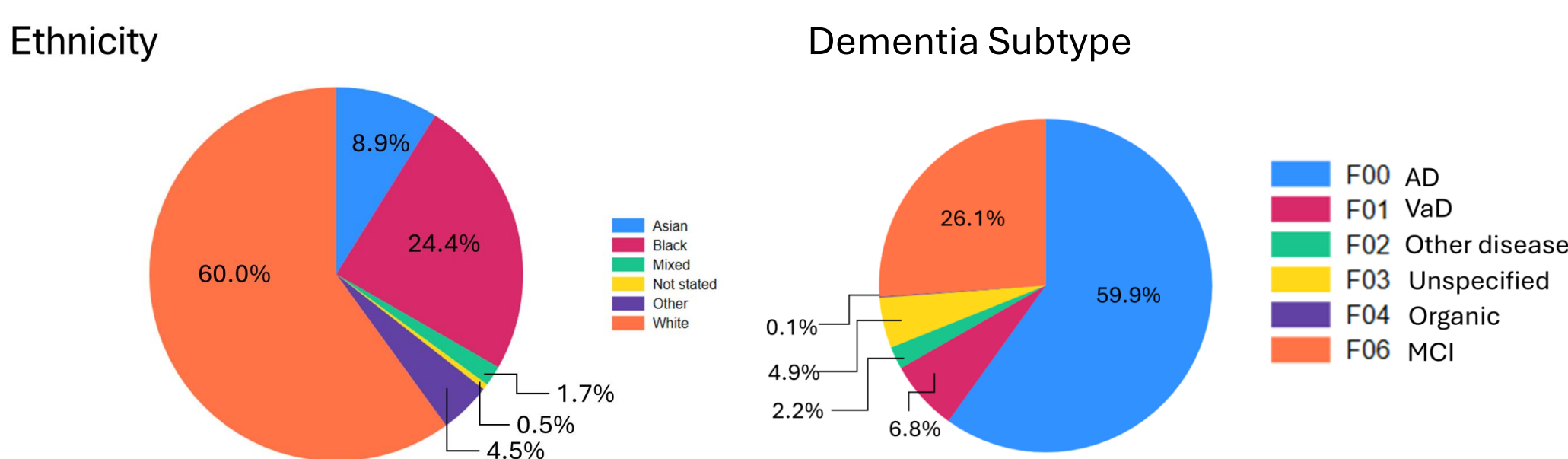
Aim: investigate if air pollution exposure is associated with hippocampal subfield volumes in dementia.

METHODS

- Retrospective cohort
- Air pollution estimates at patients' residential postcode were linked to electronic health records of patients from the SLAM Image Bank.
- Daily average in pollution (PM2.5, PM10, and nitrogen dioxide (NO2)) calculated
- Hippocampal subfield volumes were segmented from clinical MRI images using ANTSx-Deep-Flash pipeline.
- Covariates= age, gender, ethnicity, Index of Multiple Deprivation, and medical comorbidities

RESULTS

- 2061 patients included
- No significant associations between any of the air pollution measures and any of the hippocampal subfield volumes.
- CA1 volume was not significantly associated with PM2.5 exposure



	PM2.5		PM10		NO2	
	Regression coefficient	P value	Regression coefficient	P value	Regression coefficient	P value
Left_aLEC	-0.70	0.58	-0.60	0.71	-3.27	0.55
Right aLEC	-0.60	0.59	-0.58	0.69	1.12	0.82
Left CA 1	0.43	0.42	0.74	0.28	3.13	0.17
Right CA1	0.38	0.61	0.38	0.61	4.05	0.10
Left DG CA2 CA3 CA4	1.07	0.46	2.23	0.23	6.95	0.27
Right DG CA2 CA3 CA4	-0.04	0.98	-0.31	0.85	5.54	0.32
Left parahippocampal	0.15	0.70	0.30	0.55	1.97	0.24
Right parahippocampal	0.20	0.61	0.26	0.62	1.95	0.26
Left perirhinal	0.14	0.76	-0.04	0.94	-0.88	0.65
Right perirhinal	0.07	0.88	-0.03	0.96	-0.19	0.92
Left pMEC	-2.44	0.42	-2.07	0.60	0.37	0.98
Right pMEC	1.01	0.72	1.82	0.62	5.71	0.64
Left subiculum	1.97	0.20	3.16	0.11	12.92	0.05
Right subiculum	1.90	0.24	2.47	0.24	13.33	0.05

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CONCLUSIONS

- Air pollution exposure (PM2.5, PM10 and NO2) is not associated with hippocampal subfield specific atrophy
- Other mechanisms (e.g. vascular) for the link between air pollution and dementia should be investigated.

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