# How to generate tables using SAS

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## **Outline**

- Process to generate table
- Proc tablulate and examples
- Proc report and examples
- A comparison of Proc tablulate and Proc report



## Generating table process

#### Step1. Design the table

- Specification of classification variables and analysis variables,
- definition of dimensions of the table,
- Identification of desired statistics etc..

#### Step 2. Generate the SAS code

Step3. Customize the table.

Label, format, style, font, weight



### Proc tablulate

Proc Tabulate is used to build tabular reports containing descriptive information, including hierarchical relationships among variables.

This procedure provides flexible report writing features such as:

- flexible table construction
- multiple dimensions
- use of labels and formats



## Proc tablulate

#### The general syntax

```
PROC TABULATE <option(s)>;
BY <DESCENDING> variable-1 <...<DESCENDING>variable-n> <NOTSORTED>;
CLASS variable(s) </options>;
CLASSLEV variable(s)/ STYLE=<style-element-name | <PARENT>><[style-attribute-specification(s)]>;
FREQ variable;
KEYLABEL keyword-1='description-1'<...keyword-n='description-n'>;
KEYWORD keyword(s)/ STYLE=<style-element-name | <PARENT>><[style-attribute-specification(s)]>;
TABLE <<page-expression, > row-expression, > column-expression
/ table-option(s)>;
VAR analysis-variable(s) 
/ options>;
WEIGHT variable;
```



```
proc tabulate data=asthma1 order=data;
  class region;
  var number;
  table number*mean*region;
run;
```

number								
Mean								
	region							
Sun Country	Five Hills	Cypress	Regina Qu'Appelle	Sunrise	Saskatoon	Saskatchewan		
16.63	22.43	8.80	43.71	18.00	39.00	209.38		



```
proc tabulate data=asthma1 order=data;
  class region;
  var number;
  table region, number*mean;
run;
```

	number
	Mean
region	
Sun Country	16.63
Five Hills	22.43
Cypress	8.80
Regina Qu'Appelle	43.71
Sunrise	18.00
Saskatoon	39.00
Saskatchewan	209.38



```
proc tabulate data=asthma order=data;
  class region time;
  var number;
  table time, region , number*mean;
run;
```

Time Q1 Jun-11

	number
	Mean
region	
Sun Country	18.35
Five Hills	22.51
Cypress	
Regina Qu'Appelle	46.47
Sunrise	18.65
Saskatoon	35.46
Saskatchewan	123.86

. . . . portions of the table not shown . . .

Time O4 Mar-13

Time Q4 Mar-13	number
	Mean
region	
Sun Country	29.00
Five Hills	
Cypress	
Regina Qu'Appelle	
Sunrise	
Saskatoon	
Saskatchewan	78.36



```
proc tabulate data=asthma1 order=data;
  class region time;
  var number;
  table region, number*mean*time;
run;
```

	Time							
	Q1 Jun-11	Q2 Sep-11	Q3 Dec-11	Q4 Mar-12	Q1 Jun-12	Q2 Sep-12	Q3 Dec-12	Q4 Mar-13
	number							
	Mean							
region								
Sun Country	16.00	19.00	17.00	11.00	17.00	14.00	16.00	23.00
Five Hills	22.00	18.00	19.00	29.00	20.00	27.00	22.00	
Cypress		8.00	9.00	10.00	11.00	6.00		
Regina Qu'Appelle	66.00	50.00	47.00	30.00	22.00	53.00	38.00	-
Sunrise	16.00					20.00		
Saskatoon	46.00	44.00	30.00	32.00	41.00	47.00	33.00	
Saskatchewan	230.00	250.00	218.00	224.00	288.00	197.00	132.00	136.00



```
proc template;
  define style styles.sty3;
  parent=styles.printer;
   style header/ font size=0.7 font weight=bold font face="arial" ;
     end;
  run;
proc format;
   value $backf
         'Sun Country' = 'white'
         'Five Hills' = 'CX93D6FF'
         'Cypress' = 'white'
         "Regina Qu'Appelle "='CX93D6FF'
         'Sunrise' = 'white'
         'Saskatoon' = 'CX93D6FF'
         'Saskatchewan'='beige';
run;
options nodate nonumber orientation=portrait pagesize=max;
ods pdf file="U:/SAS/table/table1.pdf " style=sty3;
```

```
title " Rate of Asthma related hospitalizations per 100,000 population
   and count of hospitalizations ";
proc tabulate data=grap.obs rate asthma order=data;
   class region reference time;
   classlev time/style=[background=CX93D6FF];
   classlev region / style=[background=$backf.];
   classlev reference / style=<parent>;
   var number :
   table (region *reference) *[style=<parent>[font weight=medium]
   fontfamily="arial" foreground=black font size=0.7]], time*number='
   '*f=4./ misstext=[label="*"] box=[label="Baseline as Oct 31, 2011"
   style=[font weight=light fontfamily="arial" foreground=black
   font size=0.2]];
   keylabel sum=' ';
   keyword all/style=<parent> ;
run;
```

#### Rate of Asthma related hospitalizations per 100,000 population and count of hospitalizations

			Time								
Baseline as Oct 3	1, 2011	Q1 Jun-11	Q2 Sep-11	Q3 Dec-11	Q4 Mar-12	Q1 Jun-12	Q2 Sep-12	Q3 Dec-12	Q4 Mar-13		
Region	Reference										
Sun Country	Count	16	19	17	11	17	14	16	23		
	Rate	21	26	22	21	22	22	20	35		
Five Hills	Count	22	18	19	29	20	27	22	*		
	Rate	23	25	19	22	29	43	20	*		
Cypress	Count	٠	8	9	10	11	6	*			
	Rate	*	19	22	24	27	14	*	*		
Regina Qu'Appelle	Count	66	50	47	30	22	53	38	*		
	Rate	27	22	23	34	35	27	20	*		
Sunrise	Count	16	*	*	*	*	20	*	*		
	Rate	21	*	*	*	*	29	*	*		
Saskatoon	Count	46	44	30	32	41	47	33	*		
	Rate	25	17	16	14	15	16	24	*		
Saskatchewan	Count	230	250	218	224	288	197	132	136		
	Rate	18	23	21	30	19	27	20	21		



## **Proc report**

The REPORT procedure combines features of the PRINT, MEANS, and TABULATE procedures with features of the DATA step in a single report-writing tool that can produce a variety of reports.

#### This procedure provides features as following:

- Generating table easily
- flexible to allow the calculation of a cumulative total and row change.



## **Proc report**

#### The general syntax

```
PROC REPORT <option(s)>;
BREAK location break-variable
BY <DESCENDING> variable-1 <...<DESCENDING> variable-n> <NOTSORTED>;
COLUMN column-specification(s);
COMPUTE location <target> </ STYLE=<style-element-name> <[style-attribute -specification(s)]>>;
LINE specification(s); ... select SAS language elements ...
ENDCOMP;
COMPUTE report-item </ type-specification>;
CALL DEFINE (column-id, 'attribute-name', value); ... select SAS language elements ...
ENDCOMP:
DEFINE report-item / <usage> <attribute(s)> <option(s)> <iustification> <COLOR=color> <'column-
    header-1' <...'column-header-n'>> <style>;
FREQ variable;
RBREAK location </ option(s)>;
WEIGHT variable;
```



```
Proc report data=asthma1 nowd;
column region number;
  define region /"Region" group order=data;
  define number/"Mean" mean format=6.2;
run;
```

Region	Mean
Sun Country	16.63
Five Hills	22.43
Cypress	8.80
Regina Qu'Appelle	43.71
Sunrise	18.00
Saskatoon	39.00
Saskatchewan	209.38



```
Proc report data=asthma1 nowd ;
  column region number, time;
  define region /"Region" group order=data ;
  define time/ across order=data "Time" ;
  define number/ "" analysis format=6.2 ;
run;
```

		Time								
Region	Q1 Jun-11	Q2 Sep-11	Q3 Dec-11	Q4 Mar-12	Q1 Jun-12	Q2 Sep-12	Q3 Dec-12	Q4 Mar-13		
Sun Country	16.00	19.00	17.00	11.00	17.00	14.00	16.00	23.00		
Five Hills	22.00	18.00	19.00	29.00	20.00	27.00	22.00	-		
Cypress		8.00	9.00	10.00	11.00	6.00				
Regina Qu'Appelle	66.00	50.00	47.00	30.00	22.00	53.00	38.00	-		
Sunrise	16.00					20.00				
Saskatoon	46.00	44.00	30.00	32.00	41.00	47.00	33.00			
Saskatchewan	230.00	250.00	218.00	224.00	288.00	197.00	132.00	136.00		



```
Proc report data=asthma1 nowd;
  column region time number;
  define region /"Region" group order=data;
  define time/ order=data "Time";
  define number/ "" sum analysis format=6.2;
  break after region/ol skip summarize suppress;
  rbreak after/ dol skip summarize;
run;
```



Region Sun Country	Time Q1 Jun-11 Q2 Sep-11 Q3 Dec-11 Q4 Mar-12 Q1 Jun-12 Q2 Sep-12 Q3 Dec-12 Q4 Mar-13	16.00 19.00 17.00 11.00 17.00 14.00 16.00 23.00
Five Hills	Q1 Jun-11 Q2 Sep-11 Q3 Dec-11 Q4 Mar-12 Q1 Jun-12 Q2 Sep-12 Q3 Dec-12 Q4 Mar-13	22.00 18.00 19.00 29.00 20.00 27.00 22.00

. . . . portions of the table not shown . . .

Saskatoon	Q1 Jun-11	46.00
	Q2 Sep-11	44.00
	Q3 Dec-11	30.00
	Q4 Mar-12	32.00
	Q1 Jun-12	41.00
	Q2 Sep-12	47.00
	Q3 Dec-12	33.00
	Q4 Mar-13	
		273.00
		=====
		949.00



```
Proc report data=asthma nowd
  style(header) = [background=CX93D6FF font size=0.7 font weight=bold
   font face="Arial"]
  style(column) = [font size=0.7];
  column region reference number, time;
  define region / "Region" group order=data;
  define reference/ "Reference" group;
  define time/ across order=data "Time" ;
  define number/ "" analysis format=6.0;
  compute region;
    if region='' then call define
   ( row ,'STYLE','STYLE=[background=CX93D6FF]');
    if region='Saskatchewan' then call define
   ( row ,'STYLE','STYLE=[background=beige]');
  endcomp;
run;
```



#### Rate of Asthma related hospitalizations per 100,000 population and count of hospitalizations

		Time							
Region	Reference	Q1 Jun-11	Q2 Sep-11	Q3 Dec-11	Q4 Mar-12	Q1 Jun-12	Q2 Sep-12	Q3 Dec-12	Q4 Mar-13
Sun Country	Count	16	19	17	11	17	14	16	23
	Rate	21	26	22	21	22	22	20	35
Five Hills	Count	22	18	19	29	20	27	22	
	Rate	23	25	19	22	29	43	20	
Cypress	Count		8	9	10	11	6		
	Rate	-	19	22	24	27	14	-	
Regina Qu'Appelle	Count	66	50	47	30	22	53	38	
	Rate	27	22	23	34	35	27	20	
Sunrise	Count	16					20		
	Rate	21					29		
Saskatoon	Count	46	44	30	32	41	47	33	-
	Rate	25	17	16	14	15	16	24	
Saskatchewan	Count	230	250	218	224	288	197	132	136
	Rate	18	23	21	30	19	27	20	21



## **Proc report**

#### Compute block

One of the unique features of the REPORT procedure is the Compute Block.

- Unlike most other SAS procedures, PROC REPORT has the ability to modify values
  within a column, to insert lines of text into the report, to create columns, and to control
  the content of a column.
- Through compute blocks it is possible to use a number of SAS language elements, many of which can otherwise only be used in the DATA step.

```
Compute <location> <report_item> </ options>;
one or more SAS language elements
Endcomp;
```



```
Proc report data=asthma1 nowd;
  column region number;
  define region /"Region" group order=data;
  define number/analysis "Mean" mean format=6.2;
  compute after region;
    line '';
  endcomp;
run;
Region Mean
Sun Country 16.63
Five Hills 22.43
```

Region	Mean
Sun Country	16.63
Five Hills	22.43
Cypress	8.80
Regina Qu'Appelle	43.71
Sunrise	18.00
Saskatoon	39.00
Saskatchewan	209.38



```
Proc report data=asthma1 nowd ;
  column region number predict;
  define region /"Region" group order=data ;
  define number/disply ;
  define predict/ computed "Predict" format=6.2 ;
    compute predict;
    predict=number*0.91;
  endcomp;
run;
```

Region	number	Predict
Region	number	Predict
Sun Country	16	14.56
	19	17.29
	17	15.47
	11	10.01
	17	15.47
	14	12.74
	16	14.56
	23	20.93
Five Hills	22	20.02
	18	16.38
	19	17.29
	29	26.39
	20	18.20
	27	24.57
	22	20.02

... portions of the table not shown ...



## Comparison of Proc tabulate with Proc report

#### Proc tabulate

- Flexible table construction
- Supporting three-dimensional table.

#### **Proc report**

- Providing both detail and summary reports.
- Compute block.



## Reference

- 1. Art Carpenter, Carpenter's Complete Guide to the SAS REPORT Procedure
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## Thank you!