Guide: Kaplan Meier survival curves

Kaplan-Meier survival curves are a way of graphically displaying the time until study participants developed a particular event or endpoint, often death, or an event such as recurrence of cancer, myocardial infarction, etc.

Because all participants started the study at a different time-point, each participant will have been followed for a different length of time. Many participants may not have yet had the ‘event’, so their outcome will be unknown. A Kaplan-Meier curve displays both those participants who have had the event, and the duration on study of those who have not yet had the event.

The x-axis shows time, and the y-axis shows the proportion of patients who have or have not had the event. Commonly, the patients remaining at risk for an event in the Control and Intervention arms are shown below the x-axis. These numbers decrease towards the right of the x-axis, as there are fewer patients who have been followed up for a long time, or have not already had the event.

Every time a participant has an event, their event is displayed as a ‘step-down’ on the graph. Participants who have not yet had the event are ‘censored’, often shown with a small vertical line, at the time at which they were last followed up. This means their survival is taken into account, but only up until their maximum follow-up time. The estimate of treatment effect is more precise at the left of the curve, where more patients are included.

The figure shows a Kaplan-Meier curve for survival in cancer patients treated with the anti-depressant Sertraline versus Placebo. The number at risk becomes very low from 16 months onwards, as few patients have both survived that long, and been followed for that long on the trial. This illustration does not show tick marks for censored patients due to the larger numbers of patients on the study.