

# IHI Call Days | Call 12

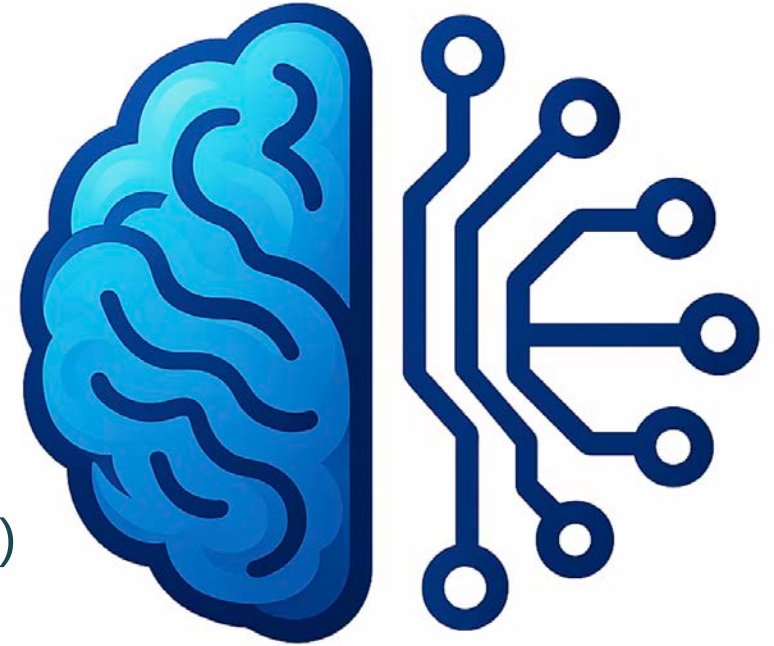
## NeuroPharm-AI

Jan-Marc Verlinden, founder

MEDrecord [www.medrecord.io](http://www.medrecord.io)

HealthTalk [www.healthtalk.ai](http://www.healthtalk.ai)

Coachi <https://cms.coachi.club> (launching)



made with ♥ at

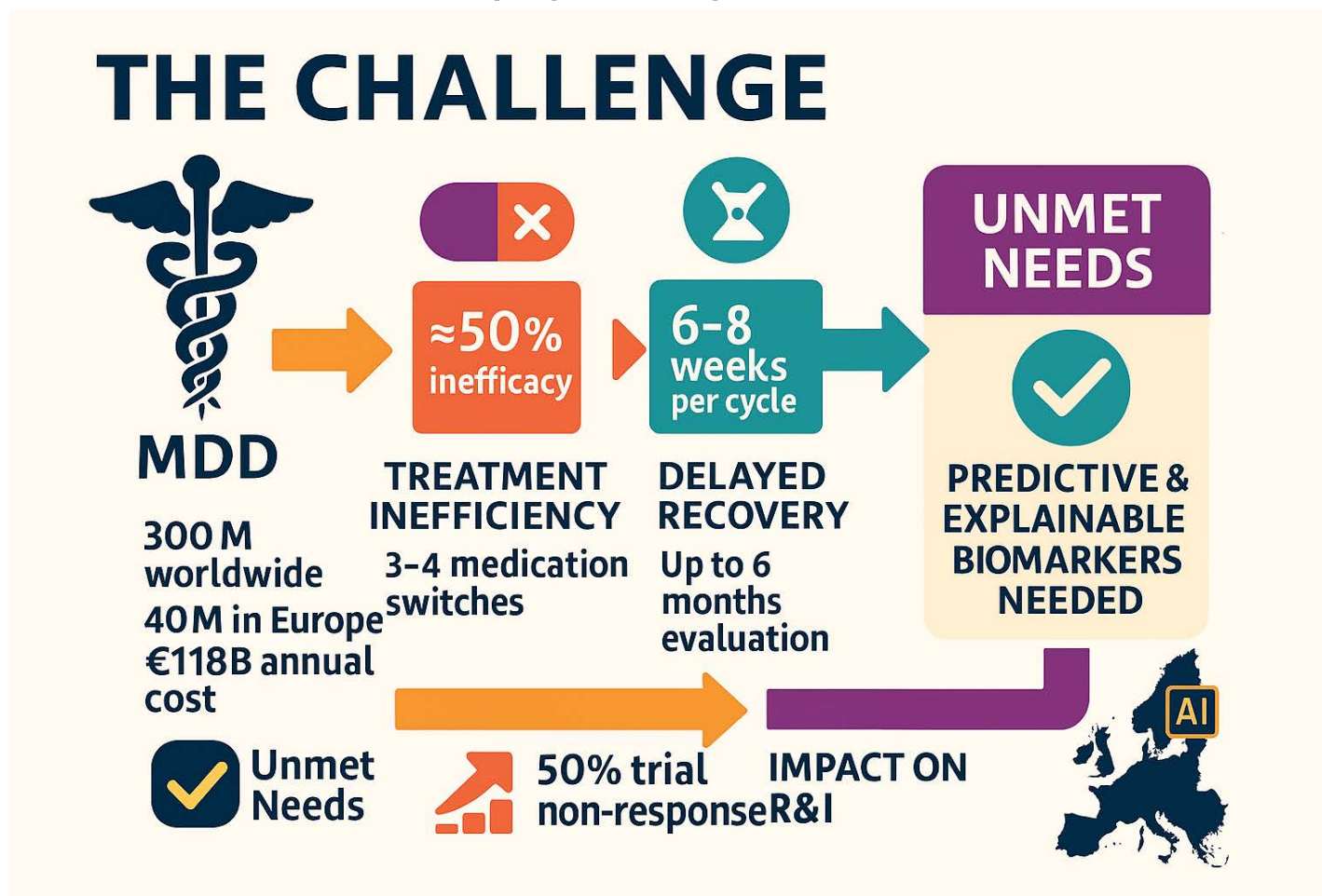


**MEDrecord**  
*eHealth platform as a Service*

**ihi** innovative  
health  
initiative

# Challenges and objectives

*In Europe, around **40 million people** live with depression, but 60 % fail to benefit from their first antidepressant—highlighting an urgent need for predictive, AI-enabled biomarkers to replace trial-and-error psychiatry.*



# From trial-and-error to precision care in depression treatment

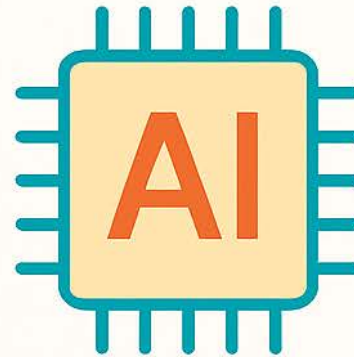
Predict antidepressant response within one week using  
MRI, EEG and AI.



**MRI**



**EEG**



**AI**

Built on proven translational neuroscience from Amsterdam UMC

**A European framework for personalised psychiatry  
and smarter CNS drug trials**

# Prof. Liesbeth Reneman, MD PhD

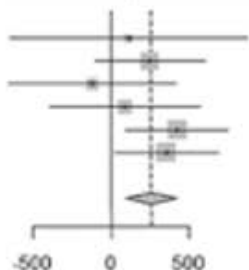
## Professor of Translational Neuroradiology at Amsterdam UMC

Key peer-reviewed contributions include:

- Prediction of antidepressant response: multimodal MRI + clinical RCT data predicting sertraline response with 68 % balanced accuracy (AUROC 0.73) in a randomized trial of 229 patients (Am J Psychiatry, 2024) [10]; far better than current clinical practice
- ENIGMA-MDD mega-analysis: cortical-structure predictors of antidepressant outcome (Hum Brain Mapp, 2025);
- Pioneering Psychoradiology for drug effects & precision psychiatry: imaging biomarkers of serotonergic and dopaminergic systems (Neuroimaging Clin N Am, 2020; J Psychopharmacol, 2023; keynote lecture ISMRM 2019, Inaugural lecture 2017)
- Methylphenidate RCTs: age-dependent effects on the human dopaminergic system (JAMA Psychiatry, 2016; Radiology, 2019);
- MDMA neurotoxicity: pioneering work on serotonin-system damage (Lancet, 2001).

### Structural MRI:

Hippocampal volume predicts response to antidepressants

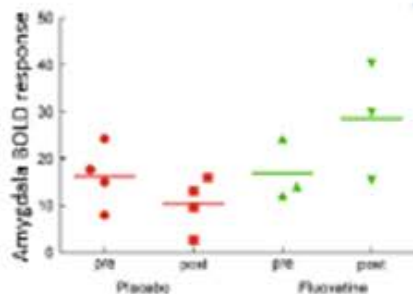


Meta-analysis by Colle et al., 2016 (22)

### Functional (f)MRI:

Amygdala reactivity following SSRI treatment is negatively associated with outcome (pilot data Reneman group)

| Subject No. | Treatment  | CGI change 19 weeks |
|-------------|------------|---------------------|
| 1           | Placebo    | 3                   |
| 2           | Placebo    | 4                   |
| 3           | Placebo    | 3                   |
| 4           | Placebo    | 2                   |
| 5           | Fluoxetine | 2                   |
| 6           | Fluoxetine | 4                   |
| 7           | Fluoxetine | 6                   |



Bottelier et al., 2016 (21)

### Diffusion tensor imaging:

Fractional anisotropy values predict nonremission after antidepressant treatment.

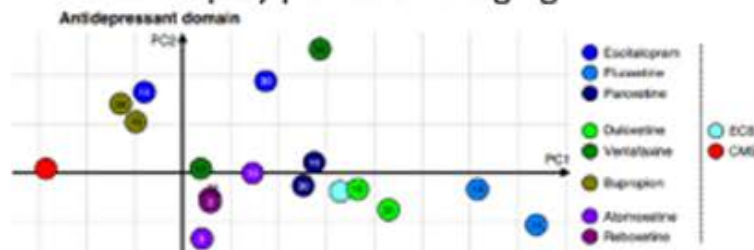
This study has identified a DTI biomarker, the ratio of FA of the stria terminalis to the FA of the CgC, which reliably identifies with a high degree of certainty (83%–88%) who will not remit acutely with at least 1 of the 3 most common ADMs

Grieve et al., 2016 (23)

With a **multivariate radiomics** approach we expect to rapidly assess efficacy with much higher reliability, than any studies looking at single features so far. Multivariate, quantifiable MRI data and clinical data are integrated using **deep learning** to develop a reliable prediction model.

### Perfusion imaging:

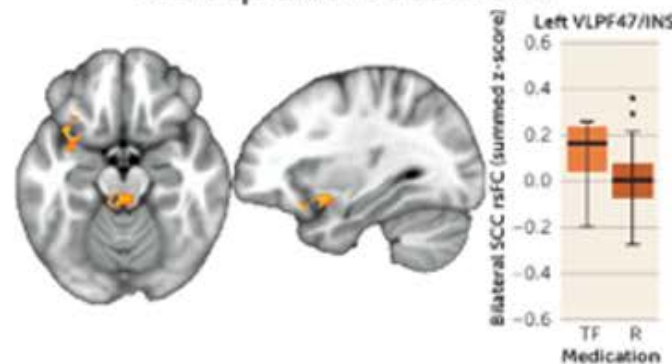
Each antidepressant has specific effects on brain perfusion, that can be picked up by perfusion imaging.



Bruns et al., 2015 (20)

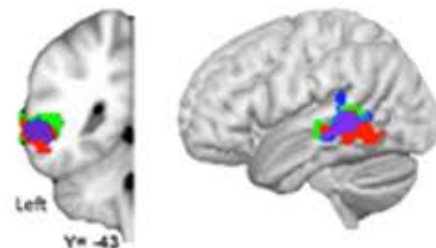
### Resting-state fMRI:

Functional connectivity in the subcallosal cingulate cortex is predictive of response to antidepressant treatment.



Dunlop et al., 2017 (17)

Resting state connectivity patterns are predictive of response to psychotherapy in depression patients.



Crowther et al., 2015 (19)

# Cross-Sector Collaboration



Multimodal Data  
& Explainable AI



Lifestyle  
& Adherence  
Support

Listetyle & Adherence



Validate MRI Biomarkers  
Predicting SSRI Response



MRI



Secure  
EU Data  
Platform



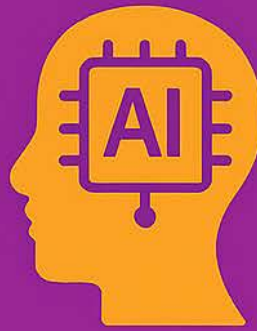
Real-World  
Impact

✓ Patients  
✓ Industry · Society

# Expected Results and Impacts



**Validated  
Biomarkers**  
Early  
Antidepressant  
Response



**Explainable AI**  
Precision Psychiatry &  
CNS Trials

**EU Data  
Platform**



GDPR/MDR/  
EHDS



**Cost-Effectiveness  
& Adherence**

**Accelerated  
Translation**



**From Research  
to Routine Care**



**Targeted Therapy  
Impact**

# Stakeholder Benefits

## Stakeholder

## Expected Benefit



Patients

Early access; improved adherence; fewer relapses



Clinicians

Objective decision support



Pharma / Med-tech

Early responder identification



Health systems

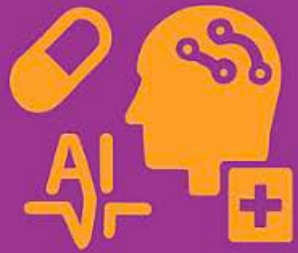
Cost savings; shorter cycles



Europe

Advances integration of AI, imaging

NeuroPharm-AI addresses fragmentation of mental-health R&I by uniting pharma, imaging, AI and clinical partners within a single European framework. It delivers on IHI SO2 by:



**Integrating  
diverse health  
industry sectors**  
to develop predictive,



**Bridging research  
and practice**  
through demonstration  
pilots in routine care



**Enhancing  
digitalisation  
and data exchange**  
aligned with the EHDS



**Advancing  
regulatory science  
and HTA readiness**  
for AI-based biomarkers

**Supporting cross-sector pre-competitive  
collaboration that benefits patients, industry and society**

# Expertise and resources

- We will be the coordinator:
  - **Scientific coordinator:** Prof. Liesbeth Reneman Amsterdam UMC – leading expertise in neuroimaging and AI-based biomarkers for antidepressant response.
  - **Digital health infrastructure:** MEDrecord BV – ISO/IEC 27001-certified eHealth platform with integrated AI, HL7 FHIR interoperability, and patient engagement tools.
- We are looking for:
  - **Pharmaceutical partners** for pre-competitive validation of predictive biomarkers and stratified CNS drug trials.
  - **Med-tech or imaging companies** with hardware or contrast-agent innovation to expand low-field MRI applications.
  - **Clinical sites & mental-health networks** for European demonstration pilots on remission, adherence, and cost-effectiveness.

Note that we have 11 running EU projects and coordinate 4, but we are rather new in IHI.

# Contact information

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