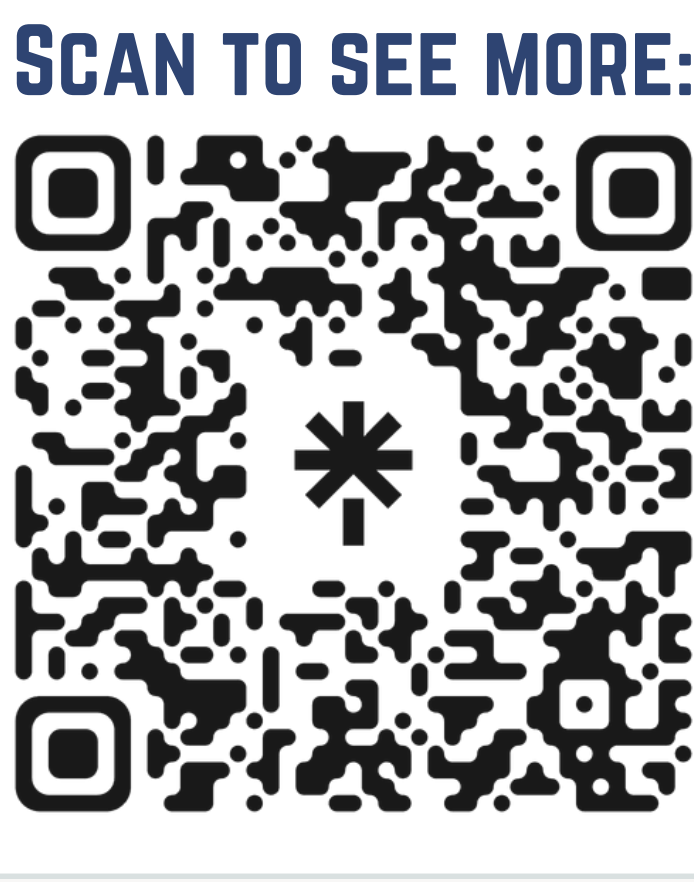


COGVis: VISUALISING ALZHEIMER'S DATA

Nellia Kornilova, Robert S. Laramee, Beili Shao



1. Cohorts Overview

2. Cohort Filtering and Selection

3. Details-on-Demand

PROBLEM

ADNI is a rich longitudinal Alzheimer's Disease research dataset, but its raw tables are **difficult to interpret** [1,2]. Clinicians, researchers, and AI developers need clearer ways to explore disease progression patterns.

AIM

To make **ADNI data easier to explore** by combining cohort overview, interactive filtering, patient-level detail, and accessible visual explanation in one prototype platform.

METHOD

CogVis is being developed iteratively with a neurologist, using PPIE feedback and visual analytics principles [3]. Data is cleaned and transformed with Python (FastAPI), then visualised in React using treemaps (Fig. 2), longitudinal heatmaps (Fig. 3), patient-level summaries [4], filters, tooltips, and exportable views (Fig. 1).

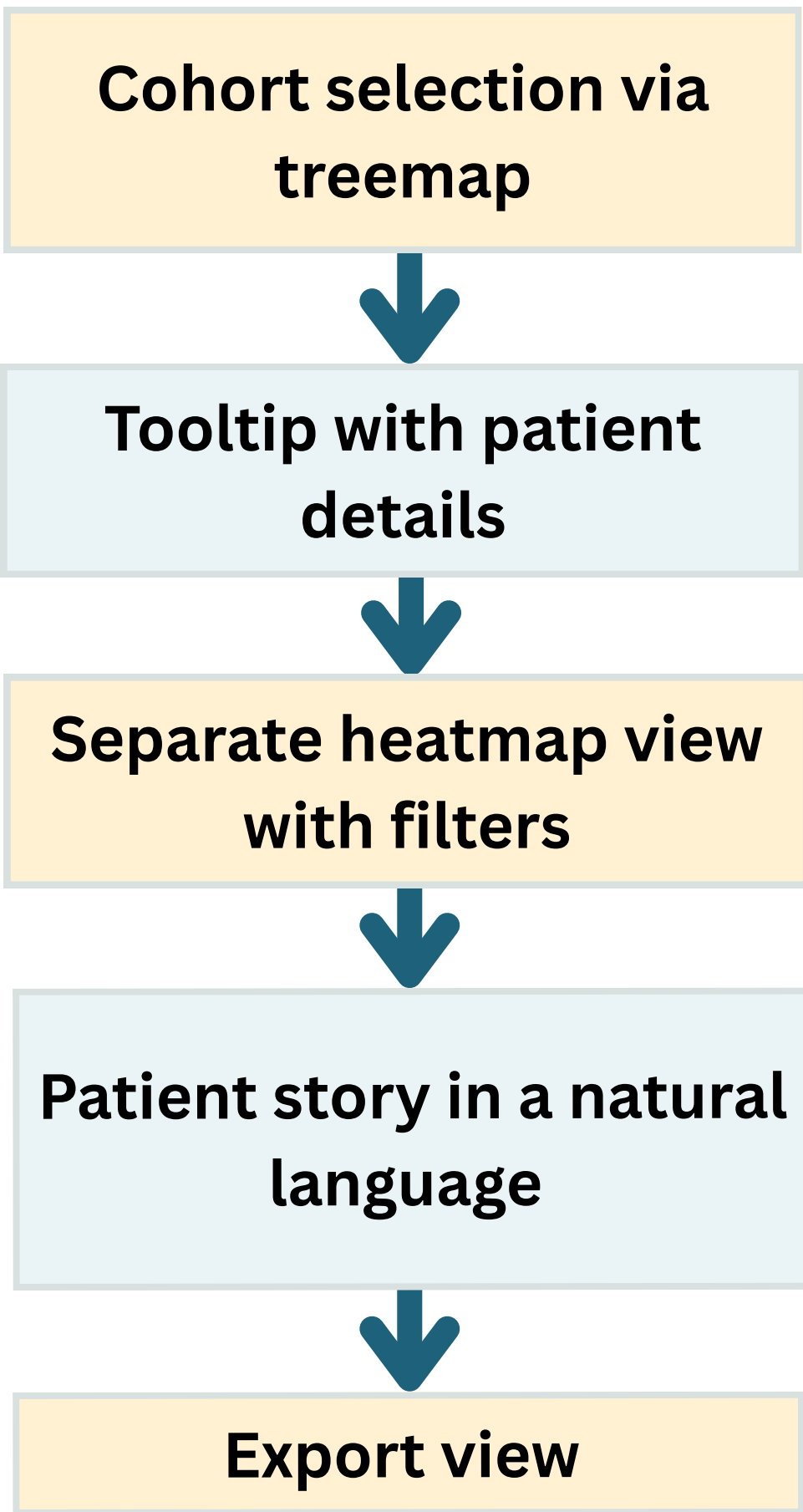


Fig.1 User flow

RESEARCH VALUE

Clinical Value

CogVis helps clinicians see how dementia-related markers change over time within a broader cohort context (Fig. 4).

Research Value

The platform exposes data completeness, subgroup distributions, and progression patterns, helping researchers identify which variables and cohorts are suitable for further analysis.

AI Explainability Value

CogVis can support future explainable AI work by placing model predictions next to the underlying patient trajectory and comparable cohort context, making predictions easier to question and interpret.

PLATFORM DESIGN

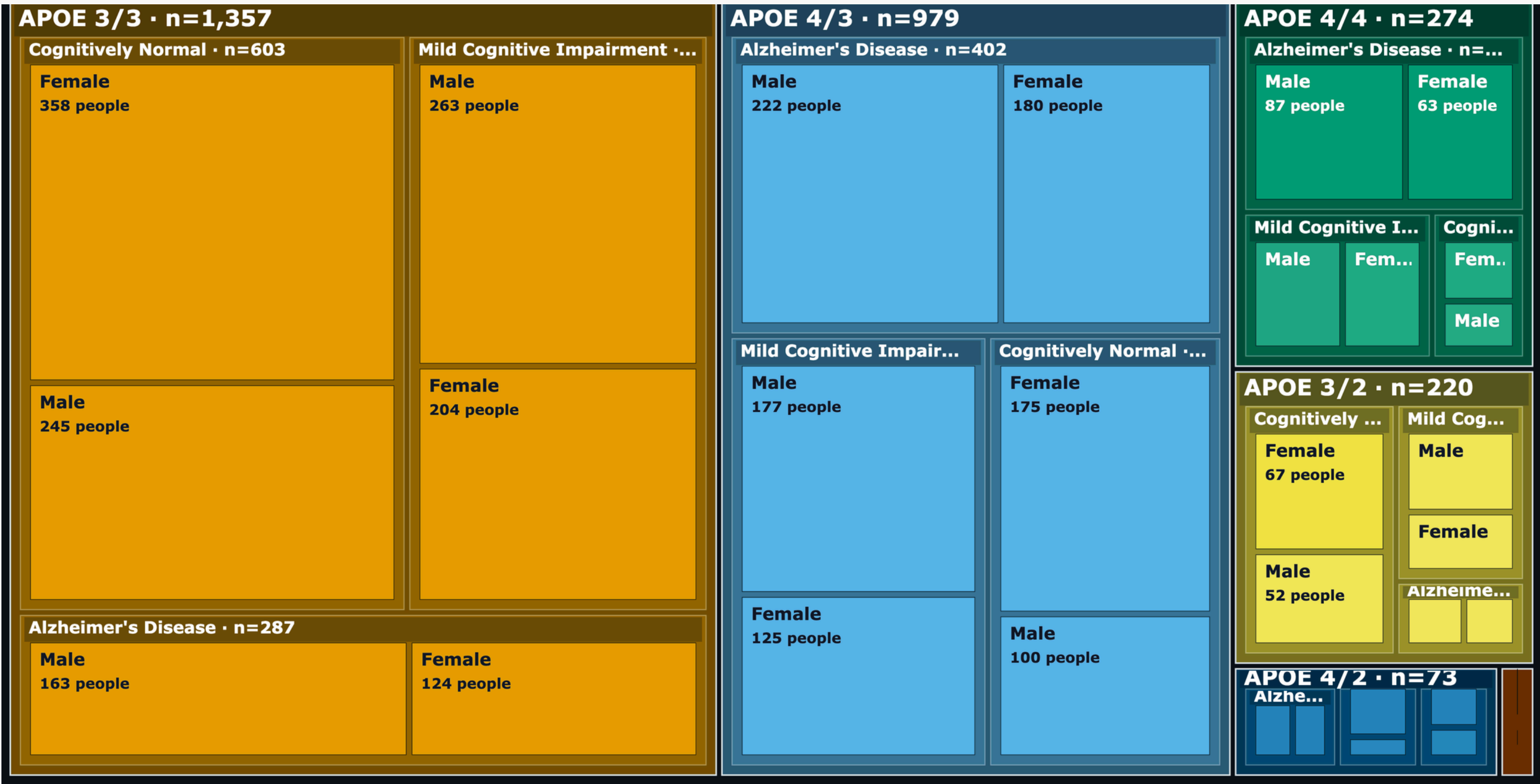
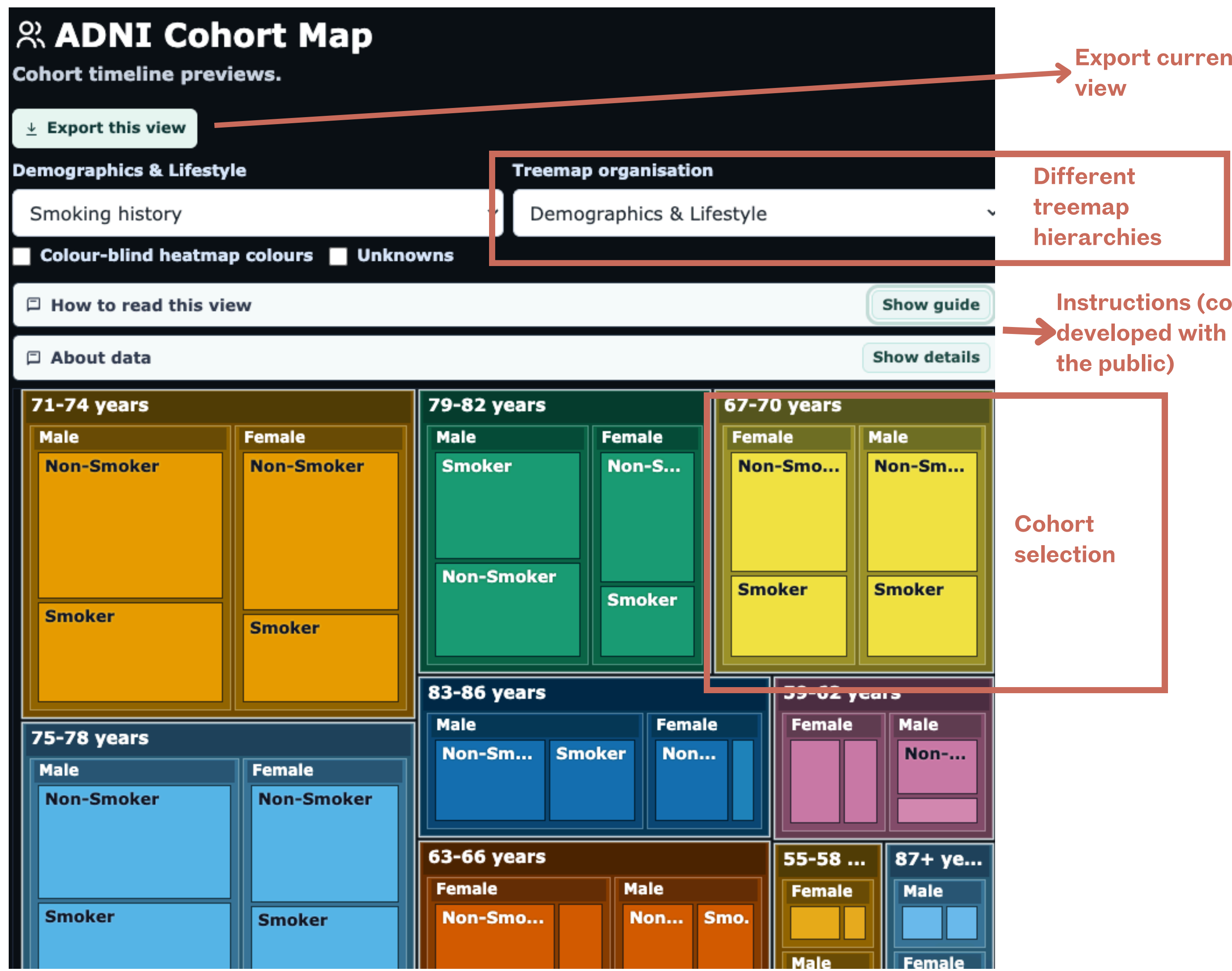


Fig.2 Treemap prototype: cohorts overview; hierarchy: APOE genotype → diagnosis → gender

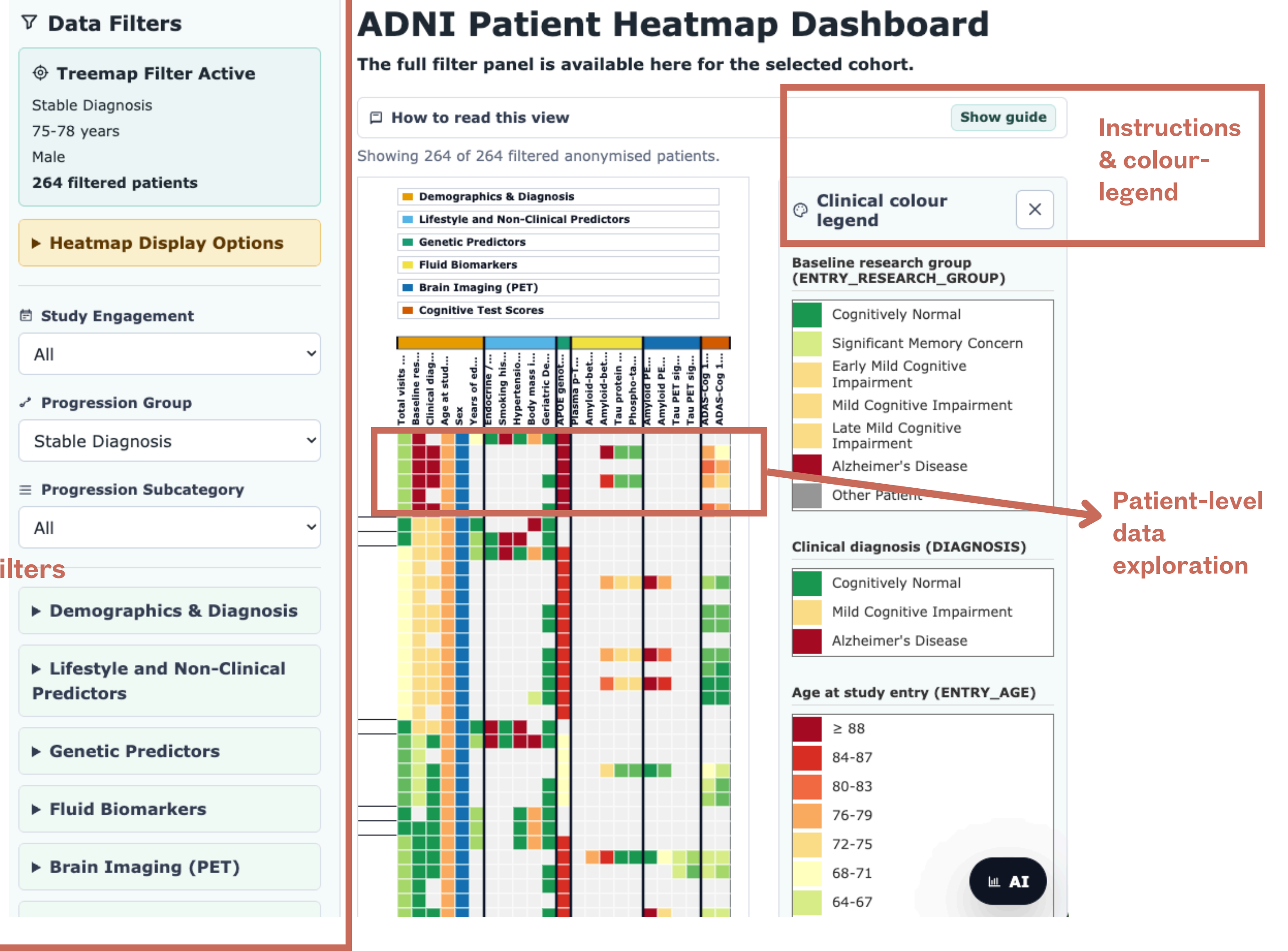


Fig. 4 CogVis platform screenshots: treemap and heatmap views

CONCLUSION & FUTURE WORK

CogVis demonstrates how complex Alzheimer's Disease datasets can be made more accessible through interactive visualisation. Future work will evaluate usability with domain experts, refine public-facing explanations, experiment with other dementia datasets and explore integration with ML models.

SOURCES

[1] Chu, N. N., & Gebre-Amlak, H. (2021). Navigating Neuroimaging Datasets: ADNI for Alzheimer's Disease. IEEE Consumer Electronics Magazine. [4] Owen, R., & Roberts, J. C. (2025). Embedding Empathy into Visual Analytics: A Framework for Person-Centred Dementia Care.

[2] Weiner, M. W., et al. (2025). Overview of the Alzheimer's Disease Neuroimaging Initiative.

[3] Shneiderman, B. (1996). The Eyes Have It. IEEE Symposium on Visual Languages.