

# From Research to Clinical Practice: Expert Consensus for Neuroimaging AI Tools for the Memory Clinic (Neuro-AIM)

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## Timely and accurate diagnosis is crucial for dementia care

- Neurodegeneration affects the brain years prior to symptom onset
- Therapies are most effective when administered early

## Challenges for the memory clinic

- Diagnosis remains costly and complex, with long waiting times
- Advent of disease-modifying therapies could overwhelm memory clinics

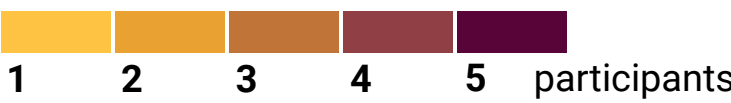
## The promise of AI neuroimaging

- Neuroimaging is routinely used in diagnosis
- Large and growing body of research on AI tools for diagnosis & prognosis
- Shared enthusiasm from both clinicians and patients for its application

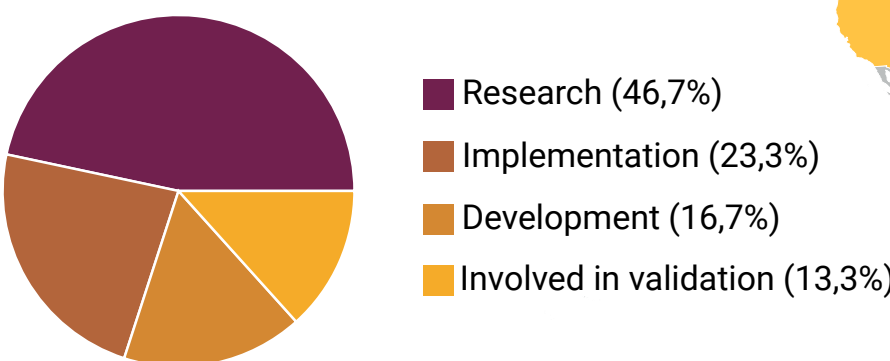
## Adoption of AI neuroimaging tools remains limited

- Lack of specific guidelines addressing the goals, usage and challenges of AI tools for neuroimaging in memory clinics

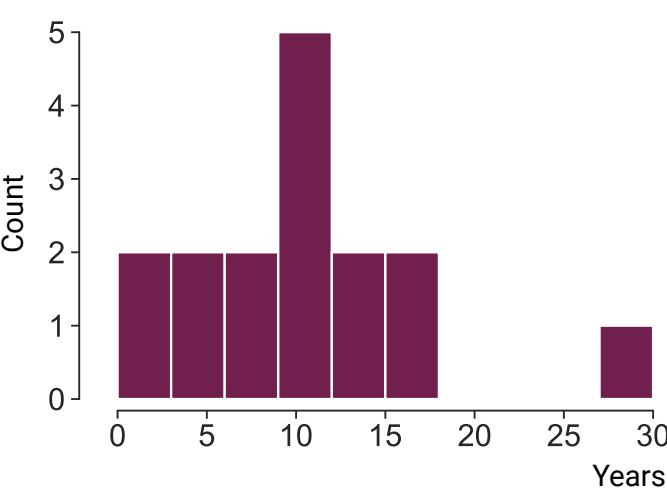
## Delphi expert panel



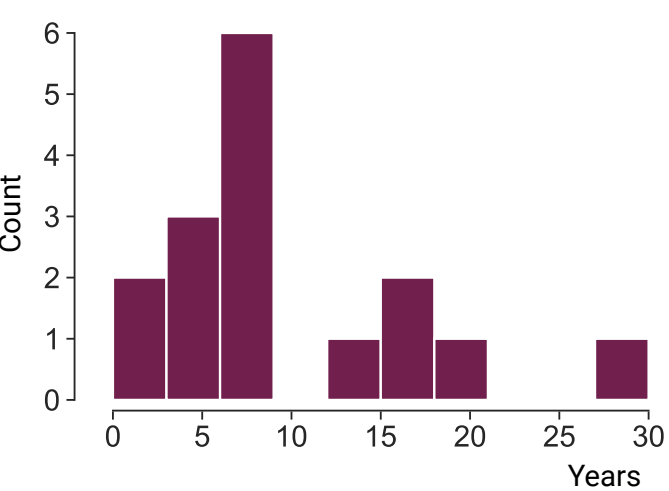
### Relationship with AI



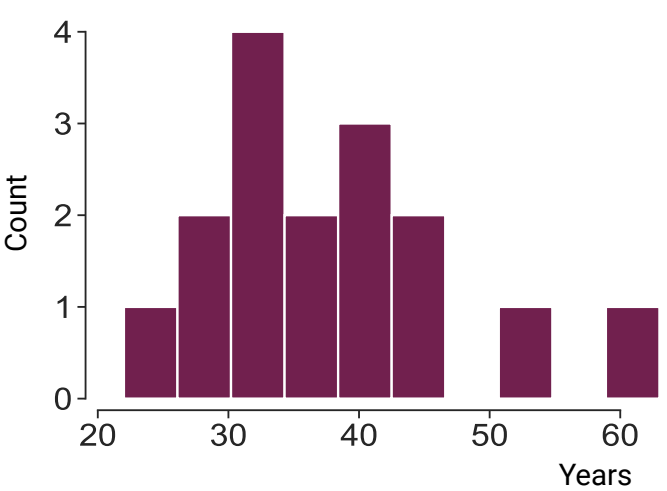
### Experience with dementia



### Experience with AI



### Age



## Purpose of AI tools for neuroimaging in the memory clinic:

## Barriers to realizing purpose:

- Diagnosis and prognosis of neurodegenerative disease
- Extracting reliable standardized metrics & personalized medicine
- Improving logistics (e.g. workload)

- Performance: generalizability to real-world clinical data
- Lack of differentiation between diseases; workflow issues; lack of transparency and trust
- Lack of uniformity in evaluation metrics

## Criteria for training and validation datasets:

- Independent, diverse, and representative datasets (different cohorts)
- High quality and large datasets
- Accurate and reliable ground truth; rich and comprehensive (e.g. include cognitive info and cognitive testing)

## Statistical evaluation metrics:

- Sensitivity, specificity and Area Under the Curve (AUC)
- Positive and negative predictive value (PPV - NPV)
- Accuracy

## Further training needed for clinicians:

- Limitations and intended use; interpretation of model output
- Error handling
- Theory and working principles

## Impact on hospitals and healthcare organisations:

- Fostering trust among clinicians
- Updating the computational infrastructure
- Adhering to a socio-economic framework

## PRIVACY & ETHICS

### Privacy considerations

- Sharing patient data
- Data leakage and attacks
- Re-identification from training dataset
- Long term data storage

### Ethical considerations

- Lack of proven added value; cost of misclassification
- Lack of uncertainty estimates
- Lack of explainability
- Socio-economic cost

## Expert consensus

Our eight consensus statements provide comprehensive, stakeholder-informed guidance for the development and implementation of AI neuroimaging tools in memory clinics. By addressing key ethical, privacy, quality, and practical considerations, these recommendations can accelerate the translation of AI research into robust, trustworthy clinical tools that deliver meaningful benefits for patients.

## Working group

### Expert panel of 16 voting members:

- Clinicians in neurology, neuroradiology, and old age psychiatry (n=6)
- Academic researchers in neurology and AI neuroimaging (n=6)
- Industry representatives in AI neuroimaging (n=4)

### External committee of 2 non-voting members

- Draft questionnaires, analyze responses and provide controlled feedback

**Brainstorm meeting** prior to Delphi process to discuss topics of interest for questionnaire with support from a Patient and Public Involvement Representative

## Delphi process

### Round 1: Mapping priorities and challenges

16x

**Collate and analyze responses**  
common themes proceed to second round

### Round 2: Ranking priorities

14x

**Controlled feedback**  
as group-averaged priority ranking

### Round 3: Reaching consensus

14x

**Predefined agreement threshold**  
>70%: strong agreement; 50-69%: moderate

Preprint available at:

