SAS® GLOBAL FORUM 2017

April 2 – 5 | Orlando, FL

A Macro to Generate Kaplan-Meier Plot and Optional Estimates

USERS PROGRAM

A Macro to Generate Kaplan-Meier Plot and Optional Estimates

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OUTLINES

- Generated survival plot with optional estimates, includes susceptible subject, events number and total subject number, survival rate with median and it's 95% CI, hazard ratio estimates with 95% CI and p-value.
- Supported to customize header, label for X-axis and Y-axis, tick marks for X-axis and add data filter.
- Generated survival plot by PROC LIFETEST and hazard ratio by PROC PHREG.
- Used PROC TEMPLATE with SAS ODS to create output.

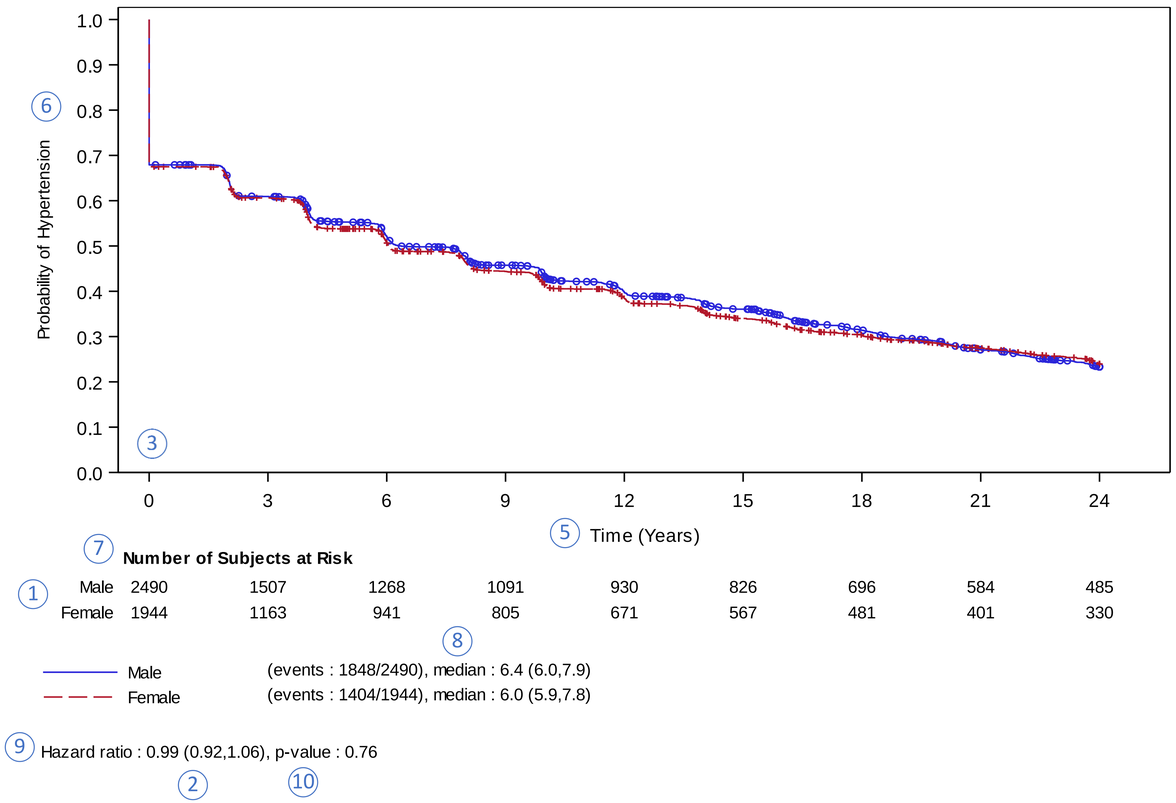
MACRO VARIABLES

	Macro Variable	Optional	Description of Function
	_INDATA		Input dataset assumed to be one record per subject.
	_TIMEVAR		Time variable.
	_CENSORVAR		Censoring variable.
1	_STRATAVAR	Y	Analysis stratification for KM.
2	_REF		Study reference group.
	_STRATALIS	Y	Study stratification variables in the model.
	_DATAFL	Y	Select partial data in LIFETEST and PHREG. e.g. SEX=M.
3	_TINTERVAL		Displaying tick marks in X-axis and at risk counts.

	Macro Variable	Optional	Description of Function
4	_HEADER		The header of the figure.
5	_XLABEL		The label of X-axis (Time interval).
6	_YLABEL		The label of Y-axis (Survival).
7	_ARTITLE		The label of Number of subjects at risk.
8	_FNMED	Y	The footnote shows survival median or not.
9	_FNHR	Y	The footnote shows hazard ratio or not.
10	_FNP	Y	The footnote shows p-value for hazard ratio or not.

OUTPUT

4 ***Figure 1a: Kaplan-Meier Plot of Hypertension***



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THE MACRO

(0) **PROC TEMPLATE** in 4 lattice layouts. The size of the second lattice was estimated by the number of stratum.

PROC LIFETEST with ODS dataset to have susceptible subject, events number, total subject numbers, and survival rate. Used KM method.

PROC PHREG with ODS dataset to have hazard ratio estimates. Could optional apply STRATA option for stratification analysis if needed. Used EXACT method.

(1) **PROC FORMAT** with CNTLIN option to capture the label from stratified variable value.

(2) Hazard ratio was calculated by reference group. Default used the last group if not specified.

(3) Specified tick value. The maximum tick was the largest value closed to the multiple of tick value.

(4)—(7) Specified header, title of X-axis, title of Y-axis, and title of susceptible subject respectively.

(8) Median survival rate was estimated by PROC LIFETEST. It's an optional output, default is N.

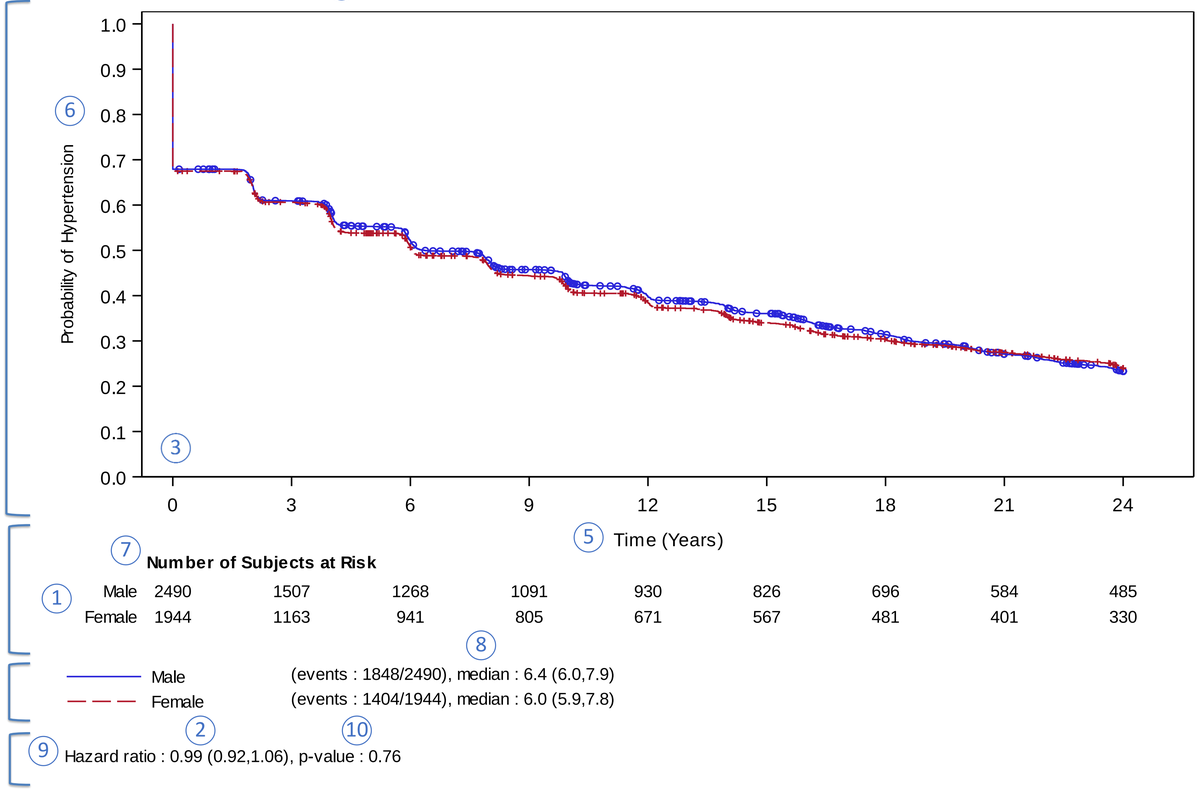
(9) Hazard ratio was calculated by PROC PHREG. It's an optional output, default is N.

(10) P-value of hazard ratio was calculated by PROC PHREG. It's an optional output, default is N.

```
%mKMplot ( _indata= sas.EXAMPLE,
           _timevar= TIMEHYP,
           _censorvar= HYPERTEN,
           _stratavar= SEX,
           _tinterval= 3,
           _ref= "Male",
           _stratalis= ,
           _header= "Figure 1a: Kaplan-Meier Plot of Hypertension",
           _Xlabel= "Time (Years)",
           _Ylabel= "Probability of Hypertension",
           _ARtitle="Number of Subjects at Risk",
           _fnmed= Y,
           _fnhr= Y,
           _fnp= Y);
```

OUTPUT

(0) (4) ***Figure 1a: Kaplan-Meier Plot of Hypertension***



REFERENCES

Berglund (2011), An Overview of Survival Analysis using Complex Sample Data, SAS Global Forum 2011

Kuhfeld and So (2013), Creating and Customizing the Kaplan-Meier Survival Plot in PROC LIFETEST, SAS Global Forum 2013

Gharibvand (2008), A Step-by-Step Guide to Survival Analysis, SAS WUSS Forum 2008

UCLA Institute for Digital Research and Education. http://stats.idre.ucla.edu/sas/seminars/sas-survival/

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