

Recreating an Excel-based report with SAS and ODS

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ABSTRACT

One of the best features of Excel is the ease with which a paper-based report can be compiled to include data tables and charts on the same page, all with easily controlled fonts, colors and spacing. The downside to using Excel for such purposes is its limited ability to analyze or manipulate data. For years, my small state agency published a paper-based report that consisted primarily of aggregated statistics and charts showing change over time in those statistics, which was compiled using Excel. When SAS introduced ODS it became possible to not only generate the required statistics in SAS, but also generate the output tables and charts in a way that closely resembled the original report format. This presentation will demonstrate how well we were able to replicate the look of the original report, and discuss the boost in productivity gained by using SAS for this project.

INTRODUCTION

Busy research analysts understand the value of a consistent report format both for themselves and for the people that consume the results of their research. A report format that presented both a data table and a chart on the same page was executed for many years using Excel because it was possible to either hand-enter data values or copy and paste SAS output; format those numbers and text to control font type and size, row and column height and width, cell borders and shading; and quickly create a good-looking chart to summarize that data – all on one page (see Figure 1 below). By adding headers and footers the results were printer ready and could be converted to PDF format quickly and easily (see Figure 2 below). The cost, however, was in the amount of time it took to create each table and chart, ensure that font styles and sizes, row heights, column widths, etc. remained consistent from one page to another. For a report with approximately 40 such pages this could be a tiresome and lengthy task. When SAS introduced its Output Delivery System in version 8, it became theoretically possible to create this report in SAS. Not only would the work of producing the tables and charts be automated (and easily updated each year), but the total amount of time necessary to move from raw data to finished report would be much reduced. However, it was also important to keep the look of the report consistent.

FIGURE 1. EXCEL WORKSHEET

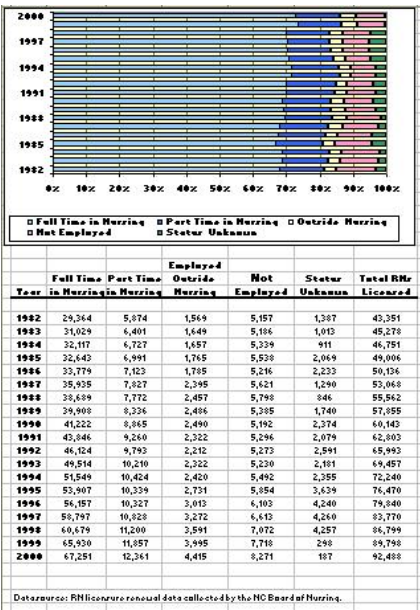
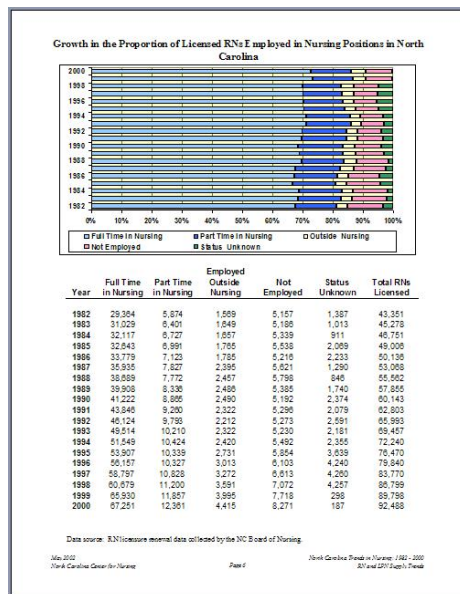


FIGURE 2. PRINT READY EXCEL SHEET



PROBLEMS AND SOLUTIONS

PROC GCHART and PROC TABULATE were used to analyze the data and construct the output we needed. We used ODS to put the data table and chart in an rich text format (RTF). so that, once finished, the page we had created could be easily moved into an Adobe PDF format. PROC TEMPLATE was used to ensure that our fonts and colors were consistent with the old style. The specifics of each of these PROCs and the options in ODS are beyond the scope of this paper, you can see the details in the program below. But there were a few problems we encountered along the way that deserve mention.

Problem: Getting a chart and a data table on the same page with no procedure titles or annotations

Solution: STARTPAGE=NO in the ODS statement
 NOPTITLE option to remove the procedure titles
 NODATE option removes the date information from the output
 NONUMBER option removes the page numbers from the output

ODS allows you to place more than one procedure within a single output page by using the STARTPAGE=NO option in the ODS statement. Generally ODS RTF puts each procedure it runs on a new page. This overrides that default. If you would like to keep your procedure titles and footnotes, but also put two pieces of output on the same page, use the STARTPAGE=NOW in addition to STARTPAGE=NO. This will suppress hard page breaks, but retains procedure titles and footnotes.

Problem: Making the font styles and sizes less like SAS and more like those available in Excel

Solution: Creating our own style template using PROC TEMPLATE

This is a very easy thing to do, especially if you start with one of the standard templates available in SAS that closely resembles the style you are after. Use SAS HELP to discover how to identify the various ODS styles available.

Problem: Making the bars in our chart run in descending order when SAS will only do the opposite.

Solution: Program a solution by recoding year values to fool SAS and using formats to print years correctly on the chart

See the full program code below for the specifics. This is a simple, but effective, work around for this type of problem which is encountered frequently when working with charts.

Problem: Putting a title and footer on the page, rather than on the PROC results.

Solution: None in SAS so far. An RTF file is output with everything in place but the page title and footers. We open the file, add titles and footers in the HEADER and FOOTER spaces and save the document as a .DOC file or a .PDF

Titles are linked to specific PROCs and therefore it is not possible to create a title for the entire page when there are multiple outputs on the same page, as called for by our report format.

Sharing the code

The program code below explains the analysis, SAS procedures, and output formatting necessary to recreate the report page presented in Figures 1 and 2 above.

```
libname rns 'c:\annual RN data';
libname trendout 'c:\report output';

*** create the data files ***;

data rn87 (keep=year empstat);
  set rns.rns87_g5;
  year = .;
  year = 1987;  run;

data rn88 (keep=year empstat);
  set rns.rns88_g5;
  year = .;
  year = 1988;  run;

.
.  etc.

data rn06 (keep=year empstat);
  set rns.rns06_g5;
  year = .;
  year = 2006;  run;

*** concatenate the individual yearly datasets ***;

data trendout.rn_trnd_empstat;
  set rn87 rn88 ... rn06;
run;
```

```

proc format;
    *** this format is used to reverse the order of the bars on the chart
    ***;

    value yearfmt
        1987='2006'
        1988='2005'
        .
        .   etc.
        .
        2006='1987';

run;

/* put missing or unknown status at the right-hand side of the chart */
/* can also use this for proc tabulate to control order of columns */

data trendout.rn_trnd_empstat_recode;
    set trendout.rn_trnd_empstat;
    if empstat=. then empstat=99;
    if empstat=0 then empstat=99;
run;

/* It is impossible to impose the order we want the bars to be in
   because of the group=option in the hbar statement. Yet, in order to
   produce 100% bars with g100, we MUST use the group= option (which always
   orders
   ascending from top to bottom). Our solution is to TRICK SAS by reversing
   the
   years in variable value but attach formats that show the correct year.
   SAS uses
   the reversed values to order the chart but displays the formatted
   (correct)
   value on the chart axis */

/* Use this dataset for the chart but the one above for the table to retain
   ascending order */

data testreorder;
    set trendout.rn_trnd_empstat_recode;

    if year=1987 then year=2006;
    else if year=1988 then year=2005;
    else if year=1989 then year=2004;
    .
    .   etc.
    .
    else if year=2006 then year=1987;

format year yearfmt.;    run;

```

```

/* This makes some adjustments to the Journal style provided by SAS and
   allows us to mimic the original fonts and styles from the old Excel
   report. We will use the adjusted style (mytable) in the table code below.
*/

proc template;
  define style mytable;
    parent = styles.journal;
    replace fonts /
      'SASTitleFont' = ("Arial, Helvetica, Helv",2,Bold)
      'TitleFont2' = ("Arial, Helvetica, Helv",2,Bold)
      'TitleFont' = ("Arial, Helvetica, Helv",2,Bold)
      'FootnoteFont' = ("Times New Roman",8pt,Italic)
      'StrongFont' = ("Arial, Helvetica, Helv",2,Bold)
      'EmphasisFont' = ("Arial, Helvetica, Helv",2,Italic)
      'FixedEmphasisFont' = ("Courier New, Courier",2,Bold Italic)
      'FixedStrongFont' = ("Courier New, Courier",2,Bold)
      'FixedHeadingFont' = ("Courier New, Courier",2,Italic)
      'FixedFont' = ("Courier New, Courier",2)
      'headingEmphasisFont' = ("Arial, Helvetica, Helv",2,Bold)
      'headingFont' = ("Arial, Helvetica, Helv",2, Bold)
      'docFont' = ("Arial, Helvetica, Helv",10pt);
    replace GraphFonts /
      'GraphDataFont' = ("Arial",8pt)
      'GraphValueFont' = ("Arial",10pt)
      'GraphLabelFont' = ("Arial",12pt)
      'GraphFootnoteFont' = ("Arial",12pt)
      'GraphTitleFont' = ("Arial",14pt);
    replace Output from Container /
      background = colors('bgA1')
      rules = GROUPS
      frame = HSIDES
      cellpadding = 6
      cellspacing = 0
      borderwidth = 1
      bordercolor = colors('fgA1');
    replace SystemFooter from TitlesAndFooters /
      font = Fonts('FootnoteFont') indent = 100;
  end;
run;

```

```

***** RTF output *****;

/* these statements remove the date, page number, and 'The SAS System' from
the output and sets the page layout to equal margins all around */

options nodate nonumber topmargin="0in" bottommargin="0in" leftmargin="0in"
      rightmargin="0in";

ods rtf body='H:/SAS DATA/DATA/TRENDS/Supply/RTF files/rntrendsempstat.rtf'
      style=mytable startpage=no;

ods nptitle; /* this removes the procedure title from the output */

goptions reset=all device=png;

/* Generate the chart to show percentage in each category every year */

proc gchart data=testreorder;
  hbar year / subgroup=empstat group=year nozero g100 discrete
    type=percent gspace=0 space=0 width=.75 woutline=1
    coutline=black nostats cframe=cxffffcc legend=legend1 maxis=axis1
    raxis=axis2 gaxis=axis3;
  format empstat empfmt.;
  legend1 label=none value=(f='Arial /bold' h=10pt) across=3 down=2
    shape=bar(8pt,8pt) position=(bottom center outside) mode=share;
  axis1 label=none value=(f='Arial /bold' h=10pt);
  axis2 label=none value=(f='Arial /bold' h=10pt '0%' '10%' '20%' '30%'
    '40%' '50%' '60%' '70%' '80%' '90%' '100%') minor=none;
  axis3 label=none value=none ;
  pattern1 v=s c=cx99ccff;
  pattern2 v=s c=cx3366ff;
  pattern3 v=s c=cxffffcc;
  pattern4 v=s c=cx99ff99;
  pattern5 v=s c=cx009966;
  pattern6 v=s c=cxccccff;
run; quit;

/* Generate the data table */

proc tabulate data=trendout.rn_trnd_empstat_recode style=[just=center];
  where year > 1986;
  class year empstat /missing;
  format empstat empfmt.;
  table year=' ', N=' ' * f=comma12.0 * (empstat=' ' all='Total RNs
Licensed')
    /nocontinued box='Year' style=[outputwidth=6in];
  title ' ';
run;
ods rtf close;

```

FIGURE 3. ODS RTF OUTPUT

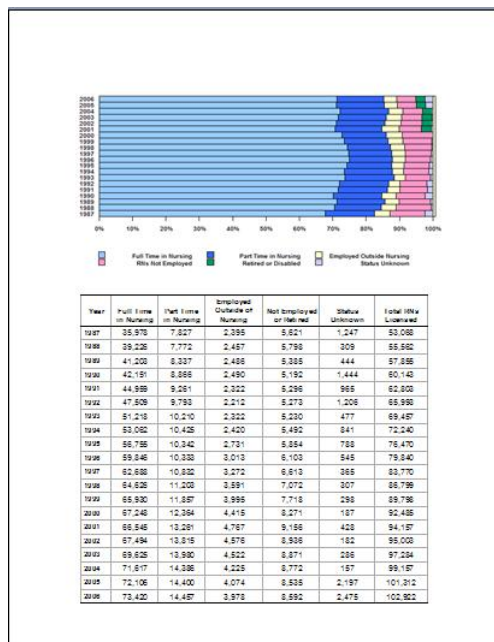
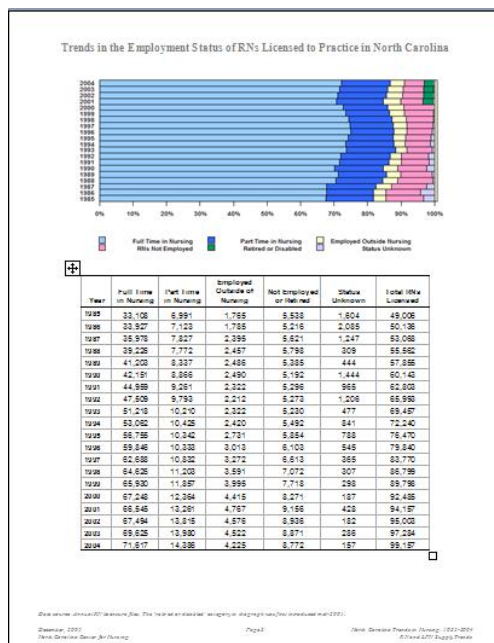


FIGURE 4. HEADERS AND FOOTERS ADDED



CONCLUSION

The time required to program the creation of this report in SAS was about twice what it has historically taken to construct the report in Excel. However, that programming only had to be created once, and is easily updated each year with a minimum of effort. Now the creation of this report – including the time to update the SAS programs - takes about ¼ the time it once did, and there is no chance for typographical errors in the data tables. We have improved the quality of the report and the creation time, while maintaining a consistent look and format.

ACKNOWLEDGMENTS

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RECOMMENDED READING

Hoevenaars, Marcel and Baljet, Machteld. "Creating RTF-Output Using ODS and PROC TEMPLATE" SUGA, 2001. Blue Gum Data Analysis, Blackhealth, NSW. Paper can be downloaded at: www.bluegumdata.com.au

Haworth, Lauren E., *Output Delivery System: The Basics*, Cary, NC: SAS Institute Inc., 2001.

CONTACT INFORMATION

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