

extRpolateS: A Shiny-Based Interactive Platform for Time-to-Event Data Modeling in Health Technology Assessments

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Conclusions

extRpolateS is a comprehensive solution for time-to-event analysis, accessible to both analysts and non-experts. It generates robust outputs for health economic models while ensuring ease of use. With its advanced modeling capabilities, extRpolateS improves decision-making in HTAs. Future enhancements, including the integration of health economic modeling, could further expand its impact.

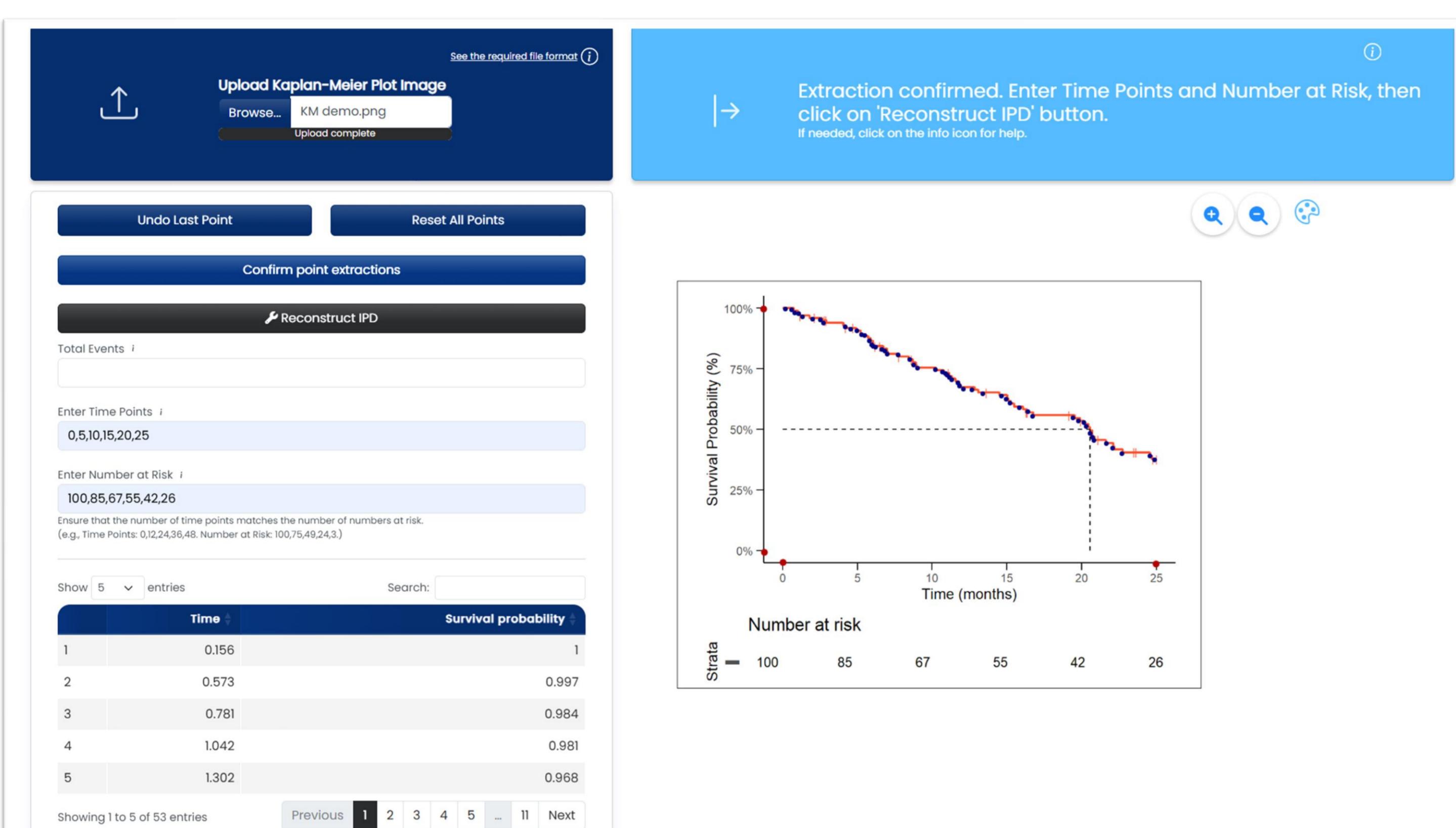


Figure 1: Kaplan-Meier figure digitized in the app

Aim

We aimed to develop extRpolateS, an interactive R-Shiny application that pairs advanced survival-extrapolation methods with an intuitive interface, enabling analysts to generate reliable extrapolations for HTA without the need for coding.

The figure shows a screenshot of the extRpolateS app interface. On the left, there is a survival curve plot with a red line and a blue shaded area representing the confidence interval. The x-axis is 'Months' from 0 to 80, and the y-axis is 'Survival probability' from 0 to 1.0. On the right, there is a sidebar titled 'Extrapolation settings' with sections for 'Curve Settings' and 'Curve comparison plots'. The 'Curve Settings' section includes a 'Choose the distributions' dropdown with options like Kaplan-Meier, Exponential, Weibull, Gompertz, Gamma, Lognormal, Log-logistic, and Generalised gamma. The 'Curve comparison plots' section shows a plot of 'Time to event probability' vs 'Months' for two datasets: 'Independent - Demo A NSCLC TL1 DBL1 OS Months Empirical' (blue line) and 'Independent - Demo B NSCLC TL1 DBL1 OS Months Reconstructed - weibull' (red line).

Table 1: Goodness of fit and restricted mean tables

Methods

extRpolateS is a cloud-based platform developed in R Shiny, leveraging the survival, flexsurv and survHE packages for time-to-event modeling, and plotly/ggplot2 for interactive visualizations. The modular interface includes an input module that accepts 3 types of data: a KM figure, digitized KM data or empirical trial data. The output module provides descriptive analytics (e.g., Kaplan-Meier curves, proportional hazard checks) and supports a range of modeling approaches, including general parametric (e.g., Weibull), spline-based (normal, hazard, or odds scale), mixture and non-mixture cure, relative survival and piecewise models. All modeling follows the guidelines outlined in the NICE Technical Support Documents 14 and 21.

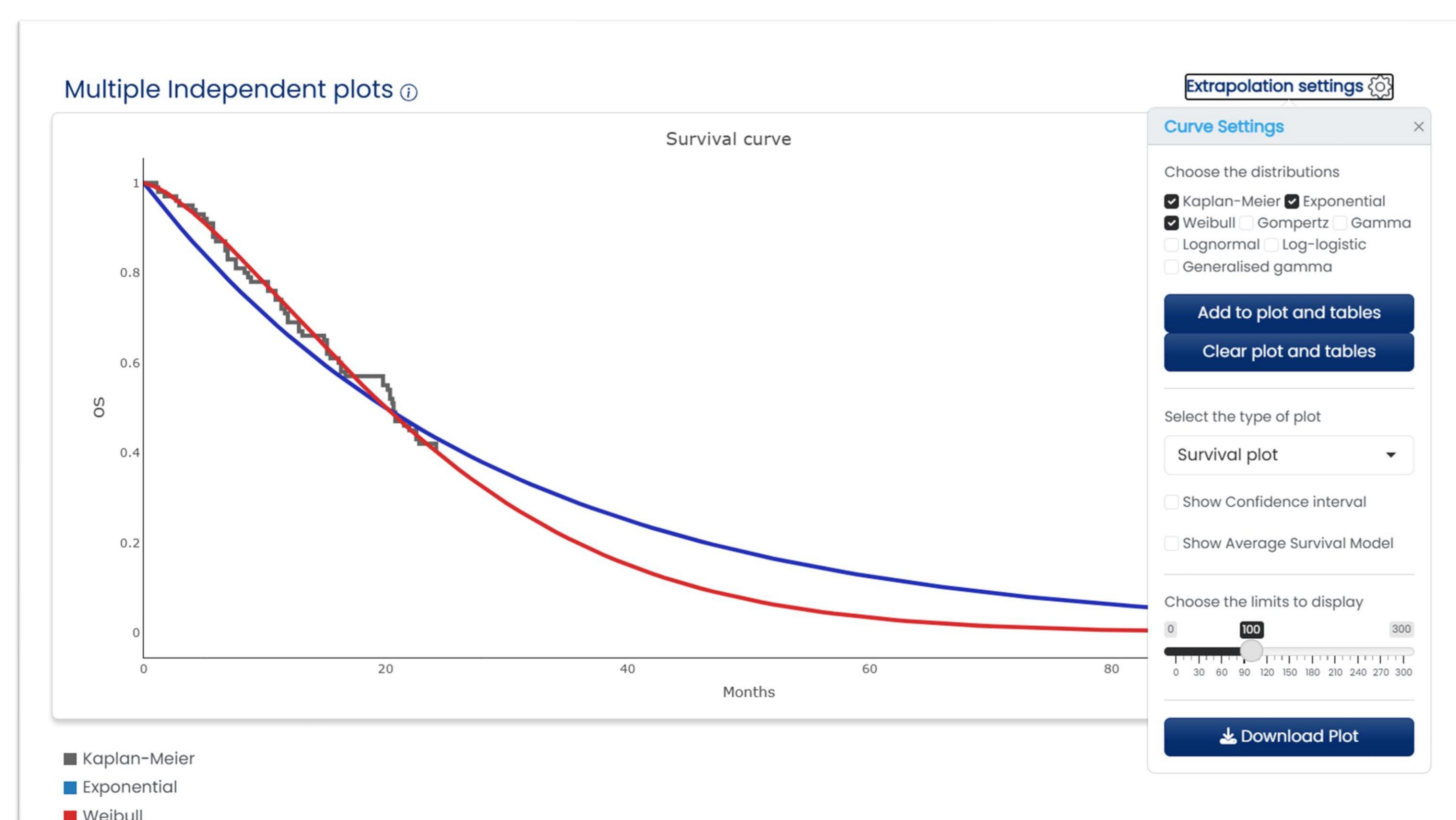


Figure 2: Independent survival extrapolations and available settings

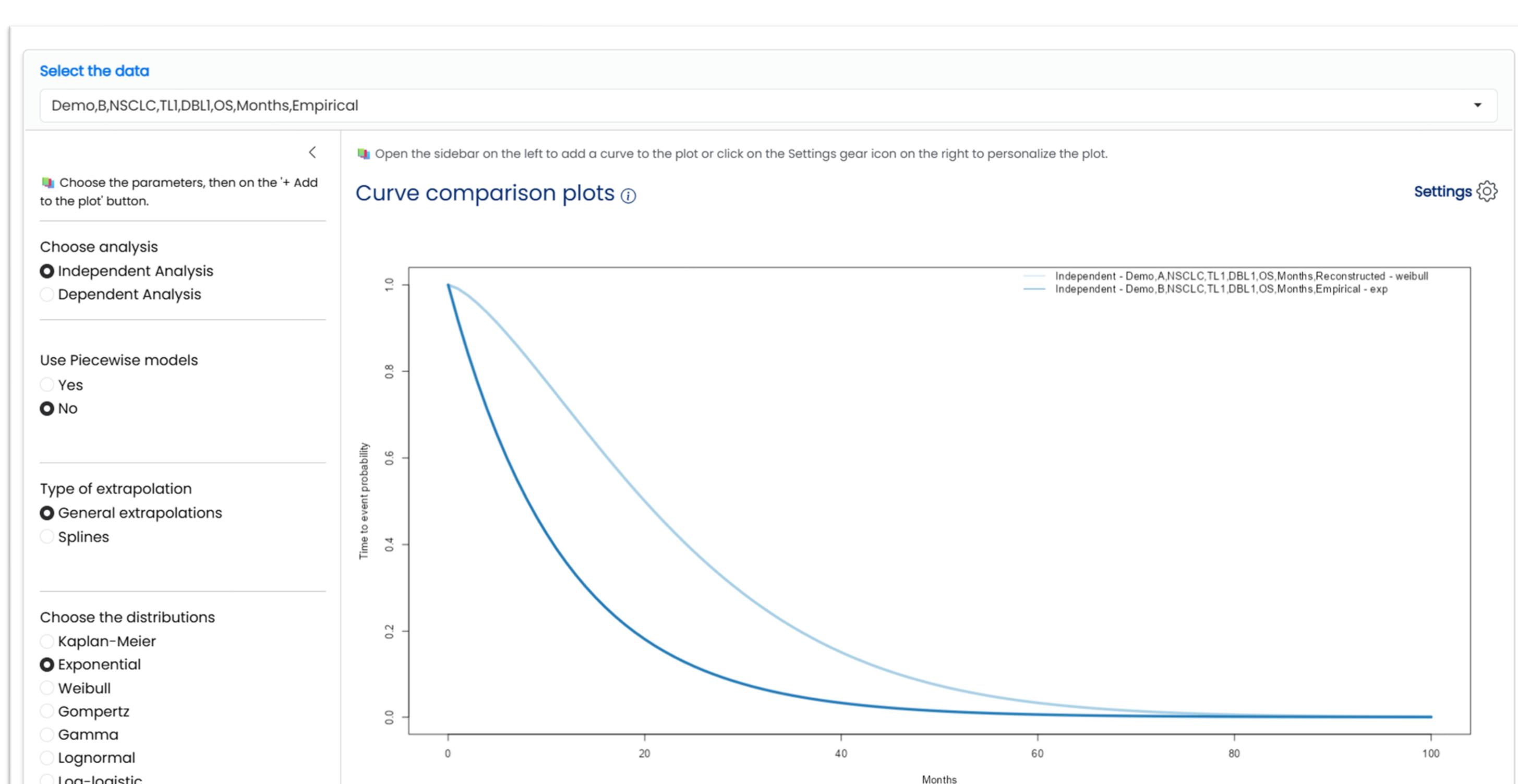
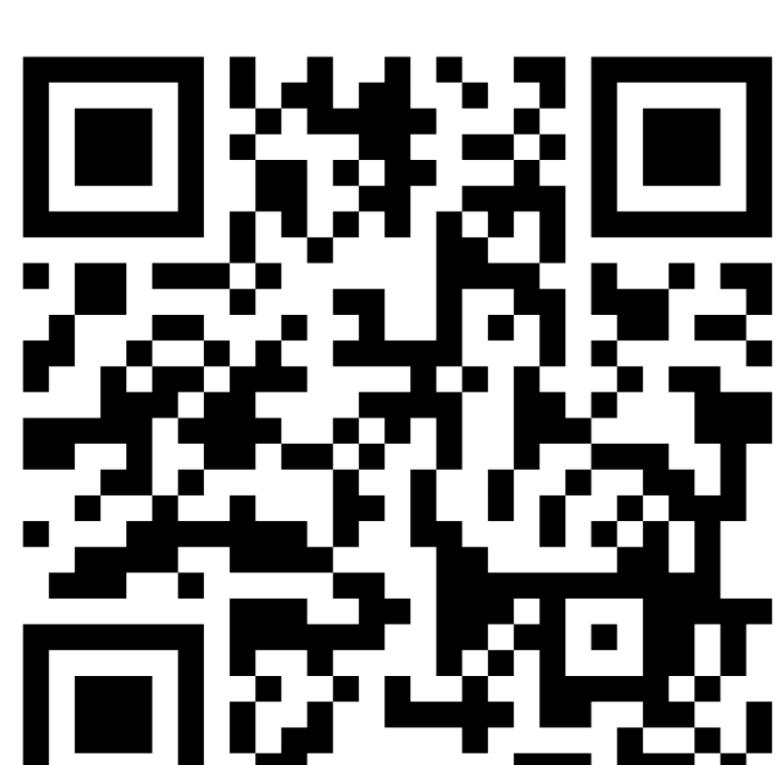


Figure 3: Advanced modelling options of stored datasets

Scan to see more!



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