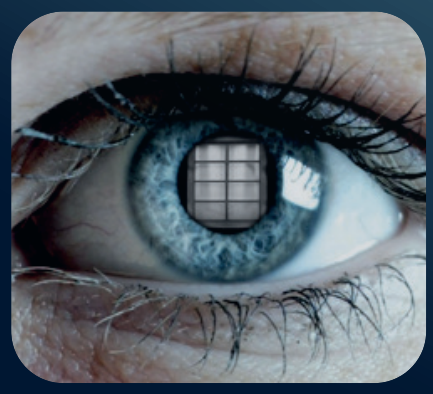
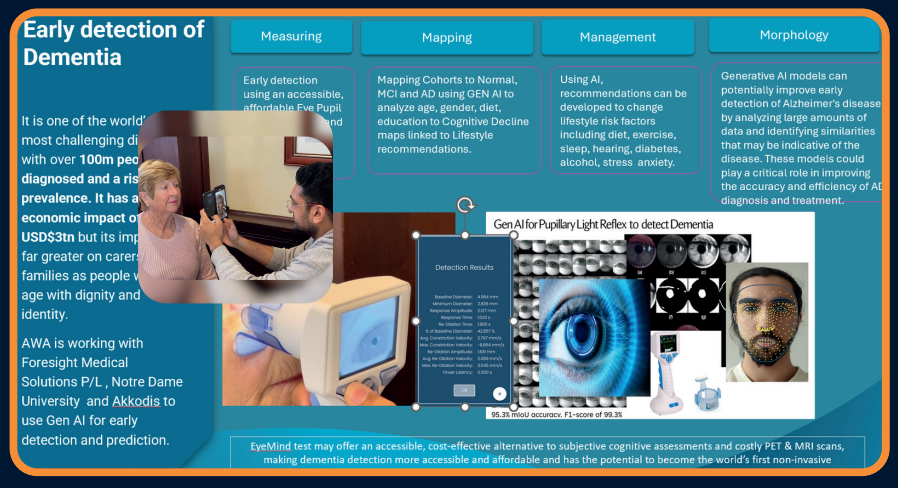
NON-INVASIVE AI-BASED EYE ASSESSMENT FOR EARLY DETECTION OF DEMENTIA - addressing lifestyle risk factors to change the disease trajectory



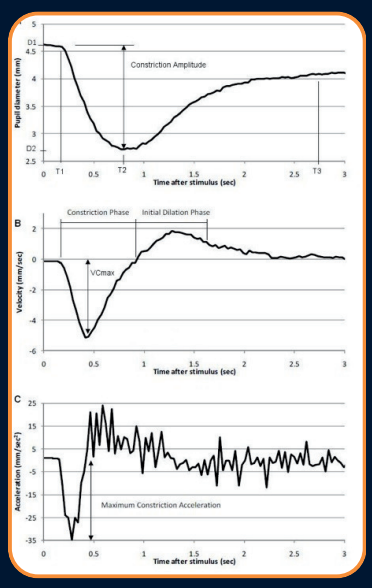
Professor Warren Harding, AM Chair Alzheimer's WA, VP Akkodis, National Dementia Expert Reference Group , Board Member Australian Digital Health Agency

Dementia presents a $2.8tn global challenge and has emerged as one of the leading challenges in Australian healthcare system as they seek new, innovative models of care and care settings. This can avoid extended length of stay, five times higher acute care costs, fewer ED presentations, less ambulance ramping and bed blockage. Greater funding for aging in place, Transition to Home , Acute Hospital in the Home, Transition to Residential Care Programs can support more effective community-based dementia care solutions.

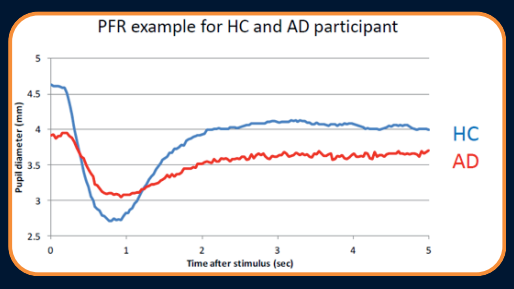
Early pre-clinical non-invasive affordable disease detection offers significant opportunities to impact the cognitive decline trajectory. This paper presents findings of data gathered from 75 participants in a 2025 SCGH/Osborne Park Hospital Memory Clinic trial on Eye Biomarkers for early dementia Detection showing a >90% accuracy of distinguishing individuals with early cognitive impairment compared to healthy control. Ethics approval was granted by NMHS, and the trial conducted in partnership with Professor Yogesan, UND and data analysis with Gen AI inputs provided by Akkodis. Early detection enables 14 key interventions of Detection, Innovation and Community-Based Care .



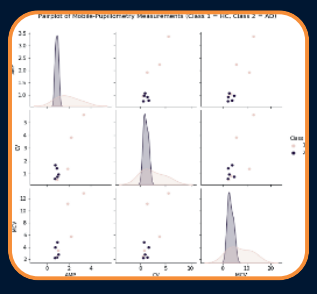
- **Revolutionary AI-based Ocular Biomarker Analysis**: Uses mobile phone cameras and AI to detect subtle changes in the eye linked to Alzheimer's
- **Non-Invasive, Cost-Effective, and Scalable**: Enables widespread screening in primary & community care settings.
- **Early Detection for Better Outcomes**: Identifies at-risk individuals before clinical symptoms appear, allowing early intervention, risk factor modification.
- **Use of Gen AI** :Generating bespoke personalised Risk Assessment and Preventative health plans
- **Multisite validation** planned for advanced AI refinement for detecting subtle neurological Micro dynamic signals captured with a smartphone.



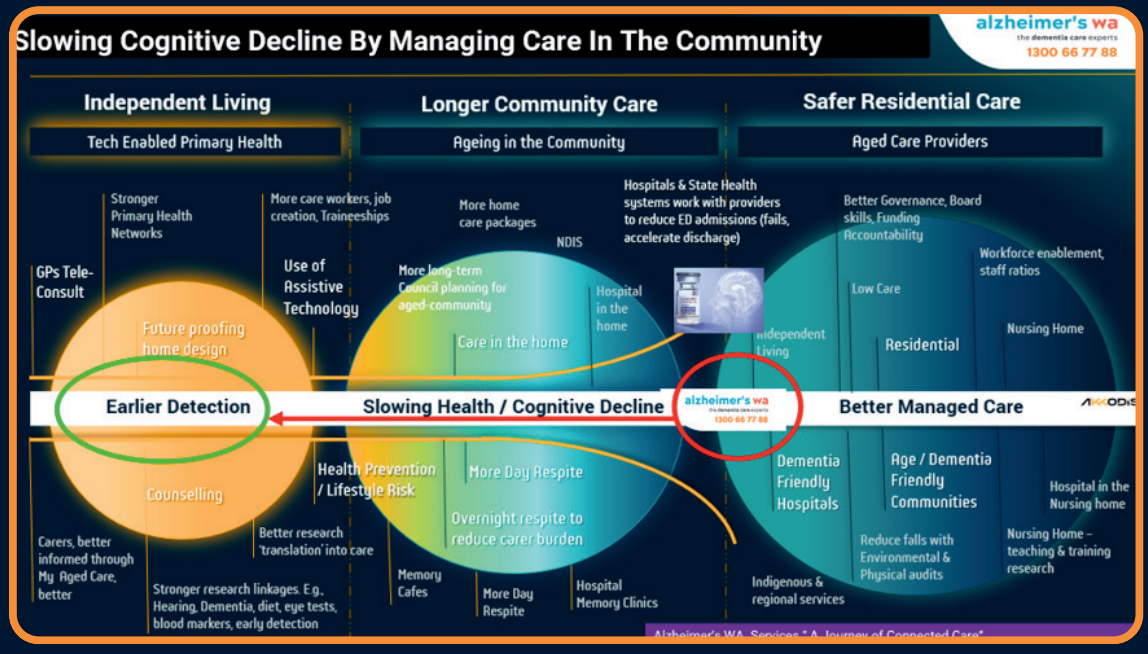
Ocular Parameters obtained using a smartphone app.



Front of the eye measurements from Healthy Control (HC) and Alzheimer's (AD) participant



Ocular parameters obtained using Healthy Control and Alzheimer's participants



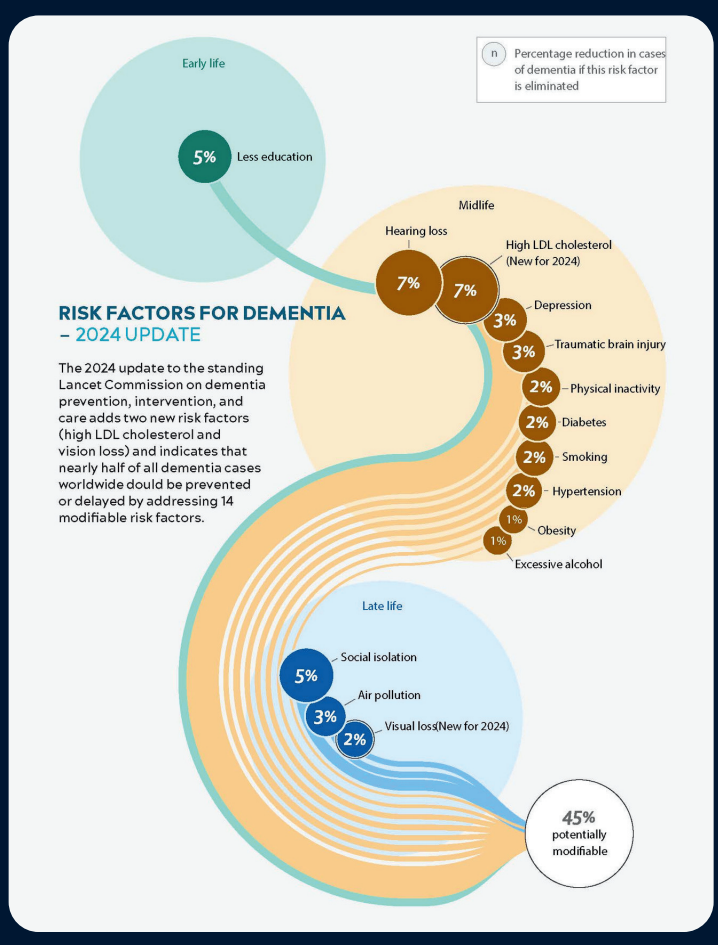
Early Detection Care Intervention

1. Early detection - (including Blood Biomarkers, Cerebrospinal Fluid, Gen AI for Eye Detection/ Pupil Light Response for Dementia mapped against amyloid PET/MRI, Retinal Imaging)
2. Early intervention on Lancet Commission 12 modifiable lifestyle risk factors
3. Better Post-diagnostic support/Care navigation.
4. Innovation and assistive technology - (telemetry 5G GPS location monitoring),
5. Clinical workforce dementia training & leadership
6. Capacity building and accredited training
7. International skills attraction
8. Primary care and GP engagement
9. Building dementia-friendly communities
10. Memory Cafes and Social Engagement
11. Carer support groups
12. Day and overnight respite
13. Home Care /Support at Home Services
14. Education for family and unpaid carers

Conclusion

Lifestyle Risk Factors Intervention

Pre-clinical, non-invasive and accessible early detection offers an opportunity to change the cognitive decline trajectory by addressing the Lancet Commission's 14 Lifestyle Risk Factors and enable 14 key post-diagnostic care interventions which align with the Western Australia State Dementia action plan 2026 and the National Dementia Action Plan 2023-33.



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