exploristics
INNOVATIVE ANALYTICS SOLUTIONS

KerusCloud Use Example

De-risking once a study has initiated, adapting to new information

Re-evaluating the probability of success (PoS).

KerusCloud®

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De-risking once a study has initiated, adapting to new information.

KerusCloud is a revolutionary simulation-guided study design tool that ensures clinical trials are designed effectively to collect the right data, in the right patients, in the right way. Its use supports evidence-based design decisions to extensively de-risk real clinical studies, reducing development time, costs and patient burden.

The Software

KerusCloud allows multiple study uncertainties to be explored simultaneously, in minutes, within a virtual environment. Study outcomes are visualised with an interactive heatmap where detailed results help identify the pros and cons of different design options. This allows the key drivers of study success to be pinpointed rapidly so that the best design and analysis approach can be selected, first time.

Diverse information and data types inform the simulations with sources including the scientific literature, disease registries, historical trials and real-world data. These data are captured in the platform as synthetic data sets, avoiding privacy constraints, and used to build virtual patient populations to answer 'what if' study scenarios questions.

KerusCloud's synthetic data driven simulations are uniquely informative. They best represent the complexity found in real studies by accurately mimicking the quirks found in real patient-level data, like missingness. Therefore, KerusCloud provides exceptional advanced analytical insights able to deliver the smarter studies needed to address today's complex clinical research challenges.

The Challenge

A sponsor biopharmaceutical company was running a clinical trial to examine the effect on an inflammatory biomarker of interest in patients treated with an investigative treatment versus placebo. Following initiation of the trial, two things changed:

Change 1

It emerged that the treatment effect was potentially larger than originally expected at the study design and planning stages. This meant that the original sample size was probably conservative.

Change 2

During the recruitment period the COVID-19 pandemic occurred, causing the planned sample size to become logistically difficult to achieve.

Considering these changing circumstances, the sponsor wished to re-evaluate the probability of success (PoS) for the study if it was adapted to include fewer patients than initially planned.

The Approach

Exploristics carried out additional literature searches to obtain relevant background information on the clinical biomarker of interest to inform the strategy for the simulation work. This identified two critical design assumptions that were not considered at the initial design stage:

- **Assumption 1** correlation between baseline and post dose biomarker value
- **Assumption 2** truncation of biomarker data due to values outside lab range

KerusCloud study simulation software was used to quantify the Probability of Success (PoS), going beyond the original sample size calculations to simultaneously evaluate multiple design and efficacy 'what if' scenarios. KerusCloud simulates patient level data and so was able to create virtual patient populations which could reflect the real-life data we would collect in the study, for example the truncation of biomarker data. The following scenarios were considered:

- a range of assumed expected effect sizes (including larger than originally planned)
- a range of assumed correlations between baseline and post dose (given the true underlying value was unknown)
- different recruitment design decisions between 60% and 100% of the planned sample size

The Results

KerusCloud was used to rapidly quantify the PoS for these scenarios and then visualise in an interactive heatmap (Figure 1).

The PoS heatmap **identified a previously hidden risk;** the importance of the baseline to post dose correlation.

Simulated scenarios indicated that **this correlation was a key driver of success** and the study as **originally planned was underpowered** if the correlation was below 0.9.

The risk associated was **quantified** and the team could plan to **mitigate** this; by examining the correlation between baseline and post dose in a blinded fashion to provide **key information for planning.**

The Impact

Simulation with KerusCloud provided key insights for the team when making decisions around the required sample size to support the design of this clinical trial, highlighting the benefits of simulation to fully explore the risks for a study.

- **Its use identified the importance of the baseline to post dose correlation in this study, enabling mitigation for this risk to be put in place through a blinded ongoing review of the data.**
- **KerusCloud identified a viable design with an improved recruitment/risk profile relative to the original sample size calculation.**
- **These insights gave the company a more flexible recruitment strategy, de-risking the study while saving time and costs.**

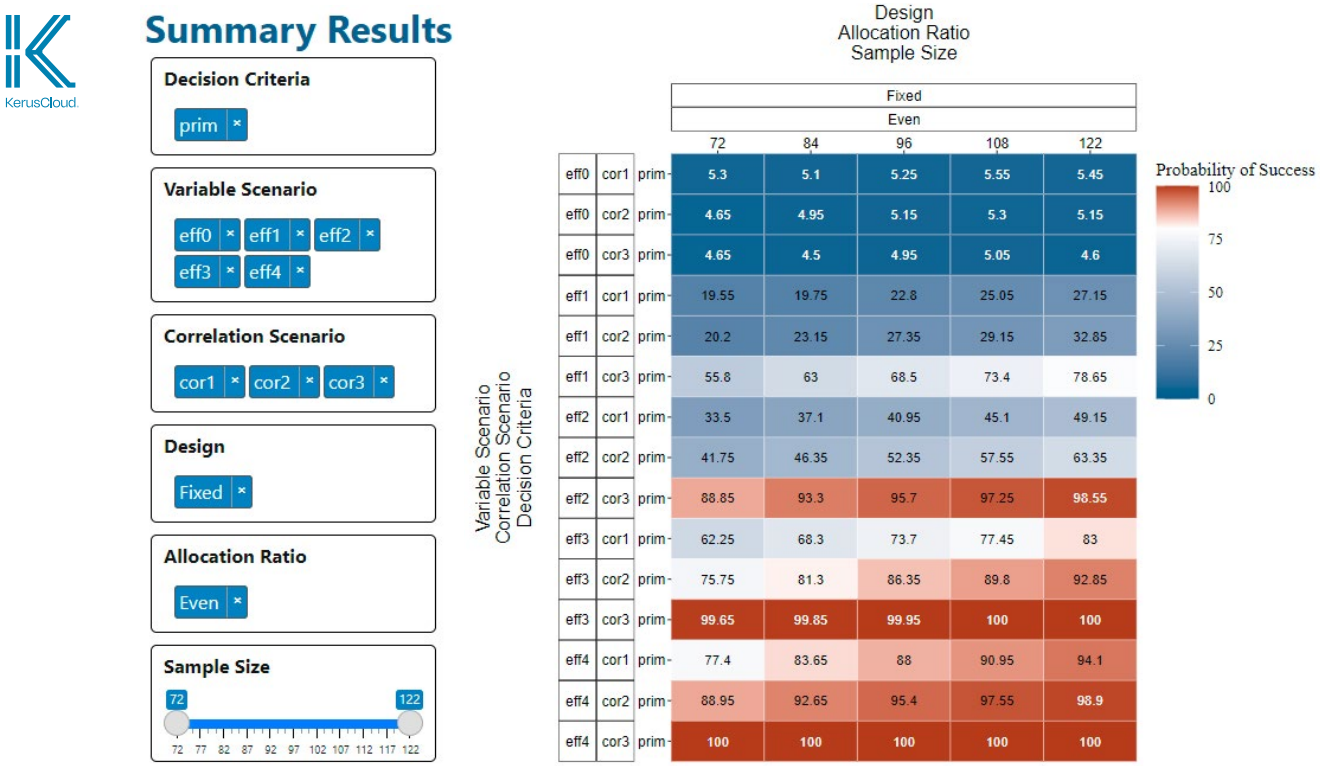

Figure 1. A KerusCloud heatmap showing the PoS values for different study scenarios, where dark blue indicates very low PoS and dark red indicates very high PoS.

Why Exploristics?

Expertise In Early Development

The development of investigational drugs is a complex and expensive process with many risks. For over ten years our teams have been supporting and de-risking clinical development with their in-depth statistics and modelling expertise. Our study planning, statistical analysis and programming services add value to early stage development programmes by ensuring they deliver the robust evidence needed for incisive, informed decision-making.

With many of our development solutions built around our unique **KerusCloud** platform, we can provide exceptional, bespoke, end-to-end biostatistics support from strategic decision-making and protocol development to analysis, reporting and stakeholder engagement.

Robust Evidence Packages

The unique offering of our comprehensive biostatistics services in combination with **KerusCloud** ensures that Exploristics can help to generate strong evidence packages to support regulatory engagement or investment, accelerating development timelines and increasing the value of pipelines.

Let's talk!

If you'd like to discuss this use case example further or learn more on how our **technology enabled services** can support your development project, please contact our VP of Sales & Marketing, Abbas Shivji, at **abbas.shivji@exploristics.com** or **book a call**.

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