

Paper GH-16

Tips for Merging SAS/GRAPH® Output into Microsoft PowerPoint

Ferrell Drewry, PharmaProSource Corp., Raleigh, NC

ABSTRACT

SAS/GRAPH® software can be used to quickly produce hundreds of graphs in a variety of display and print formats, but SAS/GRAPH output is not easily integrated into Microsoft PowerPoint presentations. If only a few SAS/GRAPH slides are needed, the manual cut-and-paste method might be sufficient. If several hundred slides are needed, then a more efficient method is needed for inserting the SAS/GRAPH output into PowerPoint. This paper describes a process to merge SAS/GRAPH output into PowerPoint slides in a manner similar to the mail-merge process in Microsoft Word. The techniques presented were used to insert several hundred SAS/GRAPH displays into PowerPoint as backup slides for an FDA advisory committee meeting. Using the advisory committee meeting scenario as a case study, this paper also provides tips for making SAS/GRAPH output blend with the other slides in the PowerPoint presentation and for ensuring high-quality results.

INTRODUCTION

As statistical programmers, we are frequently asked to create multiple SAS/GRAPH plots for presentations. A common request is for us to produce over 100 plots as backup slides for an FDA advisory committee meeting. In many cases, the client takes our work and asks a graphic artist to reproduce the plots on Microsoft PowerPoint slides so that the plots will integrate or blend into the presentation style of the text slides being presented at the meeting. This process of reproducing the plots results in a large duplication of effort, and it creates the need for careful quality control of the hand-produced plots.

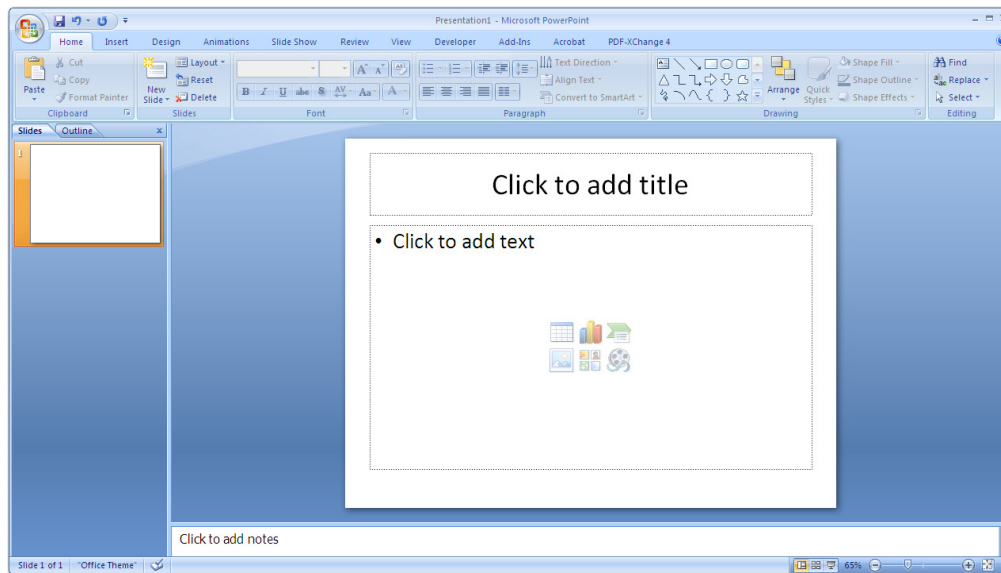
With the release of SAS 9.2 and by carefully selecting options, we have been able to produce SAS/GRAPH output that meets the presentation quality requirements of our clients. Also, we have been able to automate the process of merging SAS/GRAPH output into PowerPoint. This paper describes the process used to merge SAS/GRAPH output into a PowerPoint to quickly produce high-quality slides. In this paper, SAS/GRAPH output refers to any plot, chart, map or any other output derived from SAS/GRAPH software. Initially, the paper addresses the GOPTIONS needed to integrate or merge a single SAS/GRAPH output into a PowerPoint slide. Then, the paper outlines steps to use a program to merge SAS/GRAPH output onto several PowerPoint slides.

This paper contains a sample SAS macro that was used to prepare SAS/GRAPH output for merging. Although a Visual Basic for Applications (VBA) program could be used to perform the actual merge into PowerPoint, the example in the paper relies on PPTMerge from PPTools (see www.pptools.com/merge) to actually perform the merge. Without a VBA program or PPTMerge, users would need to cut-and-paste each SAS/GRAPH output onto a PowerPoint slide or manually insert the SAS/GRAPH output file into a slide. With the automation provided by PPTMerge or VBA, users can simply run a program to automatically create PowerPoint slides for each SAS/GRAPH output. PPTMerge is an add-in to PowerPoint, and it uses a process similar to the mail-merge process used to create form letters in Microsoft Word. This paper includes all of the details needed to use PPTMerge with SAS/GRAPH output.

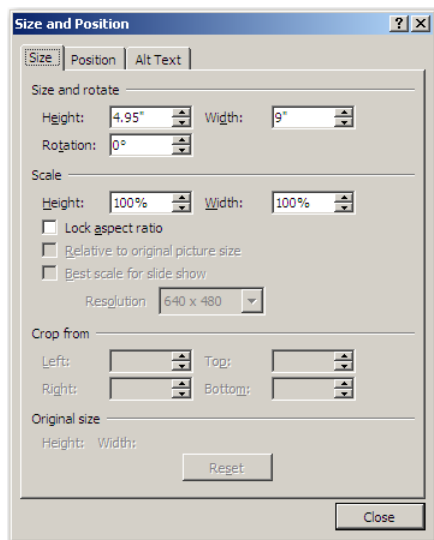
The SAS programs in this paper rely on SAS 9.2. With some slight modification, earlier versions of SAS software can be used. SAS program statements specific to SAS 9.2 are noted in the paper along with suggestions for using prior versions of SAS software. The PowerPoint examples in this paper use Microsoft PowerPoint 2007. Other PowerPoint versions that support VBA or PPTMerge can be used.

MATCHING SAS/GRAPH OPTIONS TO YOUR POWERPOINT PRESENTATION

The first step to creating high-quality SAS/GRAPH output for your PowerPoint presentation is to determine how much space on the PowerPoint slide is available for the SAS/GRAPH output. Create a PowerPoint slide and determine the size of the text box area that may contain a graph. For example, here is the default title-and-content layout slide in PowerPoint.

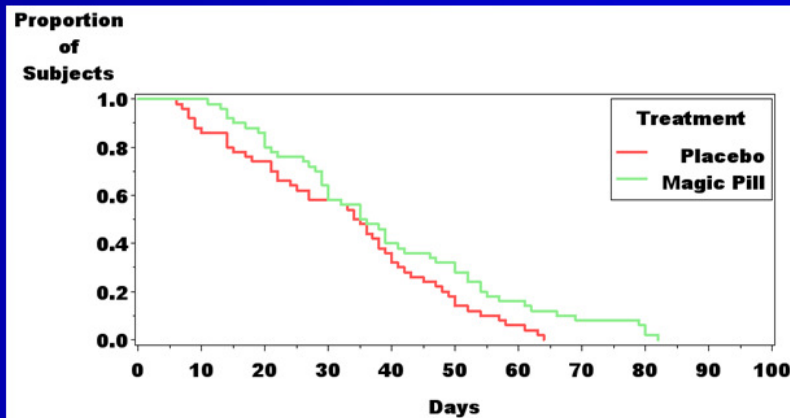


To determine the size of the text box below the title area, click the right mouse button in the text box and open the Size and Position dialog. In this case, height is 4.95" and width is 9". These dimensions are used in the SAS/GRAPH GOPTIONS statement to match the SAS/GRAPH output area to the PowerPoint slides.



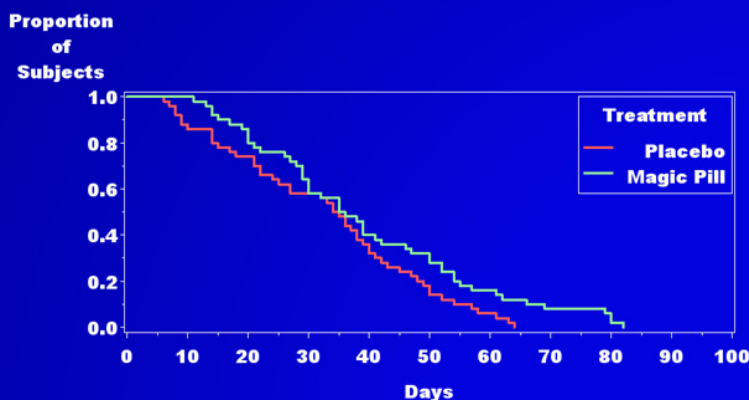
There is a new SAS/GRAPH device driver in SAS 9.2 that allows for transparent graphic images. Transparent graphic images or pictures have been used on web sites for years. In prior versions of SAS/GRAPH software when SAS/GRAPH output was pasted into PowerPoint, the SAS/GRAPH background was visible or the SAS/GRAPH background was matched to the background of the slide to make the background appear invisible. Here is an example plot that was manually inserted into the slide text box area and where the SAS/GRAPH background is visible.

Sample with Background Visible



Note that the title for the slide was not generated by SAS software. To make the slide blend with other slides in the presentation, titles and BY-lines are entered as text in PowerPoint rather than included as part of the SAS/GRAPH output. Also note that a custom PowerPoint background is used in this example and that it would be difficult to match the SAS/GRAPH background to the slide background. The previous example used GOPTIONS DEVICE=PNG. Here is the sample example plot again as a transparent image produced when GOPTIONS DEVICE=PNGT.

Sample with Background Invisible



Now, the SAS/GRAPH output and the custom slide background are blended into an attractive slide. Beauty is always in the eye of the beholder, but some people prefer the example with an invisible SAS/GRAPH background. The device driver PNGT is new to SAS 9.2. Here is the complete GOPTIONS statement used to produce the example with the invisible background.

```
goptions reset=all
        vsize=4.95 in
        hsize=9.00 in
        ftext="Arial Black"
```

```

c text=white
h text=16pt
h title=24pt
device=pngt
gsfmode=replace
gsfname=figfile
;

```

Note that VSIZE= and HSIZE= parameters in the GOPTIONS statement match the sizes needed for the text box area of the PowerPoint slide that is used. The GSFMODE= and GSFNAME= parameters are required to produce an output file. Inserting the output file into PowerPoint yields better results than cutting-and-pasting the image from a SAS window to a PowerPoint slide.

For SAS versions prior to version 9.2, a separate graphics utility program is needed to make the background invisible by converting SAS/GRAPH output into transparent output. There are plenty of utility programs that can create transparent graphics, however a discussion of that conversion process is beyond the scope of this paper.

MERGE SAS/GRAPH OUTPUT INTO POWERPOINT SLIDE WITH PPTMERGE

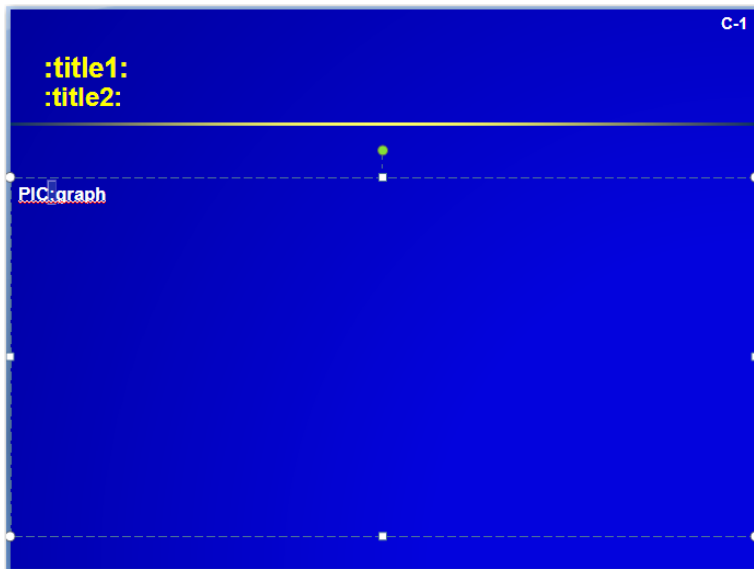
PPTMerge from PPTools is used to automatically merge SAS/GRAPH output into PowerPoint. A new slide is created for each SAS/GRAPH output. The process is similar to the mail-merge process for creating form letters in Microsoft Word. Assuming that PPTMerge has been installed in PowerPoint, here are the steps to create the PowerPoint slides from SAS/GRAPH:

1. Create a template slide in a new PowerPoint presentation. The template slide must have a text area with text matching the text expected by PPTMerge. The text required is explained in detail below.
2. Create SAS/GRAPH output using the HSIZE and VSIZE of the text area created in step 1. Use DEVICE=PNGT when invisible SAS/GRAPH backgrounds are preferred.
3. Create an Excel spreadsheet that has a column name matching the text entered in step 1. In the column, enter the names of the SAS/GRAPH output files from step 2 that will be merged into a slide. Each row of the spreadsheet causes a new slide to be created from the template slide created in step 1. Additional columns in the spreadsheet can be used for titles and BY-lines on a slide.
4. Start PowerPoint, open the presentation created in step 1, and run the PPTMerge add-in.

Each of these steps is described in detail below. A SAS macro is used to create the SAS/GRAPH output and corresponding Excel spreadsheet required for PPTMerge. By using a macro to create the output and the Excel spreadsheet, human error is eliminated from the process of making the custom PowerPoint titles and BY-lines match the SAS/GRAPH output.

STEP 1: CREATE TEMPLATE SLIDE FOR PPTMERGE

Creating the template slide for PPTMerge is similar to creating any other slide for a PowerPoint presentation. Select a background, color scheme and layout. Decide how many title lines are needed and where the SAS/GRAPH output will be displayed on a slide. Like a form letter with field codes in Microsoft Word, this template slide must contain special text that serves as instructions for PPTMerge. Any text areas that will be entered automatically by PPTMerge must have a text label surrounded by colons e.g. :title1:, :title2:. Image areas that will be automatically filled must have a text label in the form PIC:graph. "Text label" here means text entered in the text field box on the slide. It serves as a label since the format of the text is unique. The words title1, title2, and graph are arbitrary, but those labels must match the column names of the spreadsheet created in step 3. Here is a sample template slide that has two title lines and a single large area for the SAS/GRAPH output.



Note: "Template slide" does not mean a PowerPoint master slide. "Template slide" means any slide in the presentation with text in the format expected by PPTMerge.

STEP 2: CREATE SAS/GRAPH OUTPUT

There are many ways to create SAS/GRAPH output. The GOPTIONS needed to produce attractive graphs in PowerPoint are shown above. What follows is a SAS macro that creates multiple graphs along with the entries needed for the Excel spreadsheet required in step 3. As mentioned, programmatically creating the spreadsheet with the graphs eliminates errors that can occur when manually entering the spreadsheet data.

First, a dataset is created to hold the title, BY-line, and file name of each SAS/GRAPH output. The dataset variable labels match the text areas created in the template slide from step 1. For now, the dataset is empty. When multiple SAS jobs are used, this dataset would be created elsewhere and saved as a permanent SAS dataset.

```
/** create a 0 obs, 3 var dataset to hold our slide info **/
data slide_control;
  length title1 $80    /** first title line of a PowerPoint slide    **/
         title2 $80    /** second title line is BY value line      **/
         figure $200;  /** saves file name for the SAS/GRAPH output **/
  label title1=':title1:' /** labels match PowerPoint template slide tags **/
         title2=':title2:'
         figure='PIC:graph';
  stop; /** no obs, just vars -- we will add obs later **/
run;
```

Next, some random data is generated for the graphs. Note that the format contains information that is used later to create BY-line text.

```
/** create some data to analyze **/
proc format;
  value tx 0='Placebo'
         1='Magic Pill';
  value gender 0='For Male Subjects'
              1='For Female Subjects';
  value bmggrp 0='For Subjects in Underweight BMI Group'
              1='For Subjects in Normal BMI Group'
              2='For Subjects in Overweight BMI Group';
```

```

run;
data exposed;
  do i=1 to 50;
    do Treatment=0 to 1;
      Days = 65 - round(uniform(123456789)*60,1)
              + treatment*15*(i<15) + treatment*5;
      gender = round(uniform(0),1);
      bmigrp = round(uniform(0)*2,1);
      output;
    end;
  end;
drop i;
format bmigrp bmigrp. gender gender. treatment tx.;
run;

```

Now, a macro is used to produce six Kaplan-Meier plots that will be merged into a PowerPoint presentation. This macro is also used to produce the XML spreadsheet used by PPTMerge to create the titles and BY-lines for each slide of the presentation. Note that the formats created above are used for the BY-line values and for descriptive information in the SAS/GRAPH output file name.

```

%macro kmplot(byvar=,strata=);
  /** sort and analyze our bogus test data */
  proc sort data=exposed;
    by &byvar &strata;
  run;
  proc lifetest data=Exposed outsurv=k mest noprint;
    %if &byvar NE %then %do;
      by &byvar;
    %end;
    time Days;
    strata &strata;
    survival conftype=linear;
  run;
  /** now loop through values of BYVAR to produce output */
  %let byval_cnt=1; /** default times to loop */
  /** for BY groups: (otherwise ignore)
  /** since we have formatted values, we need to retrieve the unformatted
  *** values for the WHERE clause on the PROC Gplot statement below */
  %if &byvar NE %then %do;
    ** use format to get value of var;
    proc format library=work cntlout=fmtdata;
      select &byvar;
    run;
    proc sql noprint;
      select start,
             label
             into :byval separated by ' ',
                 :bylab separated by '~'
             from fmtdata;
    quit;
    %let byval_cnt=&sqllobs;
    %put _user_;
  %end;
  /** produce and save a graph for each BY value */
  %do i=1 %to &byval_cnt;
    /** SAS/GRAPH output file name has BY-line info */
    %if &byvar NE %then %do;
      %let figfile

```

```

        =C:\projects\SESUG\graphs\KMfigure_where_&byvar._is_%scan(&byval,&i).png;
    %end;
%else %do;
    %let figfile=C:\projects\SESUG\graphs\KMfigure_for_all_subjects.png;
    %end;
/** save figure file name and selection criteria for merging with PowerPoint **/
data current_slide;
    if 0 then set slide_control; /** trick to just get var info - not obs **/
    retain figure "&figfile"
        title1 'Days without Reflux';
    %if &byvar NE %then %do;
        retain title2 "%scan(&bylab,&i,%str(~))";
    %end;
    %else %do;
        retain title2 "For All Subjects";
    %end;
    output;
    stop;
run;
proc append base=slide_control data=current_slide;
run;
filename figfile "&figfile";
/** standard setting for our PowerPoint slides **/
goptions reset=all
    vsize=4.75 in /** size here matches graph area size in PowerPoint **/
    hsize=9.00 in /** size here matches graph area size in PowerPoint **/
    ftext="Arial Black"
    ctext=white
    htext=16pt
    htitle=24pt
    device=pngt /** driver for invisible SAS/GRAPH background **/
    gsfmode=replace
    gsfname=figfile;
symbol1 i=STEPLJ w=2 c=lightred;
symbol2 i=STEPLJ w=2 c=lightgreen;
axis1 order=(0 to 1 by .2)
    minor=(number=1)
    label=(j=c 'Proportion'
        j=c 'of'
        j=c 'Subjects')
    color=white;
axis2 order=(0 to 100 by 10)
    minor=(number=1)
    color=white;
legend1 frame
    cborder=white
    down=2
    mode=protect
    position=(top right inside)
    label=(justify=center position=top);
/** produce a graph -- where clause assumes numeric BY values **/
proc gplot data=k mest
    %if &byvar NE %then %do;
        (where=(&byvar=%scan(&byval,&i)))
    %end;
    ; /** finish PROC GLOT statement **/
plot survival*days=&strata

```

```

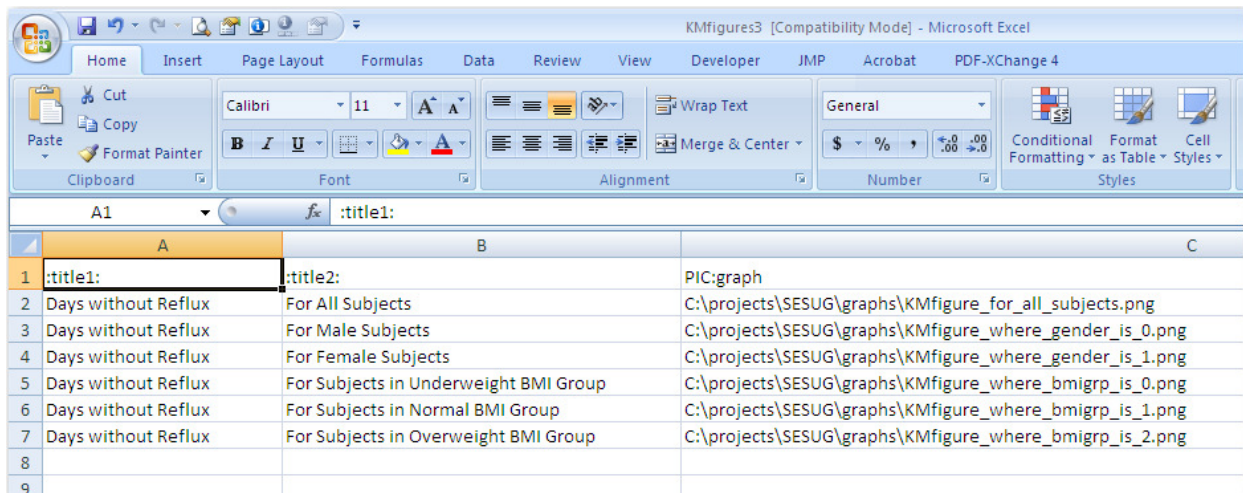
/ vaxis=axis1 haxis=axis2 legend=legend1;

run;
filename figfile clear;
%end; /** end of %do i=1 %to &byval_cnt **/
%mend;
%kmplot(byvar=, strata=treatment);
%kmplot(byvar=gender, strata=treatment);
%kmplot(byvar=bmigrp, strata=treatment);
/** save slide control data as XML spreadsheet **/
ods markup tagset=tagsets.excelxp file='C:\projects\SESUG\slides\KMfigures3.xml';
proc print data=slide_control split=' ' noobs;
run; quit;
ods markup close;

```

STEP 3: CREATE EXCEL SPREADSHEET

PPTMerge uses an Excel spreadsheet to control slide creation. The columns of the spreadsheet correspond to the names of the text and image areas in the template slide that was created in step 1. PPTMerge creates a new slide for each row of the spreadsheet, and it inserts text and image files from the spreadsheet into each of the new slides. Here is a sample spreadsheet with columns that match the template slide show in step 1 above.

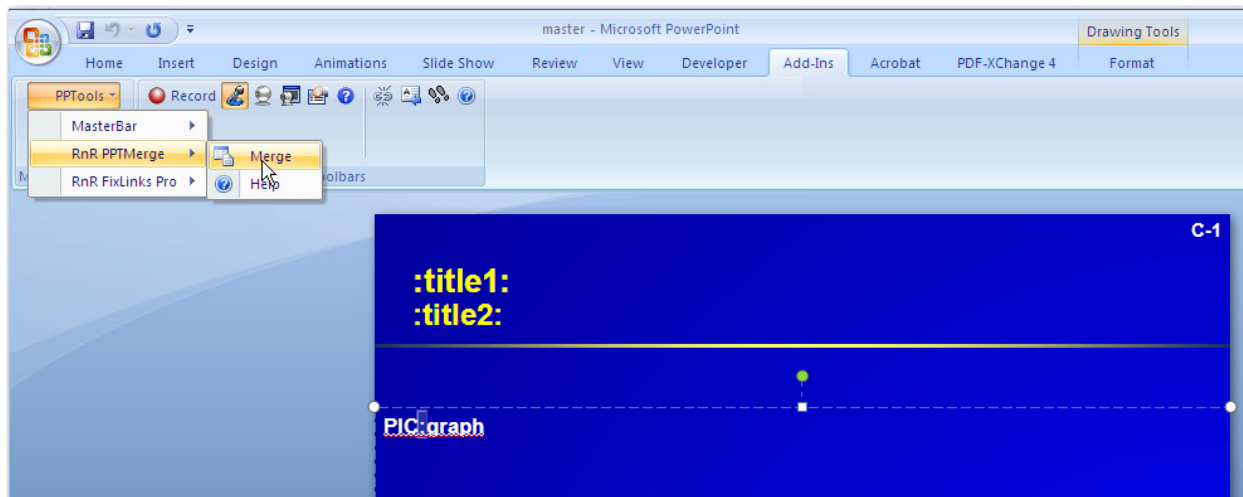


	A	B	C
1	:title1:	:title2:	PIC:graph
2	Days without Reflux	For All Subjects	C:\projects\SESUG\graphs\KMfigure_for_all_subjects.png
3	Days without Reflux	For Male Subjects	C:\projects\SESUG\graphs\KMfigure_where_gender_is_0.png
4	Days without Reflux	For Female Subjects	C:\projects\SESUG\graphs\KMfigure_where_gender_is_1.png
5	Days without Reflux	For Subjects in Underweight BMI Group	C:\projects\SESUG\graphs\KMfigure_where_bmigrp_is_0.png
6	Days without Reflux	For Subjects in Normal BMI Group	C:\projects\SESUG\graphs\KMfigure_where_bmigrp_is_1.png
7	Days without Reflux	For Subjects in Overweight BMI Group	C:\projects\SESUG\graphs\KMfigure_where_bmigrp_is_2.png
8			
9			

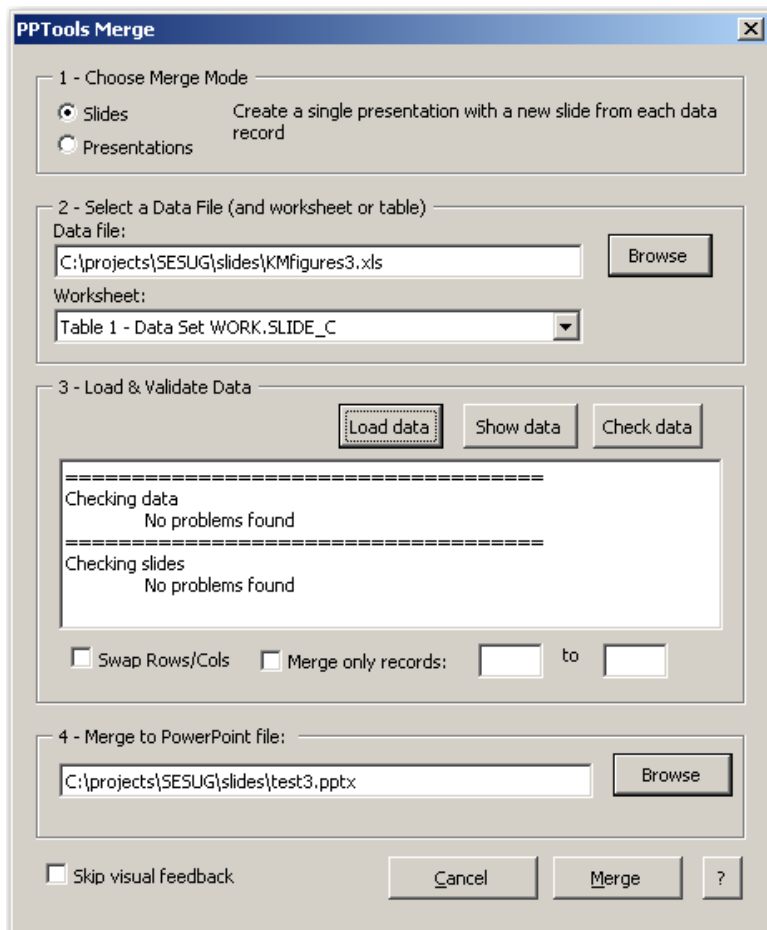
The SAS macro shown in step 2 above creates an XML spreadsheet using the new ODS TAGSET EXCELXP. When an XML spreadsheet is created, it must be opened in Excel and saved as an Excel workbook before it can be used by PPTMerge. PPTMerge cannot read the XML spreadsheet format. An alternative is to use PROC EXPORT to create a CSV file, but the column names will need to be edited to match the names required by PPTMerge. So either way, the spreadsheet must be opened and saved in Excel before it can be used with PPTMerge. The spreadsheet data can be edited or ordered whenever needed prior to running PPTMerge in step 4.

STEP 4: RUN PPTMERGE TO PRODUCE FINAL RESULT

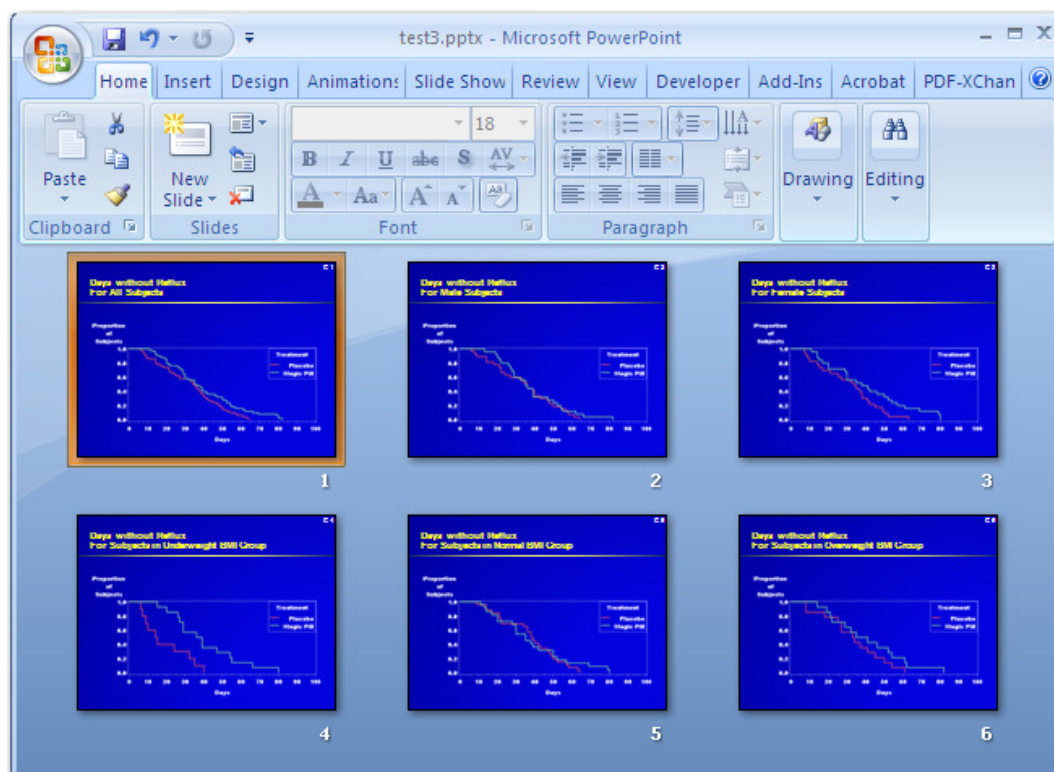
The final step in the process is to run the PPTMerge add-in. Open the template slide created in step 1 above with PowerPoint and run PPTMerge from the Add-Ins menu,



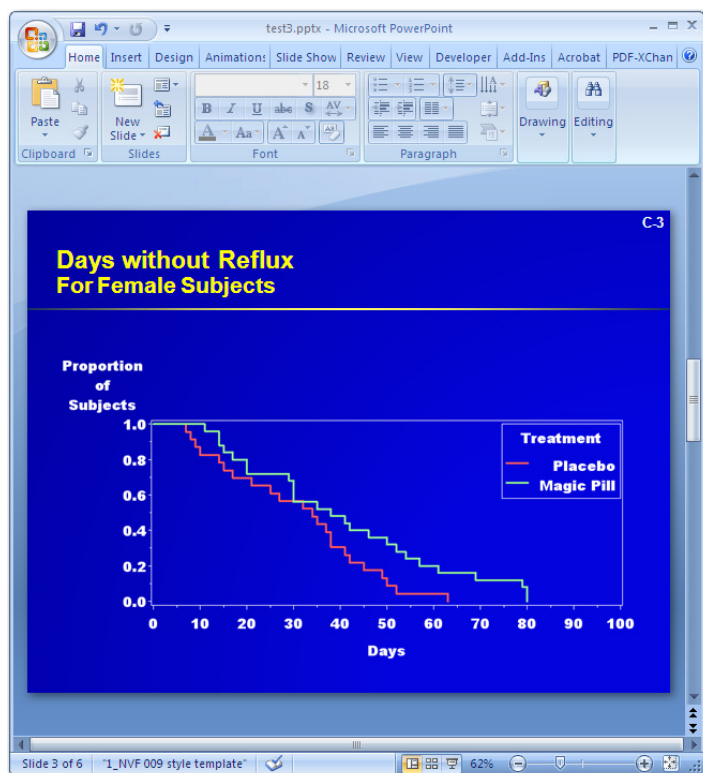
Here is the PPTMerge dialog window.



Be sure to press the Load Data button after specifying the data file. When the data file has been checked and the Merge to PowerPoint file has been specified, the Merge button will be available to run the merge process. The result is a presentation with all graphs loaded into slides with the titles and BY-lines specified.



Here is a slide that was produced with the sample program in step 2 above. Note that the second title line or BY-line text is the same text that was created in the PROC FORMAT step in step 2 above.



CONCLUSION

There are many ways to produce high-quality slides for important presentations like FDA advisory committee meetings. Usually, the objective is to produce a large quantity of slides quickly and accurately. With SAS/GRAPH and automation tools like PPTMerge, both objectives can be easily met. This process is a big improvement over the traditional cut-and-paste method and over the process of reproducing the slides by hand.

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CONTACT INFORMATION

Your comments and questions are valued and encouraged. Contact the author at:

Ferrell Drewry
PharmaProSource Corp.
8601 Six Forks Rd Ste 400
Raleigh, NC 27615
Work Phone: +1 919 882 2118
Fax: +1 919 882 2119
E-mail: fdrewry@pharmaprosource.com
Web: www.pharmaprosource.com

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