

Blood biomarkers for Alzheimer disease across ethnoracially diverse cohorts and health-care contexts: a systematic review and meta-analysis

0386

Xiaoxi Ma, Gurpreet Kaur Hansra, Tharusha Jayasena, John D Crawford, Anne Poljak, Perminder S Sachdev
Centre for Healthy Brain Ageing, Discipline of Psychiatry and Mental Health, School of Clinical Medicine, Faculty of Medicine and Health, The University of New South Wales, Sydney, NSW 2052, Australia

- p-tau217, p-tau181 and GFAP showed the largest group differences.
 - Biomarker directionality was consistent across diverse populations.
 - Ethnoracial differences observed in clinical, but not Aβ-PET comparisons.
- Scan for full article →

Contact:
xiaoxi.ma@unsw.edu.au

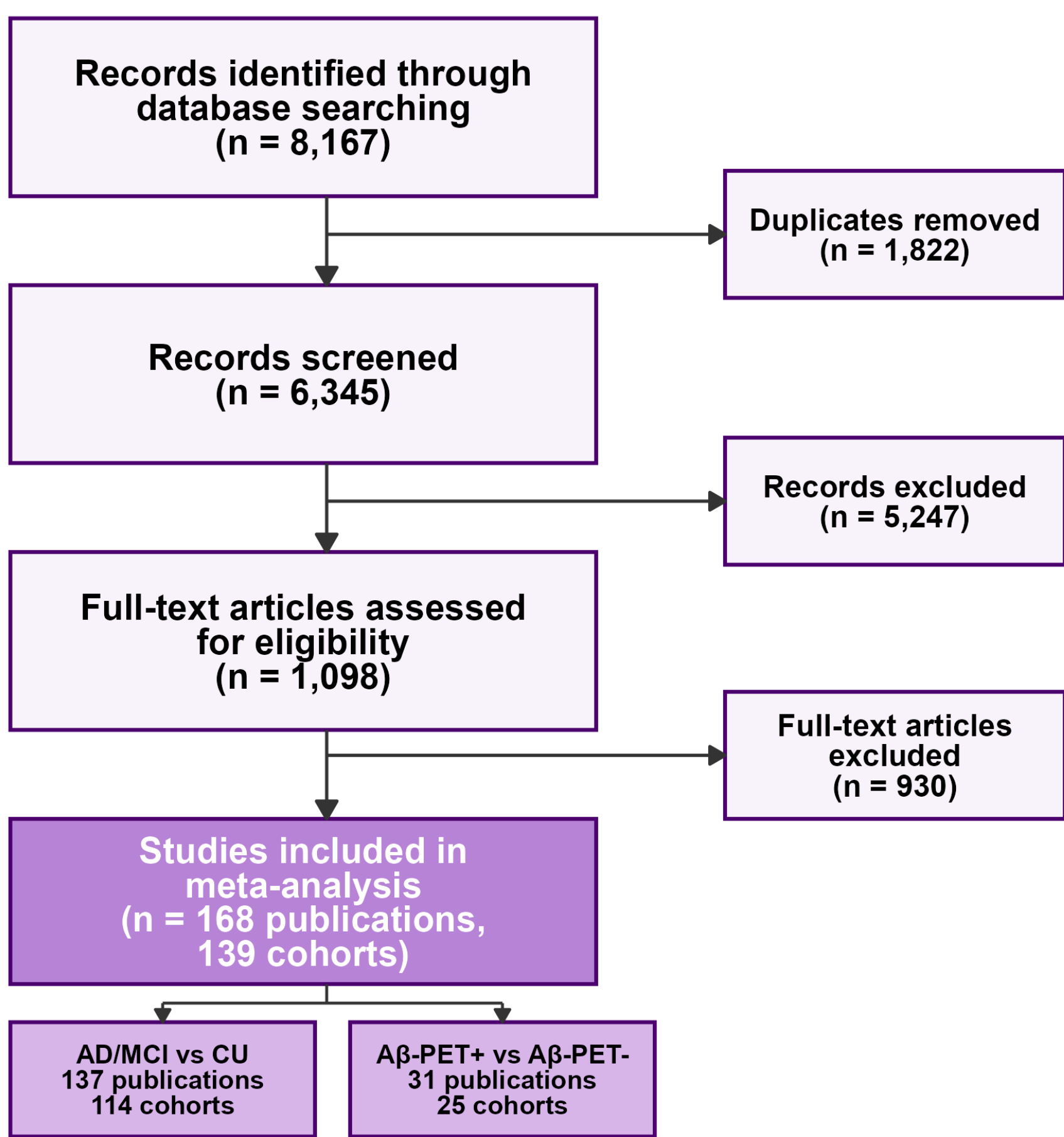


BACKGROUNDS

Blood-based biomarkers could transform Alzheimer disease (AD) detection by enabling scalable, less invasive assessment of underlying pathology, yet their applicability across globally diverse populations remains uncertain.

METHODS

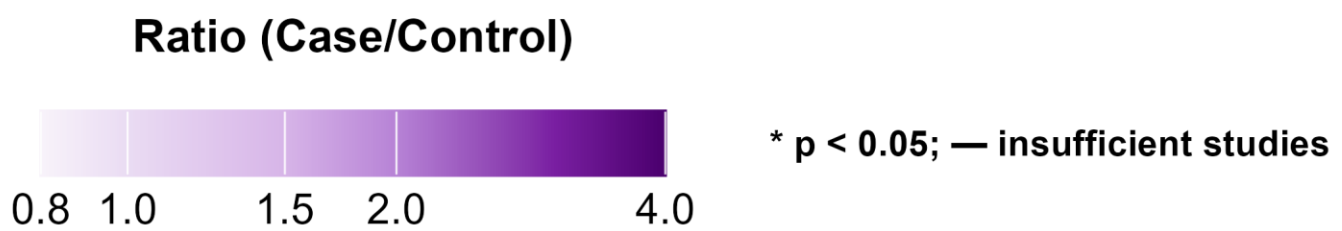
- Systematic review and meta-analysis of 168 publications comprising 139 independent cohorts.
- Studies included populations from Asia, Europe, North America, South America, Africa and Oceania.
- Random-effects meta-analyses pooled log-transformed ratios of mean biomarker concentrations.
- Comparisons:
AD vs CU
MCI vs CU
Aβ-PET+ vs Aβ-PET-



Population	AD vs CU	MCI vs CU	Aβ+ vs Aβ-
White	36 cohorts (N=5,245 vs 7,659)	29 cohorts (N=5,478 vs 9,583)	11 cohorts (N=2,443 vs 3,350)
Asian	46 cohorts (N=4,578 vs 7,383)	27 cohorts (N=2,572 vs 3,848)	12 cohorts (N=1,210 vs 1,652)
Black	4 cohorts (N=294 vs 640)	2 cohorts (N=148 vs 438)	-
Hispanic/Latino	7 cohorts (N=901 vs 2,326)	4 cohorts (N=596 vs 1,117)	-
MENA	3 cohorts (N=101 vs 79)	-	-
Indigenous	1 cohorts (N=41 vs 181)	1 cohorts (N=140 vs 181)	-
Multi-ethnic	7 cohorts (N=909 vs 1,360)	5 cohorts (N=502 vs 1,141)	2 cohorts (N=90 vs 323)
Total	104 cohorts (N=12,069 vs 19,628)	68 cohorts (N=9,436 vs 16,308)	25 cohorts (N=3,743 vs 5,325)

Pooled biomarker concentration ratios across diagnostic comparisons

Biomarker Comparison		Total	White	Asian	Black	Hispanic/Latino	Multi-ethnic
p-tau217	AD vs CU	2.76*	4.03*	2.07	0.81	2.90*	2.62*
	MCI vs CU	1.95*	2.10*	2.05*	—	1.37	1.83*
	Aβ+ vs Aβ-	2.98*	3.44*	2.63*	—	—	—
GFAP	AD vs CU	1.94*	1.89*	2.46*	1.44*	1.74*	1.34*
	MCI vs CU	1.47*	1.52*	1.51*	—	1.30*	1.41*
	Aβ+ vs Aβ-	1.56*	1.54*	1.65*	—	—	1.45*
p-tau181	AD vs CU	1.87*	2.08*	1.80*	1.38*	1.47*	1.85*
	MCI vs CU	1.41*	1.60*	1.27*	0.94	1.13	1.50*
	Aβ+ vs Aβ-	1.67*	1.49*	1.76*	—	—	1.52*
NfL	AD vs CU	1.62*	1.65*	1.69*	1.66*	1.58*	1.31*
	MCI vs CU	1.27*	1.33*	1.19*	1.47*	1.24*	1.16
	Aβ+ vs Aβ-	1.23*	1.22*	1.20*	—	—	1.29*
p-tau231	AD vs CU	1.52*	1.52*	—	—	—	—
	MCI vs CU	1.44*	1.44*	—	—	—	—
	Aβ+ vs Aβ-	1.37*	—	—	—	—	1.41*
t-tau	AD vs CU	1.20*	1.20*	1.24*	0.98	1.09	0.97
	MCI vs CU	1.10*	1.10*	1.14*	—	1.01	0.92
	Aβ+ vs Aβ-	1.04	1.06	1.01	—	—	—
Aβ42/Aβ40	AD vs CU	0.87*	0.88*	0.85*	0.82*	0.92*	1.00
	MCI vs CU	0.91*	0.93*	0.85*	0.93	0.98	0.89*
	Aβ+ vs Aβ-	0.86*	0.88*	0.84*	—	—	0.85*



- RESULTS**
- p-tau217, p-tau181 and GFAP showed the largest and most consistent group differences.
 - Across subgroup analyses, p-tau181, GFAP, NfL and Aβ42/Aβ40 showed broadly consistent directional changes across populations.
 - In clinical comparisons, MCI/CU p-tau181 ratios were lower in predominantly Asian than White cohorts. AD/CU GFAP ratios were higher in predominantly Asian than White cohorts.
 - No significant between-population differences were observed in Aβ-PET-defined comparisons.

- CONCLUSIONS**
- Leading blood biomarkers show robust AD-related signals across studied
 - Harmonized, pathology-confirmed validation in underrepresented populations is needed before equitable clinical implementation.