

Notes on Kaplan Meier Estimates using R

Chris Sutton, October 2023

In the package 'survival', the function `survfit()` can be used to find the Kaplan-Meier estimate of the survival function.

```
install.packages("survival")  
library(survival)
```

The R code needed for the Kaplan-Meier estimate is

```
survfit(formula, conf.int = 0.95, conf.type =  
"plain")
```

In this code 'formula' is a formula object with a survival object as the response variable. The `survfit()` function also calculates 95% confidence intervals for the estimate but we will not use these in the Survival Models module.

With right-censored data, a survival object may be created with the R command

```
Surv(time, delta).
```

Here 'time' is a vector containing the times to the event or censoring, and 'delta' is a 0/1 vector denoting whether the individual was censored (0) or experienced the event (1).

Example

In the medical trial for a new pharmaceutical treatment, the following times are recorded in days for 17 patients in the trial to recover from an illness (where * indicates people who left the trial before recovery)

```
6 4* 8 4 7 7 2* 1 8 5 2* 6 5 4 4 4* 3
```

We can fit a Kaplan Meier estimate of the survival function to this data (where "survival" here represents patients who still have the illness) with the following R code:

```
library(survival)  
X <- c(1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1)
```

```

time <- c(6,4,8,4,7,7,2,1,8,5,2,6,5,4,4,4,3)
delta <- c(1,0,1,1,1,1,0,1,1,1,0,1,1,1,1,0,1)
S <- surv(time, delta)
S
[1] 6 4+ 8 4 7 7 2+ 1 8 5 2+ 6 5 4 4
[16] 4+ 3
KM <- survfit(S ~ X, conf.int=0.95, conf.type =
"plain")

```

which will calculate the Kaplan Meier estimate and return it in the R-Studio Environment as "KM"

Rather than specify S separately here you could embed the Surv() object inside the survfit() formula with `survfit(Surv(time, delta) ~ X, conf.int =0.95, conf.type = "plain")` instead.

Then to see the KM survival function in the R consol

```
View(KM)
```

```
KM[["surv"]]
```

And to plot a graph of the Survival Function

```
plot(KM, xlab="time", ylab="Survival function")
```

