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SAS® Tools for Cost Effective and High Quality Clinical Trial Reporting

Paul J. Novotny, Mayo Clinic, Rochester, MN
Angelina D. Tan, Mayo Clinic, Rochester, MN
Nathan R. Foster, Mayo Clinic, Rochester, MN
Jeff A. Sloan, Mayo Clinic, Rochester, MN

ABSTRACT

Being able to rapidly create analyses on clinical trials reduces their cost by reducing turn around times. SAS reporting macros enable statisticians to be more productive and also results in their reports being more focused, accurate, and easier to present to investigators. Two reporting macros were developed and have become very popular SAS tools at the Mayo Clinic and the Alliance for Clinical Trials in Oncology. These macros are easy to implement but are also flexible enough to be useful on a wide range of studies.

INTRODUCTION

The idea for creating a SAS report macro came out of desperation. The North Central Cancer Treatment Group (NCCTG, currently combined into the Alliance for Clinical Trials in Oncology) was running a large study on the effects of erythropoietin on hemoglobin levels and fatigue (Steensma, 2006). The pharmaceutical company providing the erythropoietin decided they wanted to submit the study results to the FDA for a drug labeling change. They wanted NCCTG to produce about 100 different tables and listings within a week of closing the study, and the results had to be totally accurate since they would be reviewed in detail by the FDA. Instead of panicking or hard coding each table or hiring a large statistical and clerical staff, NCCTG statisticians created a generic SAS macro that could be tailored to easily produce all of the reports in one SAS program. The extreme functionality of this tool soon became apparent, to the extent that the macro has become the most used analytic SAS macro at the Mayo Clinic and is taught to all newly hired Masters Level and Bachelors Level statisticians.

The original macro (%table) summarizes several continuous, discrete, ordinal, and/or survival variables by the levels of another discrete variable. This macro can report percentages, means, medians, standard deviations, coefficients of variation, and quartiles overall and within each level of a subgroup. Confidence intervals and p-values can also be reported for differences between groups. This macro can report p-values from chi-square tests, Fisher's exact tests, Kruskal-Wallis tests, exact Kruskal-Wallis tests, Wilcoxon rank sum tests, exact Wilcoxon tests, ANOVA F-tests, log-rank tests, equal variance t-tests, unequal variance t-tests, sign rank tests, and the Cochran-Armitage trend test.

A second macro (%stable) was later created to summarize time-to-event data and outputs the number of events, event rates at selected time points, median event times, log-rank p-values, Wilcoxon p-values, and univariate and multivariate Cox model p-values and odds ratios.

These two macros create summary reports in an RTF format which are publication quality and can be inserted directly into manuscripts or presentations. They have greatly increased the productivity of statisticians at the Mayo Clinic, because they provide very quick study results, allowing statisticians to spend more time interpreting results and less time programming, sorting through output, and creating reports. The macros pull together information from several SAS procedures and output them in a condensed format that is publication quality and easy to interpret. This process saves time for investigators since they do not have to wade through pages of SAS output looking for the analysis results for each variable and each test. It also eliminates transcription errors in reports since the macros pull data directly from SAS and enter them into the reports.

The TABLE macro was originally reported in the article by Smith 2005 along with many other summary and plotting macros. However, the macro has been greatly enhanced since that report.

TABLE MACRO: SUMMARIZING VARIABLES BY SUBGROUP

BASIC MACRO CALL

The TABLE macro reports summary measures for continuous, discrete, ordinal, or survival variables either overall or by subgroups. It also provides p-values for testing differences in subgroups. The only required parameters are the input dataset name, an output destination, and the names and types of the variables to analyze. An example of the basic macro call is

```
%table(dsn      = master,          /* input dataset          */
       var      = age ps,         /* analysis variables    */
       type     = c d,           /* analysis variable types */
       by       = arm,          /* group variable        */
       outdoc   = table1.rtf);   /* output RTF file name  */
```

This example uses data from a temporary SAS dataset called 'master', summarizes variables age and ps by arm subgroups, and creates an RTF document called table1.rtf. The 'type' parameter specifies that variable age is continuous (c) and the ps variable is discrete (d). Table 1 shows the resulting RTF file.

Table 1: Basic TABLE Output

	Arm A (N=428)	Arm B (N=691)	Total (N=1119)	p value
Age				0.3757
N	428	691	1119	
Mean (SD)	59.7 (11.4)	60.3 (11.6)	60.1 (11.5)	
Median	61.0	61.0	61.0	
Q1, Q3	53.0, 68.0	52.0, 69.0	52.0, 69.0	
Range	(27.0-88.0)	(19.0-88.0)	(19.0-88.0)	
PS				0.7424
Missing	68	138	206	
0	190 (40.5%)	279 (59.5%)	469 (51.4%)	
1	152 (38.6%)	242 (61.4%)	394 (43.2%)	
2	18 (36.0%)	32 (64.0%)	50 (5.5%)	
(report generated on 14JUL2011)				

This table format follows presentation guidelines recommended by Tufte (1990) and Ehrenberg (1977). It uses only a minimum number of vertical and horizontal lines thus maximizing the amount of information and minimizing the amount of ink, puts group information side-by-side in columns to make them easier to compare, and uses single and double spacing and indenting to guide the eye of the reader. Sample sizes are automatically reported in each column label, and a date stamp is added as a footnote to keep track of the progression of updated reports. Variable labels and value formats are retained and used in the report.

REPORTING OPTIONS

The p-values shown in table 1 are from the default tests of a Kruskal-Wallis test for continuous variables and a chi-square test for discrete variables. These tests can be changed using the PTYPE parameter and can include chi-square tests, Fisher's exact test, Kruskal-Wallis test, exact Kruskal-Wallis test, Wilcoxon rank sum test, exact Wilcoxon test, ANOVA F-test, log-rank test, equal variance t-test, unequal variable t-test, sign rank test, or the Cochran-Armitage trend test. The different options for the PTYPE and TYPE parameters are shown in Appendix I.

Other options are available for handling missing values, printing footnotes to label the tests used for each p-value, rounding summary measures, printing 95% confidence intervals for differences, choosing the summary statistics to report for continuous variables, choosing the type of percentages to report for discrete variables, truncating or wrapping long labels, changing table borders, adding titles and footnotes, changing font sizes, choosing page orientation, removing unwanted rows, and adding comments to the tables.

Table 2 shows an example of printing row percentages, changing rounding options, changing reported summary measures, and changing tests.

```
%table(dsn      = master,
       var       = age ps,
       type     = c d,
       by       = arm,
       outdoc   = table2.rtf,

       pcttype  = row, /* prints row percentages */

       meandec  = 1, /* rounds the mean to one significant digit */
       pctdec   = 0, /* rounds percentages to no digits */

       ptype    = tu kw, /* changes p-values to an unequal variance t-test */
                          /* for age and a Kruskal-Wallis test for ps */
       pfoot    = y, /* includes footnotes to label each test */

       cstats   = mean, /* prints only the mean for continuous variables */
       dstats   = percent); /* prints only percentages for discrete variables */
```

Table 2: Example with Rounding, Changing Tests, and Printing Row Percentages

	Arm A (N=428)	Arm B (N=691)	Total (N=1119)	p value
Age				0.3735 ¹
Mean	59.7	60.3	60.1	
PS				0.6207 ²
Missing	68	138	206	
0	41%	59%	51%	
1	39%	61%	43%	
2	36%	64%	6%	

(report generated on 14JUL2011)
¹ Unequal Variance T-Test ² Kruskal-Wallis

LABELING OPTIONS

If the 'BY' parameter is not specified, the macro reports only an overall summary column. It can also print p-values for testing whether the means or distributions of continuous variables are different and whether discrete variables have equal proportions in each level of that variable. Example 3 shows the code for testing whether the overall mean age is different from 60 and whether there are equal proportions of patients in each level of the PS variable. It also shows options for adding a table title, labeling the source of the p-values, and for wrapping long labels. If label wrapping is used, the program makes the line breaks between words if possible.

```
%table(dsn      = master,
       var       = age ps,
       type     = c d,
       outdoc   = table3.rtf,

       ptype    = t c, /* runs a t-test on age and a chi-square test on ps */
       tloc     = 60, /* the t-test checks for a difference from a mean of 60 */
       pfoot    = y, /* includes a footnote to label each test */

       labelwd  = 25 /* sets the label wide to 25 characters */
       labelwrap = y, /* wraps long labels to new lines */
       tttitle1=Table 3: Univariate Tests and Labeling); /* adds a table title */
```

Table 3: Univariate Tests and Labeling

	Total (N=1119)	p value
Age at First Diagnosis of Lung Cancer		0.8601 ¹
N	1119	
Mean (SD)	60.1 (11.5)	
Median	61.0	
Q1, Q3	52.0, 69.0	
Range	(19.0-88.0)	
Baseline ECOG Performance Score		<0.0001 ²
Missing	206	
0-Asymptomatic (Fully Active)	469 (51.4%)	
1-Symptomatic but Completely Ambulatory	394 (43.2%)	
2-Symptomatic <50% In bed during the day	50 (5.5%)	

(report generated on 14JUL2011)
¹T-Test (Mu0=60) ²Chi-Square

ADDING COMMENTS AND REMOVING ROWS

Tables can be enhanced by removing unwanted lines or adding comments. These comments are created in a separate dataset and passed to the macro in the COMMENTS parameter. This is very similar to the process used to add annotation to SAS graphs.

To understand how to add comments to a table, it is necessary to understand how the macro stores the summary information. When the TABLE macro is called, it creates the following dataset which is then printed using a SAS template. All of the variables are character variables.

Table 4: Example of Final Dataset Created by the TABLE Macro

NVAR	_LINE	LEVEL	C1	C2	CI	CTOTAL	PVALUE
1	1	Age					0.3757
1	2	N	428	691		1119	
1	3	Mean	60	60		60	
1	4						
2	1	PS					0.7424
2	2	0	190 (53%)	279 (51%)		469 (51%)	
2	3	1	152 (42%)	242 (44%)		394 (43%)	
2	4	2	18 (5%)	32 (6%)		50 (6%)	

In this dataset, the variable NVAR is the number of the variable being summarized, _LINE is the line number of the summary for that variable, LEVEL is the name of the variable and the values or levels of that variable, columns C1 and C2 are the columns of summary values for the first two levels of the 'BY' variable, CI is the column of confidence interval information, CTOTAL is the overall summary column, and PVALUE is the column of p-values.

To add information to this table, create a new dataset that contains variables for each of these columns and add information at new _LINE numbers. For example, the following code adds a multiple endpoint p-value test at the top of the table, adds a blank line, adds a comment before the second variable, and adds a comment after the last variable. Note that any comments starting in column one of the LEVEL variable will be printed in bold text. Any comments in the LEVEL variable with a blank in the first column will not be printed in bold text.

```

data comm;
  length level          $ 150
         pvalue         $ 17
         ci c1 c2 ctot total $ 40;

  nvar=1; _line=0.5; level="O'Brien Global Test"; pvalue='0.0157'; output;
  nvar=1; _line=0.6; level=' '; pvalue=' '; output;
  nvar=2; _line=0.5; level='Baseline ECOG'; output;
  nvar=3; _line=1; level=' '; output;
  nvar=3; _line=2; level='Missing Arm Values Excluded'; output;

```

After creating this dataset, include the dataset name in the COMMENTS parameter and the annotation will show up in the table as shown in table 5.

```

%table(dsn      = master,
       var      = age ps,
       type     = c d,
       by      = arm,
       outdoc   = table5.rtf,

       dvar     = 1 1 2 2 2, /* removes the 4th and 5th lines for age */
                          /* (removes the median and quartiles) */
       dline    = 4 5 2 4 5, /* and the 2nd, 4th, and 5th lines for ps */
                          /* (only keeps the row with PS of 0 */

       comments = comm);      /* adds the comments */

```

Table 5: Summary with Added Comments and Deleted Rows

	Arm A (N=428)	Arm B (N=691)	Total (N=1119)	p value
O'Brien Global Test				0.0157
Age				0.3757
N	428	691	1119	
Mean (SD)	59.7 (11.4)	60.3 (11.6)	60.1 (11.5)	
Range	(27.0-88.0)	(19.0-88.0)	(19.0-88.0)	
Baseline ECOG				
PS				0.7424
0	190 (52.8%)	279 (50.5%)	469 (51.4%)	
Missing Arm Values Excluded				
(report generated on 22JUL2011)				

TABLEMERGE MACRO: COMBINING SEVERAL TABLES INTO ONE DOCUMENT

Each of the examples above required a separate macro call, and each table was created in a separate RTF document. The TABLEMERGE macro can be used to combine several TABLE reports into one RTF document. To accomplish this, add an OUTDAT parameter in each TABLE macro call. Then list those OUTDAT values in TABLEMERGE. The example below takes the output of three TABLE runs and combines them into one document called alldata.rtf.

```

%table(dsn=master, by=arm, var=var1 var2 var3, type=c c d, outdat=dat1);
%table(dsn=master, by=arm, var=var4 var5 var6, type=d o c, outdat=dat2);
%table(dsn=master, by=arm, var=var7 var8 var9, type=c c c, outdat=dat3);

%tablemerge(dsn=dat1 dat2 dat3, outdoc=alldata.rtf);

```

STABLE MACRO: SUMMARIZING TIME-TO-EVENT DATA

BASIC MACRO CALL

The TABLE macro has options for summarizing basic time-to-event data. However, advanced time-to-event analyses were too complicated to incorporate into the TABLE macro. Because time-to-event analyses are very common in clinical trials, a separate macro (%stable) was written for these analyses. This macro can report the number of valid observations, number of events, median times, confidence intervals for the median times, survival rates and confidence intervals for survival rates at a specific time point, log-rank and Wilcoxon p-values, univariate and multivariate Cox model hazard rates, univariate score or Wald p-values, and multivariate likelihood ratio or Wald p-values. A basic call to the STABLE macro is:

```
%stable(dsn      = master,           /* input data set           */
        time     = fu_time,         /* time variable            */
        status   = fu_stat,        /* status variable: 1=censor, 2=event */
        var      = arm ps,         /* analysis variables       */
        outdoc   = table6.rtf);    /* output RTF file name    */
```

This code uses data from the temporary SAS dataset called 'master', summarizes the time variable called 'fu_time' across the arm and ps variables, and creates an RTF file called table6.rtf. The status variable (fu_stat) contains the censoring status of the time variable. This variable is equal to '1' for censored times and '2' for events. The resulting RTF file is shown in table 6.

Table 6: Basic STABLE Output

Variable	N	Events	Median Days	5-Year Survival % (95% CI)	Cox Univariate Hazard Ratio (95% CI)	Cox Univariate Score p-value	Cox Multivariate Hazard Ratio (95% CI)	Cox Multivariate Likelihood Ratio p-value (n=1233)
Arm								
Arm A	428	410 (96%)	445	3.2% (1.8%,5.7%)	--	<0.0001	--	<0.0001
Arm B	691	592 (86%)	614	9.8% (7.3%,13.0%)	0.64 (0.56,0.72)		0.60 (0.53,0.69)	
Arm C	380	354 (93%)	528	5.3% (3.4%,8.3%)	0.8709 (0.7554,1.0041)		0.82 (0.70,0.96)	
PS								
0	638	557 (87%)	637	9.7% (7.4%,12.8%)	--	<0.0001	--	<0.0001
1	530	501 (95%)	430	3.2% (1.9%,5.6%)	1.64 (1.45,1.85)		1.68 (1.49,1.90)	
2	70	68 (97%)	217	1.8% (0.3%,11.9%)	2.60 (2.02,3.34)		2.58 (2.00,3.32)	
(report generated on 03AUG2011)								

The multivariate Cox model results include both arm and ps in the model. Note that the hazard rate for arm C is printed using more significant digits than the other arms. This is done automatically for odds ratios or confidence intervals that are close to 1.00. This makes it easy to determine if the confidence interval actually includes the value of one or not. Otherwise, if rounded to two digits, the upper CI of the odds ratio for arm C would be 1.00. And it wouldn't be clear if this is a value like 0.996 rounded up or 1.004 rounded down.

REPORTING OPTIONS

The variables in the VAR parameter must all be discrete variables, and the analyses will be done for each level of these variables. To include continuous variables, list them in the CVAR parameter as shown in example 7. For continuous variables, the counts, number of events, median survival, and survival percentages are the overall values for patients without missing values for that variable. This example also shows how to add a table title, change the year at which to calculate survival percentages, change input data and median time units, remove unwanted columns, and change reference groups for discrete variables.

```

%stable(dsn      = master,
       time     = fu_time,
       status   = fu_stat,
       var      = arm ps,
       outdoc   = table7.rtf,

       cvar     = age, /* includes continuous variable AGE in the model */
       title1=Table 7: Modified STABLE Output /* adds a table title */

       year     = 2, /* prints survival percentages at year 2 */
       medunits = m, /* prints median survival in months */
       timeunits = d /* time variable is in days */

       n        = n, /* turns off the column of counts */
       events   = n, /* turns off the column for the number of events */

       ref      = 3 2); /* uses third level as the reference group for arm */
                       /* and second level as the reference group for ps */

```

Table 7: Modified STABLE Output

Variable	Median Months	2-Year Survival % (95% CI)	Cox Univariate Hazard Ratio (95% CI)	Cox Univariate Score p-value	Cox Multivariate Hazard Ratio (95% CI)	Cox Multivariate Likelihood Ratio p-value (n=1233)
Arm				<0.0001		<0.0001
Arm A	14.64	25.0% (21.2%,29.4%)	1.148 (0.996,1.324)		1.22 (1.04,1.42)	
Arm B	20.20	41.2% (37.7%,45.0%)	0.73 (0.64,0.84)		0.74 (0.64,0.85)	
Arm C	17.37	30.1% (25.8%,35.2%)	--		--	
PS				<0.0001		<0.0001
0	20.95	41.3% (37.6%,45.3%)	0.61 (0.54,0.69)		0.60 (0.53,0.67)	
1	14.14	24.9% (21.5%,28.9%)	--		--	
2	7.14	14.3% (8.0%,25.4%)	1.59 (1.23,2.04)		1.54 (1.19,1.98)	
Age	18.06	33.7% (31.3%,36.2%)	1.0043 (0.9994,1.0092)	0.0847	1.009 (1.003,1.015)	0.0052

(report generated on 03AUG2011)

UNIVARIATE OPTIONS

This example shows how to change options on the univariate Cox models. This includes adding log-rank p-values, Wilcoxon p-values, Wald p-values, and the sample size used in each univariate Cox model.

```

%stable(dsn      = master,
       time     = fu_time,
       status   = fu_stat,
       var      = arm ps,
       outdoc   = table8.rtf,

       events   = n, /* turns off the column for the number of events */
       median   = n, /* turns off the median survival time column */

       logrank  = y, /* prints the log-rank p-value */
       wilcoxon = y, /* prints the Wilcoxon p-value */
       score    = n, /* turns off univariate score p-values */
       wald1    = y, /* prints univariate Wald p-values */
       utotal   = y); /* prints sample size for each univariate Cox model */

```

Table 8: Univariate Options

Variable	N	log-rank p-value	Wilcoxon p-value	Cox Univariate Hazard Ratio (95% CI)	Cox Univariate Wald p-value	Cox Multivariate Hazard Ratio (95% CI)	Cox Multivariate Likelihood Ratio p-value (n=1233)
Arm		<0.0001	<0.0001				
Arm A	428			--		--	<0.0001
Arm B	691			0.64 (0.56,0.72)	<0.0001	0.60 (0.53,0.69)	
Arm C	380			0.8709 (0.7554,1.0041)	0.0569	0.82 (0.70,0.96)	
Univariate Model (n=1499)							
PS		<0.0001	<0.0001				
0	638			--		--	<0.0001
1	530			1.64 (1.45,1.85)	<0.0001	1.68 (1.49,1.90)	
2	70			2.60 (2.02,3.34)	<0.0001	2.58 (2.00,3.32)	
Univariate Model (n=1238)							
(report generated on 03AUG2011)							

MULTIVARIATE OPTIONS AND STRATIFIED MODELS

Table 9 is an example of running a stratified Cox model and changing multivariate Cox model options.

```

%stable(dsn      = master,
        time     = fu_time,
        status   = fu_stat,
        var      = arm ps,
        outdoc   = table9.rtf,

        lr       = n,      /* turns off multivariate likelihood ratio p-values */
        wald2    = y,      /* turns on multivariate Wald p-values */

        strata   = site); /* Cox models are stratified by site */

```

Table 9: Example of Stratified Cox Models

Variable	N	Events	Median Days	5-Year Survival % (95% CI)	Cox Univariate Hazard Ratio (95% CI)	Cox Univariate Score p-value	Cox Multivariate Hazard Ratio (95% CI)	Cox Multivariate Wald p-value (n=1233)
Arm						<0.0001		
Arm A	428	410 (96%)	445	3.2% (1.8%,5.7%)	--		--	
Arm B	691	592 (86%)	614	9.8% (7.3%,13.0%)	0.64 (0.56,0.72)		0.61 (0.53,0.70)	<0.0001
Arm C	380	354 (93%)	528	5.3% (3.4%,8.3%)	0.8708 (0.7546,1.0048)		0.83 (0.71,0.97)	0.0119
PS						<0.0001		
0	638	557 (87%)	637	9.7% (7.4%,12.8%)	--		--	
1	530	501 (95%)	430	3.2% (1.9%,5.6%)	1.63 (1.45,1.85)		1.68 (1.48,1.90)	<0.0001
2	70	68 (97%)	217	1.8% (0.3%,11.9%)	2.58 (2.00,3.32)		2.58 (2.00,3.32)	<0.0001
(report generated on 03AUG2011) Cox Models Stratified by Site.								

TWO SIDE-BY-SIDE ENDPOINTS

STABLE can report either one or two time endpoints. Table 10 is an example of printing two time-to-event endpoints side by side. This can produce a lot of output, so it is advisable to turn off some information.

```
%stable(dsn      = master,
        var       = arm ps,
        outdoc    = table10.rtf,

        time      = fu_time pg_time, /* two time variables          */
        status    = fu_stat pg_stat, /* two status variables         */
        t1label   = OS,              /* label for first time variable */
        t2label   = DFS,             /* label for second time variable */
        n         = n,               /* turns off some columns       */
        events    = n,
        percent   = n,
        hr1       = n,
        score     = n);
```

Table 10: Example of Two Time-to-Event Endpoints

Variable	Median OS Days	OS Cox Multivariate Hazard Ratio (95% CI)	OS Cox Multivariate Likelihood Ratio p-value	Median DFS Days	DFS Cox Multivariate Hazard Ratio (95% CI)	DFS Cox Multivariate Likelihood Ratio p-value (n=1233)
Arm			<0.0001			<0.0001
Arm A	445	--		431	--	
Arm B	614	0.60 (0.53,0.69)		601	0.60 (0.52,0.69)	
Arm C	528	0.82 (0.70,0.96)		514	0.82 (0.70,0.96)	
PS			<0.0001			<0.0001
0	637	--		626	--	
1	430	1.68 (1.49,1.90)		418	1.69 (1.49,1.91)	
2	217	2.58 (2.00,3.32)		207	2.59 (2.01,3.34)	

(report generated on 03AUG2011)

CONCLUSIONS

The TABLE, TABLEMERGE, and STABLE macros are simple but powerful tools for reporting clinical trials. They can greatly increase statistician and investigator productivity which results in reducing the costs of clinical trials. They enable the study team to spend more time interpreting the data and less time programming, searching through pages of SAS output, and creating reports. These summary reports also increase the quality of reports and eliminate transcription errors.

These macros are very powerful and should be used with caution. They will report exactly what you ask them to report even if the analyses are incorrect. It is the user's responsibility to look carefully at the data, plot distributions, check for outliers and influential points, test assumptions, and check residuals. The macros should only be used for reporting final, verified results.

The macros have many other parameter options that are not reported in this manuscript. These options are explained in the macro documentation available from the first author. The TABLE and TABLEMERGE macros work on any SAS version 8.2 or higher and the STABLE macro requires SAS version 9.2.

TRADEMARKS

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CONTACT INFORMATION

These macros are available by request from the first author:

Paul Novotny
Mayo Clinic
Health Sciences Research
200 1st Street SW
Rochester, MN 55905 USA
(507) 284-4186
E-mail: novotny@mayo.edu

Appendix I: TABLE Macro PTYPE and TYPE Parameter Options

PTYPE Parameter		TYPE Parameter			
Parameter Value	Test	Parameter Value	Variable Type	TABLE Output	Default PTYPE
0 or n	No p-value	1 or c	Continuous	Prints n, mean, median, standard deviation, quartiles and range	3
1 or c or ch	Chi-Square	2 or d	Discrete	Prints n and percent	2
2 or fe	Fisher's Exact	3 or o	Ordinal	Prints n and percent	3
3 or kw	Kruskal-Wallis	4 or s	Survival	Prints n, events, and medians	8
4 or ekw	Exact Kruskal-Wallis	5	Discrete	Prints n	2
5 or w	Wilcoxon Rank Sum	6	Discrete	Prints percent	2
6 or ew	Exact Wilcoxon	7	Continuous	Prints n, median, and quartiles	3
7 or f	ANOVA F-test	8	Continuous	Prints n, mean, standard deviation, and range	3
8 or lr	Log-rank	p1	Discrete	Prints only the first category	2
9 or t	t-test (Univariate)	p2	Discrete	Does not print the first category	2
10 or sr	Sign Rank (Univariate)	p3	Discrete	Does not print the first two categories	2
11 or tr	Cochran-Armitage Trend Test				
12 or te	Equal Variance T-Test				
13 or tu	Unequal Variance T-Test				
14 or t2	Equal Variance T-Test or Unequal Variance T-Test or Wilcoxon Test as Appropriate				