QYPREDICT®:
Added value to patient selection strategies and statistical analysis in Alzheimer's disease clinical trials

QYNAPSE

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Background

Many patients enrolled in CTs for AD do not progress clinically over the study, reducing detection of positive treatment effects

The suboptimal selection of patients has been a key contributor to the high failure rate of disease-modifying trials for AD

AI approaches, such as Qypredict®, are promising tools to improve the selection of patient populations more likely to clinically progress during the timeframe of AD CTs.

Objectives

1) To evaluate the benefit of using QyPredict® to refine patient selection in terms of success probability (**Implementation 1**).

2) To assess the influence of the inclusion of a predictive score (such as QyPredict®) into statistical analysis on trial success probability (**Implementation 2**).

QYPREDICT® and clinical trials simulation

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Inputs:

- Demographic data
- Clinical and Cognitive data at baseline
- QYSCORE® T1 structural volumetric markers
- APOE4 and Aβ status

QYPREDICT®

Multiple feature engineering and machine learning models

Output:

Probability score (between 0-1) of CDR-SOB increasing within 12 months

Usage 1:
QYPREDICT® incorporated into the inclusion criteria at screening

Original database
ADNI
1987 patients

Inclusion criteria

- Age: [55-85]
- MMSE: [24-30]
- CDR: 0.5
- Amyloid positive
- QYPREDICT®

Eligible patients
547 patients

1000 simulations

Bootstrap with replacement

Selected patients
1000 patients

Control arm
500 patients

Treatment arm
500 patients

Treatment effect
25% reduction on CDR-SOB decline

Usage 2:
QYPREDICT® included as a covariate in the statistical analysis

Statistical analysis
with QYPREDICT® used as additional covariate

→ **Success / Failure**

* CDR-SOB = Clinical Dementia Rating – Sum of Boxes
* MMSE = Mini Mental State Examination

Results

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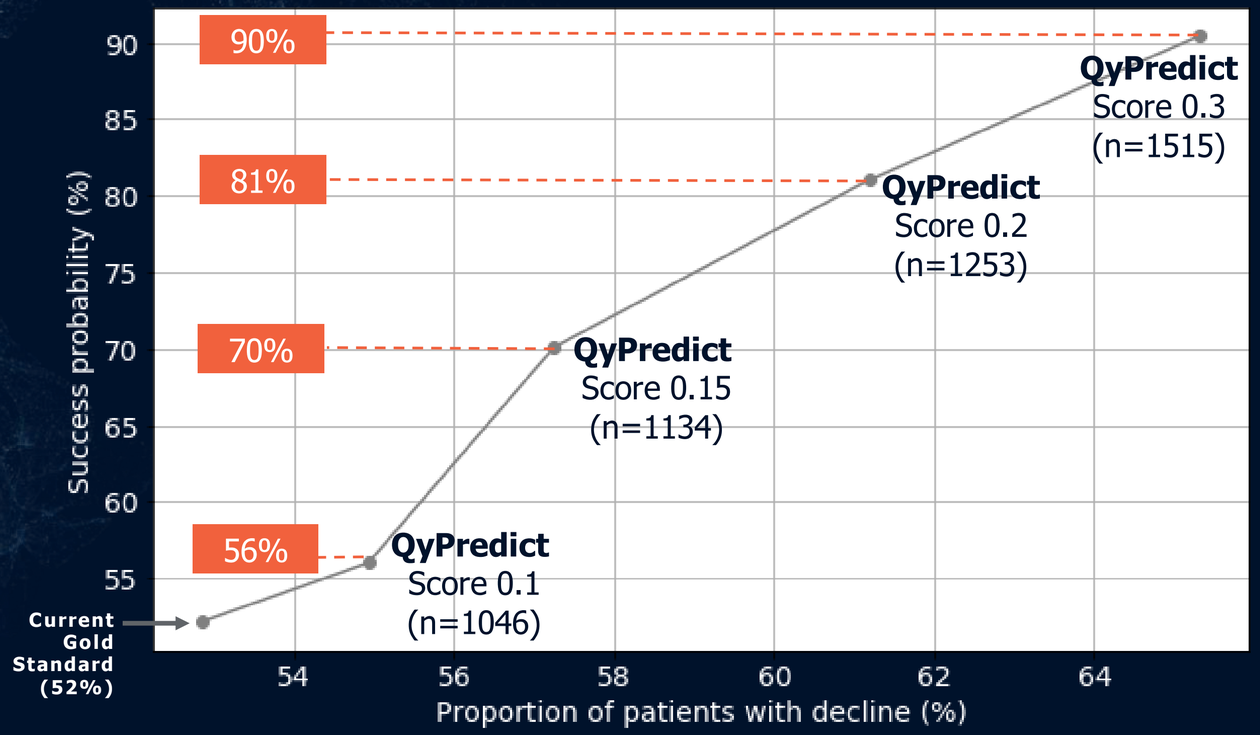
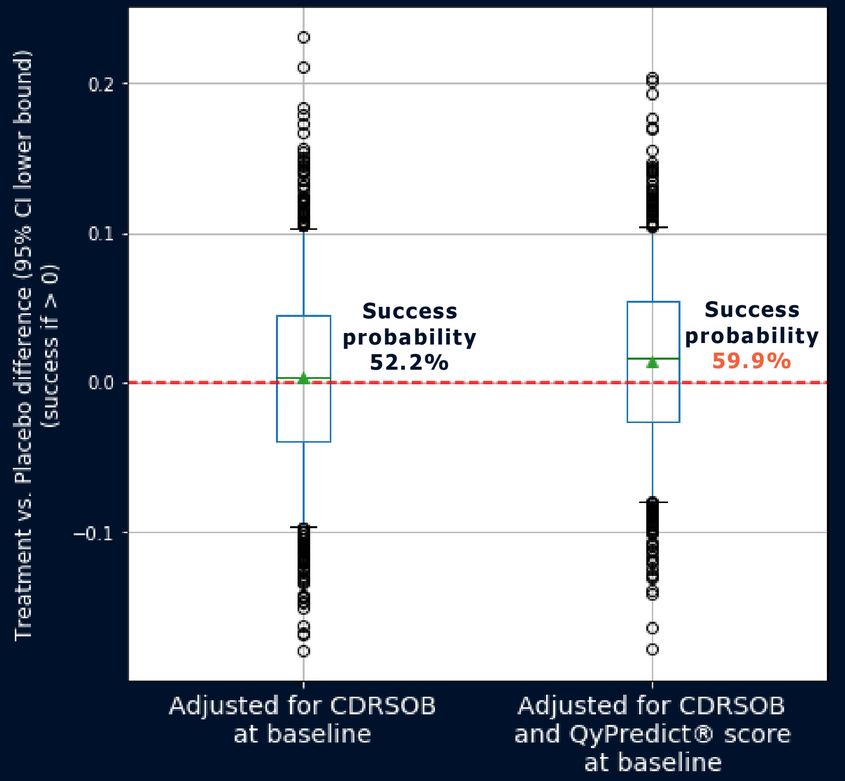
Usage 1:
QYPREDICT® incorporated into the inclusion criteria at screening



n = total patients screened to reach 1000 patients enrolment

Usage 2:
QYPREDICT® included as a covariate in the statistical analysis



Conclusions:

The use of QYPREDICT® score as part of the inclusion criteria in this CT simulation **significantly** improved the probability of trial success, while increasing screening failure rates due to excluding those who would be less likely to clinically progress.

These results support the promising potential of the combined use of QYPREDICT® to improve design and power of AD clinical trials, and the likelihood of **detecting positive treatment effects** and **achieving trial success.**