PhUSE 2007

Paper PO10

Compute; Your Future with Proc Report

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ABSTRACT

PROC REPORT is widely used within the pharmaceutical industry to summarise and list clinical trial data. This paper will focus on the COMPUTE statement available within this SAS® procedure and will highlight the wide-ranging use of this facility.

INTRODUCTION

This paper will explore six examples that demonstrate the COMPUTE statement within PROC REPORT and illustrate its usage in a Pharmaceutical context.

EXAMPLES

1. Computing columns based on statistics
2. Creating flagging variables according to abnormal results
3. Producing a customised summary on each page
4. Varying footnotes by page
5. Creating page numbers
6. Displaying a graph and report on a single page

PROC REPORT SYNTAX

PROC REPORT <DATA= > <OUT= > WINDOWS | NOWINDOWS;

COLUMN column-specifications;
DEFINE variable /
   <usage>
   <attributes>
   <options>
   <justification>
   <"column-header">;
BREAK location break-variable < / break-options >;
BBREAK location < / break-options >;

COMPUTE location < break-variable >;
   LINE specifications;
ENDCOMP;

COMPUTE report-item < / type-specification >;
   CALL DEFINE (column-id, "attribute-name", value);
ENDCOMP;

BY < descending > variable;
RUN;
1. COMPUTING COLUMNS BASED ON STATISTICS

It is often necessary for body mass index (BMI) to be included in Demography listings. Body Mass Index is calculated as weight (kg) divided by height squared (m²). The COMPUTE statement can be used to derive this variable and then display it in the final listing.

```
proc report data=demo spacing=2 split="*" nowd headskip headline ps=43 ls=108;
  column subject treat age sex ethnic height weight bmi;
  define subject / left group order "Subject";
  define treat / left group order "Treatment*Sequence";
  define age / left order "Age*(yrs)";
  define sex / left order "Sex";
  define ethnic / left order "Ethnicity";
  define height / left display "Height*(m)";
  define weight / left display "Weight*(kg)";
  define bmi / left computed format=6.2 "BMI*(kg/m^2)";
compute bmi;
  bmi = weight / (height*height);
endcomp;
run;
quit;
```

Output: Listing of Demographic Characteristics

<table>
<thead>
<tr>
<th>Subject</th>
<th>Treatment</th>
<th>Age (yrs)</th>
<th>Sex</th>
<th>Ethnicity</th>
<th>Height (m)</th>
<th>Weight (kg)</th>
<th>BMI (kg/m^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A/B</td>
<td>31</td>
<td>F</td>
<td>Hispanic or Latino</td>
<td>1.58</td>
<td>62.5</td>
<td>25.04</td>
</tr>
<tr>
<td>2</td>
<td>B/A</td>
<td>23</td>
<td>F</td>
<td>Not Hispanic or Latino</td>
<td>1.64</td>
<td>60.0</td>
<td>22.31</td>
</tr>
<tr>
<td>3</td>
<td>A/B</td>
<td>25</td>
<td>M</td>
<td>Not Hispanic or Latino</td>
<td>1.80</td>
<td>72.5</td>
<td>22.38</td>
</tr>
<tr>
<td>4</td>
<td>A/B</td>
<td>25</td>
<td>M</td>
<td>Not Hispanic or Latino</td>
<td>1.80</td>
<td>67.8</td>
<td>20.93</td>
</tr>
<tr>
<td>5</td>
<td>B/A</td>
<td>20</td>
<td>F</td>
<td>Not Hispanic or Latino</td>
<td>1.75</td>
<td>86.0</td>
<td>28.08</td>
</tr>
<tr>
<td>6</td>
<td>B/A</td>
<td>20</td>
<td>M</td>
<td>Not Hispanic or Latino</td>
<td>1.91</td>
<td>79.3</td>
<td>21.74</td>
</tr>
<tr>
<td>7</td>
<td>B/A</td>
<td>20</td>
<td>F</td>
<td>Not Hispanic or Latino</td>
<td>1.72</td>
<td>69.5</td>
<td>23.49</td>
</tr>
<tr>
<td>8</td>
<td>A/B</td>
<td>22</td>
<td>F</td>
<td>Not Hispanic or Latino</td>
<td>1.65</td>
<td>54.0</td>
<td>19.83</td>
</tr>
<tr>
<td>9</td>
<td>B/A</td>
<td>32</td>
<td>M</td>
<td>Not Hispanic or Latino</td>
<td>1.82</td>
<td>86.5</td>
<td>26.11</td>
</tr>
<tr>
<td>10</td>
<td>A/B</td>
<td>20</td>
<td>F</td>
<td>Not Hispanic or Latino</td>
<td>1.58</td>
<td>64.0</td>
<td>25.64</td>
</tr>
</tbody>
</table>

2. CREATING FLAGGING VARIABLES ACCORDING TO ABNORMAL RESULTS

The COMPUTE statement can be used in PROC REPORT to attach flags to abnormal values. These types of output are commonly produced for listing ECG, Vital signs and Lab results. The SAS code below attaches High/Low flags to heart rate values outside the pre-defined potential clinical concern (PCC) range.

It is important to ensure that the DISPLAY option is included on the variables used in COMPUTE blocks. In this example, the heartbeat (Heart rate clinical concern code with value ‘H’ for high and ‘L’ for low) and heart (Heart rate in beats per minute) variables are used in the COMPUTE block. It is also necessary to list these variables prior to the computed variable in the columns statement. Finally, the “character” option will need to be used on the COMPUTE statement as heartpci is a computed character variable (it is derived by concatenating heart and heartbeat).

A COMPUTE AFTER statement is used to add a footnote to the table to define the flags.
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proc report data=vitals spacing=2 split="*" nowd headskip headline ps=43 ls=108;
column subject treat vsactdy vsacttm visitnum visit heartccd heartpci;
define subject / left group order "Subject";
define treat / left group order "Treatment*Sequence" flow;
define vsactdy / left order width=5 "Study*Day";
define vsacttm / left order "Date";
define visitnum / order noprint;
define visit / left width=17 "Visit" flow;
define heartccd / display noprint;
define heart / display noprint;
define heartpci / left computed width=8 "Heart*Rate (bpm)"
break after subject /skip;
compute heartpci / character length=20;
if heartccd in ("H" "L") then heartpci=trim(left(heart)) || " "
  |trim(left(heartccd));
else heartpci=trim(left(heart));
endcomp;
compute after_page_ / left;
text1="H=High, L=Low";
line text1 $108.0;
endcomp;
run;
quit;

Output: Listing of Heart Rate values for subjects with Abnormalities of Potential Clinical Concern

<table>
<thead>
<tr>
<th>Subject</th>
<th>Treatment</th>
<th>Study Sequence</th>
<th>Day</th>
<th>Date</th>
<th>Time</th>
<th>Visit</th>
<th>Heart Rate (bpm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A/B</td>
<td>-14</td>
<td>05JUL</td>
<td>2006</td>
<td>10:06</td>
<td>SCREENING</td>
<td>84</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>20JUL</td>
<td>2006</td>
<td>10:11</td>
<td>PERIOD 1</td>
<td>72</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>21JUL</td>
<td>2006</td>
<td>10:09</td>
<td>PERIOD 1</td>
<td>79</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10</td>
<td>29JUL</td>
<td>2006</td>
<td>10:25</td>
<td>PERIOD 2</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11</td>
<td>30JUL</td>
<td>2006</td>
<td>10:02</td>
<td>PERIOD 2 DAY 2</td>
<td>39 L</td>
</tr>
<tr>
<td></td>
<td></td>
<td>24</td>
<td>12AUG</td>
<td>2006</td>
<td>11:15</td>
<td>FOLLOW-UP</td>
<td>45</td>
</tr>
<tr>
<td>2</td>
<td>B/A</td>
<td>-14</td>
<td>08JUL</td>
<td>2006</td>
<td>13:52</td>
<td>SCREENING</td>
<td>88</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>23JUL</td>
<td>2006</td>
<td>13:36</td>
<td>PERIOD 1</td>
<td>110 H</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>24JUL</td>
<td>2006</td>
<td>14:02</td>
<td>PERIOD 1</td>
<td>90</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10</td>
<td>01AUG</td>
<td>2006</td>
<td>13:12</td>
<td>PERIOD 2</td>
<td>95</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11</td>
<td>02AUG</td>
<td>2006</td>
<td>12:57</td>
<td>PERIOD 2</td>
<td>89</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20</td>
<td>11AUG</td>
<td>2006</td>
<td>12:59</td>
<td>FOLLOW-UP</td>
<td>87</td>
</tr>
<tr>
<td>3</td>
<td>A/B</td>
<td>-14</td>
<td>12JUL</td>
<td>2006</td>
<td>08:06</td>
<td>SCREENING</td>
<td>84</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>27JUL</td>
<td>2006</td>
<td>08:36</td>
<td>PERIOD 1</td>
<td>72</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>28JUL</td>
<td>2006</td>
<td>08:51</td>
<td>PERIOD 1</td>
<td>79</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10</td>
<td>05AUG</td>
<td>2006</td>
<td>08:20</td>
<td>PERIOD 2</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11</td>
<td>06AUG</td>
<td>2006</td>
<td>08:14</td>
<td>PERIOD 2</td>
<td>58</td>
</tr>
<tr>
<td></td>
<td></td>
<td>21</td>
<td>16AUG</td>
<td>2006</td>
<td>09:04</td>
<td>FOLLOW-UP</td>
<td>39 L</td>
</tr>
</tbody>
</table>

H=High, L=Low
3. PRODUCING A CUSTOMISED SUMMARY ON EACH PAGE

It is often useful to be able to add subheadings at the beginning of each page of the report to summarise by a particular variable within your data. For example, the COMPUTE block in PROC REPORT can be used to summarise data by cohort. The study used in this example has two cohorts.

options nobyline;
proc sort data=pknc;
  by cohort;
run;

proc report data=pknc spacing=2 split="" nowd headskip headline ps=43 ls=108;
by cohort;
column cohort visit bign time n impute mean std median min max;
declare cohort / order=internal id spacing=2 width=1 format=$108.0 noprnt;
declare visit / left group "Visit";
declare bign / left group width=4 format=2. "N";
declare time / left group "Planned*Relative*Time";
declare n / left "n";
declare impute / left "Number*Imputed";
declare mean / left "Mean";
declare std / left "SD";
declare median / left "Median";
declare min / left "Min.";
declare max / left "Max.";
compute before _page_ / left;
  line "Cohort = " cohort $108.0;
endcomp;
run;

compute after _page_ / left;
  text = "sysuserid: &$ProjectPath\Program\Analysis\_program..sas
%sysfunc(datetime(),datetime."");
  line @1 text $108.0;
endcomp;
run;
quit;
### Cohort = Cohort 1

<table>
<thead>
<tr>
<th>Visit</th>
<th>N</th>
<th>Planed Relative Time</th>
<th>Number</th>
<th>Imputed</th>
<th>Mean</th>
<th>SD</th>
<th>Median</th>
<th>Min.</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>DAY 1</td>
<td>14</td>
<td>PRE-DOSE 1 14</td>
<td>1</td>
<td>3.519</td>
<td>1.3696</td>
<td>3.640</td>
<td>0.00</td>
<td>5.45</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>H</td>
<td>4</td>
<td>5.858</td>
<td>2.0927</td>
<td>5.895</td>
<td>2.81</td>
<td>10.01</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>H</td>
<td>4</td>
<td>8.673</td>
<td>2.9289</td>
<td>8.550</td>
<td>4.53</td>
<td>13.74</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>H</td>
<td>4</td>
<td>10.575</td>
<td>2.8155</td>
<td>10.365</td>
<td>6.66</td>
<td>17.15</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>H</td>
<td>4</td>
<td>9.965</td>
<td>2.4304</td>
<td>9.420</td>
<td>7.06</td>
<td>15.25</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>H</td>
<td>4</td>
<td>8.224</td>
<td>2.0953</td>
<td>8.125</td>
<td>4.84</td>
<td>11.53</td>
<td></td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>H</td>
<td>4</td>
<td>6.927</td>
<td>1.8188</td>
<td>7.300</td>
<td>3.60</td>
<td>9.47</td>
<td></td>
</tr>
<tr>
<td></td>
<td>24</td>
<td>H</td>
<td>4</td>
<td>5.051</td>
<td>1.5072</td>
<td>4.815</td>
<td>2.25</td>
<td>7.06</td>
<td></td>
</tr>
</tbody>
</table>

### Cohort = Cohort 2

<table>
<thead>
<tr>
<th>Visit</th>
<th>N</th>
<th>Planed Relative Time</th>
<th>Number</th>
<th>Imputed</th>
<th>Mean</th>
<th>SD</th>
<th>Median</th>
<th>Min.</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>DAY 1</td>
<td>14</td>
<td>PRE-DOSE 1 14</td>
<td>2</td>
<td>1.729</td>
<td>0.7604</td>
<td>1.985</td>
<td>0.00</td>
<td>2.29</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>H</td>
<td>4</td>
<td>2.932</td>
<td>0.6217</td>
<td>2.755</td>
<td>2.18</td>
<td>4.24</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>H</td>
<td>4</td>
<td>3.290</td>
<td>0.5748</td>
<td>3.330</td>
<td>2.40</td>
<td>4.22</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>H</td>
<td>4</td>
<td>2.877</td>
<td>0.5284</td>
<td>2.790</td>
<td>2.25</td>
<td>4.08</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>H</td>
<td>4</td>
<td>2.358</td>
<td>0.9523</td>
<td>2.445</td>
<td>0.00</td>
<td>4.40</td>
<td></td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>H</td>
<td>4</td>
<td>1.615</td>
<td>1.0466</td>
<td>1.760</td>
<td>0.00</td>
<td>3.79</td>
<td></td>
</tr>
<tr>
<td></td>
<td>24</td>
<td>H</td>
<td>4</td>
<td>1.111</td>
<td>NQ</td>
<td>NQ</td>
<td>0.00</td>
<td>3.01</td>
<td></td>
</tr>
</tbody>
</table>

### Summary of Plasma ABC123456 Pharmacokinetic Concentration-Time Data (ng/mL)
4. VARYING FOOTNOTES BY PAGE

For tables that span multiple pages, a common practice is to put a standard message such as “See last page for footnotes” at the bottom of each page except the last, and a complete listing of all footnotes at the bottom of the table on the final page. This can help to conserve page space if there are numerous footnotes. The code below shows the use of the COMPUTE and LINE statement to add footnotes in this way.

The significant lines in the code are the “after” and “after _page_” options in the COMPUTE statement. The “after” option executes at the end of the table; the “after _page_” executes at the end of each page of the table.

```
proc report data=pkcnc spacing=2 split="*" nowd headskip headline ps=43 ls=108;
  column cohort bign visit time n impute mean std median min max;
  define cohort / left group "Cohort";
  define bign / left group width=4 format=2. "N";
  define visit / left group "Visit";
  define time / left group "Planned*Relative*Time";
  define n / left "n";
  define impute / left "Number*Imputed";
  define mean / left "Mean";
  define std / left "SD";
  define median / left "Median";
  define min / left "Min.";
  define max / left "Max.";
  break after visit;

  compute after;
    hold = "x";
  endcomp;

  compute after _page_ / left;
    length text1 text2 text3 text4 $ 108;
    if hold="x" then do;
      text1="Cohort 1: Day 1(Drug A Alone), Day 10(Drug A + Drug B 10mg).";
      text2="Cohort 2: Day 1(Drug A Alone), Day 10(Drug A + Drug B 30mg).";
      text3="If more than 30% of values are imputed, the standard deviation will not be displayed.";
      text4="If the mean or median value is below the LLQ, it will be set to ‘NQ’.";
    end;
    else text1="See last page for footnotes.";
    line text1 $f108.;
    line text2 $f108.;
    line text3 $f108.;
    line text4 $f108.;
  endcomp;
run;
quit;
```
PhUSE 2007

Output: Summary of Plasma ABC123456 Pharmacokinetic Concentration-Time Data (ng/mL)

<table>
<thead>
<tr>
<th>Planned</th>
<th>Relative</th>
<th>Number</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cohort</td>
<td>N</td>
<td>Visit</td>
<td>Time</td>
<td>n</td>
<td>Imputed</td>
<td>Mean</td>
</tr>
<tr>
<td>---------</td>
<td>---</td>
<td>------</td>
<td>------</td>
<td>---</td>
<td>---------</td>
<td>------</td>
</tr>
<tr>
<td>1</td>
<td>14</td>
<td>DAY 1</td>
<td>PRE-DOSE</td>
<td>1</td>
<td>14</td>
<td>1</td>
</tr>
<tr>
<td>1H</td>
<td>14</td>
<td>0</td>
<td>5.858</td>
<td>2.0927</td>
<td>5.895</td>
<td>2.81</td>
</tr>
<tr>
<td>2H</td>
<td>14</td>
<td>0</td>
<td>8.673</td>
<td>2.9289</td>
<td>8.550</td>
<td>4.53</td>
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<td>4H</td>
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<td>0</td>
<td>10.575</td>
<td>2.8155</td>
<td>10.365</td>
<td>6.66</td>
</tr>
<tr>
<td>6H</td>
<td>14</td>
<td>0</td>
<td>9.965</td>
<td>2.4304</td>
<td>9.420</td>
<td>7.06</td>
</tr>
<tr>
<td>8H</td>
<td>14</td>
<td>0</td>
<td>8.224</td>
<td>2.0953</td>
<td>8.125</td>
<td>4.84</td>
</tr>
<tr>
<td>12H</td>
<td>14</td>
<td>0</td>
<td>6.927</td>
<td>1.8188</td>
<td>7.300</td>
<td>3.60</td>
</tr>
<tr>
<td>24H</td>
<td>14</td>
<td>0</td>
<td>5.051</td>
<td>1.5072</td>
<td>4.815</td>
<td>2.25</td>
</tr>
<tr>
<td>14</td>
<td>DAY 10</td>
<td>PRE-DOSE</td>
<td>1</td>
<td>14</td>
<td>0</td>
<td>9.641</td>
</tr>
<tr>
<td>1H</td>
<td>14</td>
<td>0</td>
<td>11.982</td>
<td>2.7164</td>
<td>11.440</td>
<td>7.08</td>
</tr>
<tr>
<td>2H</td>
<td>14</td>
<td>0</td>
<td>14.702</td>
<td>3.3639</td>
<td>14.415</td>
<td>10.29</td>
</tr>
<tr>
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<td>16.899</td>
<td>4.2662</td>
<td>16.315</td>
<td>12.18</td>
</tr>
<tr>
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See last page for footnotes.

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<td>Visit</td>
<td>Time</td>
<td>n</td>
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<td>Mean</td>
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<tr>
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<td>0.9337</td>
<td>3.785</td>
<td>2.58</td>
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<td>4.310</td>
<td>2.84</td>
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<td>6H</td>
<td>14</td>
<td>0</td>
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<td>1.1970</td>
<td>3.810</td>
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<td>2.765</td>
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</tr>
</tbody>
</table>

Cohort 1: Day 1(Drug A Alone), Day 10(Drug A + Drug B 10mg).
Cohort 2: Day 1(Drug A Alone), Day 10(Drug A + Drug B 30mg).
If more than 30% of values are imputed, the standard deviation will not be displayed.
If the mean or median value is below the LLQ, it will be set to 'NQ'.
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5. CREATING PAGE NUMBERS

PROC REPORT has no direct options for printing the page number on a report. This example shows one method for addressing this problem using a single macro (called %pagenum) which can be used to write out "Page x of y" using the COMPUTE statement. The example uses an adverse events dataset to create a listing of adverse events with page numbers in the top right hand corner of each page.

options nodate;
%macro pagenum(  
  code = /* Proc report code, quoted by %nrstr */  
  outfile = outfile /* Output file */  
);  
%global page pages label;  
/* First section */  
%let page = 0;  
%let label = 10;  /* la */  
filename _outfile “&outfile”;  
proc printto print = _outfile;  
run;  
%unquote(&code.)  
proc printto;  
run;  
filename _outfile clear;  /* lb */  
/* Second section */  
%let totpages = &page.;  
%let page = 0;  /* lc */  
%let label = %eval(%length(&totpages.)* 2 + 4);  /* ld */  
%unquote(&code.)  
%mend pagenum;  
/* Create an AE listing */  
%pagenum(code=%nrstr(  
proc report data=ae spacing=2 split=”*” nowd headskip headline ps=43 ls=108;  
column subject treat aet aetterm aestdm aeendm aesev aaser;  
  define subject / left group order "Subject";  
  define treat / left group order "Treatment";  
  define aet / left "Preferred Term";  
  define aetterm / left "verbatim"?ext";  
  define aestdm / left "Start*date/time";  
  define aeendm / left "End*date/time";  
  define aesev / left "Severity";  
  define aaser / left "Serious*Y/N";  
compute before _page_ / right;  
  call execute("%let page = %eval(&page. + 1);");  /* le */  
  length _XofY &label.;  
  _XofY = symget("page") || " of " || symget("totpages");  /* if */  
  line "Page " _XofY $char.;  /* lg */  
endcomp;  
run;  
quit;  ));
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First section: The macro variable &page stores the current page number. The first section of the macro establishes the number of pages in the final output. The total number of pages is the same as the value of &page at the end of the first run. This is then stored in the macro variable &totpages. The results from this section are deleted (see 1b in the code above). The length of the “X of Y” string part of the page number text is assigned to the macro variable &label. The initial value of &label is arbitrary (1c). It is adjusted once the total number of pages is known (1d).

Second section: The macro variable &page is reset to zero at the beginning of each run through of this section. The true length for the page number label (“X of Y” part only) is calculated (1e), and then the PROC REPORT is run, generating the output (1d). The COMPUTE statement in the PROC REPORT increments &page (1e), creates a temporary variable called _XofY (1f) and finally outputs the page number text in the top right hand corner (1g).

Output: Listing of Adverse Events (first page)

<table>
<thead>
<tr>
<th>Serious Subject</th>
<th>Treatment</th>
<th>Preferred Term</th>
<th>Verbatim Text</th>
<th>Start date/time</th>
<th>End date/time</th>
<th>Severity</th>
<th>Y/N</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Placebo</td>
<td>Headache</td>
<td>Headache</td>
<td>09JUN2007: 16:15</td>
<td>10JUN2007: 10:13</td>
<td>Mild</td>
<td>N</td>
</tr>
</tbody>
</table>

6. DISPLAYING A GRAPH AND REPORT ON A SINGLE PAGE

It is often useful to be able to produce a plot and summary of data on the same page of output. The following code provides an example of weight plotted against height with a listing showing subject, height and weight displayed beneath it. The output is saved to an HTM file named report.htm using the SAS Output Delivery System (ODS).

```sas
options device=gif xpixels=480 ypixels=360 gsfmode=replace;
symbol1 v=star c=blue;
axis1 label=(c=lib "Height (m)") order=(1.4 to 2.0 by 0.2);
axis2 label=(c=lib "Weight (kg)") order=(40 to 110 by 10);
proc gplot data=demo gout=work.chart;
   plot height*weight / name="chart" vaxis=axis1 haxis=axis2;
run;
quit;
ods html body="c:\report.htm" gpath="c:\" (URL=NONE)
styname=sasweb;
proc report data=demo nowd split="*";
columns subject height weight;
   define subject / left display "Subject";
   define height / left display "Height (m)";
   define weight / left display "Weight (kg)";
compute before _page_ / center;
   call define(_ROW_, "GRSEG", "work.chart.chart");
endcomp;
run;
quit;
ods html close;
```
Output: Plot and listing for the first 10 subjects

<table>
<thead>
<tr>
<th>Subject</th>
<th>Height (m)</th>
<th>Weight (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.63</td>
<td>56.3</td>
</tr>
<tr>
<td>2</td>
<td>1.67</td>
<td>75.3</td>
</tr>
<tr>
<td>3</td>
<td>1.64</td>
<td>58.3</td>
</tr>
<tr>
<td>4</td>
<td>1.67</td>
<td>57.5</td>
</tr>
<tr>
<td>5</td>
<td>1.84</td>
<td>73.2</td>
</tr>
<tr>
<td>6</td>
<td>1.87</td>
<td>73.3</td>
</tr>
<tr>
<td>7</td>
<td>1.84</td>
<td>66.6</td>
</tr>
<tr>
<td>8</td>
<td>1.9</td>
<td>88</td>
</tr>
<tr>
<td>9</td>
<td>1.71</td>
<td>72</td>
</tr>
<tr>
<td>10</td>
<td>1.82</td>
<td>81.8</td>
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</tbody>
</table>
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CONCLUSION

This paper has illustrated a number of capabilities of the COMPUTE statement for presenting clinical trial results in the pharmaceutical industry. However, as with most SAS procedures there are alternative, but often less efficient, methods for achieving similar output.

REFERENCES

SAS OnlineDoc®, Version 8.


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