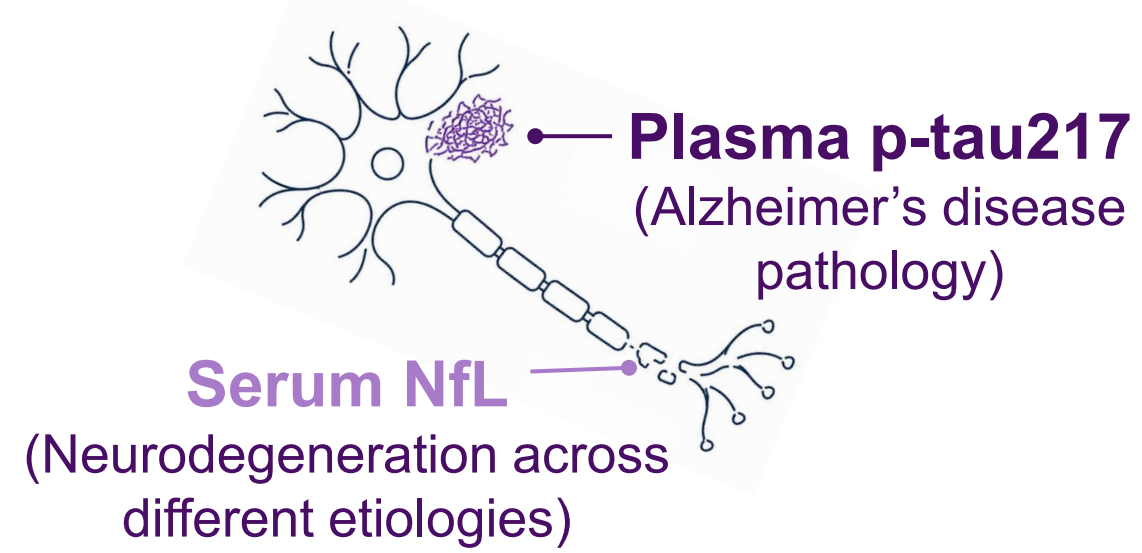
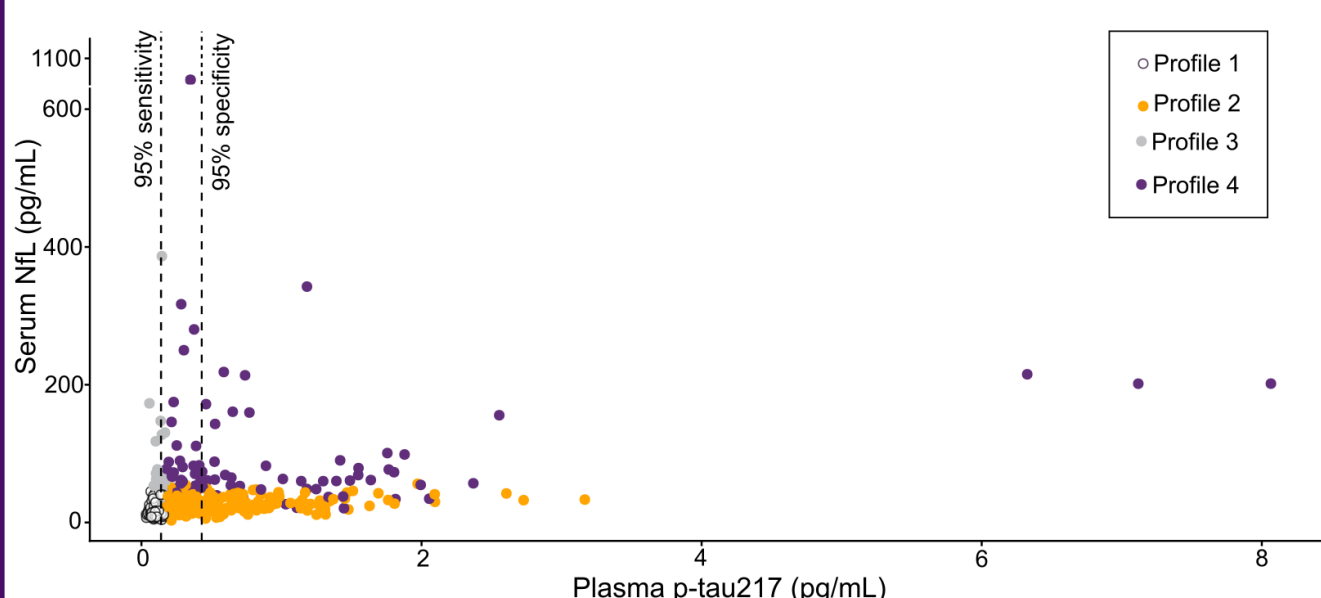
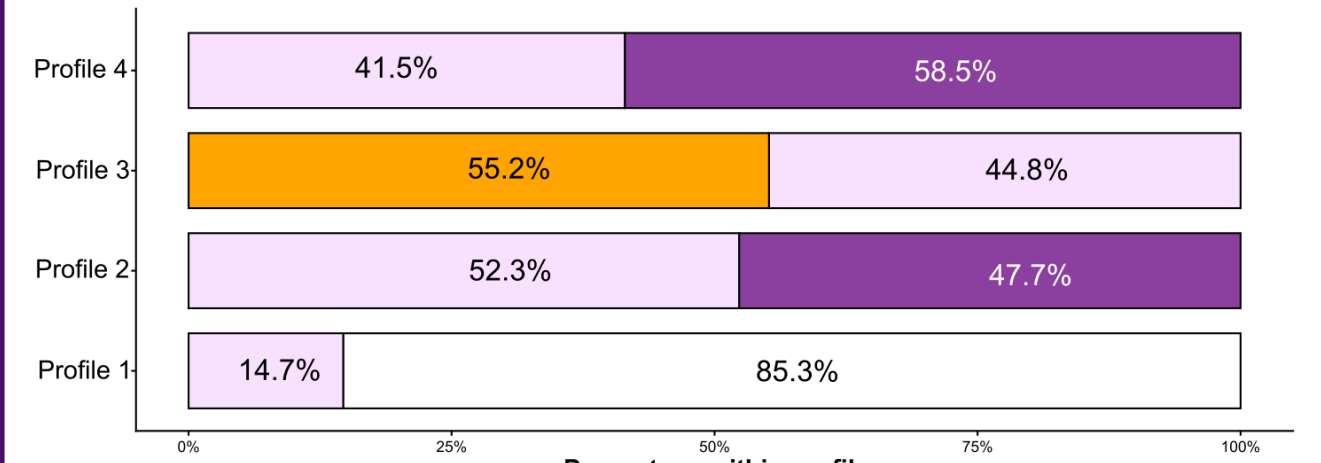


A Digital Decision-Support Tool Integrating Blood-based Biomarkers for Triage in Patients with Cognitive Complaints

Anuschka Silva-Spínola, PhD¹; Mariana Coelho, MD²; Pedro Faustino, MD^{1,2,3}; Miguel Tábuas-Pereira, MD^{1,2,3}; João Durães, MD^{1,2,3}; Marisa Lima, PhD^{1,2}; Joel Arrais, PhD⁴; Isabel Santana, MD PhD^{1,2,3}; Inês Baldeiras, PhD^{1,3}.

¹Center for Innovative Biomedicine and Biotechnology, University of Coimbra; ²Neurology Department, Unidade Local de Saúde de Coimbra; ³Faculty of Medicine, University of Coimbra; ⁴Centre for Informatics and Systems, Department of Informatics Engineering, University of Coimbra.

! The digital integration of **combined p-tau217 and NfL** transformed blood-based biomarker results into **actionable clinical pathways**, facilitating the **early** differentiation of AD-related and non-AD cognitive disorders while **preserving specialist resources** for higher-risk patients.

INTRODUCTION	METHODS	RESULTS	CONCLUSIONS	REFERENCES																														
Blood-based biomarkers (BBM) are transforming dementia assessment.  Translation of biomarker results into clinical decisions remains challenging in routine neurology practice. OBJECTIVE: To evaluate a digital triage tool integrating plasma p-tau217, age-adjusted NfL, and AD risk estimation to support clinical routing and prioritization of confirmatory testing in patients with cognitive complaints.	 817 BBM requests (2025) ↓  658 patients with p-tau217 + NfL Mean age 70.8 ± 9.4 years 60% female ↓  Digital triage tool Module 1: BBM Interpretation COMBINED BBM STRATIFICATION¹ <table><tr><th></th><th>Normal NfL³</th><th>Abnormal NfL</th></tr><tr><td>Normal p-tau217²</td><td>Profile 1</td><td>Profile 3</td></tr><tr><td>Abnormal p-tau217</td><td>Profile 2</td><td>Profile 4</td></tr></table> ▪ Profile 1: Low AD likelihood. ▪ Profile 2: AD-pathway biology. ▪ Profile 3: Non-AD neurodegeneration. ▪ Profile 4: Mixed/advanced neurodegeneration. AD RISK ESTIMATION Logistic regression model: Plasma p-tau217 + Age ↓ Probability of AD pathology  Rule-out  Intermediate  Rule-in		Normal NfL ³	Abnormal NfL	Normal p-tau217 ²	Profile 1	Profile 3	Abnormal p-tau217	Profile 2	Profile 4	COMBINED BBM STRATIFICATION <table><tr><th></th><th>Normal NfL</th><th>Abnormal NfL</th></tr><tr><td>Normal p-tau217</td><td>266</td><td>29</td></tr><tr><td>Abnormal p-tau217</td><td>281</td><td>82</td></tr></table>  AD RISK ESTIMATION <table><tr><th>Plasma p-tau217</th><th>n</th><th>%</th></tr><tr><td>Clearly negative</td><td>243</td><td>36.9</td></tr><tr><td>Intermediate/gray zone</td><td>234</td><td>35.6</td></tr><tr><td>Clearly positive</td><td>181</td><td>27.5</td></tr></table> Probability of AD pathology  34.4%  39.8%  25.8% CLINICAL RECOMMENDATION  Recommendation action: ☐ Clinical monitoring ☐ Perform MRI & Neuropsychological evaluation ☐ Perform confirmatory CSF or Amyloid-PET ☐ Confirm AD & Start dementia-specific management		Normal NfL	Abnormal NfL	Normal p-tau217	266	29	Abnormal p-tau217	281	82	Plasma p-tau217	n	%	Clearly negative	243	36.9	Intermediate/gray zone	234	35.6	Clearly positive	181	27.5	A digital triage tool integrating plasma p-tau217, age-adjusted NfL, and regression-based risk estimation supported structured evaluation of patients with cognitive complaints in routine neurology care. By applying high-confidence rule-out or rule-in classification in ~60% of patients, this approach supports efficient clinical routing and resource management in everyday practice.  “BIO-Mind: Biomarker-based Predictive Tool for Early Alzheimer’s Diagnosis in Clinical Practice” was awarded the UC Innovation Projects Competition by ULS Coimbra on December 19, 2024, recognizing its innovation potential and clinical applicability. The intellectual property and ownership of BIO-Mind remain with the authors (AS-S, IS, IB, JPA) and their affiliated institutions (UC).	¹Rousset RZ, et al. <i>Alzheimers Dement (Amst)</i>. 2024; ²Silva-Spínola A, et al. <i>Sci. Rep.</i> 2026; ³Spínola A, et al. <i>Sinapse</i>. 2026. CUTOFFS Plasma p-tau217 study REFERENCE VALUES Serum NfL study
	Normal NfL ³	Abnormal NfL																																
Normal p-tau217 ²	Profile 1	Profile 3																																
Abnormal p-tau217	Profile 2	Profile 4																																
	Normal NfL	Abnormal NfL																																
Normal p-tau217	266	29																																
Abnormal p-tau217	281	82																																
Plasma p-tau217	n	%																																
Clearly negative	243	36.9																																
Intermediate/gray zone	234	35.6																																
Clearly positive	181	27.5																																
				CONTACT  Anuschka Silva-Spínola Assistant Researcher, Ph.D. Center for Innovative Biomedicine and Biotechnology (CiBB) University of Coimbra, Portugal ✉: uc49254@uc.pt ISTAART member n.º 100019693209 																														