

A General Solution for SAS Graph – How to Make Programmer's Life Easier

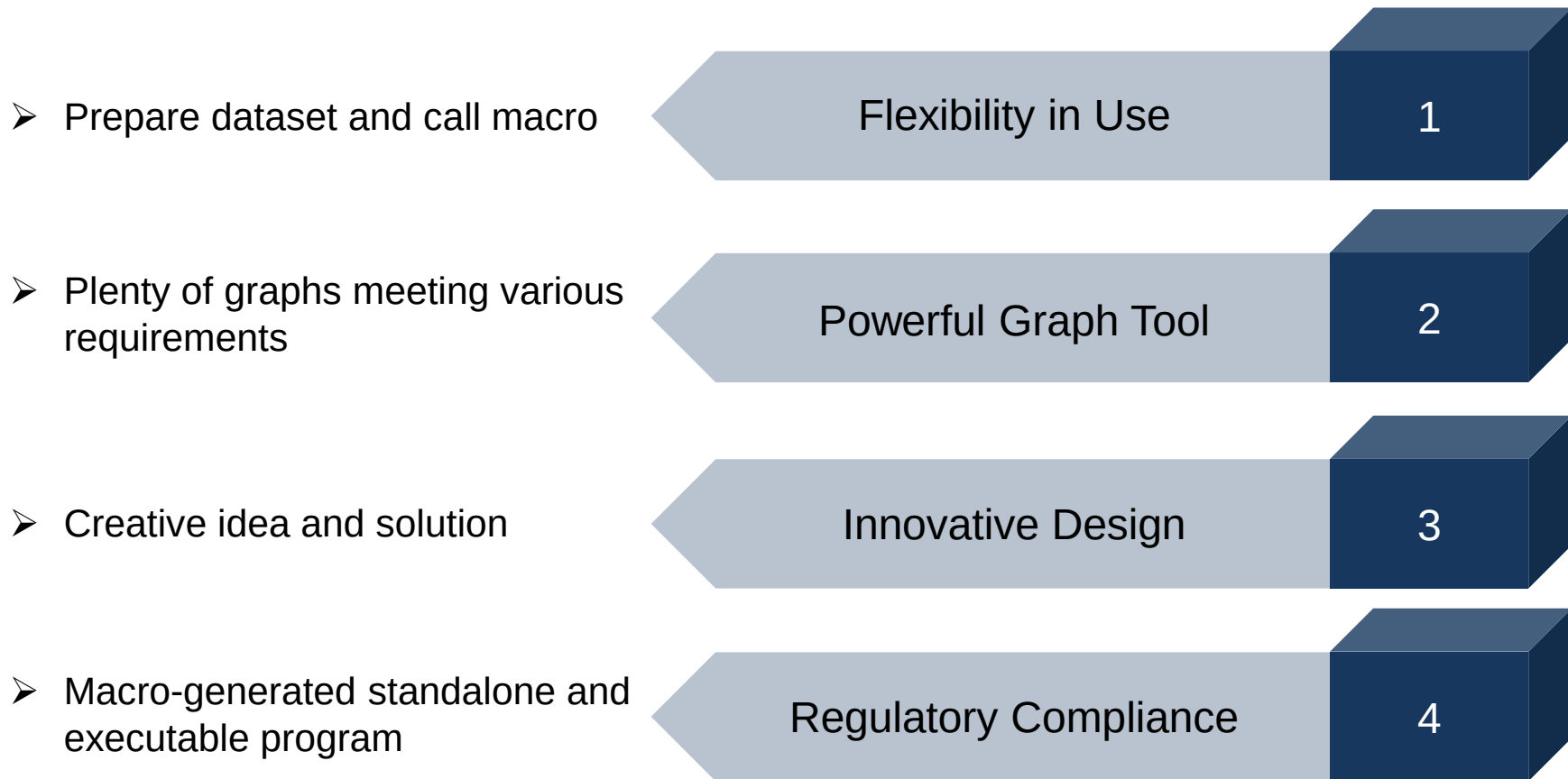
Zhiping Yan & Huadan Li

Shanghai PHUSE SDE 2019

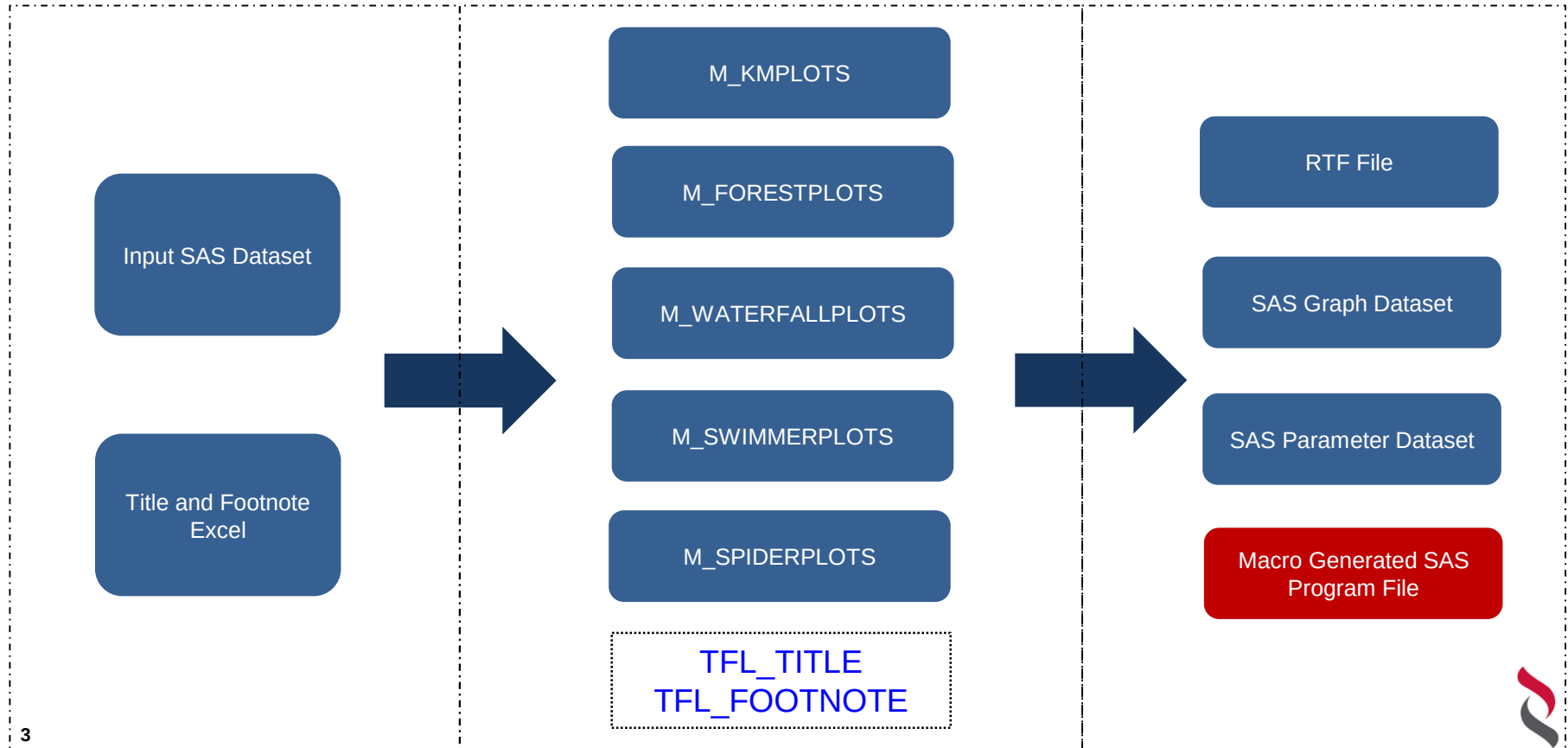
01Nov2019



Make Programmer's Life Easier, Why?



Overview



Macro Generated SAS Program File

Human Generated Code

```
*****
*** Study Name: m_kmplots
*** Program: f_km_km.sas
*** Programmer: Zhiping Yan
*** Date: 24FEB2019
***
*** Description: dev km plot
***
*****
MODIFICATIONS:
Programmer:
Date:
Reason:
*****/

data hr;
  trt01pn = 2; hr = "0.39 (0.23-0.66)"; pvalue= 0.0004; output;
run;

*Example 1;
%m_kmplots(
  input_dataset          = lptad.adtte
  input_dataset_where    = %str(efffl = "Y")
  time_var               = survtime
  censor_var             = censor
  censor_indicator       = 1
  strata_var             = trt01p|trt01pn
  xaxis_label            = %str(Overall Survival (Days))
  graph_height           = 4.4
  output_pgm_path        = Y
  title_footnote_template = &protopath/docs/macromgt/m_titles_kmplots.xlsx
  outfile_name           = f_km_strata
);
```

MPRINT option
MFILE option

Open code
before
%m_xxx can
be retained

Macro Generated Code

```
*****
*** Study Name: m_kmplots
*** Program: f-km-strata
*** Programmer: Zhiping Yan
*** Date: 24FEB2019
***
*** Description: Dev f-km-strata.rtf
***
*****
MODIFICATIONS:
Programmer:
Date:
Reason:
*****/

data hr;
  trt01pn = 2; hr = "0.39 (0.23-0.66)"; pvalue= 0.0004; output;
run;

*Example 1;
-----*
* Step 02: Read in input data *;
-----*
data _input_dataset;
  set lptad.adtte (where=(efffl = "Y"));
run;

%u_format(input_dataset = _input_dataset
,in_var = trt01pn
,text_var = trt01p
,fmtnam = fmtnam
);

proc sort data=_input_dataset;
  by trt01pn survtime;
run;
```

Submission-ready
Standalone
Executable
Easy-to-debug

General Output and Graph Setting

Output Type:

- ❖ Default is appendix

DESTINATION

A – Appendix TFL
I – Intext TFL

Output RTF Layout Orientation:

- ❖ Default layout is Landscape for appendix figure, Portrait for intext figure

LAYOUT_ORIENTATION:

L – Landscape
P – Portrait

Title & Footnote:

- ❖ Determine output name

TITLE_FOOTNOTE_TEMPLATE

Excel File

OUTFILE_NAME

Extract title and footnote

TFL_TITLE

TFL_FOOTNOTE

Graph Height and Graph Width:

- ❖ Default Graph Height is assigned based on graph type
4.4 inch for landscape appendix figure
4.0 for portrait figure

GRAPH_HEIGHT

- ❖ Default Graph Width is assigned based on graph type
 $\text{Graph Height} / 0.618$

GRAPH_WIDTH

Programing Assigned Output Path:

OUTPUT_PATH

OUTPUT_DATALIB

OUTPUT_PGM_PATH

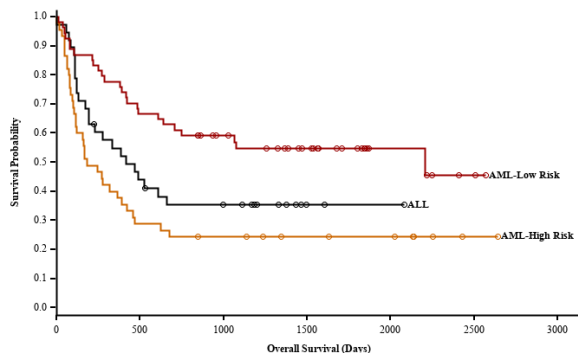


General Output and Graph Setting

STRATA_VAR/TRT_VAR:

Each value of variable referred by parameter strata_var/trt_var represents a group (a line)

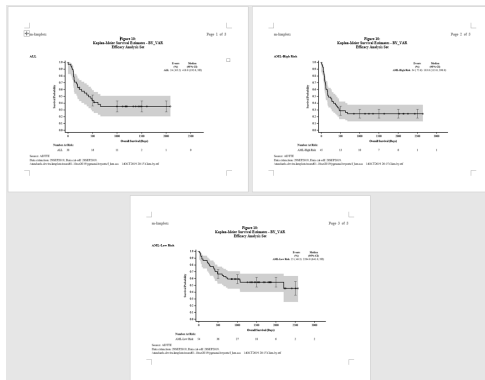
Example: TRT01P|TRT01PN



BY_VAR:

Each value of variable referred by parameter by_var will be displayed in one page

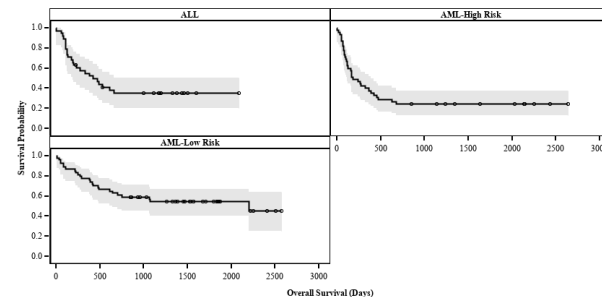
Example: TRT01P|TRT01PN



CLASS_VAR:

Each value of variable referred by parameter class_var will be displayed in one grid (cell)

Example: TRT01P|TRT01PN|2|2



- Combination of BY_VAR and STRATA_VAR or combination of CLASS_VAR and STRATA_VAR can allow users to create more complex graph.
- Combination of BY_VAR and CLASS_VAR is not allowed.



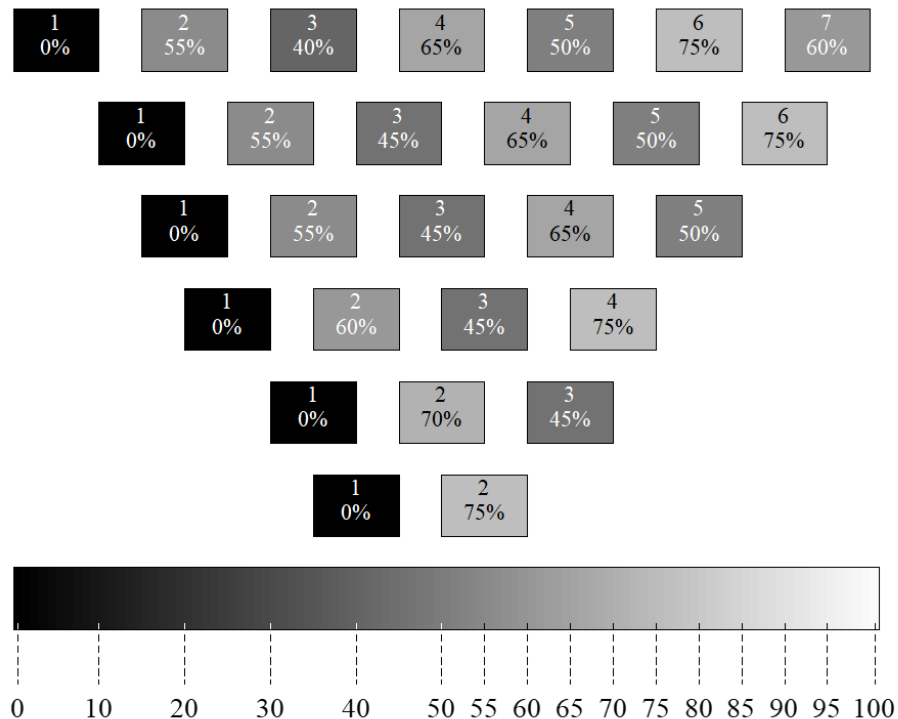
Programming Assigned Color, Symbol & Pattern

Black and White Graph

- ❖ Graph element color will be assigned automatically based on number of strata groups and color combination suggestions from right figure

If there are 2 strata, color will be GRAY00 for 1st stratum, GRAY75 for 2nd stratum

If there are 3 strata, color will be GRAY00 for 1st stratum, GRAY70 for 2nd stratum and GRAY45 for 3rd stratum



GRAY_COLOR = Y



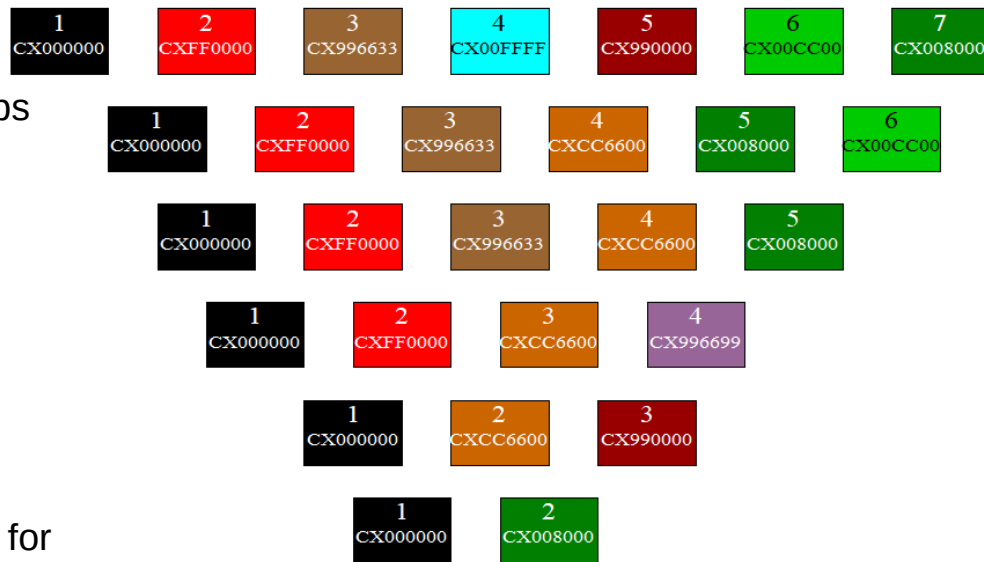
Programming Assigned Color, Symbol & Pattern

Colored Graph

- ❖ Graph element color will be assigned automatically based on number of strata groups and color combination suggestions from right figure

If there are 2 strata, color will be CX000000 for 1st stratum, CX008000 for 2nd stratum

If there are 3 strata, color will be CX000000 for 1st stratum, CXCC6600 for 2nd stratum and CX990000 for 3rd stratum



GRAY_COLOR = N



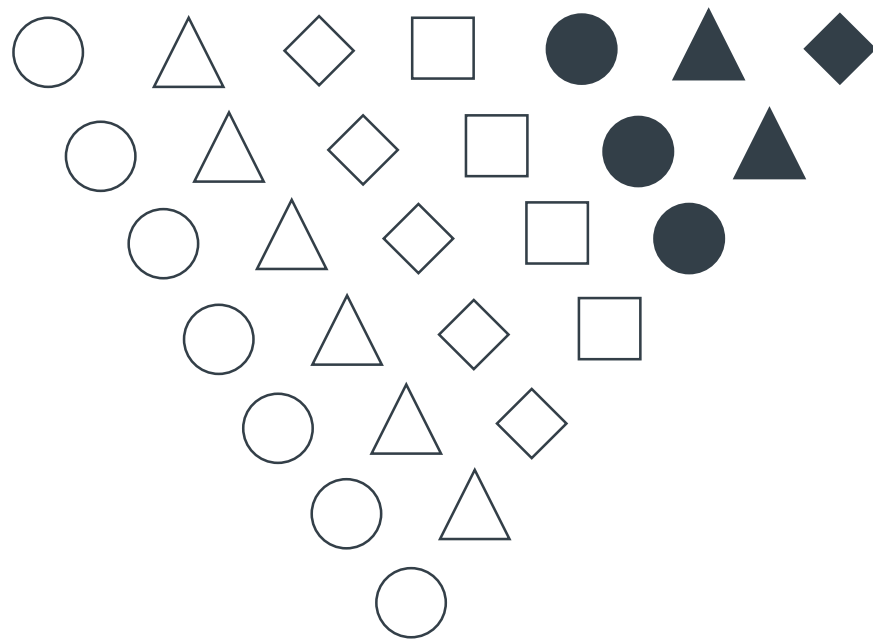
Programming Assigned Color, Symbol & Pattern

Marker Symbol

- ❖ Graph Marker Symbols will be assigned automatically to be circle for all groups when **COMMON_SYMBOL** is **Y**. Otherwise, they will be assigned based on number of strata groups and symbol combination suggestions from right figure

If there are 2 strata, symbols will be CIRCLE for 1st stratum, TRIANGLE for 2nd stratum

If there are 3 strata, color will be CIRCLE for 1st stratum, TRIANGLE for 2nd stratum and DIAMOND for 3rd stratum



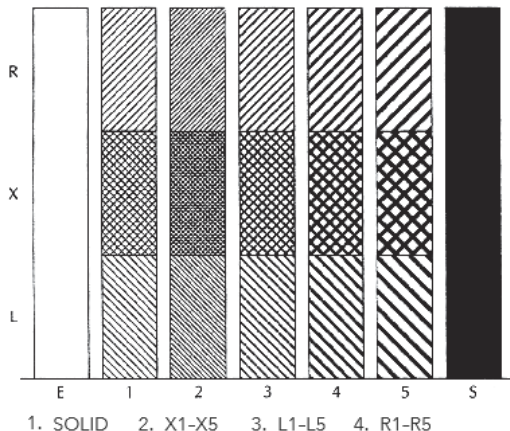
COMMON_SYMBOL= N



Programming Assigned Color, Symbol & Pattern

Fill Pattern

- ❖ For Tumor Response, bar fill pattern will be assigned automatically based on values of Response.
- ❖ For other group, bar fill pattern will be assigned automatically based on number of strata groups and color combination suggestions from right figure



Color, symbol and pattern values are assigned based on tumor response for Waterfall, Spider and Swimmer plot.

Response	Pattern
CR/irCR	X5
uCR/iruCR/CRi	X3
VGPR	X4
PR/irPR	X2
uPR/iruPR/nPR	X1
PRL	L4
MR	L2
SD/irSD	R3
PD/irPD	L1
NE/irNE/NA	R1
Missing/Unknown	S



General Axis Setting

Axis Type:

LOG LOG10
LINEAR (default)

❖ XAXIS_TYPE

❖ YAXIS_TYPE

Axis Variables:

Programming
assigned
automatically
based on type of
graph

❖ XAXIS_VAR

❖ YAXIS_VAR

Axis Tick Values:

Axis tick values will be
computed by macro
automatically from data

❖ XAXIS_TICK_VALUES

❖ XAXIS_TICK_VALUES_FORMAT

❖ YAXIS_TICK_VALUES

❖ YAXIS_TICK_VALUES_FORMAT

❖ YAXIS_INCLUDERANGES

Axis Label:

Programming
assigned
automatically based
on type of graph

❖ XAXIS_LABEL

❖ YAXIS_LABEL

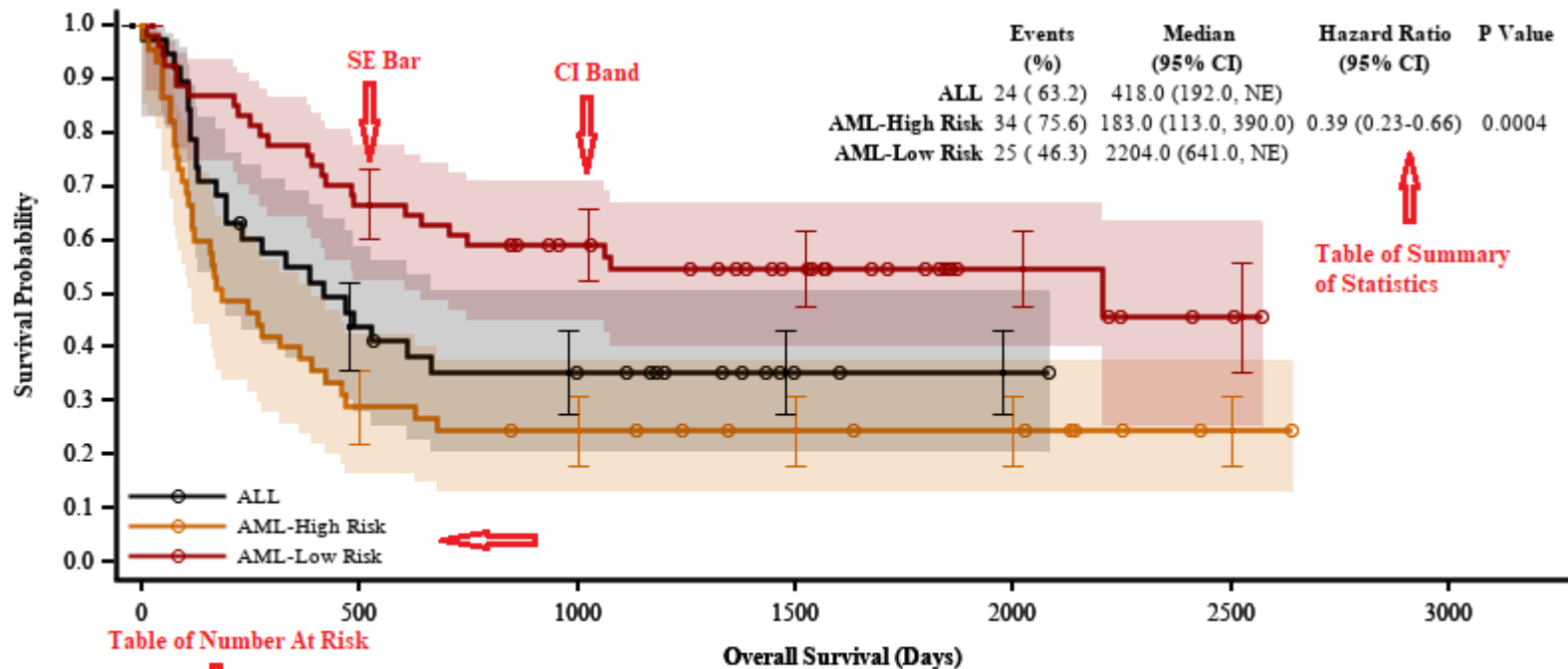
Other Setting

❖ LEGEND_TITLE

❖ REFERENCE_LINES

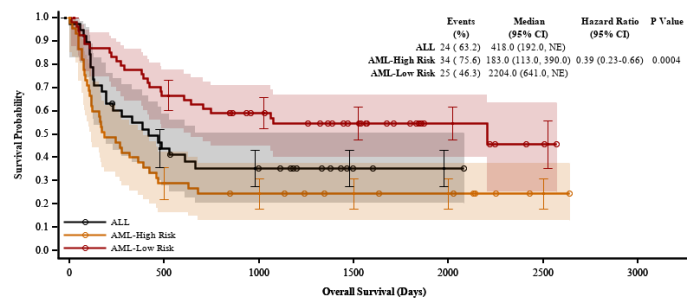


Kaplan Meier Plot Overview



Four Types of M_KMPLOTS

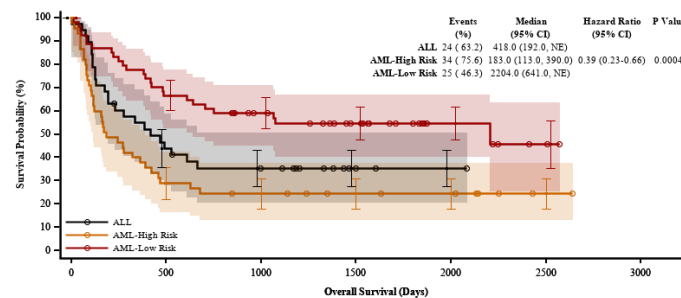
PLOT = SURV



Number At Risk:

ALL	38	16	11	2	1	0	0
AML-High Risk	45	13	10	7	6	1	0
AML-Low Risk	54	36	27	18	6	2	0

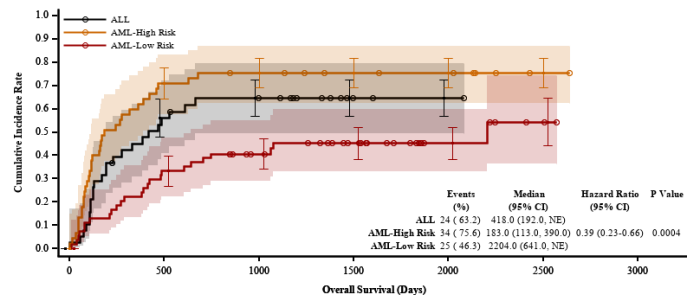
PLOT = SURVP



Number At Risk:

ALL	38	16	11	2	1	0	0
AML-High Risk	45	13	10	7	6	1	0
AML-Low Risk	54	36	27	18	6	2	0

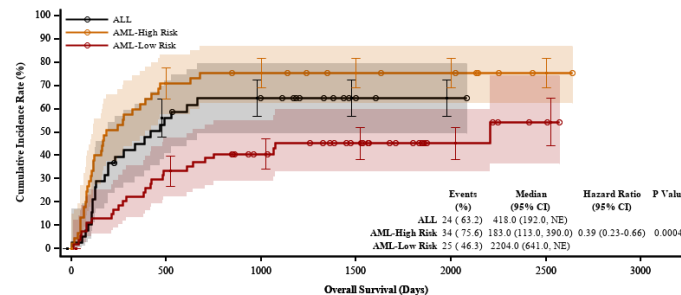
PLOT = FAIL



Number At Risk:

ALL	38	16	11	2	1	0	0
AML-High Risk	45	13	10	7	6	1	0
AML-Low Risk	54	36	27	18	6	2	0

PLOT = FAILP



Number At Risk:

ALL	38	16	11	2	1	0	0
AML-High Risk	45	13	10	7	6	1	0
AML-Low Risk	54	36	27	18	6	2	0



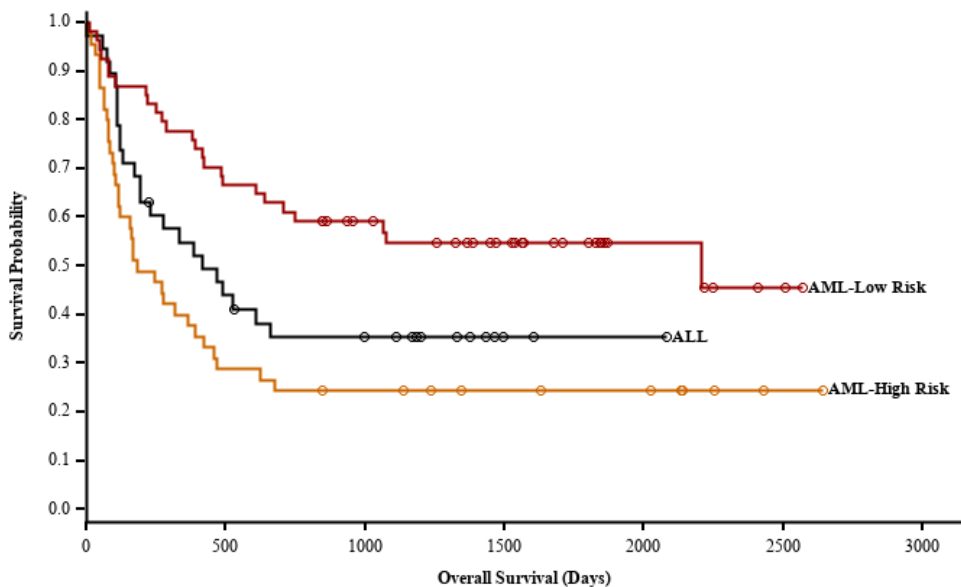
M_KMPLOTS Parameters

```
%macro m_kmplots(
  input_dataset          = /* (required) Name of input dataset */
  ,input_dataset_where    = /* (optional) An arithmetic/logical expression to select observations meeting conditions from INPUT_DATASET */
  ,time_var               = /* (required) Name of the TIME variable (numeric) */
  ,censor_var             = /* (required) Name of the CENSOR variable (numeric) */
  ,censor_indicator       = /* (optional) Censor indicator values, default is 1. It can be a list of values like 1 2 3 4 5 */
  ,plot                   = /* (optional) SURV, SURVP, FAIL or FAILP. default SURV */
  ,alpha_level            = /* (optional) Alpha level for confidence interval, default = 0.05 */
  ,confidence_type        = /* (optional) Confidence type, default is LOGLOG. */
  ,display_stats          = /* (optional) EVENT, MEDIAN, LRPVALUE, HAZARD, HRPVALUE */
  ,hazardratio_dataset    = /* (optional) Name of dataset containing hazard ratio statistics */
  ,display_tab            = /* (optional) Displaying Number At Risk table? Y/N, default is N */
  ,display_ci_se          = /* (optional) Displaying CI or SE interval? Values could be CI, SE, BOTH */
  ,strata_var             = /* (optional) Name of stratum variable, for example, trt01p|trt01pn */
  ,class_var             = /* (optional) Name of class variable to display a panel of similar graphs */
                        /* Character var|Numeric var|row_number|column_number e.g., trt01p|trt01pn|2|2 */
  ,by_var                = /* (optional) Name of by variable to obtain separate analyse. e.g., trt01p|trt01pn */
  ,xaxis_label            = /* (optional) Plot X axis label */
  ,timelist               = /* (optional) Selected time points for X axis, for example, 0 10 20 30 40 50 or 0 to 50 by 10 */
  ,yaxis_label            = /* (optional) plot Y axis label if you want to change the default */
  ,gray_color             = /* (optional) Use gray color schemes? Y/N, default N */
  ,common_symbol          = /* (optional) Use common symbol? Y/N, default Y when gray color is N and N when gray color is Y */
  ,display_legend         = /* (optional) Display legend? Y/N, default N */
  ,legend_position        = /* (optional) Position of legend if you want to change default */
  ,output_path            = /* (optional) Path where output rtf file to be placed, default is fptrgs when destination is A and fptritxt */
                        /* when destination is I */
  ,output_pgm_path        = /* (optional) Path where generated program file to be placed */
                        /* 1) Default is N, produce no macro-generated program file */
                        /* 2) if Y, produce macro-generated program file and path is fptopen */
                        /* 3) Folder path to contain macro-generated program file */
  ,output_dataset         = /* (optional) Name of sas dataset for the output figure. Default is derived from outfile_name and destination */
  ,output_datlib          = /* (optional) Libname for output final figure dataset, default is lptgs when destination is A and lptitxt */
                        /* when destination is I */
  ,graph_height           = /* (optional) Height of graph, 4.4 for landscape appendix tfl; 4.8 for landscape intext tfl; 4.0 for */
                        /* portrait tfl */
  ,graph_width            = /* (optional) Width of graph, default is graph_height/0.618 */
  ,layout_orientation     = /* (optional) Orientation of layout. default is Portrait/P when destination is I and Landscape/L when */
                        /* destination is A */
  ,title_footnote_template = /* (optional) Full name of title and footnote file following global template */
  ,outfile_name           = /* (required) outfile_name used to extract title and footnote */
  ,tfl_title              = /* (optional) TFL title when title is not from excel file. There are 3 pieces of information separated by | */
                        /* 1st piece: TFL number. 2nd piece: TFL title. 3rd piece: TFL population. Example: */
                        /* Table 14.3.2.2|Overall Summary of Treatment-Emergent Adverse Events|Safety Analysis Set */
  ,tfl_footnote           = /* (optional) TFL footnotes concatenated with "\line" when footnote is not from excel file. Example: */
                        /* Abbreviations: DLT = dose limiting toxicity; SAE = serious adverse event; TEAE = treatment */
                        /* adverse event. \line All percentages are based on N. */
  ,language               = /* (optional) Language used in TFL. Default is en. Valid values include en (English) and zh (Chinese) */
  ,destination            = /* (optional) i - intext TFL; a - appendix tfl */
  ,help                   = /* (optional) Put help information in log? Y/N */
  ,debug                  = /* (optional) debug (keep temporary datasets?) Y/N, default is N. */
);
```



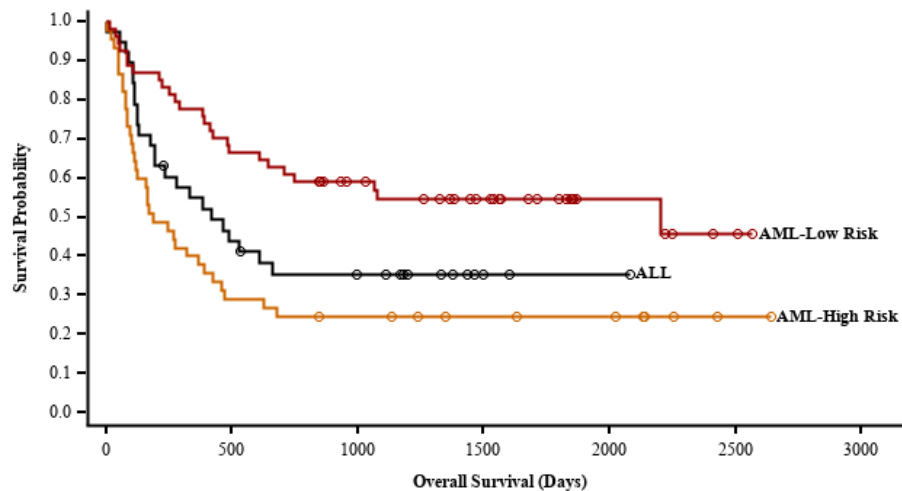
Example 1: Create Survival Probability Plot – STRATA_VAR

```
%m_kmplots( input_dataset = lptad.adtte
,input_dataset_where      = %str(efffl = "Y")
,time_var                 = survtime
,censor_var               = censor
,censor_indicator         = 1
,strata_var               = trt01p|trt01pn
,xaxis_label              = %str(Overall Survival (Days))
,title_footnote_template  = &protpath/m_titles_kmplots.xlsx
,outfile_name             = f_km_strata
);
```



Example 2: Display Table of Number of Subjects at Risk

```
%m_kmplots(
  input_dataset      = lptad.adtte
, input_dataset_where = %str(efffl = "Y")
, time_var           = survtime
, censor_var         = censor
, censor_indicator    = 1
, strata_var         = trt01p|trt01pn
, display_tab        = Y
, xaxis_label        = %str(Overall Survival (Days))
, title_footnote_template = &protpath/m_titles_kmplots.xlsx
, outfile_name       = f_km_risk
);
```



Number At Risk:

ALL	38	16	11	2	1	0	0
AML-High Risk	45	13	10	7	6	1	0
AML-Low Risk	54	36	27	18	6	2	0



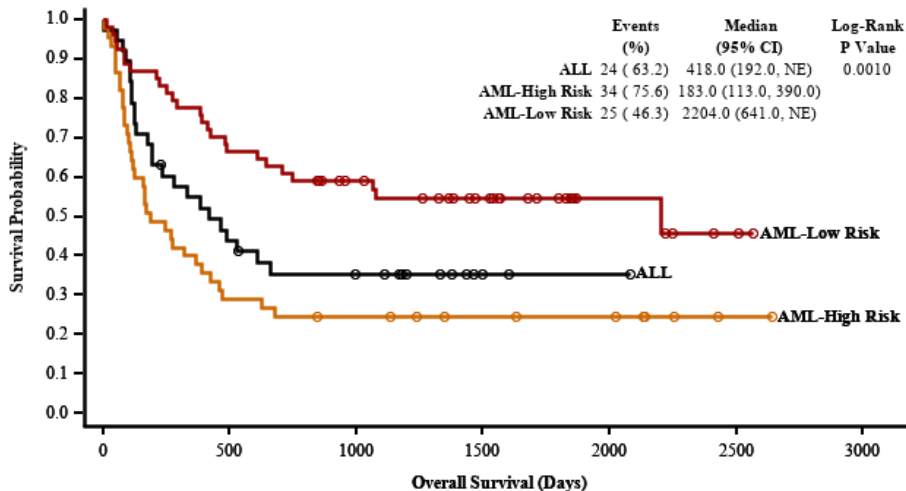
Example 3: Display Statistical Summary Table

```
%m_kmplots(
  input_dataset      = lptad.adtte
, input_dataset_where = %str(efffl = "Y")
, time_var           = survtime
, censor_var         = censor
, censor_indicator    = 1
, strata_var         = trt01p|trt01pn
, display_stats      = event median lrpvalue
, display_tab        = Y
, xaxis_label        = %str(Overall Survival (Days))
, title_footnote_template = &protpath/m_titles_kmplots.xlsx
, outfile_name       = f_km_sum
);
```

Common three combinations:

```
EVENT MEDIAN LRPVALUE
EVENT MEDIAN HAZARD HRPVALUE
EVENT HAZARD HRPVALUE
```

Order of stats can be changed and any number of stats can be requested



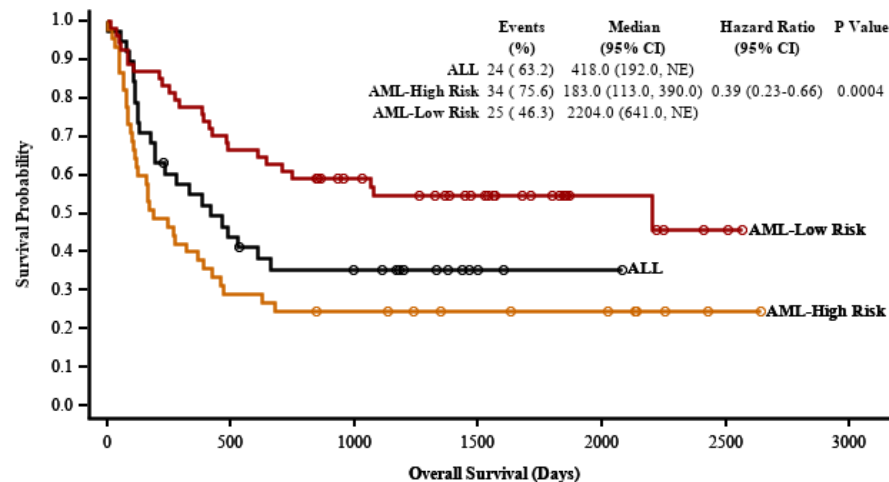
Number At Risk:

	ALL	AML-High Risk	AML-Low Risk
0	38	45	54
16	16	13	36
11	11	10	27
2	2	7	18
1	1	6	6
0	0	1	2
0	0	0	0



Example 4: Display Hazard Ratio Statistics

```
%m_kmplots(
    input_dataset      = lptad.adtte
, input_dataset_where = %str(efffl = "Y")
, time_var            = survtime
, censor_var          = censor
, censor_indicator    = 1
, strata_var          = trt01p|trt01pn
, display_stats       = event median hazard hrpvalue
, hazardratio_dataset = hr
, display_tab         = Y
, xaxis_label         = %str(Overall Survival (Days))
, graph_height        = 4.4
, output_pgm_path     = Y
, title_footnote_template = &protpath/m_titles_kmplots.xlsx
, outfile_name        = f_km_hr
);
```



Number At Risk:

ALL	38	16	11	2	1	0	0
AML-High Risk	45	13	10	7	6	1	0
AML-Low Risk	54	36	27	18	6	2	0

trt01pn	hr	pvalue
2	0.39 (0.23-0.66)	0.0004

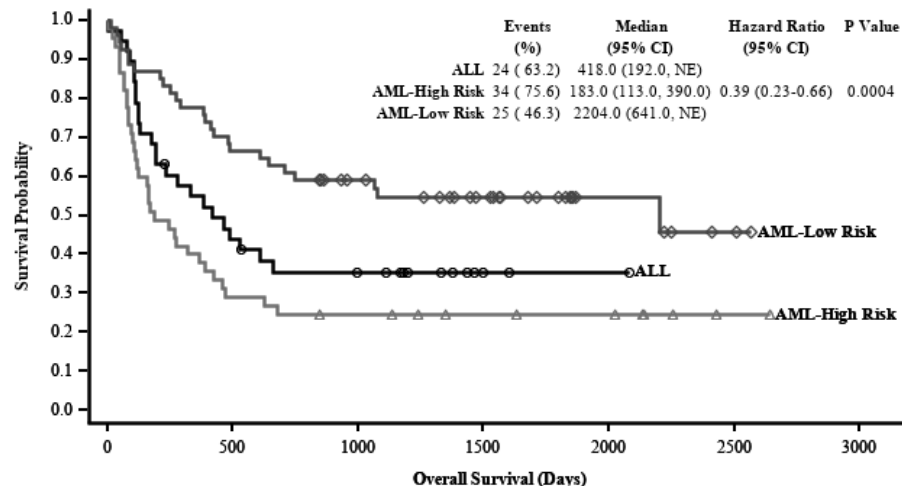
If display_stats = event hazard hrpvalue , Median (95% CI) will not be displayed

Variable name HR and PVALUE are fixed. Plus, numeric STRTA_VAR (TRT01PN in this case) or BY_VAR should also be included if STRATA_VAR or BY_VAR is populated.



Example 5: Apply Gray Color Scheme and Different Marker Symbol

```
%m_kmplots(
  input_dataset      = lptad.adtte
, input_dataset_where = %str(efffl = "Y")
, time_var           = survtime
, censor_var         = censor
, censor_indicator    = 1
, strata_var         = trt01p|trt01pn
, display_stats      = event median hazard hrpvalue
, hazardratio_dataset = hr
, gray_color         = Y
, display_tab        = Y
, xaxis_label        = %str(Overall Survival (Days))
, title_footnote_template = &propath/m_titles_kmplots.xlsx
, outfile_name       = f_km_gray
);
```



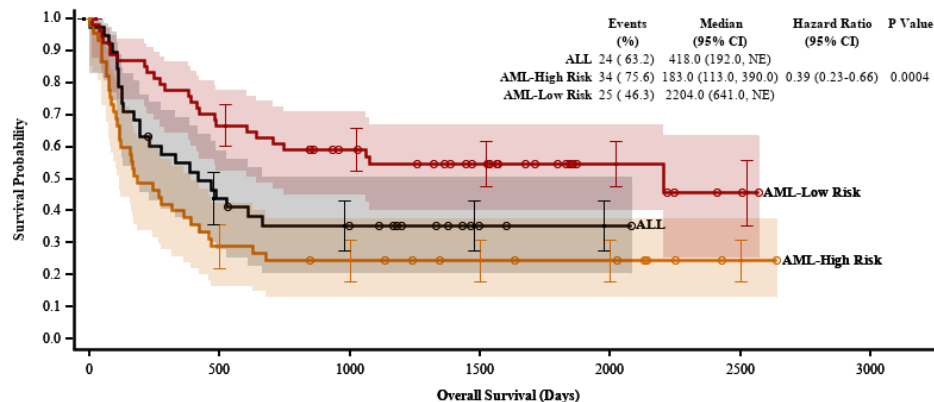
Number At Risk:

ALL	38	16	11	2	1	0	0
AML-High Risk	45	13	10	7	6	1	0
AML-Low Risk	54	36	27	18	6	2	0



Example 6: Ask for Confidence Interval Band or Standard Error Bar

```
%m_kmplots(
  input_dataset      = lptad.adtte
, input_dataset_where = %str(efffl = "Y")
, time_var           = survtime
, censor_var         = censor
, censor_indicator    = 1
, strata_var         = trt01p|trt01pn
, display_stats      = event median hazard hrpvalue
, hazardratio_dataset = hr
, display_ci_se      = both
, display_tab        = Y
, xaxis_label        = %str(Overall Survival (Days))
, title_footnote_template = &protpath/m_titles_kmplots.xlsx
, outfile_name       = f_km_ci
);
```



Number At Risk:

ALL	38	16	11	2	1	0
AML-High Risk	45	13	10	7	6	1
AML-Low Risk	54	36	27	18	6	2

CI - Display Confidence Interval band

SE - Display Standard Error bar

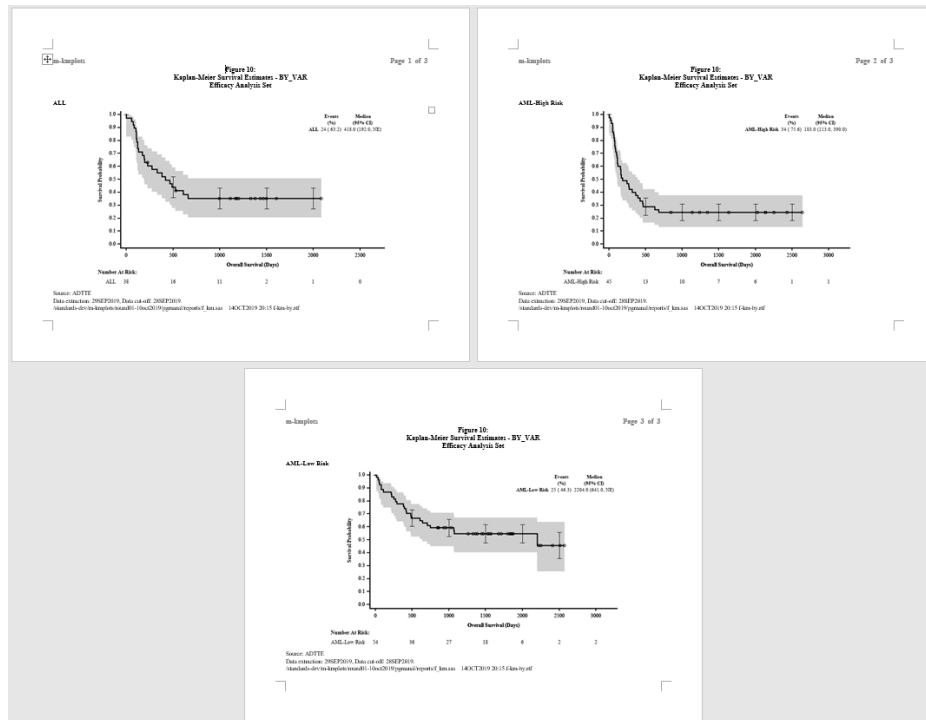
Both - Display both Confidence Interval band and Standard Error bar



Example 7: Create Survival Probability Plot – BY_VAR

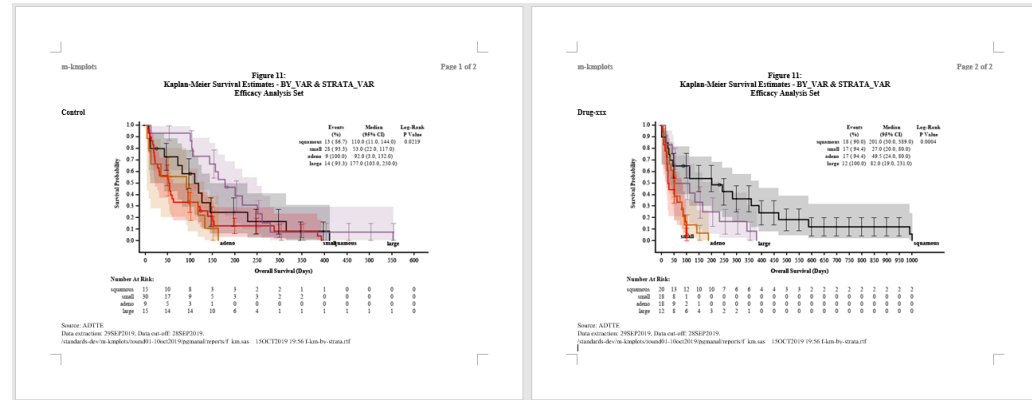
```
%m_kmplots(
    input_dataset          = lptad.addtte
    ,input_dataset_where    = %str(efffl = "Y")
    ,time_var               = survtime
    ,censor_var             = censor
    ,censor_indicator       = 1
    ,by_var                 = trt01p|trt01pn
    ,display_stats          = event median lrpvalue
    ,display_ci_se          = both
    ,display_tab            = Y
    ,axis_label             = %str(Overall Survival (Days))
    ,title_footnote_template = &protpath/m_titles_kmplots.xlsx
    ,outfile_name           = f_km_by
);
```

Value of character BY_VAR will be displayed
on top left of graph on each page



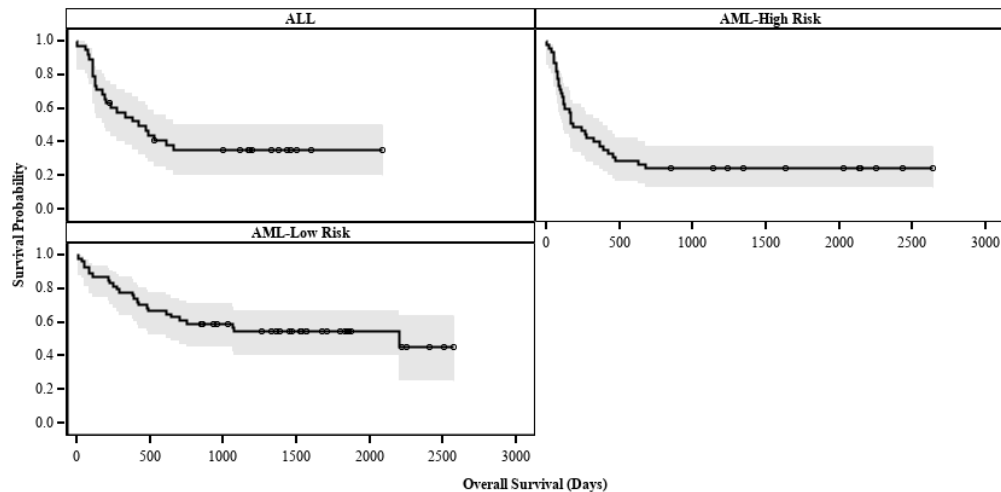
Example 8: Create Survival Probability Plot – BY_VAR & STRATA_VAR

```
%m_kmplots(
  input_dataset      = lptad.adttel
, input_dataset_where = %str(efffl = "Y")
, time_var           = survtime
, censor_var         = censor
, censor_indicator    = 1
, by_var             = trt01p|trt01pn
, strata_var         = cell|celln
, display_stats      = event median lrpvalue
, display_tab        = Y
, display_ci_se      = both
, axis_label         = %str(Overall Survival (Days))
, title_footnote_template = &protpath/m_titles_kmplots.xlsx
, outfile_name       = f_km_by_strata
);
```



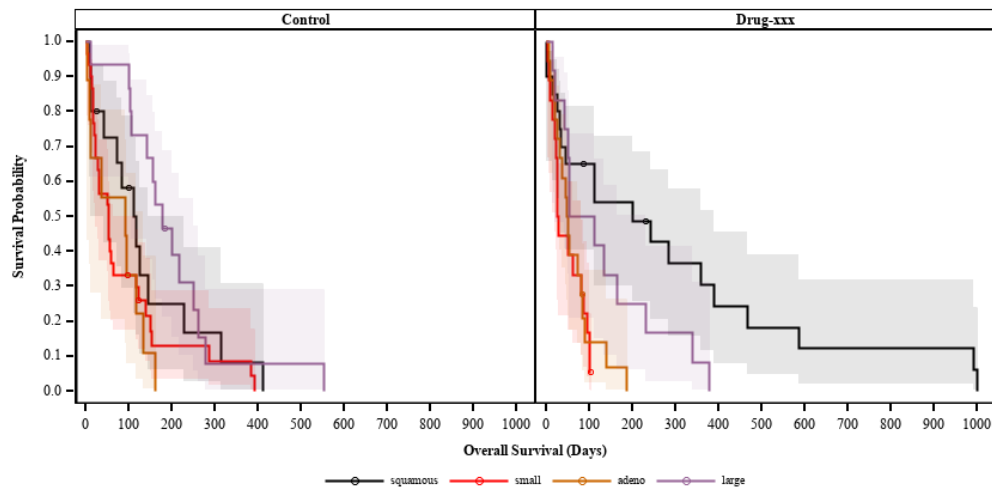
Example 9: Create Survival Probability Plot – CLASS_VAR

```
%m_kmplots(  
  input_dataset      = lptad.adtte  
, input_dataset_where = %str(efffl = "Y")  
, time_var          = survtime  
, censor_var         = censor  
, censor_indicator   = 1  
, class_var          = trt01p|trt01pn|2|2  
, display_ci_se      = CI  
, xaxis_label        = %str(Overall Survival (Days))  
, title_footnote_template = &protpath/m_titles_kmplots.xlsx  
, outfile_name        = f_km_class  
);
```



Example 10: Create Survival Probability Plot – CLASS_VAR & STRATA_VAR

```
%m_kmplots(  
  input_dataset      = lptad.adttel  
,input_dataset_where = %str(efffl = "Y")  
,time_var           = survtime  
,censor_var         = censor  
,censor_indicator    = 1  
,class_var          = trt01p|trt01pn|1|2  
,strata_var          = cell|celln  
,display_ci_se      = CI  
,display_legend      = Y  
,axis_label         = %str(Overall Survival (Days))  
,title_footnote_template = &protpath/m_titles_kmplots.xlsx  
,outfile_name       = f_km_class_strata  
);
```



When curve labels in one of data cells collide with each other, group information can be displayed in legend at the bottom of graph.



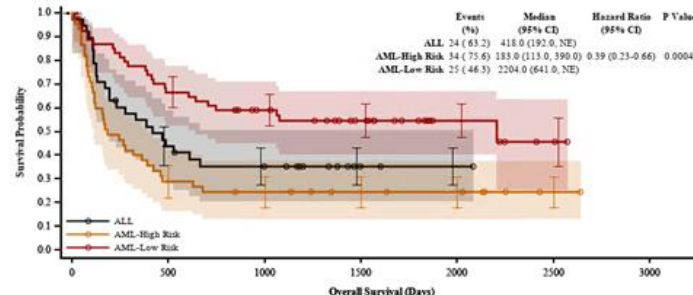
Example 11: Create Survival Probability Plot – INTTEXT TFL

```
%m_kmplots(
  input_dataset      = lptad.adtte
, input_dataset_where = %str(efffl = "Y")
, time_var           = survtime
, censor_var         = censor
, censor_indicator    = 1
, strata_var         = trt01p|trt01pn
, display_stats      = event median hazard hrpvalue
, hazardratio_dataset = hr
, display_legend      = Y
, display_ci_se      = both
, display_tab        = Y
, xaxis_label        = %str(Overall Survival (Days))
, destination        = I
, title_footnote_template = &protpath/m_titles_kmplots.xlsx
, outfile_name       = f_km_intext
);
```

m_kmplots

Page 1 of 1

Figure 17: Kaplan-Meier Survival Estimates - Fail (Efficacy Analysis Set)

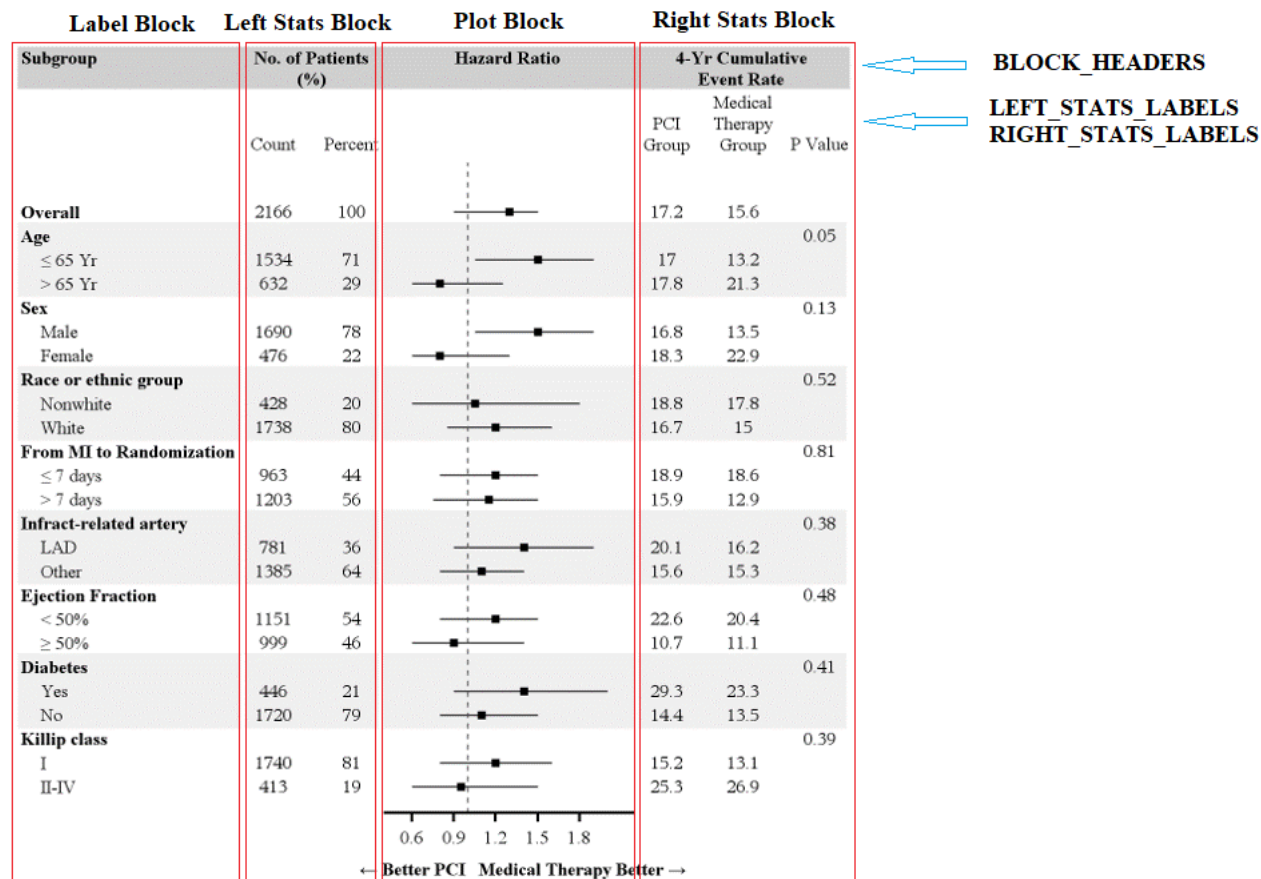


Number At Risk:						
ALL	38	16	11	2	1	0
AML-High Risk	45	13	10	7	6	1
AML-Low Risk	54	36	27	18	6	2

Source: ADTTE
 Data extraction: 29SEP2019, Data cut-off: 28SEP2019.
 /standards-dev/m_kmplots/round01-10oct2019/pgmanal/reports/f_km.sas 15OCT2019 19:56 f_km_intext-1.rtf



Forest Plot Overview



Both Left Stats Block and Right Stats Block can contain more than one blocks



M_FORESTPLOTS Parameters

```

%macro m_forestplots(
  input_dataset      /* (required) Name of input dataset.                               */
  ,block_headers     /* (required) Text to be displayed in block headers. Split character is -. Example:
  /* Subgroup(No. of Patients-(#))Hazard Ratio(4-Yr Cumulative Event Rate
  /* - There are 4 blocks and each block has a label
  /* Subgroup( ) | 4-Yr Cumulative Event Rate
  /* - There are 4 blocks and there are no labels for 2nd and 3rd blocks
  ,label_block       /* (required) There are two pieces separated by |. Example, subgroup(id)or subgroup(id|italic.
  /* 1st piece (required): Name of label variable to be displayed
  /* 2nd piece (required): Name of variable indicating levels.
  /* 3rd piece (optional): Name of variable indicating italic style
  ,left_stats_blocks /* (optional) Name of variables to be displayed in blocks on the left of plot block. Variables belong to the
  /* same block should be separated by | and enclosed by square brackets. Even if there is only one
  /* block, it still should be enclosed by square brackets. Split character is -. Example:
  /* [Count|Percent] - One block consists of two columns Count and Percent.
  /* [Count|Percent|HR] - Two blocks. The first block will display values of Count and Percent
  /* while the second block will display values of HR.
  ,left_stats_labels /* (optional) Labels to be displayed for columns within each block on the left of plot block. Labels belong
  /* to the same block should be separated by | and enclosed by square brackets. Even if there is
  /* only one block, it still should be enclosed by square brackets.
  /* [Count|Percent|Hazard Ratio] - Labels for first block are Count and Percent while Label for
  /* second block is Hazard Ratio.
  /* [Count| ]|Hazard Ratio] - There is no label for second column within first block.
  ,plot_block        /* (required) There are 3 pieces of information separated by |. Example: Estimate|LCL|UCL
  /* 1st piece: name of numeric variable to be displayed for estimate
  /* 2nd piece: name of numeric variable to be displayed for lower limit
  /* 3rd piece: name of numeric variable to be displayed for upper limit
  ,right_stats_blocks /* (optional) Name of variables to be displayed in blocks on the right of plot block.
  /* See LEFT_STATS_BLOCKS for details.
  ,right_stats_labels /* (optional) Labels to be displayed for columns within each block on the right of plot block.
  /* See LEFT_STATS_LABELS for details
  ,block_weights     /* (optional) Proportional width of each block relative to the overall graph width. If not specified, macro
  /* will calculate automatically.
  ,plot_yaxis_var    /* (optional) Name of variable to be used in y axis for plot. By default, macro will create a variable _obaid
  /* which is equal to _N_
  ,by_var            /* (optional) Name of by variable to obtain separate analyses. For example, test01p|test01gm
  ,test_var          /* (optional) Name of treatment variable. For example, test01|test01gm
  ,band_var          /* (optional) Name of variable to be used to plot light gray band
  ,reference_line    /* (optional) Reference line value, default is 1
  ,xaxis_type        /* (optional) Type of x axis. Valid values include LOG, LOG10, LINEAR (default)
  ,xaxis_tick_values /* (optional) Value list of x axis if you'd like to change default
  ,xaxis_label       /* (optional) Default is Control/Treatment when test_var is missing and Estimate Diff of Mean Change when
  /* test_var is populated. If Y/N, label of X axis will be turned off. It can also be a format name
  /* when BY_VAR is not missing.
  ,gray_color        /* (optional) Use gray color schemes? Y/N, default N
  ,common_symbol     /* (optional) Use common symbol? Y/N, default Y when gray color is N and Y when gray color is Y
  ,output_path       /* (optional) Path where output .rtf file to be placed, default is fptgts when destination is A and fptextit
  /* when destination is I
  ,output_pgm_path   /* (optional) Path where generated program file to be placed
  /* 1) Default is W, produce no macro-generated program file
  /* 2) If Y, produce macro-generated program file and path is fptopen
  /* 3) Folder: path to contain macro-generated program file
  ,output_dataset    /* (optional) Name of sas dataset for the output figure. Default is derived from outfile_name and destination
  ,output_datlib     /* (optional) Libname for output final figure dataset, default is fptgts when destination is A and fptitxt
  /* when destination is I
  ,graph_height      /* (optional) Height of the graph (inch), default is computed on number of observations
  ,graph_width       /* (optional) Width of graph, 9in for Landscape and 6.5in for Portrait by default
  ,layout_orientation /* (optional) Orientation of layout. default is Portrait/P when destination is I and Landscape/L when
  /* destination is A
  ,title_footnote_template /* (optional) Full name of title and footnote file following global template
  ,outfile_name       /* (required) outfile_name used to extract title and footnote
  ,tfl_title         /* (optional) TFL title when title is not from excel file. There are 3 pieces of information separated by |
  /* 1st piece: TFL number. 2nd piece: TFL title. 3rd piece: TFL population. Example:
  /* Table 14.3.2.2|Overall Summary of Treatment-Emergent Adverse Events|Safety Analysis Set
  ,tfl_footnote      /* (optional) TFL footnotes concatenated with "\line" is not from excel file. Example:
  /* Abbreviations: DLT = dose limiting toxicity; SAE = serious adverse event; TEAE = treatment
  /* adverse event. \line All percentages are based on N.
  ,destination       /* (optional) I - intent TFL; a - appendix
  ,language          /* (optional) Language used in TFL. Default is en. Valid values include en (English) and zh (Chinese)
  ,help              /* (optional) Put help information in log? Y/N
  ,debug             /* (optional) debug (keep temporary datasets?) Y/N, default is N.
) ;

```



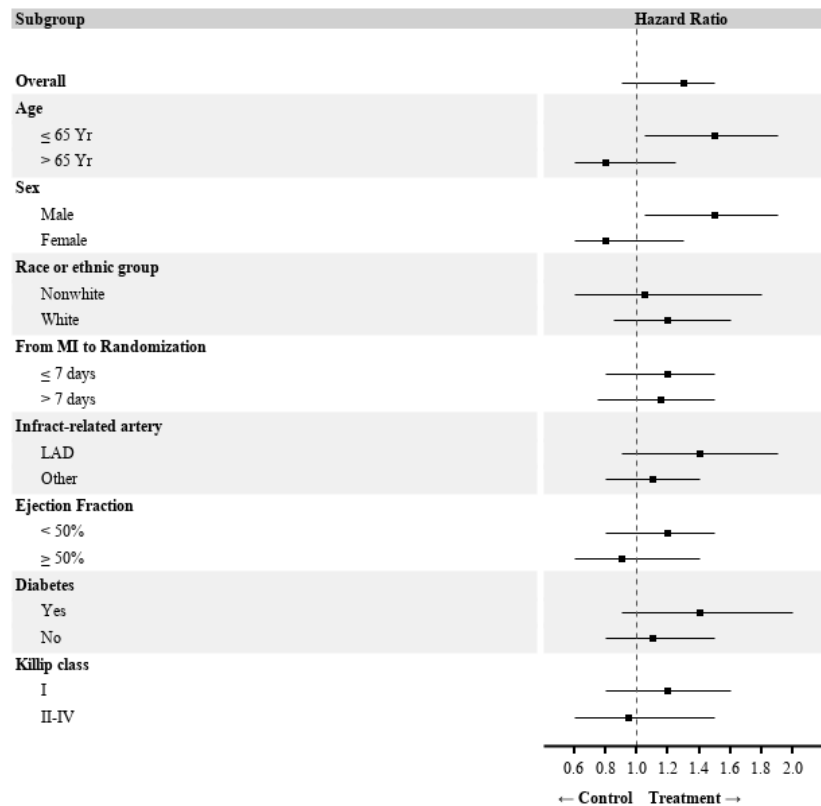
Example Data Used in Example 1 – Example 4

id	subgroup	CountPct	count	percent	mean	low	high	pcigroup	group	pvalue	ref
1	Overall	2166 (100)	2166	100	1.3	0.9	1.5	17.2	15.6		
1	Age									0.05	2
2	(*ESC*)(unicode '2264'x) 65 Yr	1534 (71)	1534	71	1.5	1.05	1.9	17	13.2		3
2	> 65 Yr	632 (29)	632	29	0.8	0.6	1.25	17.8	21.3		4
1	Sex									0.13	
2	Male	1690 (78)	1690	78	1.5	1.05	1.9	16.8	13.5		
2	Female	476 (22)	476	22	0.8	0.6	1.3	18.3	22.9		
1	Race or ethnic group									0.52	8
2	Nonwhite	428 (20)	428	20	1.05	0.6	1.8	18.8	17.8		9
2	White	1738 (80)	1738	80	1.2	0.85	1.6	16.7	15		10
1	From MI to Randomization									0.81	
2	(*ESC*)(unicode '2264'x) 7 days	963 (44)	963	44	1.2	0.8	1.5	18.9	18.6		
2	> 7 days	1203 (56)	1203	56	1.15	0.75	1.5	15.9	12.9		



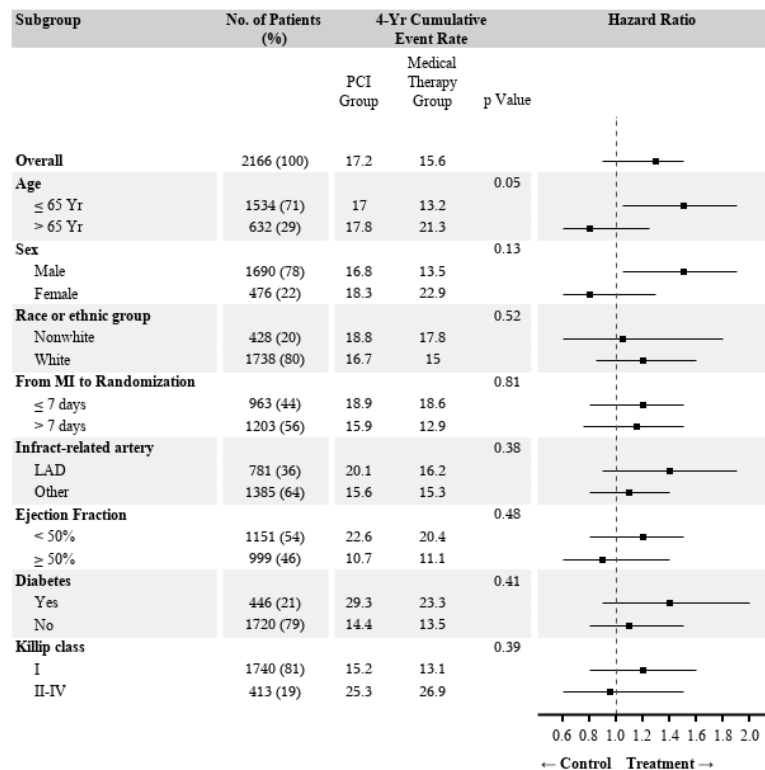
Example 1: Create Forest Plot – Only Label Block and Plot Block

```
%m_forestplots(  
  input_dataset      = lptad.forest  
,block_headers      = Subgroup|Hazard Ratio  
,label_block        = Subgroup|id  
,plot_block         = Mean|Low|High  
,band_var           = ref  
,layout_orientation = p  
,title_footnote_template = &protpath/m_titles_forestplots.xlsx  
,outfile_name       = f_forest  
);
```



Example 2: Create Forest Plot – Display two Left Stats Blocks

```
%m_forestplots(
  input_dataset      = lptad.forest
,block_headers      = Subgroup|No. of Patients~(%)|4-Yr
Cumulative~Event Rate|Hazard Ratio
,label_block        = Subgroup|id
,left_stats_blocks   = [CountPct] [PCIGroup|Group|pvalue]
,left_stats_labels   = [] [PCI~Group|Medical~Therapy~Group|p Value]
,plot_block         = Mean|Low|High
,band_var           = ref
,layout_orientation = p
,title_footnote_template = &protpath/m_titles_forestplots.xlsx
,outfile_name       = f_forest_left3
);
```



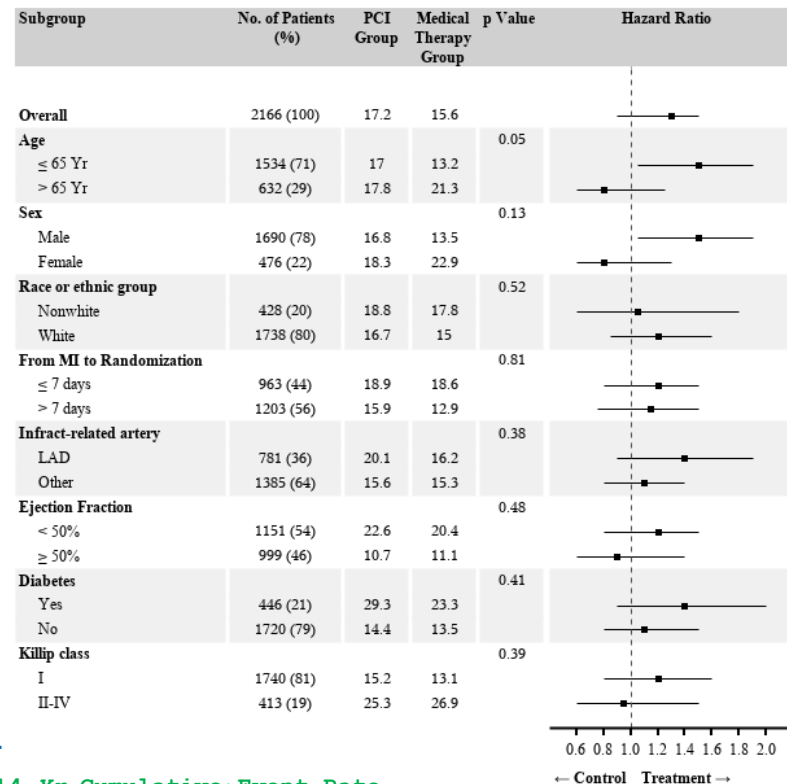
Following can create Forest plot containing two right stats blocks.

```
,block_headers      = Subgroup|Hazard Ratio|No. of Patients~(%)|PCI~Group|Medical~Therapy~Group|p Value
,right_stats_blocks  = [CountPct] [PCIGroup] [Group] [PValue]
```



Example 3: Create Forest Plot – Display More than two Left Stats Blocks

```
%m_forestplots(
  input_dataset      = lptad.forest
  ,block_headers      = Subgroup|No. of
Patients~(%) |PCI~Group|Medical~Therapy~Group|p Value|Hazard Ratio
  ,label_block        = Subgroup|id
  ,left_stats_blocks  = [CountPct] [PCIGroup] [Group] [pvalue]
  ,plot_block         = Mean|Low|High
  ,band_var           = ref
  ,layout_orientation = p
  ,title_footnote_template = &protpath/m_titles_forestplots.xlsx
  ,outfile_name       = f_forest_left4
);
```



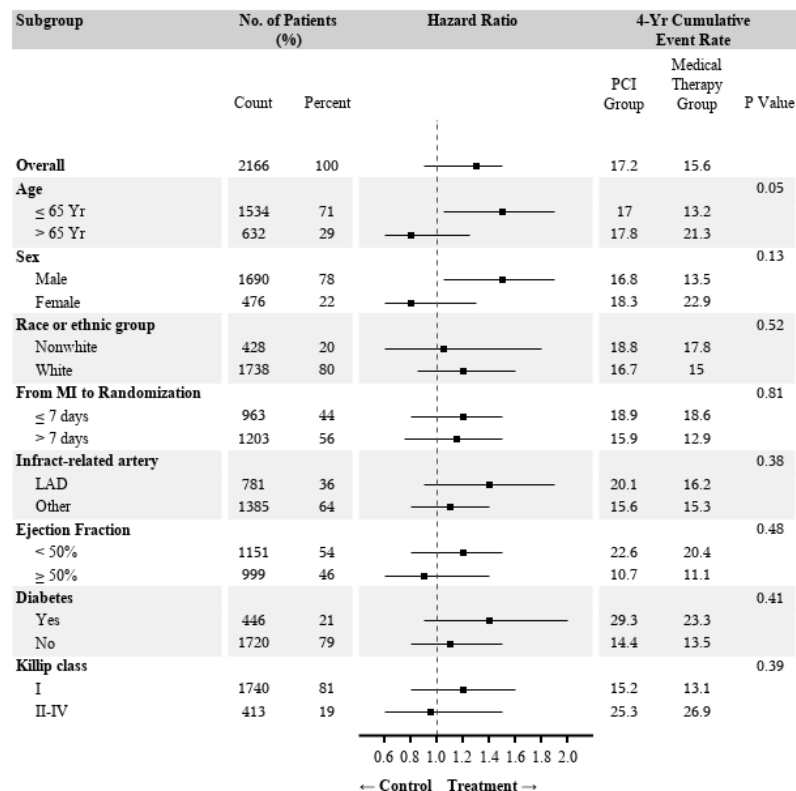
Following can create Forest plot containing more than two right stats blocks.

```
,block_headers      = Subgroup|Hazard Ratio|No. of Patients~(%) |4-Yr Cumulative~Event Rate
,right_stats_blocks  = [CountPct] [PCIGroup|Group|pvalue]
,right_stats_labels  = [] [PCI~Group|Medical~Therapy~Group|p Value]
```



Example 4: Create Forest Plot – Display both Left and Right Stats Blocks

```
%m_forestplots(
  input_dataset      = lptad.forest
,block_headers      = Subgroup|No. of Patients~(%)|Hazard Ratio|4-
Yr Cumulative~Event Rate
,label_block        = Subgroup|id
,left_stats_blocks   = [Count|Percent]
,left_stats_labels   = [Count|Percent]
,plot_block         = Mean|Low|High
,right_stats_blocks  = [PCIGroup|Group|PValue]
,right_stats_labels  = [PCI~Group|Medical~Therapy~Group|P Value]
,band_var           = ref
,layout_orientation = p
,title_footnote_template = &protpath/m_titles_forestplots.xlsx
,outfile_name       = f_forest_all
);
```



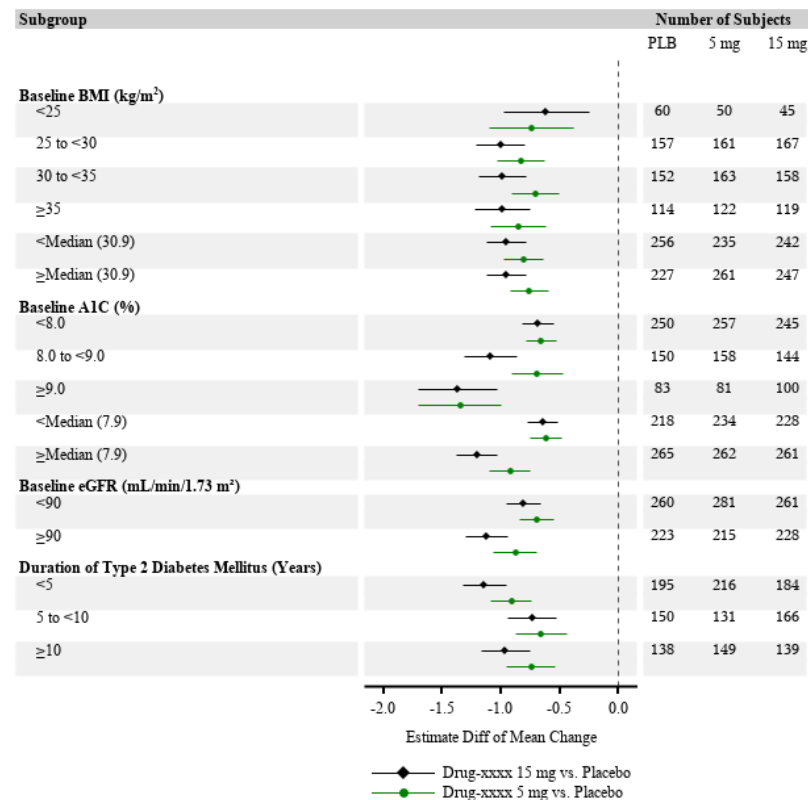
Example Data Used in Example 5

#	GRP	GRPTXT	#	ID	SUBGROUP	#	STAT	#	LOWER	#	UPPER	#	R1	#	R2	#	R3	#	REF
.			1		Baseline BMI (kg/m(*ESC*)(sup 2'))	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1	Drug-xxxx	15 mg vs. Placebo	2	<25		-0.614822015	-0.981848584	-0.247795445	60	50	45	2							
2	Drug-xxxx	5 mg vs. Placebo	2			-0.737301877	-1.095912909	-0.378690846	.	.	.	3							
1	Drug-xxxx	15 mg vs. Placebo	2	25 to <30		-1.001468646	-1.208193078	-0.794744214	157	161	167	.							
2	Drug-xxxx	5 mg vs. Placebo	2			-0.831108759	-1.037491828	-0.624725691	.	.	.	.							
1	Drug-xxxx	15 mg vs. Placebo	2	30 to <35		-0.985697855	-1.189573251	-0.781822459	152	163	158	6							
2	Drug-xxxx	5 mg vs. Placebo	2			-0.709616912	-0.912212367	-0.507021456	.	.	.	7							
1	Drug-xxxx	15 mg vs. Placebo	2	(*ESC*)(unicode '2265'x)35		-0.985173894	-1.220930549	-0.749417239	114	122	119	.							
2	Drug-xxxx	5 mg vs. Placebo	2			-0.852455698	-1.085687227	-0.619224169	.	.	.	.							
1	Drug-xxxx	15 mg vs. Placebo	2	<Median (30.9)		-0.953865521	-1.119403014	-0.788328029	256	235	242	10							
2	Drug-xxxx	5 mg vs. Placebo	2			-0.81167095	-0.977379942	-0.645961958	.	.	.	11							
1	Drug-xxxx	15 mg vs. Placebo	2	(*ESC*)(unicode '2265'x)Median (30.9)		-0.956304294	-1.121107314	-0.791501274	227	261	247	.							
2	Drug-xxxx	5 mg vs. Placebo	2			-0.759354221	-0.921941924	-0.596766519	.	.	.	.							
.			1		Baseline A1C (%)	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1	Drug-xxxx	15 mg vs. Placebo	2	<8.0		-0.687745133	-0.819713889	-0.555776377	250	257	245	15							
2	Drug-xxxx	5 mg vs. Placebo	2			-0.659961788	-0.789548819	-0.530374758	.	.	.	16							
1	Drug-xxxx	15 mg vs. Placebo	2	8.0 to <9.0		-1.089534078	-1.311823908	-0.867244247	150	158	144	.							
2	Drug-xxxx	5 mg vs. Placebo	2			-0.693808716	-0.910940778	-0.476676653	.	.	.	.							
1	Drug-xxxx	15 mg vs. Placebo	2	(*ESC*)(unicode '2265'x)9.0		-1.37325343	-1.70944077	-1.037066091	83	81	100	19							
2	Drug-xxxx	5 mg vs. Placebo	2			-1.351771287	-1.703211819	-1.000330755	.	.	.	20							

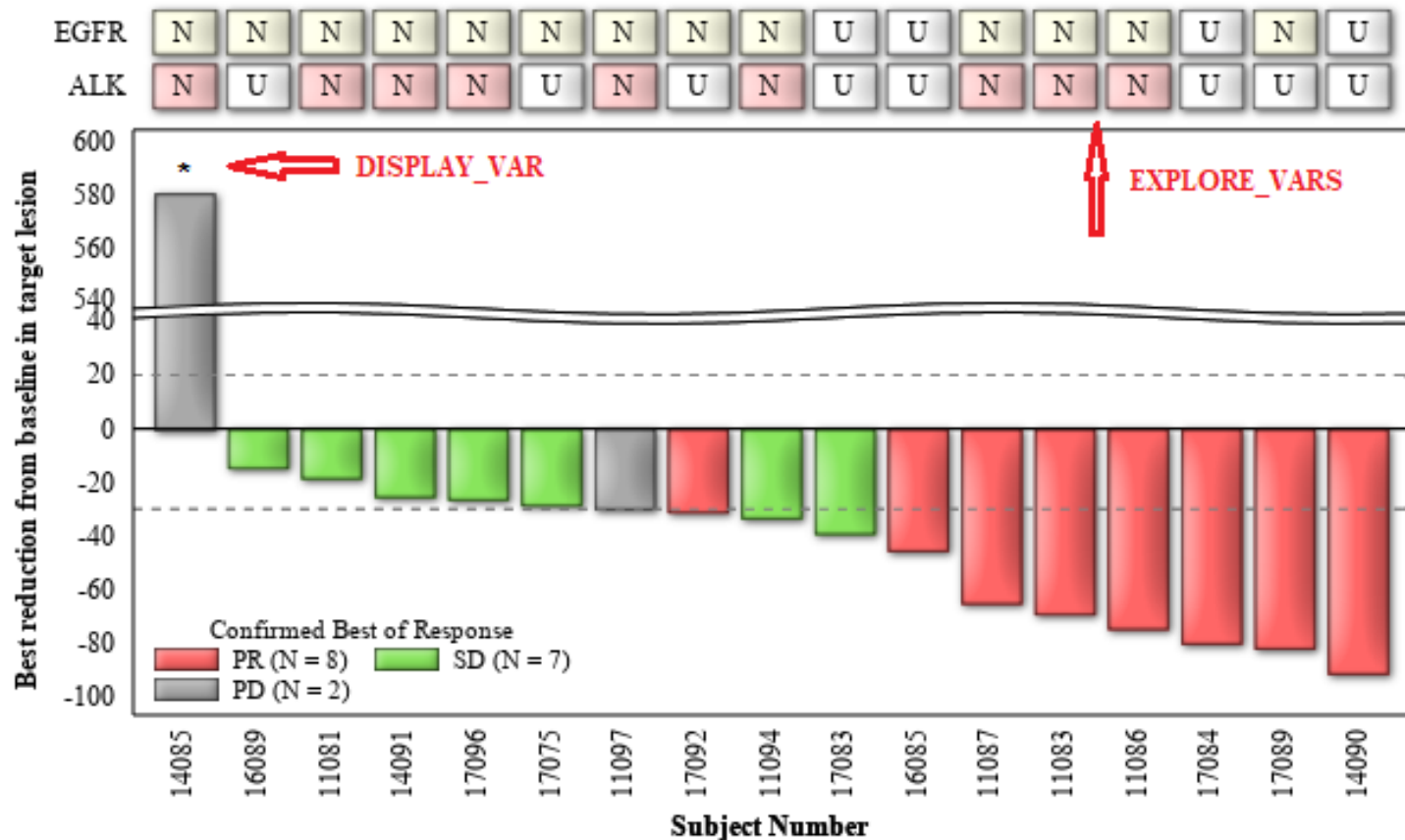


Example 5: Create Forest Plot – TRT_VAR

```
%m_forestplots(
    input_dataset      = lptad.forest2
    ,block_headers      = Subgroup| Number of Subjects
    ,label_block        = Subgroup|id
    ,plot_block         = stat|lower|upper
    ,right_stats_blocks = [r1|r2|r3]
    ,right_stats_labels = [PLB|5 mg|15 mg]
    ,trt_var            = grptext|grp
    ,band_var           = ref
    ,reference_line      = 0
    ,layout_orientation = p
    ,title_footnote_template = &protpath/m_titles_forestplots.xlsx
    ,outfile_name       = f_forest2
);
```



Waterfall Plot Overview



M_WATERFALLPLOTS Parameters

```

%macro m_waterfallplots(
    input_dataset          = /* (required) Name of input dataset                                */
    ,input_dataset_where   = /* (optional) An arithmetic or logical expression to select observations */
    ,xaxis_var             = /* (optional) Name of variable to be used in x axis for plot. Default is subjid. */
    ,yaxis_var             = /* (optional) Name of variable to be used in y axis for plot. Default is pchg. */
    ,trt_var              = /* (required) Name of group variable/name of group variable and format name, e.g. trt01a|trt01an trt01an:trta*/
    ,class_var            = /* (optional) Name of class variable to display a panel of similar graphs */
                        /* Character var|Numeric var|row_number|column_number */
                        /* For example, trt01p|trt01pn|2|2 */
    ,by_var               = /* (optional) Name of by variable to obtain separate analyse, e.g. trt01p|trt01pn */
    ,display_var          = /* (optional) Name of character variable to be displayed for bar of waterfall plot */
    ,explore_vars         = /* (optional) Label and name of variables to be displayed on top of waterfall plot */
                        /* For example, [Histology|histn|hist][PD-L1|pdlin|pdll] */
                        /* Even if there is only one exploratory indicator, it should be enclosed within square brackets. */
    ,xaxis_label          = /* (optional) Label of x axis if you want to change default. Default is Subject Number */
    ,yaxis_tick_values    = /* (optional) Value list of y axis if you'd like to change default */
                        /* Example, 0 10 20 30 40 50 or 0 to 50 by 10 or armn:range or arm:$range */
    ,yaxis_includeranges = /* (optional) Specifies the ranges for a broken Y axis. */
                        /* Example:%quote([-100,0] [40,100]) or armn:tick or arm:$tick */
    ,yaxis_label          = /* (optional) Label of y axis if you want to change default. Default is Best reduction from baseline in */
                        /* target lesion. */
    ,reference_lines      = /* (optional) Reference line values separated by blank space. Default is -30 20. */
    ,bar_width           = /* (optional) Width of the group clusters as a fraction of the midpoint spacing or bin width , default is 0.8*/
    ,gray_color          = /* (optional) Use gray color schemes? Y/N, default N. */
    ,legend_title        = /* (optional) Title of legend if you want to change default. Default is Confirmed Best of Response */
    ,output_path         = /* (optional) Path where output rtf file to be placed, default is fptrgs when destination is A and fptritxt */
                        /* when destination is I */
    ,output_pgm_path     = /* (optional) Path where generated program file to be placed */
                        /* 1) Default is N, produce no macro-generated program file */
                        /* 2) if Y, produce macro-generated program file and path is fptopen */
                        /* 3) Folder path to contain macro-generated program file */
    ,output_dataset      = /* (optional) Name of sas dataset for the output figure. Default is derived from outfile_name and destination*/
    ,output_datlib       = /* (optional) Libname for output final figure dataset, default is lptgs when destination is A and lptitxt */
                        /* when destination is I */
    ,graph_height        = /* (optional) Height of the graph (inch), default is computed on number of observations */
    ,graph_width         = /* (optional) Width of graph, 9in for Landscape and 6.5in for Portrait by default */
    ,layout_orientation  = /* (optional) Orientation of layout. default is Portrait/P when destination is I and Landscape/L when */
                        /* destination is A */
    ,title_footnote_template = /* (optional) Full name of title and footnote file following global template */
    ,outfile_name        = /* (required) outfile_name used to extract title and footnote */
    ,tfl_title           = /* (optional) TFL title when title is not from excel file. There are 3 pieces of information separated by | */
                        /* 1st piece: TFL number. 2nd piece: TFL title. 3rd piece: TFL population. Example: */
                        /* Table 14.3.2.2|Overall Summary of Treatment-Emergent Adverse Events|Safety Analysis Set */
    ,tfl_footnote        = /* (optional) TFL footnotes concatenated with "\line" when footnote is not from excel file. Example: */
                        /* Abbreviations: DLT = dose limiting toxicity; SAE = serious adverse event; TEAE = treatment */
                        /* adverse event. \line All percentages are based on N. */
    ,destination         = /* (optional) i - intext TFL; a - appendix */
    ,language            = /* (optional) Language used in TFL. Default is en. Valid values include en (English) and zh (Chinese) */
    ,help               = /* (optional) Put help information in log? Y/N */
    ,debug              = /* (optional) debug (keep temporary datasets?) Y/N, default is N. */
);

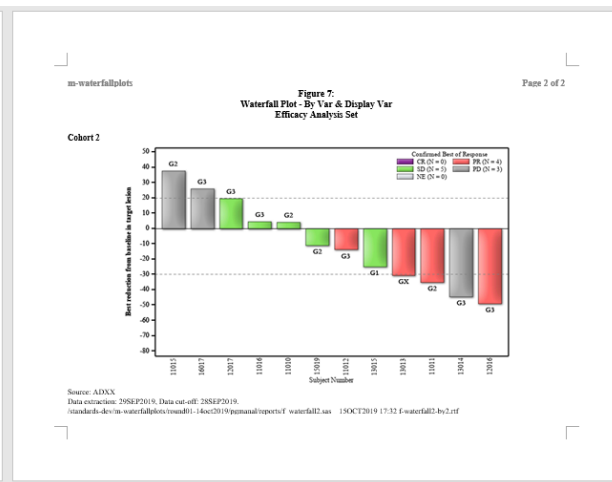
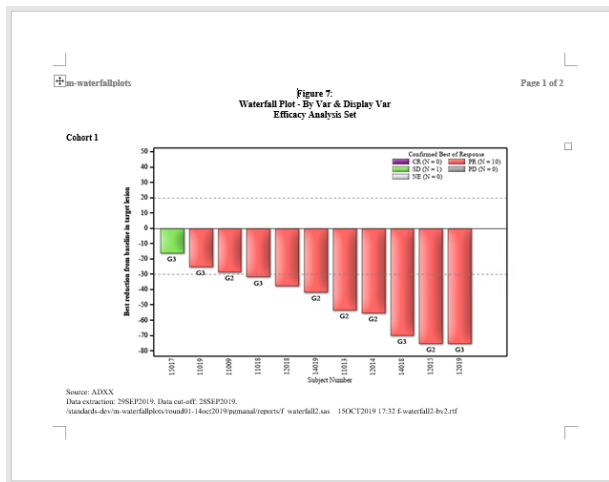
```



Example 1: Create Waterfall Plot – BY_VAR

```
%m_waterfallplots(
    input_dataset          = adtrsum
    ,input_dataset_where   = %str(paramcd =
"SUMDIAM" and an101fl = "Y" and efffl = "Y")
    ,trt_var               = respn:bor
    ,by_var                = trt01p|trt01pn
    ,display_var           = histgrbl
    ,title_footnote_template =
    &protpath/m_titles_waterfallplots.xlsx
    ,outfile_name          = f_waterfall2_by2
);
```

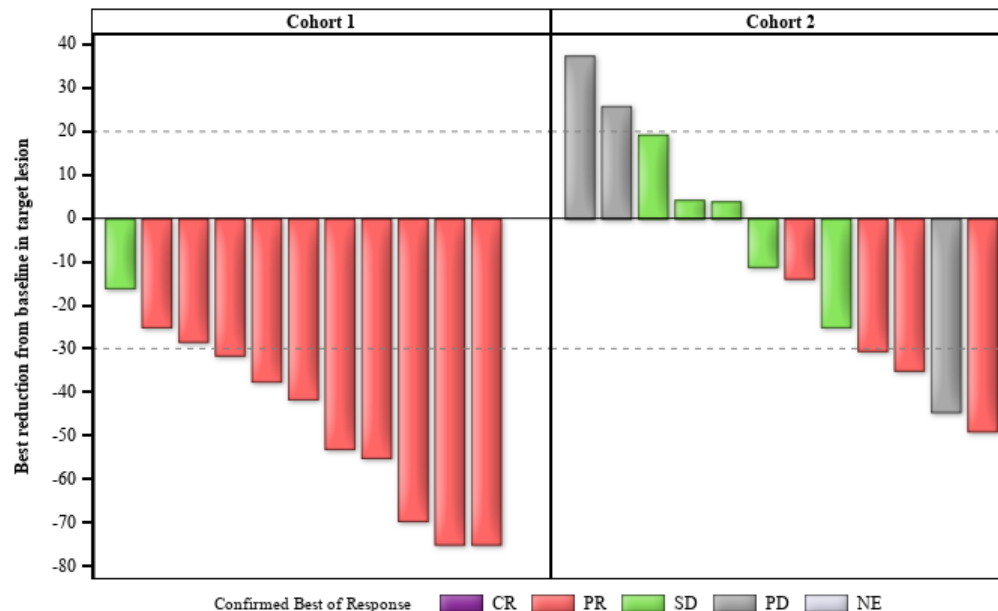
```
proc format;
    value bor
        1 = "CR"
        2 = "PR"
        3 = "SD"
        4 = "PD"
        5 = "NE"
    ;
quit;
```



Example 2: Create Waterfall Plot – CLASS_VAR

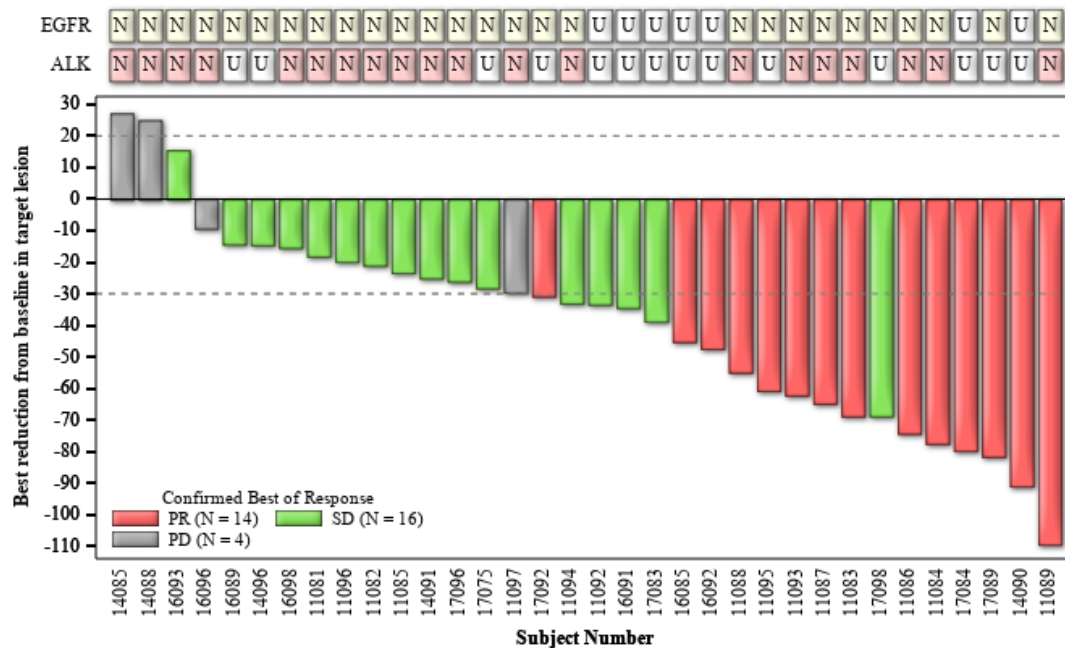
```
%m_waterfallplots(
  input_dataset      = adtrsum
, input_dataset_where = %str(paramcd = "SUMDIAM" and
  anl01fl = "Y" and efffl = "Y")
, trt_var            = respn:bor
, class_var          = trt01p|trt01pn|1|2
, title_footnote_template =
  &protpath/m_titles_waterfallplots.xlsx
, outfile_name       = f_waterfall2_class2
);
```

```
proc format;
  value bor
    1 = "CR"
    2 = "PR"
    3 = "SD"
    4 = "PD"
    5 = "NE"
  ;
quit;
```



Example 3: Create Waterfall Plot – EXPLORE_VAR

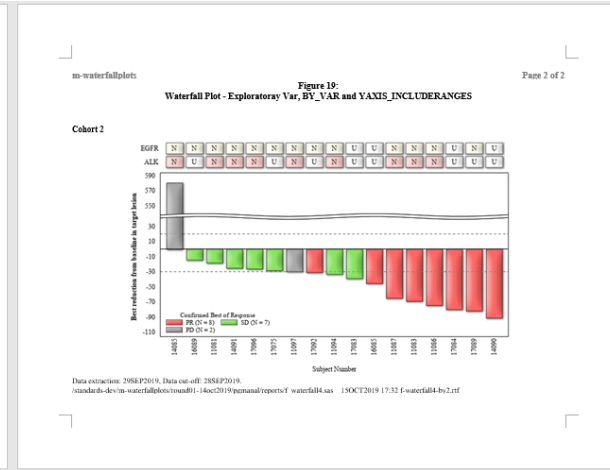
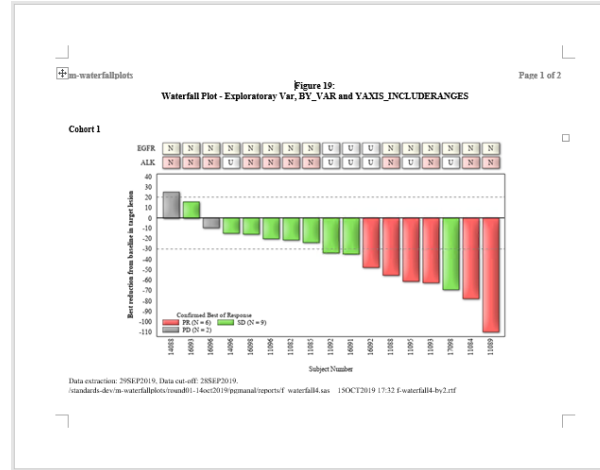
```
%m_waterfallplots(
    input_dataset          = adtrsum
    ,input_dataset_where   = %str(efffl = "Y")
    ,trt_var               = resp|respn
    ,explore_vars          =
    [ALK|alk|alkn] [EGFR|egfr|egfrn]
    ,title_footnote_template =
    &protpath/m_titles_waterfallplots.xlsx
    ,outfile_name          = f_waterfall13_explore2
);
```



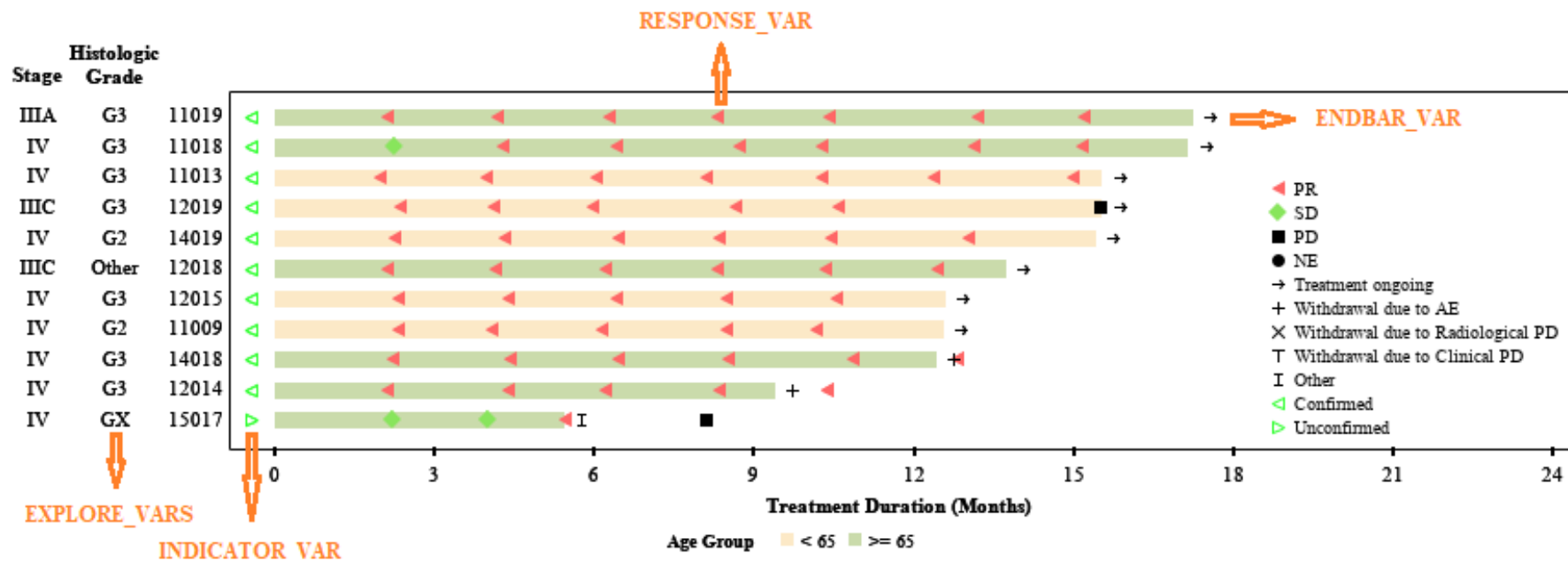
Example 4: Create Waterfall Plot – BY_VAR & Break Axis

```
%m_waterfallplots(
  input_dataset      = adtrsum
, input_dataset_where = %str(efffl = "Y")
, trt_var            = resp|respn
, explore_vars       =
[ALK|alk|alkn] [EGFR|egfr|egfrn]
, by_var             = trt01p|trt01pn
, title_footnote_template =
&protpath/m_titles_waterfallplots.xlsx
, outfile_name       = f_waterfall4_by2
, legend_position    = bottomleft
, yaxis_includeranges = trt01pn:range
, yaxis_tick_values  = trt01pn:ticklist
);
```

```
proc format;
  value $range
    "Cohort 1" = "[-110, 40]"
    "Cohort 2" = "[-110, 40][540, 600]"
  ;
  value range
    1 = "[-110, 40]"
    2 = "[-110, 40][540, 600]"
  ;
quit;
```



Swimmer Plot Overview



Special Parameters for M_SWIMMERPLOTS

RESPONSE_VAR:

Each value of variable referred by parameter response_var represents a marker on horizontal bar

Example:
AVALC|RSDUR
AVALC:\$RESP|RSDUR

ENDBAR_VAR:

Each value of variable referred by parameter endbar_var represents marker at the end of horizontal bar

Example:
DCTREAS|DCTREASN
DCTREAS:\$EOTFMT
DCTREASN:EOTFMT

INDICATOR_VAR:

Each value of variable referred by parameter indicator_var represents a marker at the beginning of horizontal bar

Example:
TYPE|TYPN
TYPE:\$TYPFMT
TYPN:TYPFMT

EXPLORE_VARS:

Each value of variable referred by parameter explore_vars will be displayed on the left of plot

Example:
[Histology|hist][PD-L1|pd11]

- Combination of RESPONSE_VAR, ENDBAR_VAR, INDICATOR_VAR and EXPLORE_VARS can allow users to create a variety of complex graphs.



Special Parameters for M_SWIMMERPLOTS

DURATION_VARS:

Each variable referred by parameter duration_vars represents a period in horizontal bar

Example:

```
TR01DURD
[Treatment Duration|TR01DURD][Study
Follow-up|SFUDURD]
```

When two durations exist, [] should be used and Duration legend item label should be provided.

TRT_VAR:

Each value of variable referred by parameter trt_var represents a group

Example:

```
TRT01P|TRT01PN or
TRT01PN:TRTP
(TRTP name of format)
```

BY_VAR:

Each value of variable referred by parameter by_var will be displayed in one page

Example:

```
TRT01P|TRT01PN
```

- Combination of BY_VAR, RESPONSE_VAR, ENDBAR_VAR, INDICATOR_VAR, EXPLORE_VARS and TRT_VAR can allow users to create a variety of complex graphs.
- Combination of BY_VAR, RESPONSE_VAR, ENDBAR_VAR, INDICATOR_VAR, EXPLORE_VARS and DURATION_VARS (two variables) can allow users to create a variety of graphs containing more than 1 study period.



M_SWIMMERPLOTS Parameters

```

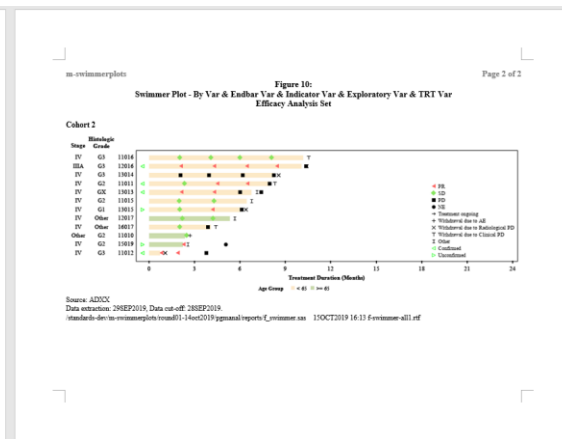
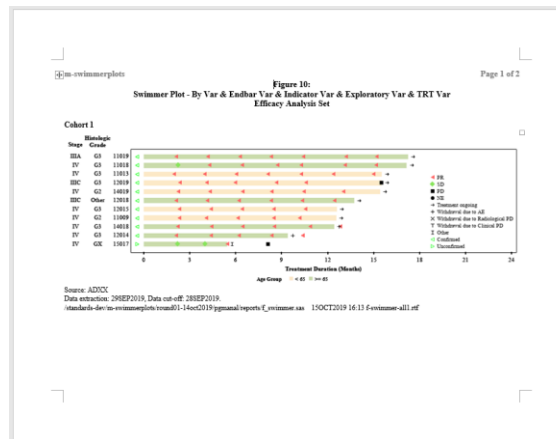
#macro m_swimmerplots(
  input_dataset      = /* (required) Name of input dataset */
  input_dataset_where = /* (optional) An arithmetic or logical expression to select observations */
  yaxis_var           = /* (optional) Name of variable to be used in y axis for plot. Default is subjid. */
  duration_vars       = /* (required) Name of numeric variables for horizontal duration bar. Legend label for duration should be
                        /* provided when there are more than one period
                        /* For example, trt01dur
                        /* (Treatment Duration|trt01dur|Study Follow-up Duration|STUD01DUR)
                        /*
  ,response_var       = /* (optional) Name of variable to be displayed as markers on swim lane. There are 2 pieces of information.
                        /* eg. aval|trdur or aval|fcrp|trdur
                        /* 1st piece: name of variable for response marker legend label, format name should be placed
                        /* after variable name and separated by : if exists
                        /*
                        /* 2nd piece: name of variable to duration of response marker
                        /*
  ,endbar_var         = /* (optional) Name of variable to be displayed at end of horizontal duration bar. Format name should be
                        /* placed after variable name and separated by : if exists.
                        /* The variable can be numeric when format exists.
                        /* Example: dcreas|dcreas or dcreas:footfmt or dcreas:footfmt.
                        /*
  ,ongoing_value      = /* (optional) Value of legend label for end bar marker displayed as ArrowRight. This is only required when
                        /* label does not contain word "Ongoing"
                        /*
  ,indicator_var      = /* (optional) Name of variable to be displayed to the left of horizontal duration bar.
                        /* Format name should be placed after variable name and separated by :
                        /* The variable can be numeric when format exists.
                        /* Example: type|typn or type:stypfmt or type:typfmt.
                        /*
  ,explore_vars       = /* (optional) Label and name of variables to be displayed on left of swimmer plot. Label and name of
                        /* character variable should be separated by | and enclosed by square brackets. Even if there is
                        /* only one block, it still should be enclosed by square bracket.
                        /* Example: (Histology|hist|PD-L1|pd1l)
                        /*
  ,trt_var            = /* (optional) Name of group variable for background color of bar. Example, trt01a|trt01an or name of group
                        /* variable and format name, Example, trt01an:trta
                        /*
  ,by_var             = /* (optional) Name of by variable to obtain separate analyses. For example, trt01g|trt01gm
  ,xaxis_tick_values  = /* (optional) Value list of X axis if you'd like to change default. e.g. 0 10 20 30 40 50 or 0 to 50 by 10
  ,xaxis_label        = /* (optional) Label of X axis if you want to change default - Treatment Duration (Weeks)
  ,yaxis_label        = /* (optional) Label of Y axis if you want to change default. Default is Subject Number
  ,legend_title       = /* (optional) Title of legend outside of data area for TRT_VAR
  ,gray_color         = /* (optional) Use gray color schemes? Y/N, default N
  ,offset_percent     = /* (optional) Distance between horizontal bar and indicator or endbar marker in percentage. Default is 0.02
  ,marker_size        = /* (optional) Size of marker symbols displaying RESPONSE_VAR, ENDBAR_VAR and INDICATOR_VAR. Default is 6.
                        /* Valid values include 5, 6, 7, 8, 9
  ,bar_width          = /* (optional) Ratio of bar width of the maximum possible bar width
  ,bar_num_each_page  = /* (optional) Maximum number of horizontal bars on each page. Default is determined by marker_size, bar_width*/
                        /* layout_orientation and destination
  ,graph_width        = /* (optional) Width of graph, 9in for Landscape and 6.5in for Portrait by default
  ,output_path        = /* (optional) Path where output rtf file to be placed, default is fptgtrg when destination is A and fptxttrg
                        /* when destination is I
  ,output_pgm_path    = /* (optional) Path where generated program file to be placed
                        /* 1) Default is N, produce no macro-generated program file
                        /* 2) if Y, produce macro-generated program file and path is fptopen
                        /* 3) Folder path to contain macro-generated program file
  ,output_dataset     = /* (optional) Name of sas dataset for the output figure. Default is derived from outfile_name and destination*/
  ,output_datilib     = /* (optional) Libname for output final figure dataset, default is lptgs when destination is A and lpttxt
                        /* when destination is I
  ,layout_orientation = /* (optional) Orientation of layout, default is Portrait/P when destination is I
                        /* and Landscape/L when destination is A
  ,title_footnote_template = /* (optional) Full name of title and footnote file following global template
  ,outfile_name       = /* (required) outfile_name used to extract title and footnote
  ,tfl_title          = /* (optional) TFL title when title is not from excel file. There are 3 pieces of information separated by |
                        /* 1st piece: TFL number. 2nd piece: TFL title. 3rd piece: TFL population. Example:
                        /* Table 14.3.2.2|Overall Summary of Treatment-Emergent Adverse Events|Safety Analysis Set
  ,tfl_footnote       = /* (optional) TFL footnotes concatenated with "\line" when footnote is not from excel file. Example:
                        /* Abbreviations: DLT = dose limiting toxicity; SAE = serious adverse event; TEAE = treatment
                        /* adverse event. \line All percentages are based on N.
                        /*
  ,destination        = /* (optional) i - index; TFL a - appendix
  ,language           = /* (optional) Language used in TFL. Default is en. Valid values include en (English) and zh (Chinese)
  ,help              = /* (optional) Put help information in log? Y/N
  ,debug             = /* (optional) debug (keep temporary datasets?) Y/N, default is N.
);

```



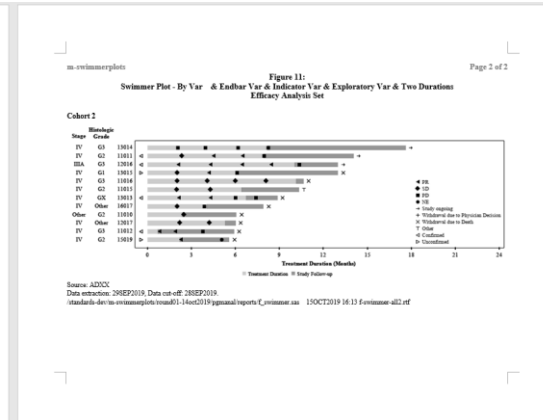
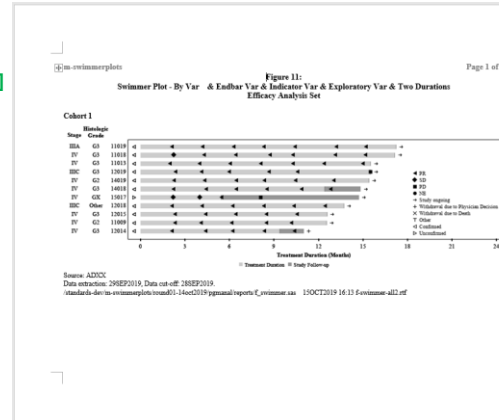
Example 1: Create Swimmer Plot – One Duration

```
%m_swimmerplots(
  input_dataset      = adrs
, input_dataset_where = efffl = "Y"
, duration_vars      = tr01durm
, endbar_var         = dctreas_desc|dctreasn
, response_var        = avalc|rsstartm
, indicator_var       = type|typn
, explore_vars       =
[Stage|distageb][Histologic~Grade|histgrbl]
, by_var             = trt01a|trt01an
, trt_var            = agegr1|agegr1n
, xaxis_tick_values  = 0 to 24 by 3
, legend_title       = Age Group
, title_footnote_template =
&protpath/m_titles_swimmerplots.xlsx
, outfile_name       = f_swimmer_all1
);
```



Example 2: Create Swimmer Plot – More than One Period

```
%m_swimmerplots(
  input_dataset           = adrs
, input_dataset_where     = efffl = "Y"
, duration_vars           =
  [Treatment Duration|tr01durm][Study Follow-up|sfudurm]
, endbar_var              = dcsreas_desc|dcsreasn
, response_var            = avalc|rsstartm
, indicator_var           = type|typn
, explore_vars            =
  [Stage|distageb][Histologic~Grade|histgrbl]
, by_var                  = trt01a|trt01an
, gray_color              = Y
, xaxis_tick_values       = 0 to 24 by 3
, output_pgm_path        = &output_pgm
, title_footnote_template =
  &protpath/m_titles_swimmerplots.xlsx
, outfile_name            = f_swimmer_all2
);
```



M_SPIDERPLOTS Parameters

```

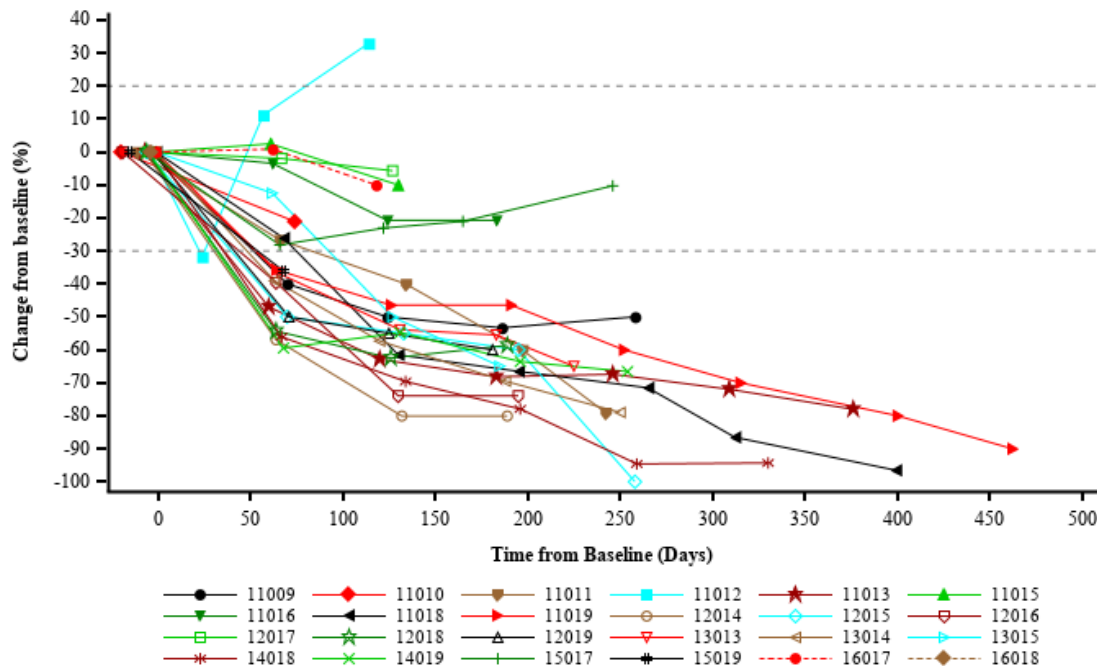
%macro m_spiderplots(
  input_dataset          = /* (required) Name of input dataset                               */
  ,input_dataset_where    = /* (optional) Arithmetic or logical expression to select observations meeting conditions from INPUT_DATASET */
  ,xaxis_var              = /* (optional) Name of variable to be used in x axis for plot. Default is ady. visit|avisitn allows you to */
                          /* display a text tick values for x axis                               */
  ,yaxis_var              = /* (optional) Name of variable to be used in y axis for plot. Default is pchg.                               */
  ,subject_var            = /* (optional) Name of subject variable. Default is subjid.                               */
  ,trt_var                = /* (optional) Name of group variable, for example, trt01a|trt01an or name of group variable and format name, */
                          /* e.g. trt01an:trta                                              */
  ,class_var              = /* (optional) Name of class variable to display a panel of similar graphs                               */
                          /* Character var|Numeric var|row_number|column_number                               */
                          /* For example, trt01p|trt01pn|2|2                                   */
  ,by_var                 = /* (optional) Name of by variable to obtain separate analyse. e.g. trt01p|trt01pn                               */
  ,xaxis_tick_values      = /* (optional) Value list of x axis if you'd like to change default. e.g. 0 10 20 30 40 50 or 0 to 50 by 10 */
  ,xaxis_tick_values_format = /* (optional) Name of format for x axis tick values. e.g. Visit                               */
  ,xaxis_label            = /* (optional) Label of x axis if you want to change default. Default is Time from Baseline (Days)           */
  ,yaxis_tick_values      = /* (optional) Value list of y axis if you'd like to change default                               */
                          /* Example, 0 10 20 30 40 50 or 0 to 50 by 10 or armn:range or arm:$range */
  ,yaxis_includeranges    = /* (optional) Specifies the ranges for a broken Y axis.                               */
                          /* Example:%quote([-100,0] [40,100]) or armn:tick or arm:$tick         */
  ,yaxis_label            = /* (optional) Label of y axis if you want to change default. Default is Change from baseline (%)           */
  ,reference_lines         = /* (optional) Reference line values separated by blank space. Default is -30 20.                               */
  ,gray_color              = /* (optional) Use gray color schemes? Y/N, default N                               */
  ,common_symbol          = /* (optional) Use common symbol? Y/N, default Y when gray color is N and N when gray color is Y           */
  ,legend_title            = /* (optional) Title of legend                               */
  ,output_path             = /* (optional) Path where output rtf file to be placed, default is fptrgs when destination is A and fptritxt */
                          /* when destination is I                                           */
  ,output_pgm_path         = /* (optional) Path where generated program file to be placed                               */
                          /* 1) Default is N, produce no macro-generated program file           */
                          /* 2) if Y, produce macro-generated program file and path is fptopen   */
                          /* 3) Folder path to contain macro-generated program file           */
  ,output_dataset          = /* (optional) Name of sas dataset for output figure. Default is derived from outfile_name and destination */
  ,output_datlib           = /* (optional) Libname for output final figure dataset, default is lptgs when destination is A and lptitxt */
                          /* when destination is I                                           */
  ,graph_height            = /* (optional) Height of graph, 4.5 for landscape appendix tfl; 4.9 for landscape intext tfl; 4.0 for portrait tfl */
  ,graph_width             = /* (optional) Width of graph, default is graph_height/0.618                               */
  ,layout_orientation      = /* (optional) Orientation of layout. default is Portrait/P when destination is I and Landscape/L when */
                          /* destination is A                                               */
  ,title_footnote_template = /* (optional) Full name of title and footnote file following global template                               */
  ,outfile_name            = /* (required) outfile_name used to extract title and footnote                               */
  ,tfl_title               = /* (optional) TFL title when title is not from excel file. There are 3 pieces of information separated by | */
                          /* 1st piece: TFL number. 2nd piece: TFL title. 3rd piece: TFL population. Example: */
                          /* Table 14.3.2|Overall Summary of Treatment-Emergent Adverse Events|Safety Analysis Set */
  ,tfl_footnote            = /* (optional) TFL footnotes concatenated with "\line" when footnote is not from excel file. Example: */
                          /* Abbreviations: DLT = dose limiting toxicity; SAE = serious adverse event; TEAE = treatment */
                          /* adverse event. \line All percentages are based on N.                               */
  ,destination            = /* (optional) i - intext TFL; a - appendix                               */
  ,language                = /* (optional) Language used in TFL. Default is en. Valid values include en (English) and zh (Chinese) */
  ,help                   = /* (optional) Put help information in log? Y/N                               */
  ,debug                   = /* (optional) debug (keep temporary datasets?) Y/N, default is N.                               */
);

```



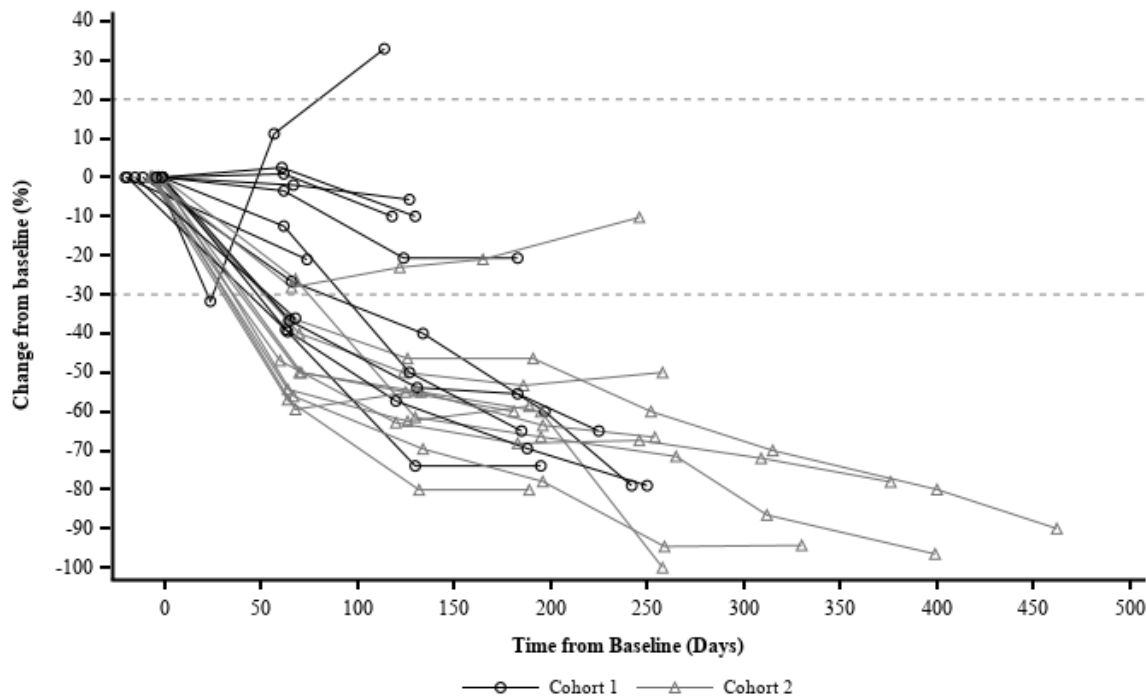
Example 1: Create Spider Plot – Display Subject Number

```
%m_spiderplots(  
    input_dataset      = adtrsum  
,input_dataset_where  = %str(paramcd =  
"SUMDIAM" and efffl = "Y")  
,title_footnote_template =  
&protpath/m_titles_spiderplots.xlsx  
,outfile_name         = f_spider  
);
```



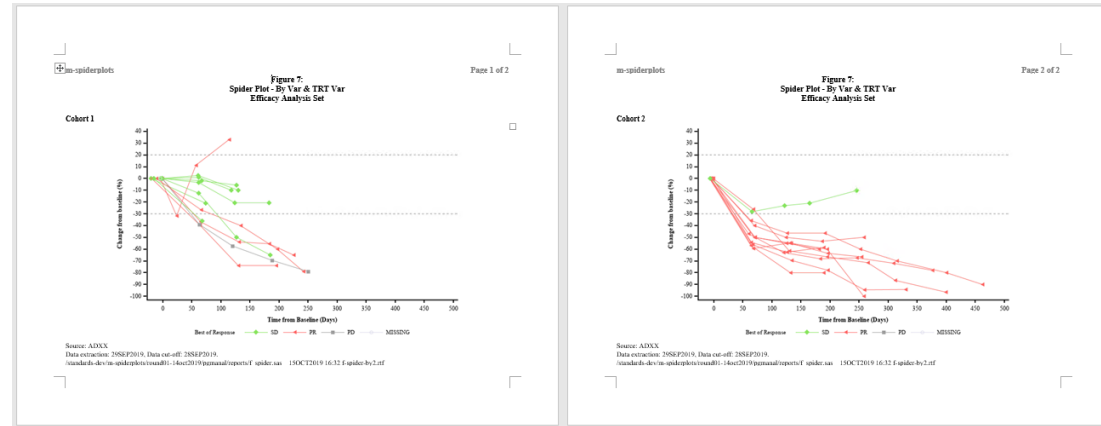
Example 2: Create Spider Plot – TRT_VAR

```
%m_spiderplots(  
  input_dataset      = adtrsum  
, input_dataset_where = %str(paramcd =  
  "SUMDIAM" and efffl = "Y")  
, trt_var           = trt01a|trt01an  
, gray_color        = y  
, title_footnote_template =  
  &protpath/m_titles_spiderplots.xlsx  
, outfile_name       = f_spider_by  
);
```



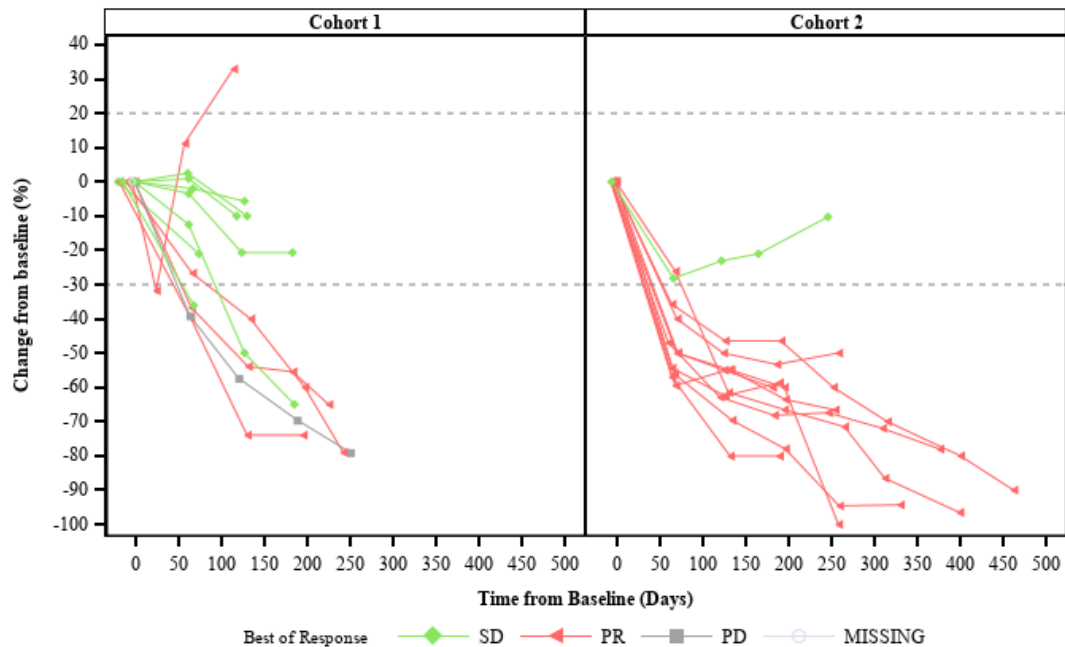
Example 3: Create Spider Plot – BY_VAR & TRT_VAR

```
%m_spiderplots(
    input_dataset      = adtrsum
    ,input_dataset_where = %str(paramcd = "SUMDIAM"
    and efffl = "Y")
    ,trt_var           = resp|respn
    ,by_var            = trt01a|trt01an
    ,legend_title      = Best of Response
    ,title_footnote_template =
    &propath/m_titles_spiderplots.xlsx
    ,outfile_name      = f_spider_by2
);
```



Example 4: Create Spider Plot – CLASS_VAR & TRT_VAR

```
%m_spiderplots(  
  input_dataset           = adtrsum1  
, input_dataset_where    = %str(paramcd = "SUMDIAM"  
and efffl = "Y")  
, trt_var                = resp|respn  
, class_var              = trt01a|trt01an|1|2  
, legend_title            = Best of Response  
, title_footnote_template =  
&protpath/m_titles_spiderplots.xlsx  
, outfile_name            = f_spider_class2  
);
```

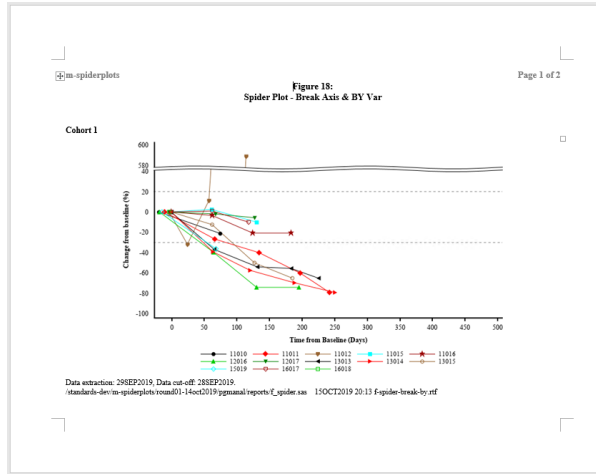


Example 5: Create Spider Plot – Break Axis & BY Var

```
%m_spiderplots(
    input_dataset          = adtrsum1
    ,input_dataset_where    =
    %str(paramcd = "SUMDIAM" and efffl = "Y")
    ,by_var                 = trt01a|trt01an
    ,yaxis_includeranges    = trt01an:range
    ,yaxis_tick_values      = trt01an:ticklist
    ,title_footnote_template =
    &protpath/m_titles_spiderplots.xlsx
    ,outfile_name           = f_spider_break_by
    );
```

```
proc format;
    Value Range
        1 = "[-100,40][580,600]";
```

```
Value ticklist
    1 = "-100 to 600 by 20" ;
quit;
```



Contact Information:

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**THANK YOU FOR YOUR
PARTICIPATION**