

KMWin - A tool for graphical presentation of results from Kaplan-Meier survival time analysis

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Interim analyses of clinical studies are common practice resulting in repetitive analyses or the need of multiple graphical representations.

Many professional Software packages are available such as SPSS, SAS or R. These packages are either only commercially available or hard to use especially if one aims to develop and customize professional graphical outputs.

KMWin (Kaplan-Meier for Windows) is a programme developed for graphical presentations of results from Kaplan-Meier survival time analysis. It combines both, free availability and provision of an easy to use interface. Analysis and graphical presentation of survival curves is achieved by controlling R.

Data

```
C:\kmwin\example.dat
row  timevar  statusvar  factorvar  filtervar
1    15.6958322  0          1          1
2    4.8452985  1          1          1
3    24.2096582  0          1          1
4    4.0252578  0          1          1
5    50.1912965  1          1          1
6    7.6127028  0          1          1
7    7.9488780  0          1          1
...
111  21.1051801  0          2          1
112  16.6755407  1          2          1
113  29.0909382  0          2          1
114  2.9737819  1          2          1
115  10.2958010  0          2          1
116  6.0344595  0          2          1
117  0.6336608  0          2          1
...
231  16.0317797  1          3          1
232  15.0517897  0          3          1
233  14.4887655  0          3          1
234  60.6647977  0          3          1
235  8.8039311    1          3          1
236  7.5860482    0          3          1
237  18.4516864  0          3          1
...
424  24.4927290  0          3          2
425  4.8178194  1          3          2
426  9.1678384  1          3          2
427  14.0188317  0          3          2
428  8.7060319   1          3          2
429  1.6630814   1          3          2
430  13.2421718  1          3          2
```

Main Menu

Main Window

New Plot | Draw | Reconnect to R
Change Data Source | Load Plot | Save Plot

Variable	Type	Level	Color	Linewidth	Linetype	Description
timevar	Time	<input checked="" type="checkbox"/> 1	red	3	solid	Group 1
statusvar	Status	<input checked="" type="checkbox"/> 2	green	3	solid	Group 2
factorvar	Factor	<input checked="" type="checkbox"/> 3	blue	3	solid	Group 3
filtervar	Factor					

x-Axis Label: Time x-Min: 0.00 x-Max: 100.00 x-Step size: 20.00
y-Axis Label: Proportion event-free y-Min: 0.00 y-Max: 1.00 y-Step size: 0.20

Mark censored times Add Infotext Invert Add number under risk Pos-x: -0.20
 Show legend Pos-x: 70.00 Pos-y: 0.50 Add number of cases

Logrank Test: None Global Pair
Pos-x: 1.00 Pos-y: 0.01 Accuracy of p: 4

Standard Output

Group	30	45	60	75	90
Group 1	30	9	4	1	0
Group 2	45	16	3	2	0
Group 3	53	9	4	1	0

Survival time data can be supplied as SPSS (sav), SAS export (xpt) or text file (dat).

The Interface comprises often used functions and functions which are not supplied by standard Software packages such as presentation of "numbers under risk".

Generated plots can directly be exported in any graphical file format supported by R, e.g. as vector graphic (emf) which facilitates further processing of the results.

Filtering

Filter Window

Variables: timevar, statusvar, factorvar, filtervar

Filter String: filtervar<2

Apply Filter | Remove Filter | Draw

Filtered Output

Group	30	45	60	75	90
Group 1	30	9	4	1	0
Group 2	45	16	3	2	0
Group 3	35	8	4	1	0

Plotting Style

Preferences Window

Item: Legend | Color: black | Background Color: white
Botype: closed | Font: bold | Scale Factor: 1.20
Margins: 2 | 5 | 2 | 10 | Linewidth: 3 | Linetype: solid

Preferences of last session | Preferences of saved session
Draw | Default preferences

Find 5 modifications

...in comparison to the filtered output!

Group	30	45	60	75	90
Group 1	30	9	4	1	0
Group 2	45	16	3	2	0
Group 3	35	8	4	1	0

Filtering survival time data previous to analysis can be achieved by applying a filter string. Strings which are not syntactically correct or filter out all data were caught by our Software.

All general settings apart from curve properties may be altered on the Preferences Window. These preferences comprise adapting colors, border styles, fonts, and scaling of different components.

Fancy Log

```
Log Window
[c]xpd=xpd[[]]agf<-function(x=0,y=0,txt,cex=NULL,xpd=TRUE,col=par("col"),bg=par("bg"),lty="n",font=1){use=par("usr");dx=(xpd[1]-xpd[2])/2;dy=(xpd[3]-xpd[4])/2;readxy=x+width(txt,cex=font)for(i=1:nrow(txt)){x1=x+width(txt,cex=font);y1=y+height(txt,cex=font);x2=x1+width(txt,cex=font);y2=y1+height(txt,cex=font);plot(x1,y1,x2,y2,lty=lty,col=col,cex=cex,xpd=xpd,col=col,font=font);}
...
What happens here?
...

```

Multiplotting

File Queue Window

Input Files: C:\kmwin\example_1.kmw, C:\kmwin\example_2.kmw, C:\kmwin\example_3.kmw

Output Directory: C:\kmwin\graphics | Change Directory
New Data Source: | Change Data Source

Output Format: Metafile (emf) | Bitmap (bmp) | Jpeg (jpg)

Width (px): 400 | Height (px): 400 | Quality (%): Low | High

Run | Cancel | Clear Log

Multiplotting Output

Each step of Kaplan-Meier survival time analysis managed by KMWin is represented by a sequence of R commands and can be viewed on the Log Window.

The file queue is a list of plots which should be sequentially processed and saved in different output formats, e.g. in the context of interim analyses. Currently supported output formats are Windows Enhanced Metafile (emf), Bitmap (bmp) and JPEG (jpg).

We conclude that our tool is well suited and convenient for repetitive analyses of survival time data. It can be used by non-statisticians and provides often used functions as well as functions which are not supplied by standard Software packages. The Software is routinely applied in the Clinical Trial Centre Leipzig.