

SAS macro package to automate coding graphs with ClinXport.

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ABSTRACT

ClinXport is a tool developed to streamline reporting, and has made its proofs through a wide range of studies, in producing in a simple way tables, listings and figures. One of the particularities of the tool was to reuse easily output layout to avoid a maximum of coding. In particular Clinxport has showed that it was very efficient and friendly to use for the production of listings and tables, but in another side was maybe limited for the creation of figures. The new possibilities brought by the SAS 9.2 version, with the new procedures as SGPLOT or SGPARENTER, allow now to automate in the same manner the reporting of the figures. It appears that possibilities are huge especially for making a quick and ready to use program layout or to build a very complex or atypical graphs to make it usable by the professional or the novice.

INTRODUCTION

SAS® 9.2 version has considerably evolved specially regarding the graphical programming with the SG Procedures.

The following poster presents a SAS macro package allowing an automation of graphics creation and gives the possibility to use them as a user friendly tool and then to explain how to exploit these new characteristics and implement them in a SAS-reporting view. On the one hand SAS beginner or uninitiated can create or modify, quickly and simply, a large panel of graphs only through a Microsoft Excel interface.

On the other hand, the huge flexibility of the tool brings to specialist the possibility to produce all type of graphics, even the most complex, thanks to the options very convenient to implement, either to import through the TEMPLATE procedure.

A QUICK RECALL OF HOW CLINXPORT WORKS

A brief and general recall of what Clinxport is will help to understand the next steps:

Basically, ClinXport is:

a/ An Excel file and a set of SAS macro driving all reports in a study

b/ Inside the file there is

- a sheet containing the study specific information, common in all outputs.(STUDY sheet)
- a sheet containing the complete list of output and their related informations (DOMAIN sheet) in particular: the type of output (table listing figure); the title; input data location and the link to the "template" sheet containing the needed information to produce the specific output.
- The "template" sheet containing the output-specific information, will be completed by the user (programmer) to create in a simple way the desired output. Then the output layout can be fully controlled and customized from the Excel workbook.

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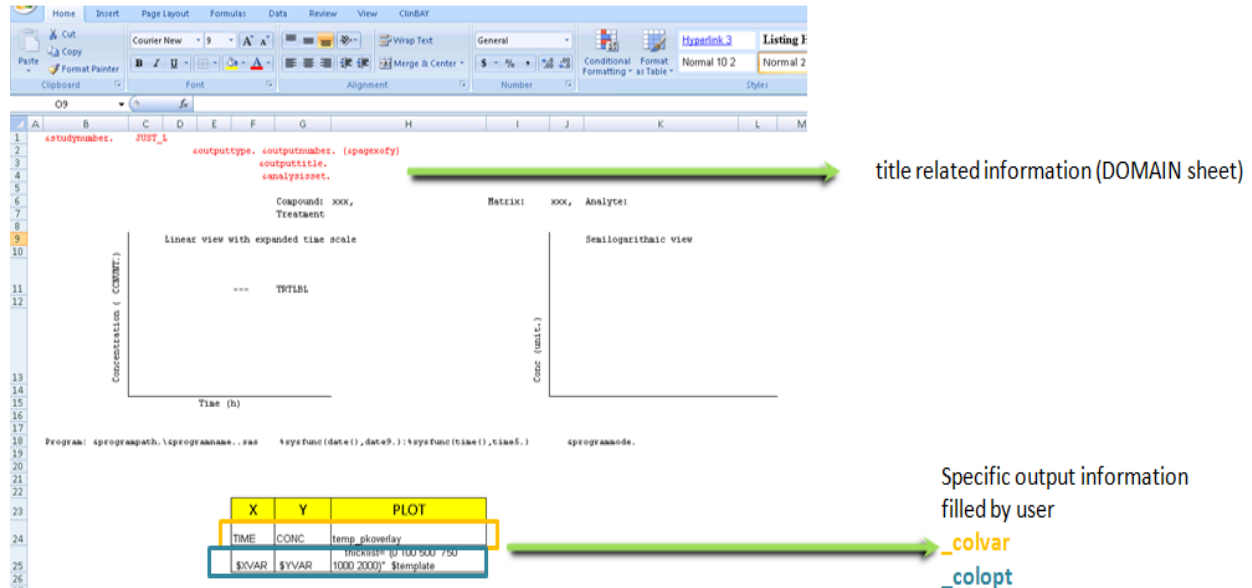
Once all of these steps are completed only one click on the interface is needed to produce the report .

HOW IT WORKS

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The purpose of this poster is to explain how with such a tool (as Clinxport) we are able to create every type of graph. The new SAS procedures proposed in SAS 9 are more intuitive and easy to implement in this reporting process. A basic knowledge of the SAS procedure is still needed in this first step but in the future an interface will be added to reduce it.

TO WHAT DOES THE TEMPLATE SHEET LOOKS LIKE?



The two colored areas (colvar and colopt) contain the information entered by user.

colvar identify the variables and type of figure.

colopt identify the matching options.

Inside the colopt area, keywords as \$XVAR, \$YVAR or \$PLOT are added to identify the functionalities of the information of each cell.

LET'S START WITH A BASIC GRAPHS

We need first to identify the following element (common in the most of graphs)

- 1/ AXIS X : Name of the X variable (ex: Time → TIME)
- 2/ AXIS Y : Name of the variable of interest (ex: Blood pressure → BL_PRESS)
- 3/ The type of figure : (ex: Box plot → VBOX)

Once the identification is done, we need to determinate the particularities (options) required for each element

- 1/ AXIS X : label="Time (days)" min=1 max=20
- 2/ AXIS Y : label="Systolic blood pressure"
- 3/ VBAR : group=AGE lineattr=solid etc..

These points are the three most important elements, this is a base in the most of the figures.

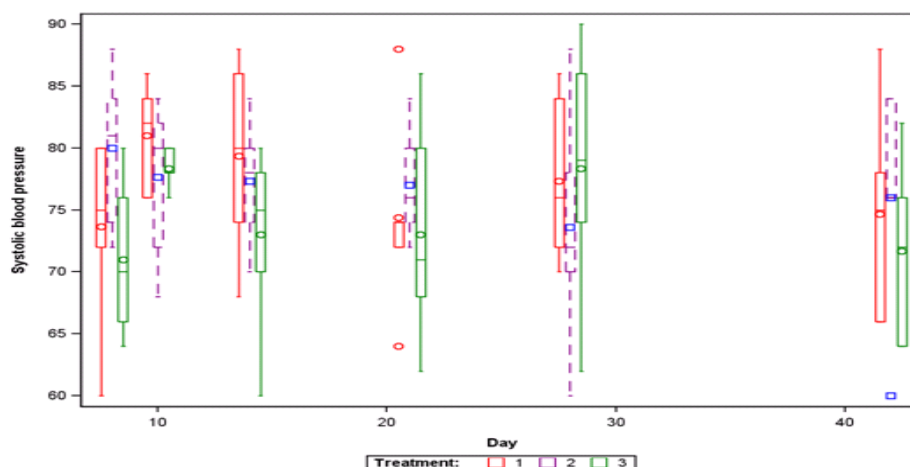
Multiple other features are of course available. (Actually all SAS features for proc SGPLOT and SPANEL are so far usable and some other are added into the reporting system)

This will give in the excel sheet:

X	Y	PLOT
TIME	BL_PRESS	VBOX
label="Day" type=linear \$XVAR	label="Systolic blood pressure" \$YVAR	CATEGORY=pday group=TREATMENT \$PLOT



Figure 14.3.3.4 (Page 1 of 1)
Boxplot of vital signs by time and treatment
Safety analysis set



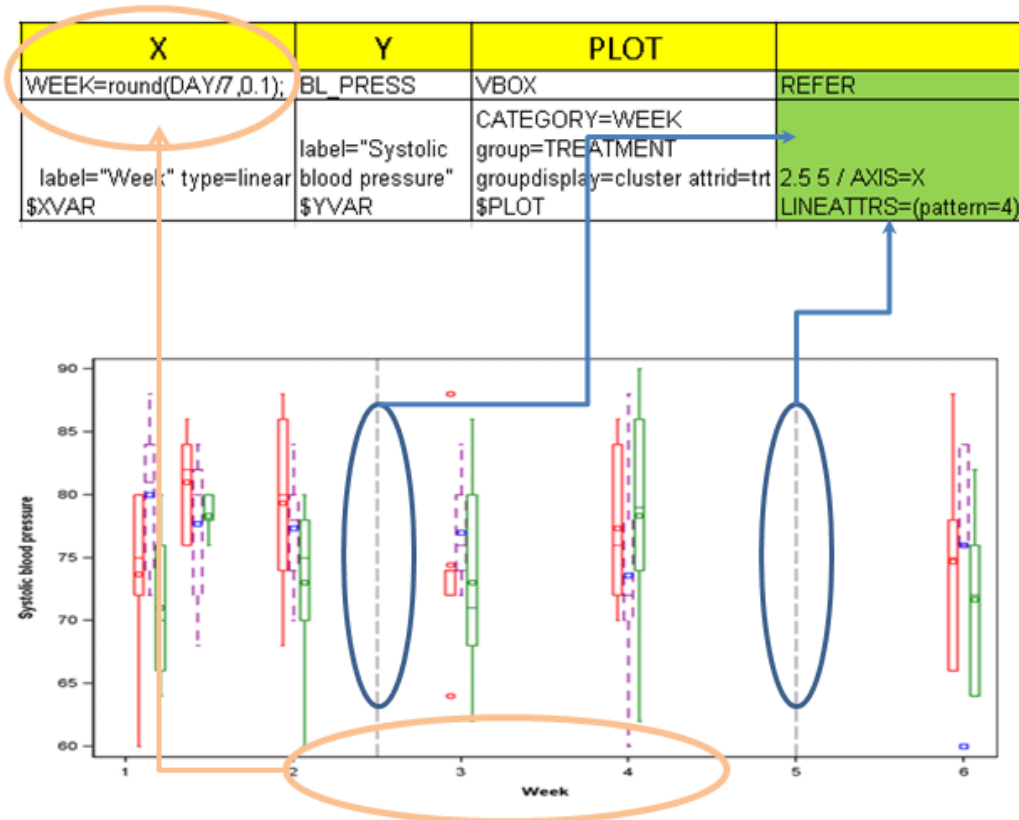
MODIFY A FIGURES

Once a graph template is built , nothing is easier to adapt to a new set of data or to complete :

Let's make some changes to the first example.

Since the previous example, we have been asked to

- 1: present the results in WEEKS and not anymore in DAYS.
- 2: To focus on the analysis between the week 2.5 and 5 by adding reference lines.



We notice that there is no need to go inside the program. Changes are intuitive, quick and applicable directly from the same template. In our case, only two manipulations have been necessary:

- Apply a transformation to the X variable by a SAS code line directly from the \$XVAR cell.
- Create a new cell to add the dash lines on the figure.

Several features :

- Any specifications of PROC SGPLOT and PROC SGPanel are implementable in this manner (VLINE,SCATTER,SERIE REG etc.. and their related options)
- Customize the legend.
- Handle a **by** statement (a same graph is often repeated in an output for several parameters) to make it appear in the title/or an axis.
- Change the color, line pattern, symbol...(thanks to the new SAS 9.3 options)
- Change the format for the variables (X and Y) and for the axes.

ABOUT PROC TEMPLATE

OVERVIEW

PROC TEMPLATE is the most powerful procedure for graphs in SAS. It is not always easy to handle but all graphical structures can be developed with it.

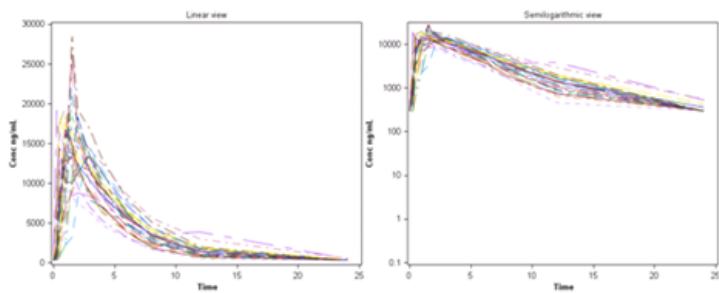
Indeed, it is sometimes asked to create a standard program for producing a figure with very specific or atypical layout and then PROC TEMPLATE can be the solution.

The ClinXport graphics macro take into account as well of the PROC TEMPLATE, and so, any template can benefit of the advantages of the tool as it has been showed previously.

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For example, a template was required to create this particular layout (Y axis of the first graph is linear and the second is in a logarithmic scale).
The call of a defined template is perfectly incorporated in the reporting process, and changes brought by the user can be set up again from the Excel sheet.

Figure 14.2-1.7 (Page 1 of 12)
Overlaying individual concentration-time profiles per treatment
Parameter: Conc (ng/mL)
Treatment Drug XYZ



X	Y	PLOT	BY VARIABLES	
TIME	CONC	temp_pkoverlay	BYVAL1=PARAMETER; BYVAL2=TRT ;	
		thicklist="(0 1 5 10 15 20 25)"		
		_XLABEL="Time" _XMAX="max(xvar)"		
		_YLABEL="BYVAL1"		
\$XVAR	\$YVAR	GROUPVAR="Subject" \$TEMPLATE		

Template name

Dynamic variables

Here is a part of the code where appear the different dynamic variables:

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```
%macro temp_pkoverlay;

data ads2;
set ads2;
....
.....

proc template;
  define statgraph temp_pkoverlay;
    dynamic _XLABEL _YLABEL GROUPVAR _TICKLIST _XMAX _YMAX ;

  beginngraph / designwidth=2500px designheight=1400px;

    *entrytitle "Treatment: " _BYVAL_;
    ....

    layout overlay /XAXISOPTS =(LABEL=_XLABEL Linearopts=( viewmin=0 viewmax=_XMAX tickvaluelist=_ticklist))
      YAXISOPTS =( LABEL=_YLABEL Linearopts=( viewmin=0 viewmax=_YMAX));

    seriesplot x=&XVAR. y=&YVAR. /group=GROUPVAR ;

    endlayout;
  endcell;

  ....
endngraph;

end;
run;

%mend temp_pkoverlay;
```

CONCLUSION

From now on, the specialist or the neophyte user can handle every type of graph.

In the same manner, as listing and table, reuse or adapt the layout of a figure becomes quick, easy and efficient and everything is always done without opening any SAS session.

It is still necessary to know the SG options in order to take advantage of the full capacities of the tool but this part will be considerably improved in a near future.

REFERENCE:

ClinXPORT a software to streamline the analysis and reporting of clinical trials with SAS®

<http://www.google.be/url?sa=t&rct=j&q=clinxport&source=web&cd=3&ved=0CDIQFjAC&url=http%3A%2F%2Fwww.phuse.eu%2Fdownload.aspx%3Ftype%3Dcms%26docID%3D3684&ei=5p5NUOPmM9SX0QXjsIGgBA&usg=AFQjCNHpkslEj4IBoEJ-sJNIXr8j2a9AQA>

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