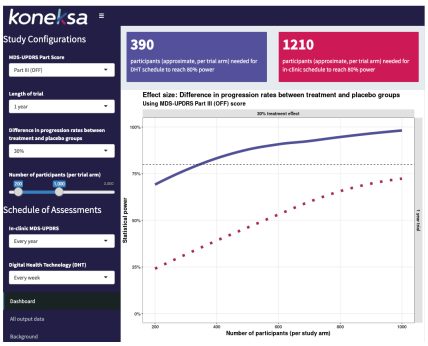
Case study

Simulator of study power for Parkinson's Disease trials

About Koneksa Health

Koneksa Health provides integrated digital health solutions for clinical drug trials, including sensitive and precise outcome measurements. Koneksa's technology, combined with study operations and data science capabilities, helps extract meaningful insights from digital signals.



The opportunity

- New Parkinson's disease (PD) therapies aim to treat motor and non-motor functions that are gradual in progression and also fluctuating.
- Neurologist-administered MDS-UPDRS assessment has been commonly used as efficacy endpoints in drug trials, but its subjectivity, imprecision, and low frequency make it difficult to detect efficacy.
- Remote digital functional assessments can improve study power through higher sensitivity and precision (quality of measurement). Frequent measurements at home increase the quantity of data without the burdens of physical clinic visits, allowing for measuring the lived experience.
- The model drives two-way engagement with study stakeholders and builds confidence in applying novel trial design.

The challenge

- While digital endpoints offer great promise, few published case studies exist. Study sponsors often request tangible proof of business benefits before adopting digital endpoints in clinical trials.
- Traditionally, study power calculations are performed with sample size as the lone input variable, considering a schedule of assessments, drug effect size, and measure reliability as fixed assumptions.
- Study sponsors and endpoint technology partners lack the means to evaluate and visualize the impact of better outcome measurements translated into key study productivity parameters.

Case study

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The approach

- To provide a realistic and interactive simulation tool that shows the impact of digital measurements on study design. The tool should be hands-on, visual, and real-time.
- The simulation's output is chosen based on the sample size (the minimum number of patients required per arm to achieve 80% power).
    - Simulation users can modify input values for study outcome measures, monitoring duration, drug effect size, clinic visit frequency, and digital measurement frequency.
- While each sponsor needs to adjust the actual study sample size based on the trial design and estimated effect size, visualizing the direction and magnitude of the power impact would facilitate educated decision-making on digital measurement adoption.

The impact

- ✔ The efficacy endpoint in the non-pivotal phase serves as a value driver.
- ✔ This simulation model quantifies the magnitude of the benefits digital measurements would bring to PD drug development. Biopharma clinical teams can evaluate different study design options and reference the results in their business cases.
- ✔ In addition to the publicly available simulator, we made the methods accessible to researchers. The scientific article on this simulation model was published in *Frontiers in Digital Health* (9 Oct 2024).
- ✔ Now, sponsor organizations can easily calculate the projected sample size reduction (and thus cost reduction) for PD trials by leveraging digital measures compared to in-clinic alternatives. This can support the business case for their adoption and accelerate the needed PD treatment for patients.

> "Successful drug development needs both effective therapy and effective measurements. Slow disease progression, fluctuations, heterogeneity, and imprecision of clinical gold standards call for digital technologies near the patients. Ultimately, study power is about achieving the smallest standard deviations possible."

— Hiro Mori

VP, Neuroscience, Koneksa Health

This case study was adapted from the paper "**Impacts on study design when implementing digital measures in Parkinson's disease-modifying therapy trials**" by Jennie S. Lavine, Anthony D. Scotina, Seth Haney, Jessie P. Bakker, Elena S. Izmailova, and Larsson Omberg (2024), published in *Frontiers in Digital Health*.