Uncovering previously unknown benefits of existing medications using large-scale analytics of observational health data sets

Real World Assessment and Research of Drugs benefits (REWARD-B)

A Technical implementation that aids the identification of unexpected benefits

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INTRO:
REWARD-B builds upon the OHDSI HADES suite of software tools to provide a comprehensive manner of performing population level estimation (PLE) at the scale of all medications by all diseases.

METHODS
• By building on the CDM it is possible to generate high quality, reproducible PLE studies across different observational health datasets.
• Self-controlled cohort study designs control for confounding by allowing individuals to act as their own controls.
• Cohorts are automatically generated from standard vocabulary concepts and can also be imported from ATLAS.
• Negative controls are selected automatically, by building on the common evidence model.
• Empirical calibration provides reliable effect estimates, adjusting for systematic bias.

RESULTS
• This software is fully open source and part of the OHDSI community’s on-going efforts to produce reproducible observational health research.
• Previous work has generated hypotheses for existing medications with protective effects against Alzheimer’s and Parkinson’s disease.

CONCLUSIONS
REWARD-B builds on top of the OMOP CDM and OHDSI software libraries to provide signal detection at scale for hypothesis generation with unexpected benefits.

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Figure 1.
REWARD-B Combines the OMOP CDM, OHDSI Analytics software, Self-controlled cohort studies and an Rshiny web application interface to report robust signal detection results for hypothesis generation.

Figure 2.
Example Forest plot shows calibrated and uncalibrated IRR values across 4 databases and meta-analysis with random effects for all patients with Bipolar disorder.

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