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DG09



Creating High Quality Statistical Graphs for Publications

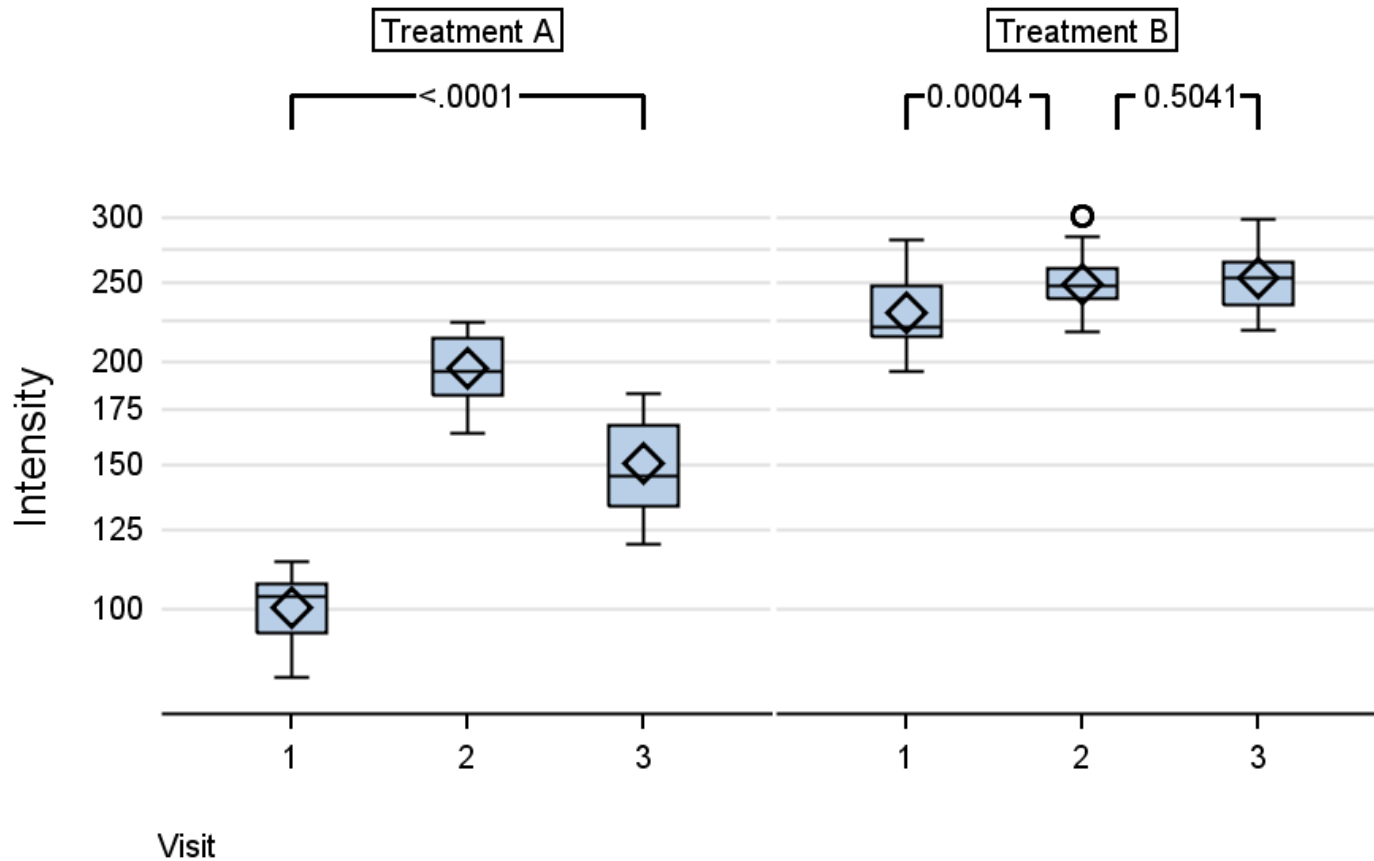
Kriss Harris, SAS Specialists Ltd, Hertfordshire,
United Kingdom

Agenda

- For you to learn:
 - how to add annotation that compares groups.
 - tips on how to improve the default Kaplan Meier Survival Curve.
 - tips on creating a panelled Forest plot.
 - DPI options

Adding p -values to figures

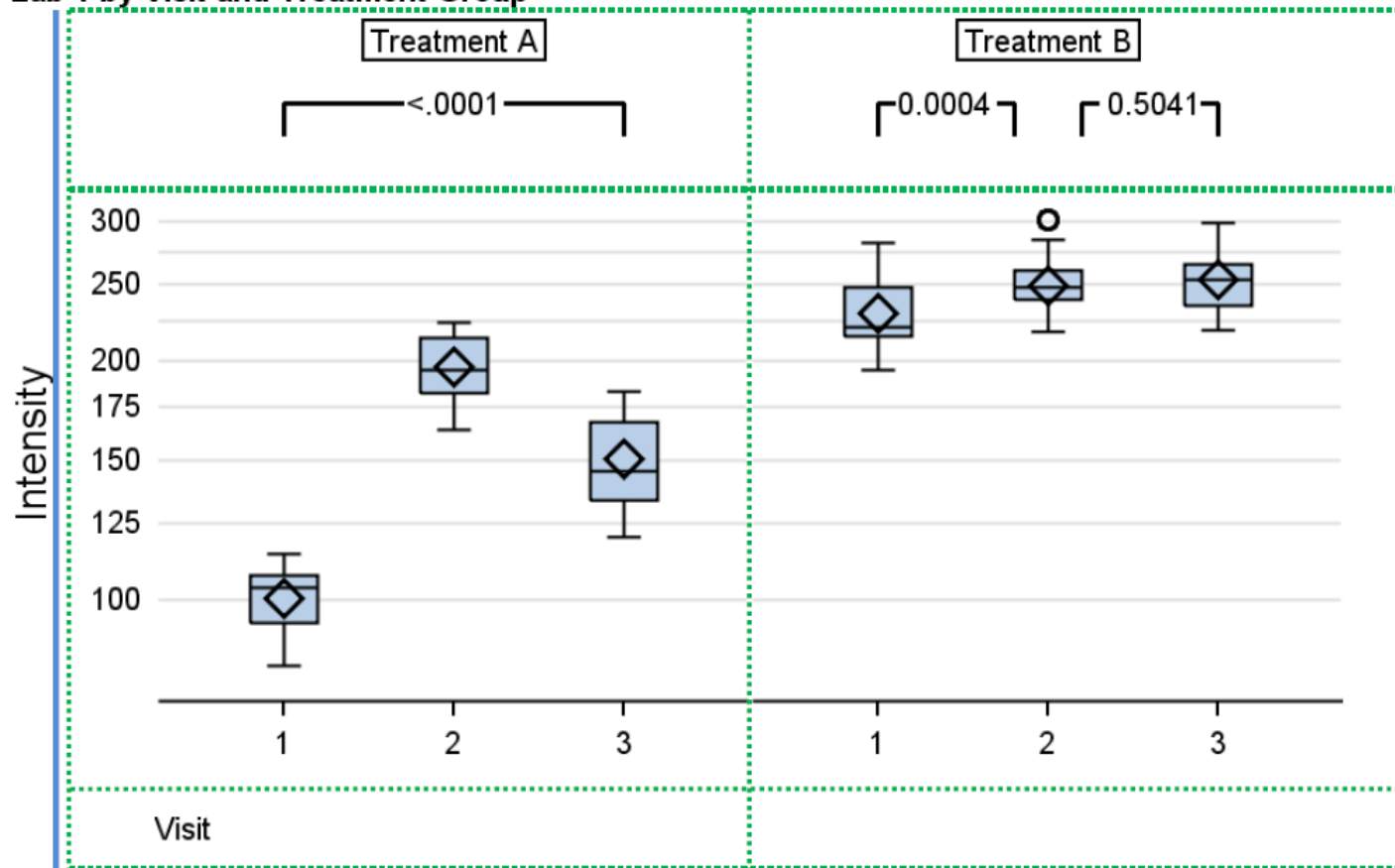
Lab 1 by Visit and Treatment Group



Adding p -values to figures

An easier way to think off the figure

Lab 1 by Visit and Treatment Group

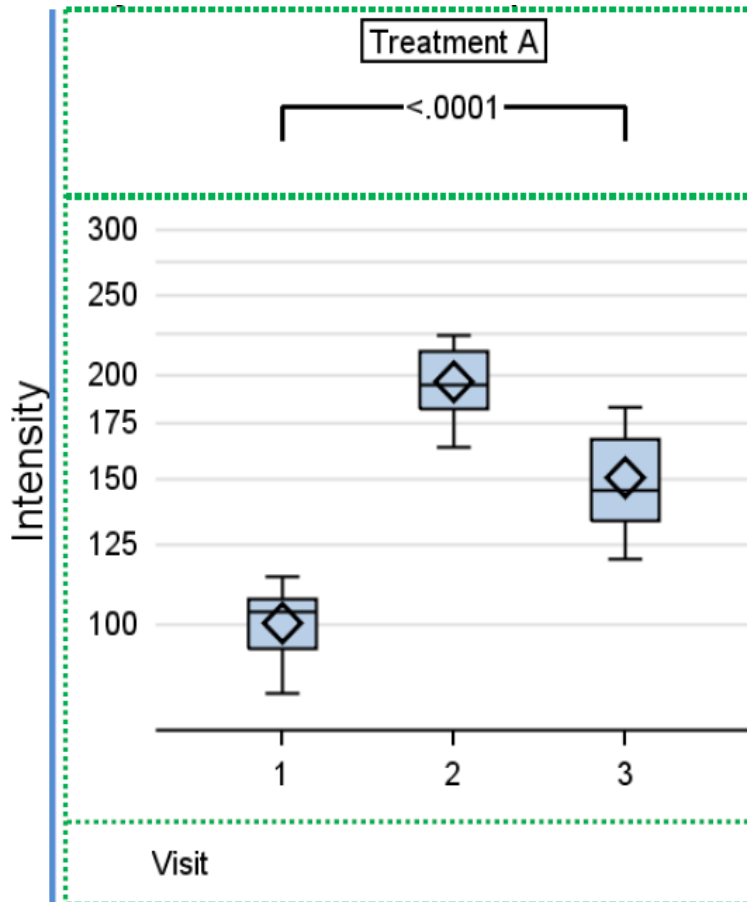


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Example of coordinates used for Vector Plot

```
data dummy_data_with_locations;  
set dummy_data_transposed;  
  
x11 = 1;  
x12 = 1.7;  
x13 = 2.3;  
x14 = 3;  
y1 = 100005;  
  
/* Setting the scale for the y2 axis to be between 100,000 and 100,010 */  
uniform = rand("uniform");  
y2scale = (100010-100000)*uniform+100000;  
run;
```

GTL Code used in vectorplot

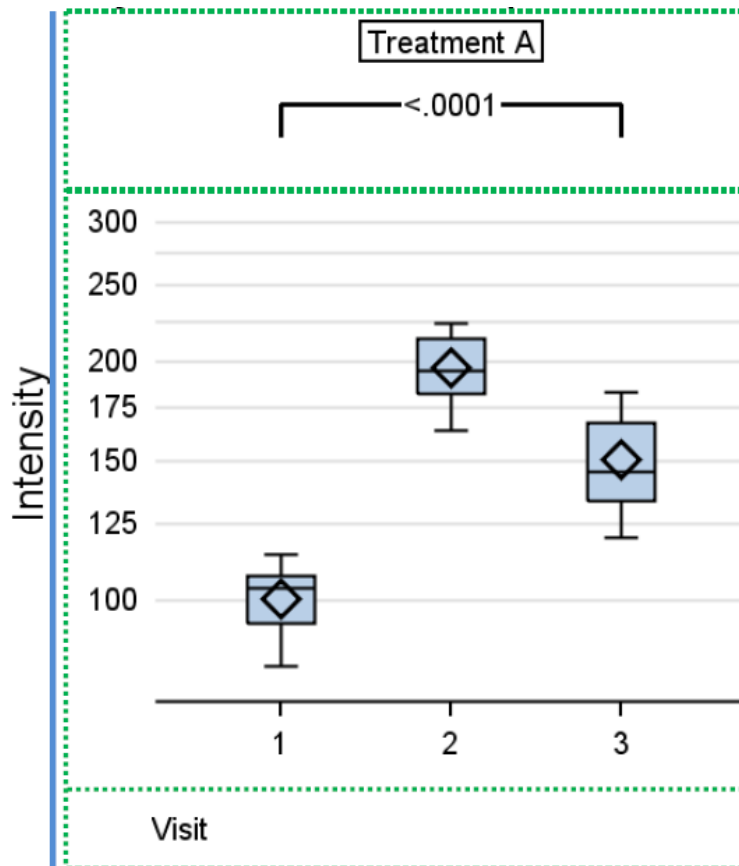


```
x11 = 1;  
x12 = 1.7;  
x13 = 2.3;  
x14 = 3;  
y1 = 100005;
```

```
vectorplot y=y1 x=x11  
xorigin=x11 yorigin=100000 /  
ARROWHEADS=false yaxis = y2;
```

```
vectorplot y=y1 x=x12  
xorigin=x11 yorigin=100005 /  
ARROWHEADS=false yaxis = y2;
```


Entry Code used in vectorplot



```
cellheader;  
    entry "Treatment A" /  
border =true;  
endcellheader;  
  
layout overlay / ...;  
    ...  
    entry halign = center _BYVAL2_;  
endlayout;
```

Kaplan Meier Survival Curve Intro

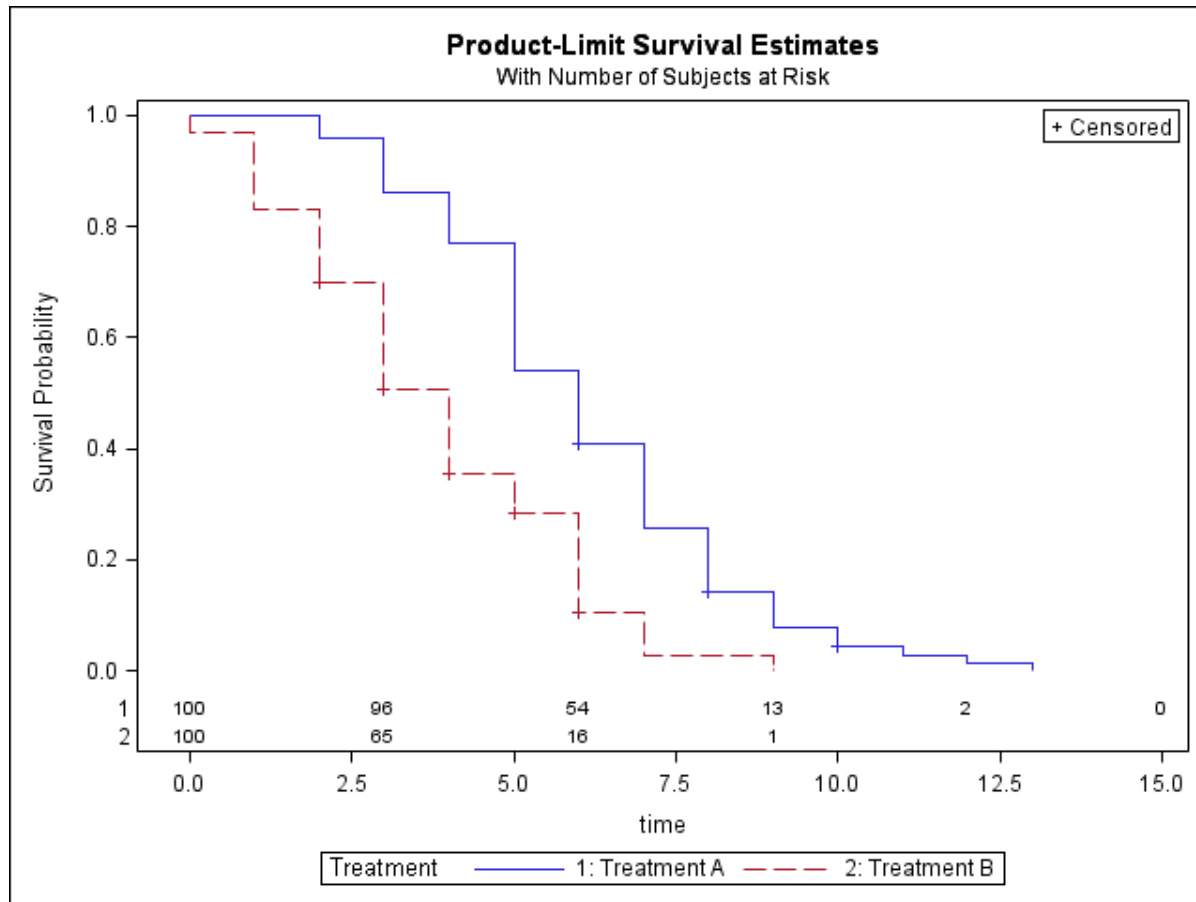
- Firstly, a decent survival curve can be generated with the LIFETEST procedure by specifying the correct options.
- Secondly, Warren Kuhfeld's and Ying So's paper can show how to use these options mentioned above and furthermore how to improve them a great deal. It is a very good paper.

<http://support.sas.com/resources/papers/proceedings13/427-2013.pdf>

Benefits and drawbacks of this method

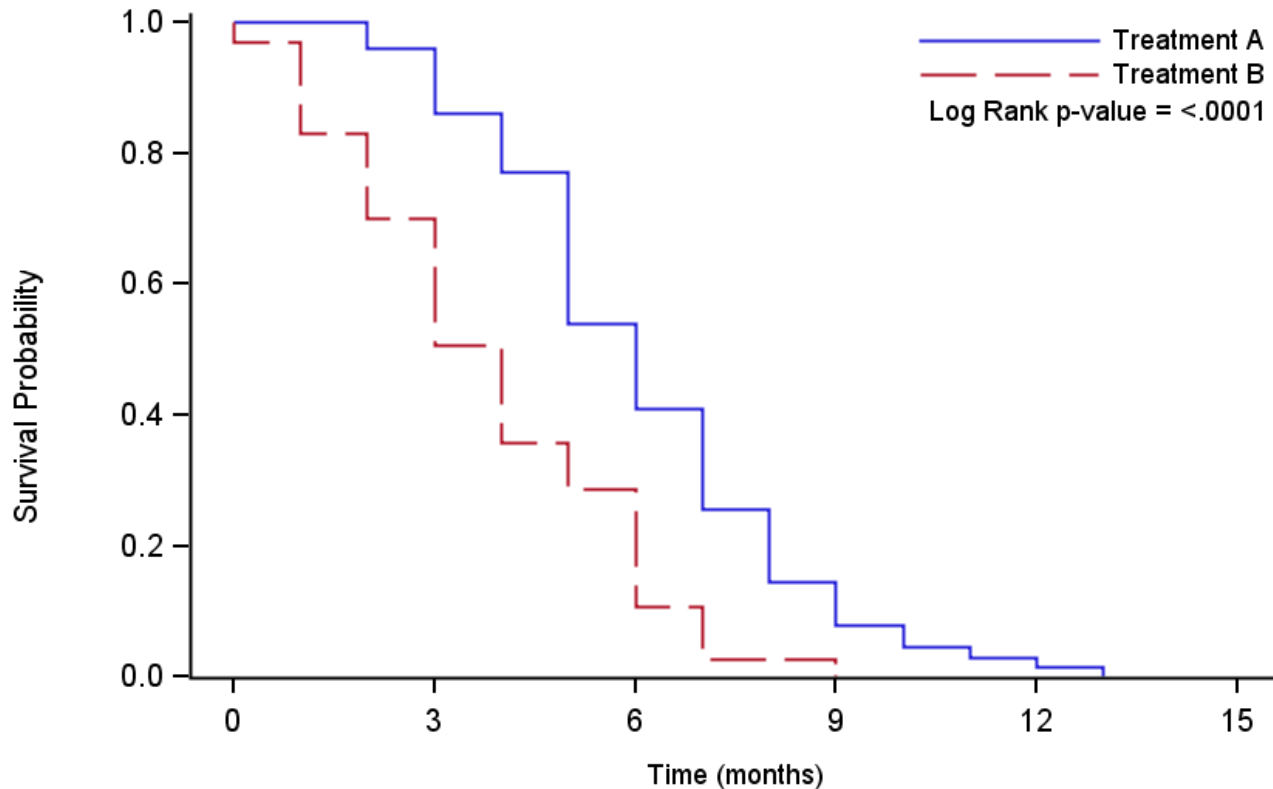
- Benefits
 - Allows you to do things that can not be done on the default Kaplan Meier plot without having to modify the `Stat.Lifetest.Graphics.ProductLimitSurvival` template.
- Drawbacks
 - Will need to know how to use GTL

Default Scatter Plot



Kaplan Meier Survival Curve

GTL Minimalist Solution



Number of
patients at risk

100
100

65
96

16
54

1
13

2

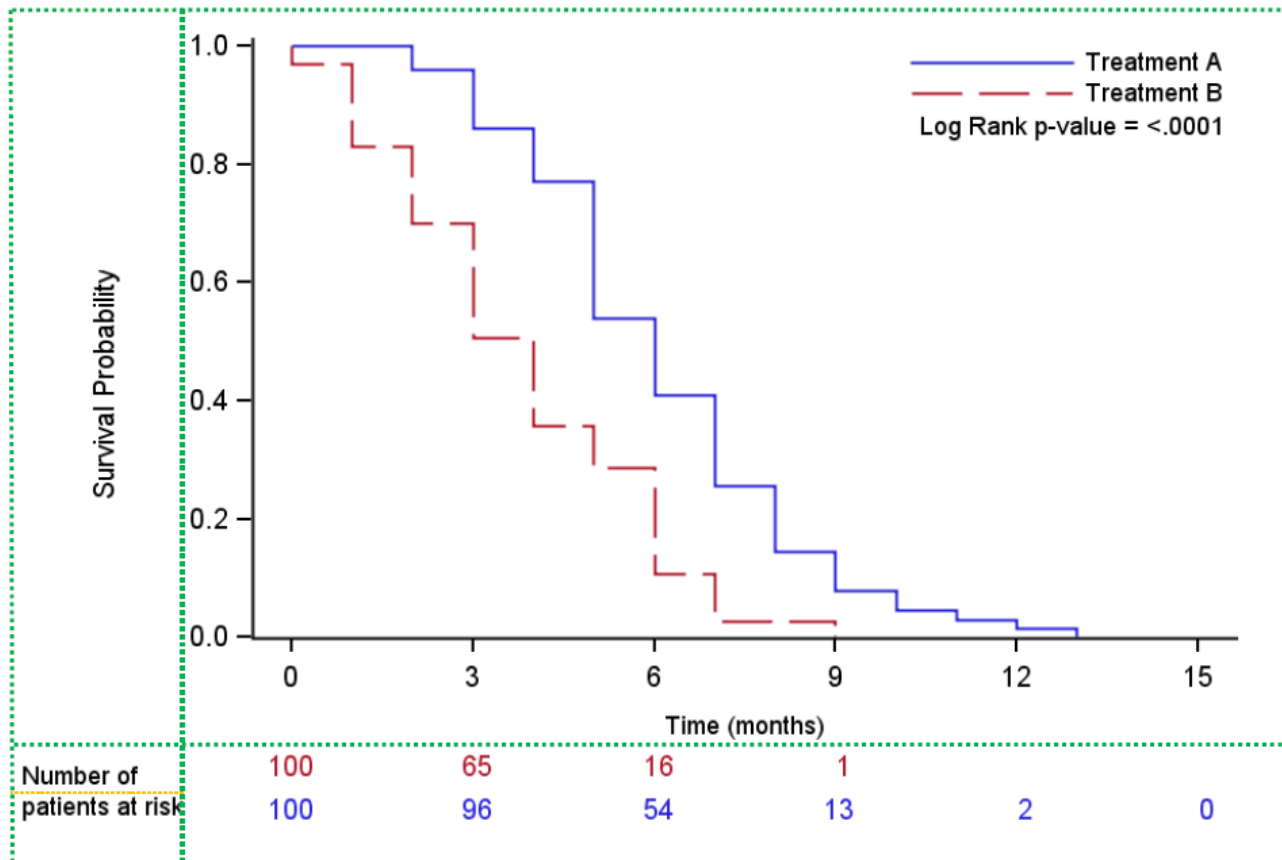
0

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Kaplan Meier Survival Curve GTL Minimalist Solution

4 Cells

Figure 3 Kaplan Meier Survival Curve with Number of Patients at Risk



Entry

Entry

StepPlot

Scatterplot

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Example GTL Code for Kaplan Meier

Part 1

```
layout lattice /rows = 2 columns = 2 columnweights = (0.14 0.86) rowweights =
(0.9 0.1) rowgutter = 4px columngutter = 0px;

layout overlay;
  entry "Survival Probability" / valign = center ROTATE=90;
endlayout;

layout overlay / xaxisopts=( Label="Time (months)" labelattrs =(size = 5pt)
type=linear linearopts=( tickvaluelist=( 0 3 6 9 12 15 ) viewmin=0
viewmax=15 ) ) yaxisopts=( display=(LINE TICKS TICKVALUES) offsetmin=0
type=linear linearopts=( viewmin=0 ) );
  StepPlot X=Time Y=Survival / primary=true Group=Stratum
  LegendLabel="Survival Probability" NAME="censored";

  DiscreteLegend "censored" / Location=Inside across=1 valign=top halign
= right border = false;

  Entry halign=right TEXTATTRS=(SIZE=5pt) "Log Rank p-value = " RANK /
  valign = top pad =(LEFT=0 RIGHT=2 TOP= 36 BOTTOM=0);
endlayout;
```

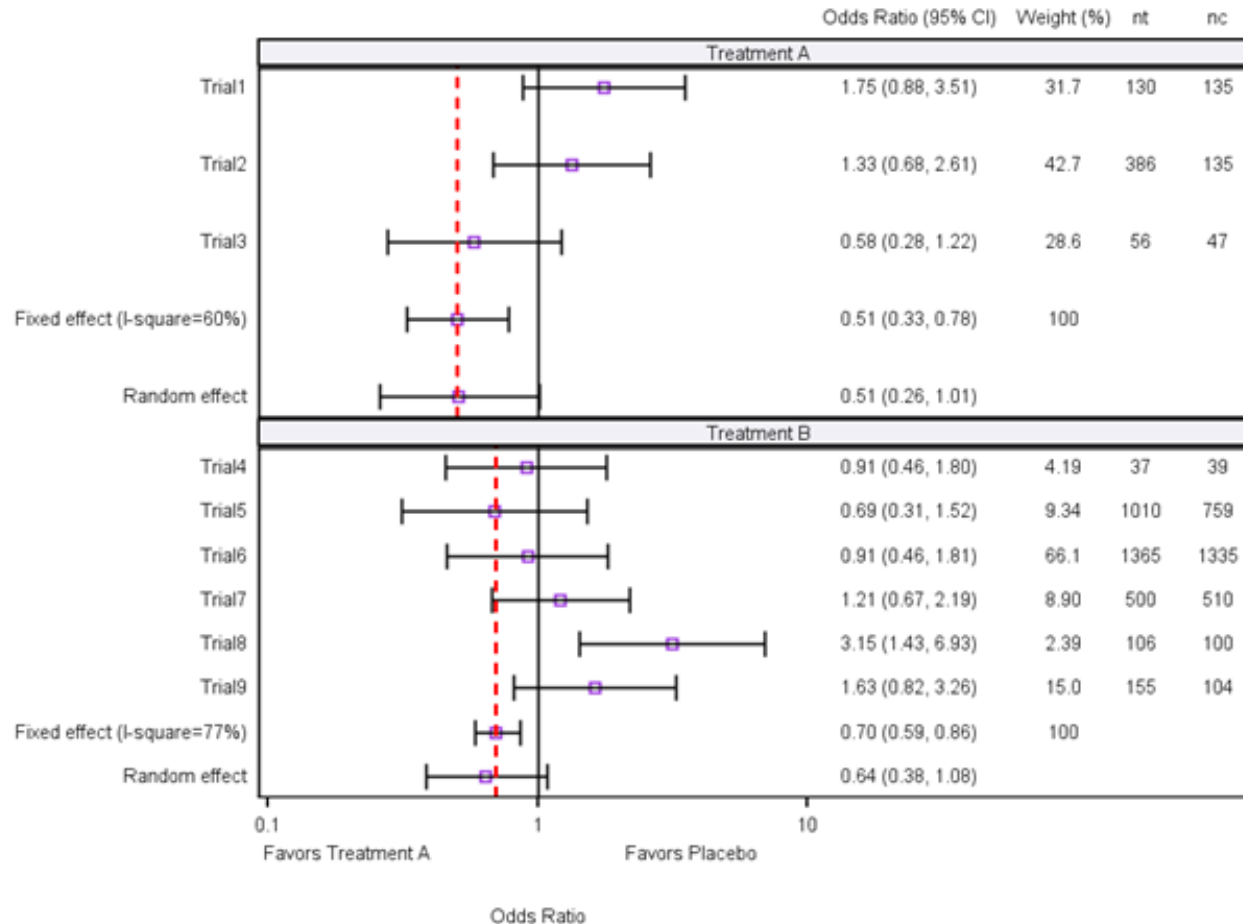
Example GTL Code for Kaplan Meier

Part 2

```
layout overlay;
  layout gridded / columns = 1 rows = 2;
    entry halign=left TEXTATTRS=(SIZE=5pt) "Number of" / pad =(LEFT=0
    RIGHT=0 TOP=0 BOTTOM=0);
    entry halign=left TEXTATTRS=(SIZE=5pt) "patients at risk" / pad
    =(LEFT=0 RIGHT=0 TOP=0 BOTTOM=0);
  endlayout;
endlayout;

layout overlay / xaxisopts=( display = NONE ) yaxisopts=( display = NONE
type=discrete );
  ScatterPlot X=tAtRisk Y=stratumchar / Group=stratumchar
  MarkerCharacter=AtRisk LegendLabel="stratumchar" NAME="SCATTER";
endlayout;
endlayout;
```

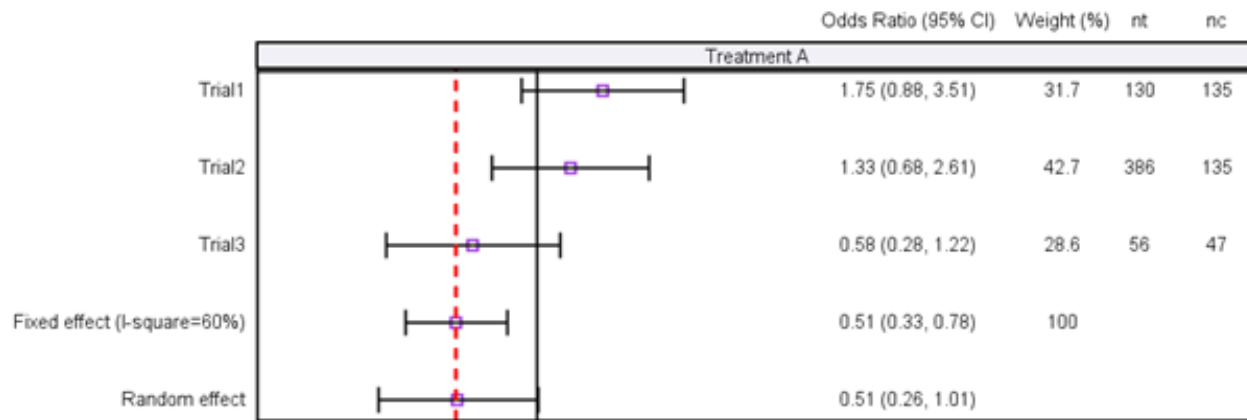

Panelled Forest plot on the log scale with descriptive statistics



Trick for the log scale with descriptive statistics

- Use a format statement:

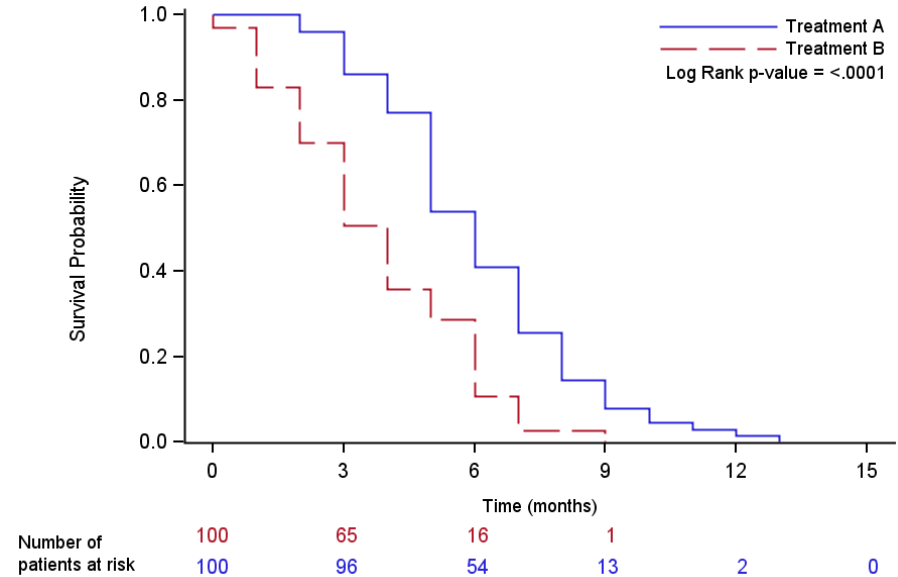
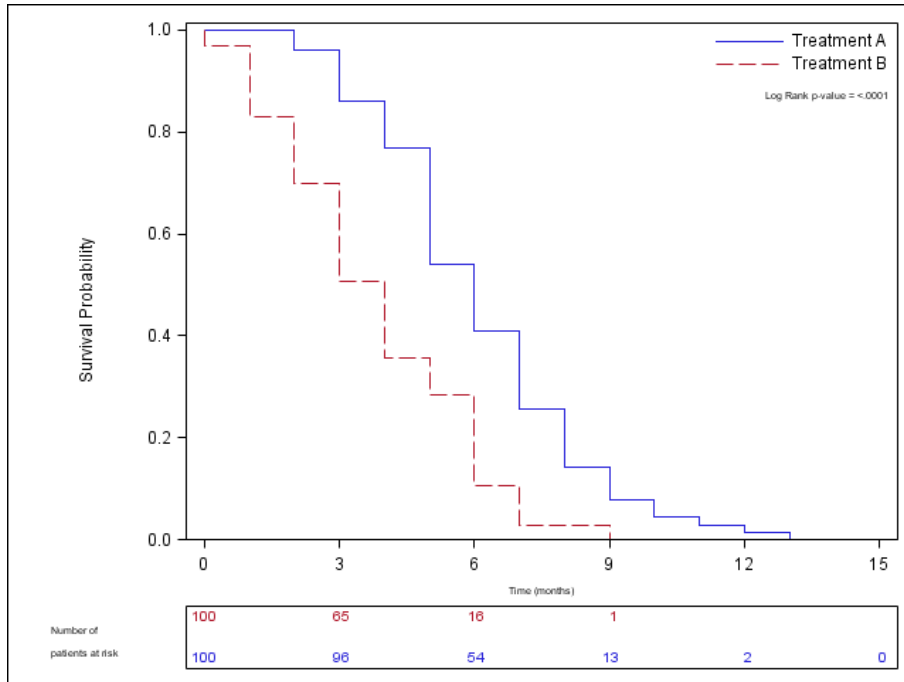
```
proc format;  
value xax 15 = "Odds Ratio (95% CI)"  
        17 = "Weight (%)"  
        18 = "nt"  
        19 = "nc";  
  
run;
```



Templates and options to create attractive figures

```
proc template;  
  define style styles.TLSPlot;  
    parent = Styles.listing;  
    style GraphFonts from GraphFonts /  
      'GraphValueFont' = ("<sans-serif>, <MTsans-serif>", 6pt)  
      'GraphLabelFont' = ("<sans-serif>, <MTsans-serif>", 8pt)  
      'GraphDataFont' = ("<sans-serif>, <MTsans-serif>", 6pt);  
  end;  
run;  
  
ods graphics on / reset = all reset=index border = off width =  
  3in height = 2in;  
  
ods listing style = styles.TLSPlot image_dpi = 300;
```

Without and with options



References

- Kuhfeld, Warren and So, Ying. 2013. “Creating and Customizing the Kaplan-Meier Survival Plot in PROC LIFETEST” Proceedings of the SAS Global Forum 2013 Conference. Available at <http://support.sas.com/resources/papers/proceedings13/427-2013.pdf>
- “Graph Size and Resolution”. Available at http://support.sas.com/documentation/cdl/en/statug/63033/HTML/default/viewer.htm#statug_odsgraph_sect034.htm
- Matange, Sanjay and Heath, Dan. 2011. “Statistical Graphics Procedures by Example: Effective Graphs Using SAS®”. Cary, NC: SAS Institute Inc.
- Mantage, Sanjay. “Forest Plots”. Available at <http://blogs.sas.com/content/graphicallyspeaking/tag/forest-plot/>
- “SAS® 9.2 Graph Template Language Reference”. Available at <http://support.sas.com/documentation/cdl/en/grstatgraph/63878/HTML/default/viewer.htm#titlepage.htm>

Questions?

- Questions?

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