

Using SAS to Analyze CYP-C Data: Introduction to Procedures

CYP-C Research Champion Webinar

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Overview

- SAS overview – revisited
- Introduction to SAS Procedures
 - PROC FREQ
 - PROC PRINT
 - PROC MEANS
 - PROC UNIVARIATE
 - PROC SORT
 - PROC CONTENTS

SAS Overview - Revisited

- For our purposes only two major things you can do in SAS
 - DATA step - Manipulate the data in some way
 - Reading in Data
 - Creating and Redefining Variables
 - Sub-Setting Data
 - Working with Dates
 - Working with Formats
 - Procedure step
 - Analyze the data
 - Produce frequency tables
 - Estimate a regression model

PROC FREQ

SAS PROC FREQ

- Allows you to get a n-way cross-tabulation of data
- Basic statistical tests are available

```
PROC FREQ <options>;
BY <variable list>;
TABLES <requests> / <options>;
RUN;
```

```
PROC FREQ DATA = T7 ;
TABLES QAIPE GENDER ;
RUN;
```

The FREQ Procedure

2001 NEIGHBOURHOOD INCOME QUINTILE (WITHIN CMACA) 1=LOWEST, 5=HIGHEST

QAIPE	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	1754	19.40	1754	19.40
2	1769	19.56	3523	38.96
3	1808	19.99	5331	58.95
4	1829	20.23	7160	79.18
5	1883	20.82	9043	100.00

Frequency Missing = 161

Gender	Frequency	Percent	Cumulative Frequency	Cumulative Percent
F	4238	46.07	4238	46.07
M	4961	53.93	9199	100.00

Frequency Missing = 5

```
PROC FREQ DATA = T7;
TABLES QAIPPE / MISSING;
RUN;
```

The FREQ Procedure

2001 NEIGHBOURHOOD INCOME QUINTILE (WITHIN CMACA) 1=LOWEST, 5=HIGHEST

QAIPPE	Frequency	Percent	Cumulative Frequency	Cumulative Percent
	161	1.75	161	1.75
1	1754	19.06	1915	20.81
2	1769	19.22	3684	40.03
3	1808	19.64	5492	59.67
4	1829	19.87	7321	79.54
5	1883	20.46	9204	100.00

```
PROC FREQ DATA = T7;
BY GENDER;
TABLES QAIPPE / MISSING;
RUN;
```

The FREQ Procedure

2001 NEIGHBOURHOOD INCOME QUINTILE (WITHIN CMACA) 1=LOWEST, 5=HIGHEST

----- Gender=F -----

QAIPPE	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	93	1.87	93	1.87
2	963	19.41	1056	21.29
3	977	19.69	2033	40.98
4	933	18.81	2966	59.79
5	994	20.04	3960	79.82
	1001	20.18	4961	100.00

----- Gender=M -----

QAIPPE	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	93	1.87	93	1.87
2	963	19.41	1056	21.29
3	977	19.69	2033	40.98
4	933	18.81	2966	59.79
5	994	20.04	3960	79.82
	1001	20.18	4961	100.00

```
PROC FREQ DATA = T7;
TABLES QAIPE * GENDER / MISSING;
RUN;
```

The FREQ Procedure

Table of QAIPE by Gender

QAIPE(2001 NEIGHBOURHOOD INCOME QUINTILE (WITHIN CMACA) 1=LOWEST, 5=HIGHEST)

Gender

	Frequency	Percent	Row Pct	Total
	1	0.01	0.01	1
	F	67	0.73	68
	M	93	1.01	93
1	1	0.01	0.01	1
1	F	790	8.58	791
1	M	963	10.46	963
2	1	0.01	0.01	1
2	F	791	8.59	792
2	M	977	10.61	977
3	1	0.01	0.01	1
3	F	874	9.50	875
3	M	933	10.14	933
4	0	0.00	0.00	0
4	F	835	9.07	835
4	M	994	10.80	994
5	1	0.01	0.01	1
5	F	881	9.57	882
5	M	1001	10.88	1001
Total	5	4238	46.05	4238

```
PROC FREQ DATA = T7;
TABLES QAIPE * GENDER / LIST MISSING;
RUN;
```

The FREQ Procedure

QAIPE	Gender	Frequency	Percent	Cumulative Frequency	Cumulative Percent
		1	0.01	1	0.01
	F	67	0.73	68	0.74
	M	93	1.01	161	1.75
1		1	0.01	162	1.76
1	F	790	8.58	952	10.34
1	M	963	10.46	1915	20.81
2		1	0.01	1916	20.82
2	F	791	8.59	2707	29.41
2	M	977	10.61	3684	40.03
3		1	0.01	3685	40.04
3	F	874	9.50	4559	49.53
3	M	933	10.14	5492	59.67
4	F	835	9.07	6327	68.74
4	M	994	10.80	7321	79.54
5		1	0.01	7322	79.55
5	F	881	9.57	8203	89.12
5	M	1001	10.88	9204	100.00

```
PROC FREQ DATA = T7;
TABLES QAIPE * GENDER / CHISQ;
RUN;
```

The FREQ Procedure

Table of QAIPE by Gender

QAIPE(2001 NEIGHBOURHOOD INCOME QUINTILE (WITHIN EMCA) 1=LOWEST, 5=HIGHEST)

Gender

Frequency Percent Row Pct Col Pct	Gender		Total
	F	M	
1	790 8.24 45.07 18.94	963 10.65 54.93 19.78	1753 19.39
2	791 8.75 44.74 18.96	977 10.61 55.26 20.07	1768 19.56
3	874 9.67 48.37 20.95	933 10.32 51.63 19.17	1807 19.99
4	835 9.24 45.65 20.02	994 11.00 54.35 20.42	1829 20.23
5	881 9.75 46.81 21.12	1001 11.07 53.19 20.56	1882 20.82
Total	4171 46.14	4868 53.86	9039 100.00

Frequency Missing = 165

Statistics for Table of QAIPE by Gender

Statistic	DF	Value	Prob
Chi-Square	4	6.3328	0.1756
Likelihood Ratio Chi-Square	4	6.3288	0.1759
Mantel-Haenszel Chi-Square	1	1.3783	0.2404
Phi Coefficient		0.0265	
Contingency Coefficient		0.0265	
Cramer's V		0.0265	

Effective Sample Size = 9039
Frequency Missing = 165

```
PROC FREQ DATA = T7;
TABLES DUMALL * GENDER / CMH;
RUN;
```

The FREQ Procedure

Table of DumALL by Gender

DumALL

Gender

Frequency Percent Row Pct Col Pct	Gender		Total
	F	M	
0	3306 35.94 46.81 78.01	3756 40.83 53.19 75.71	7062 76.77
1	932 10.13 43.61 21.99	1205 13.10 56.39 24.29	2137 23.23
Total	4238 46.07	4961 53.93	9199 100.00

Frequency Missing = 5

Summary Statistics for DumALL by Gender

Estimates of the Common Relative Risk (Row1/Row2)

Type of Study	Method	Value	95% Confidence Limits	
Case-Control (Odds Ratio)	Mantel-Haenszel	1.1380	1.0324	1.2545
	Logit	1.1380	1.0324	1.2545
Cohort (Col1 Risk)	Mantel-Haenszel	1.0734	1.0167	1.1332
	Logit	1.0734	1.0167	1.1332
Cohort (Col2 Risk)	Mantel-Haenszel	0.9432	0.9033	0.9849
	Logit	0.9432	0.9033	0.9849

Effective Sample Size = 9199
Frequency Missing = 5

```

PROC FREQ DATA = T7;
TABLES DUMALL * GENDER * QAIPE / LIST MISSING;
RUN;

```

The FREQ Procedure

DumALL	Gender	QAIPE	Frequency	Percent	Cumulative Frequency	Cumulative Percent
0			1	0.01	1	0.01
0		1	1	0.01	2	0.02
0		2	1	0.01	3	0.03
0		5	1	0.01	4	0.04
0	F		56	0.61	60	0.65
0	F	1	622	6.76	682	7.41
0	F	2	620	6.74	1302	14.15
0	F	3	676	7.34	1978	21.49
0	F	4	642	6.98	2620	28.47
0	F	5	690	7.50	3310	35.96
0	M		74	0.80	3384	36.77
0	M	1	723	7.86	4107	44.62
0	M	2	746	8.11	4853	52.73
0	M	3	705	7.66	5558	60.39
0	M	4	752	8.17	6310	68.56
0	M	5	756	8.21	7066	76.77
1		3	1	0.01	7067	76.78
1	F		11	0.12	7078	76.90
1	F	1	168	1.83	7246	78.73
1	F	2	171	1.86	7417	80.58
1	F	3	198	2.15	7615	82.74
1	F	4	193	2.10	7808	84.83
1	F	5	191	2.08	7999	86.91
1	M		19	0.21	8018	87.11
1	M	1	240	2.61	8258	89.72
1	M	2	231	2.51	8489	92.23
1	M	3	228	2.48	8717	94.71
1	M	4	242	2.63	8959	97.34
1	M	5	245	2.66	9204	100.00

PROC PRINT

SAS PROC PRINT

- Allows you to print out data from a dataset while controlling various aspects like sub-groups
- Prints observations based on order in current dataset (modify this by using PROC SORT procedure before the PROC PRINT)

```
PROC PRINT <options>;
BY <variable list>;
VAR <requests> / <options>;
RUN;
```

```
PROC PRINT DATA = T7;
VAR GENDER QAIPE DX_DATE;
RUN;
```

Obs	Gender	QAIPE	DX_DATE
1		1	02NOV2010
2			03MAR2010
3		5	23FEB2012
4		2	17FEB2012
5		3	02DEC2004
6	F	2	21FEB2007
7	F	1	02JUN2008

9195	M	5	26MAR2008
9196	M	3	28JAN2008
9197	M	5	24DEC2007
9198	M	5	04MAR2008
9199	M	2	13FEB2008
9200	M	2	19NOV2008
9201	M	1	01DEC2008
9202	M	2	03SEP2009
9203	M	2	17SEP2009
9204	M	1	06MAY2009


```

PROC PRINT DATA = T7;
WHERE DUMALL = 1;
VAR GENDER QAIPPE DX_DATE;
RUN;

```

Obs	Gender	QAIPPE	DX_DATE
5		3	02DEC2004
12	F	3	23OCT2008
13	F	3	29OCT2008
26	F	3	18NOV2008
46	F	4	20JAN2006
61	F	3	21DEC2008
62	F	2	26MAR2008
63	F	5	14APR2008

Obs	Gender	QAIPPE	DX_DATE
9202	M	2	03SEP2009
9203	M	2	17SEP2009
9204	M	1	06MAY2009

```

PROC PRINT DATA = T7;
WHERE DUMALL = 1;
BY GENDER;
VAR QAIPPE DX_DATE;
RUN;

```

Gender=		
Obs	QAIPPE	DX_DATE
5	3	02DEC2004

Gender=F		
Obs	QAIPPE	DX_DATE
12	3	23OCT2008
13	3	29OCT2008
26	3	18NOV2008
46	4	20JAN2006

Gender=M		
(continued)		
Obs	QAIPPE	DX_DATE
9177	2	31AUG2001
9178	2	18MAR2002
9181	3	21AUG2003
9183	3	17MAR2003
9184	4	09JUL2003

PROC MEANS

SAS PROC MEANS

- Allows you to summarize data and compute descriptive statistics across variables and within groups
- Can calculate mean, measures of variation, median, ranges, extreme values and perform *t*-tests

```
PROC MEANS <options> <statistic-keywords>;  
BY <variable list>;  
CLASS <variable list> / <options>;  
FREQ <variable>;  
ID <variable list>;  
OUTPUT < options> ;  
VAR <variable list>;
```

```

PROC MEANS DATA = T7;
VAR TIMEDEATH;
RUN;

```

The MEANS Procedure

Analysis Variable : TimeDeath NO. OF DAYS BETWEEN DIAGNOSIS AND DEATH

N	Mean	Std Dev	Minimum	Maximum
1512	624.5780423	629.7578573	0	4527.00

```

PROC MEANS DATA = T7;
BY GENDER;
VAR TIMEDEATH;
RUN;

```

The MEANS Procedure

Analysis Variable : TimeDeath NO. OF DAYS BETWEEN DIAGNOSIS AND DEATH

N	Mean	Std Dev	Minimum	Maximum
1	621.0000000	.	621.0000000	621.0000000

Gender=F

Analysis Variable : TimeDeath NO. OF DAYS BETWEEN DIAGNOSIS AND DEATH

N	Mean	Std Dev	Minimum	Maximum
693	574.1875902	588.9604141	0	4354.00

Gender=M

Analysis Variable : TimeDeath NO. OF DAYS BETWEEN DIAGNOSIS AND DEATH

N	Mean	Std Dev	Minimum	Maximum
818	667.2726161	660.0760038	0	4527.00

```

PROC MEANS DATA = T7;
CLASS GENDER;
VAR TIMEDEATH;
RUN;
    
```

Analysis Variable : TimeDeath NO. OF DAYS BETWEEN DIAGNOSIS AND DEATH

Gender	N		Mean	Std Dev	Minimum	Maximum
	Obs	N				
F	4238	693	574.1875902	588.9604141	0	4354.00
M	4961	818	667.2726161	660.0760038	0	4527.00

```

PROC MEANS DATA = T7 NMISS N MEAN STD STDERR CLM MIN MAX MAXDEC=2;
CLASS GENDER;
VAR TIMEDEATH;
RUN;
    
```

Analysis Variable : TimeDeath NO. OF DAYS BETWEEN DIAGNOSIS AND DEATH

Gender	N Obs	N Miss	N	Mean	Std Dev	Std Error	Lower 95%	Upper 95%	Minimum	Maximum
							CL For Mean	CL For Mean		
F	4238	3545	693	574.19	588.96	22.37	530.26	618.11	0.00	4354.00
M	4961	4143	818	667.27	660.08	23.08	621.97	712.57	0.00	4527.00

```

PROC MEANS DATA = T7 NMISS N MEAN STD STDERR CLM MIN MAX MAXDEC=2 MISSING;
CLASS GENDER;
VAR TIMEDEATH;
RUN;

```

Analysis Variable : TimeDeath NO. OF DAYS BETWEEN DIAGNOSIS AND DEATH

Gender	Obs	Miss	N	Mean	Std Dev	Std Error	Lower 95% CL for Mean	Upper 95% CL for Mean	Minimum	Maximum
	5	4	1	621.00	621.00	621.00
F	4238	3545	693	574.19	588.96	22.37	530.26	618.11	0.00	4354.00
M	4961	4143	818	667.27	660.08	23.08	621.97	712.57	0.00	4527.00

```

PROC MEANS DATA = T7 NMISS N MEAN STD STDERR CLM MIN MAX MAXDEC=2
MISSING NOPRINT;
CLASS GENDER;
VAR TIMEDEATH;
OUTPUT OUT=T7_TTD_MEAN NMISS=NMISS_TTD N=N_TTD MEAN=MEAN_TTD;
RUN;

PROC PRINT DATA = T7_TTD_MEAN;
RUN;

```

Obs	Gender	_TYPE_	_FREQ_	NMISS_ TTD	N_TTD	MEAN_TTD
1		0	9204	7692	1512	624.578
2		1	5	4	1	621.000
3	F	1	4238	3545	693	574.188
4	M	1	4961	4143	818	667.273

PROC UNIVARIATE

SAS PROC UNIVARIATE

- Allows you to examine the distribution of data and assess normality and identify outliers
- Can create many plots and run various statistical tests

```
PROC UNIVARIATE <options> ;  
BY <variable list> ;  
CLASS <variable list> / <options> ;  
ID <variable list> ;  
VAR <variable list> ;  
RUN;
```

```

PROC UNIVARIATE DATA = T7;
VAR DX_AGE;
RUN;

```

```

The UNIVARIATE Procedure
Variable: dx_age

Moments

N              9204      Sum Weights          9204
Mean           5.95512821  Sum Observations     54811
Std Deviation  4.56475102      Variance              20.8369519
Skewness       0.36669278  Kurtosis              -1.2161376
Uncorrected SS 518169      Corrected SS          191762.468
Coeff Variation 76.6524391  Std Error Mean        0.04758048

Basic Statistical Measures

Location              Variability
Mean      5.955128      Std Deviation    4.56475
Median    5.000000      Variance         20.83695
Mode      0.000000      Range            14.00000
                          Interquartile Range  8.00000

```

```

Tests for Location: Mu0=0

Test          -Statistic-      -----p Value-----
Student's t   t  125.1591      Pr > |t|      <.0001
Sign          M   4106.5      Pr >= |M|     <.0001
Signed Rank   S  16865396      Pr >= |S|     <.0001

```

Quantiles (Definition 5)

Quantile	Estimate
100% Max	14
99%	14
95%	14
90%	13
75% Q3	10
50% Median	5
25% Q1	2
10%	0
5%	0
1%	0
0% Min	0

Extreme Observations			
----Lowest----		----Highest---	
Value	Obs	Value	Obs
0	9172	14	9152
0	9171	14	9166
0	9168	14	9167
0	9163	14	9179
0	9121	14	9196

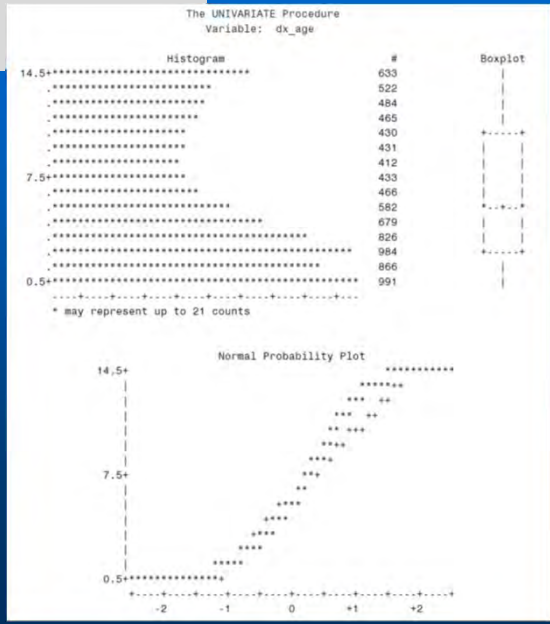
```

PROC UNIVARIATE DATA = T7;
ID CYPCID;
VAR DX_AGE;
RUN;

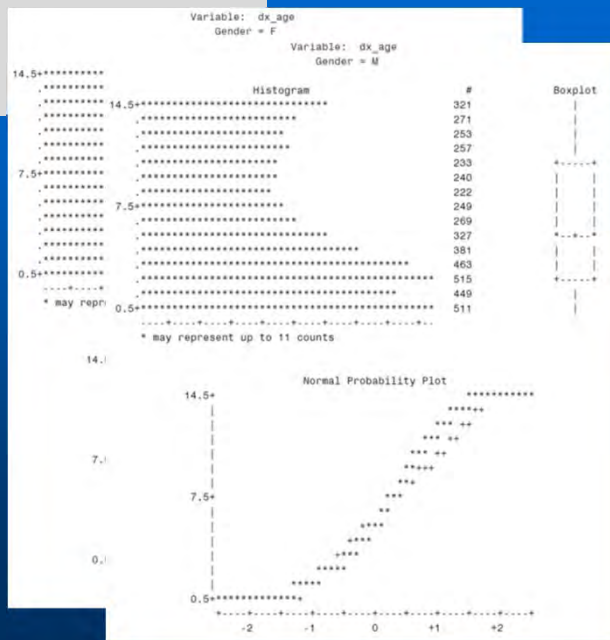
```

Extreme Observations					
-----Lowest-----			-----Highest-----		
Value	CYPCID	Obs	Value	CYPCID	Obs
0	S000236	9172	14	S000216	9152
0	S000235	9171	14	S000230	9166
0	S000232	9168	14	S000231	9167
0	S000227	9163	14	S000243	9179
0	S000184	9121	14	S000262	9196


```
PROC UNIVARIATE DATA = T7 PLOT;
ID CYPCID;
VAR DX_AGE;
RUN;
```



```
PROC UNIVARIATE DATA = T7 PLOT;
CLASS GENDER;
ID CYPCID;
VAR DX_AGE;
RUN;
```



PROC SORT

SAS PROC SORT

- Allows you to rearrange or sort the observations in a dataset by character or numeric variables
- A sorted dataset is required for any 'BY' group processing
- You can make many modifications to a dataset using this procedure which can often speed up your code

```
PROC SORT <options> ;  
BY <variable list> ;  
KEY <variable list> / <options> ;  
RUN;
```

```
PROC PRINT DATA = T7 (OBS=15);
VAR CYPCID DX_DATE;
RUN;
```

```
PROC SORT DATA = T7;
BY CYPCID;
RUN;
```

```
PROC PRINT DATA = T7 (OBS=15);
VAR CYPCID DX_DATE;
RUN;
```

Obs	CYPCID	DX_DATE
1	C000641	07OCT2010
2	L000162	09JUL2002
3	N000250	13NOV2008
4	B000477	25NOV2011
5	F000210	03JUL2007
6	F000366	12NOV2011
7	F000065	08AUG2002
8	L000108	11OCT2001
9	A000009	08MAY2001
10	B000259	04OCT2007
11	A000878	08OCT2009
12	F000343	01JUN2011
13	12573	26DEC2010
14	A000801	27NOV2008
15	F000163	26OCT2006

Obs	CYPCID	DX_DATE
1	10000	08FEB2007
2	10002	21FEB2007
3	10005	19MAR2007
4	10006	19MAR2007
5	10007	24JUL2008
6	10010	21JAN2008
7	10013	08AUG2008
8	10015	02JUN2008
9	10016	01MAY2008
10	10017	30SEP2008
11	10019	08OCT2008
12	10020	01MAY2008
13	10022	08OCT2008
14	10025	05OCT2008
15	10026	31JUL2008

```
PROC SORT DATA = T7;
BY GENDER CYPCID DX_DATE;
RUN;
```

```
PROC PRINT DATA = T7 (OBS=15);
VAR GENDER CYPCID DX_DATE;
RUN;
```

Obs	Gender	CYPCID	DX_DATE
1		12571	02NOV2010
2		12811	03MAR2010
3		13530	23FEB2012
4		B000484	17FEB2012
5		C000246	02DEC2004
6	F	10002	21FEB2007
7	F	10015	02JUN2008
8	F	10016	01MAY2008
9	F	10017	30SEP2008
10	F	10019	08OCT2008
11	F	10020	01MAY2008
12	F	10030	14OCT2008
13	F	10032	11SEP2008
14	F	10037	19SEP2008
15	F	10050	23OCT2008

```
PROC SORT DATA = T7;
BY CYPCID GENDER DX_DATE;
RUN;
```

```
PROC PRINT DATA = T7 (OBS=15);
VAR GENDER CYPCID DX_DATE;
RUN;
```

Obs	Gender	CYPCID	DX_DATE
1	M	10000	08FEB2007
2	F	10002	21FEB2007
3	M	10005	19MAR2007
4	M	10006	19MAR2007
5	M	10007	24JUL2008
6	M	10010	21JAN2008
7	M	10013	08AUG2008
8	F	10015	02JUN2008
9	F	10016	01MAY2008
10	F	10017	30SEP2008
11	F	10019	08OCT2008
12	F	10020	01MAY2008
13	M	10022	08OCT2008
14	M	10025	05OCT2008
15	M	10026	31JUL2008

```
PROC SORT DATA = T7;
BY DESCENDING GENDER CYPCID DESCENDING
DX_DATE;
RUN;
```

```
PROC PRINT DATA = T7 (OBS=15);
VAR GENDER CYPCID DX_DATE;
RUN;
```

Obs	Gender	CYPCID	DX_DATE
1	M	10000	08FEB2007
2	M	10005	19MAR2007
3	M	10006	19MAR2007
4	M	10007	24JUL2008
5	M	10010	21JAN2008
6	M	10013	08AUG2008
7	M	10022	08OCT2008
8	M	10025	05OCT2008
9	M	10026	31JUL2008
10	M	10027	25OCT2006
11	M	10034	13JUN2005
12	M	10035	12AUG2006
13	M	10039	21MAY2008
14	M	10041	13OCT2008
15	M	10044	15OCT2008

```
PROC SORT DATA = T7 OUT = T8 (KEEP=CYPCID DX_DATE);  
BY DESCENDING GENDER CYPCID DESCENDING DX_DATE;  
RUN;  
  
PROC SORT DATA = T7 OUT = T8 (RENAME=(CYPCID=ID));  
BY DESCENDING GENDER CYPCID DESCENDING DX_DATE;  
RUN;
```

PROC CONTENTS

SAS PROC CONTENTS

- Allows you to obtain information about datasets in your library

```
PROC CONTENTS <options> ;
RUN;
```

```
PROC CONTENTS DATA = T7 ;
RUN ;
```

The CONTENTS Procedure

Data Set Name	WORK.T7	Observations	9204
Member Type	DATA	Variables	122
Engine	V9	Indexes	0
Created	Thursday, July 13, 2017 03:59:44 PM	Observation Length	1896
Last Modified	Thursday, July 13, 2017 03:59:44 PM	Deleted Observations	0
Protection		Compressed	NO
Data Set Type		Sorted	YES
Label			
Data Representation	WINDOWS_64		
Encoding	wlatin1 Western (Windows)		

Engine/Host Dependent Information

Data Set Page Size	16384
Number of Data Set Pages	1152
First Data Page	2
Max Obs per Page	8
Obs in First Data Page	8
Number of Data Set Repairs	0
Filename	C:\Users\jpole\AppData\Local\Temp\SAS Temporary Files\TD144152_POG001_\t7.sas7bdat
Release Created	9.0301M1
Host Created	X64_PRO

Alphabetic List of Variables and Attributes

# Variable	Type	Len	Format	Informat	Label
42 CCSuid	Char	7			
43 CMA	Char	3			CMA OR CA CODE (999=UNKN, 000=NOT APPL)
44 CSDuid	Char	7			CENSUS SUBDIVISION CODE (999=UNKNOWN)
45 CSize	Char	1			COMMUNITY SIZE CODE (BASED ON CMACA POP2001) 1=LARGEST 5=SMALLEST
46 CSizeMIZ	Char	1			COMMUNITY SIZE AND METROPOLITAN INFLUENCE ZONE
47 CTname	Char	7			CENSUS TRACT--URBAN CTS ONLY (NO PCT)
48 CYPCID	Char	7			

```
PROC CONTENTS DATA = T7 ORDER = VARNUM;
RUN;
```

The CONTENTS Procedure

Variables in Creation Order

# Variable	Type	Len	Format	Informat	Label
1 CVPCID	Char	7			
2 ordinal_primary	Num	8			
3 p_dx_guid	Char	36			
4 behavior_code	Num	8			
5 cerebrospinal_fl_status	Char	15			
6 dx_age	Num	8			
7 dx_agegrp	Num	8			
8 has_extent_metastasis_site	Num	8			
9 icdo_m_code	Num	8			
10 icdo_t_code	Num	8			
11 icdo_t_code_des	Char	70			
12 left_stage	Char	20			
13 left_stage_sys_des	Char	31			
14 left_staging_stage_code	Char	21			
15 left_staging_sub_code1	Char	2			
16 left_staging_sub_code2	Char	2			
17 non_paired_staging_ stage_code	Char	21			
18 non_paired_staging_ sub_code1	Char	2			
19 non_paired_staging_ sub_code2	Char	2			
20 oth_left_stage_cd	Char	30			
21 oth_right_stage_cd	Char	30			
22 p_dx_centre_code	Num	8			
23 p_dx_oth_centre	Char	45			
24 right_stage	Char	20			

Topics Covered

- SAS overview – revisited
- SAS Procedures
 - PROC FREQ
 - PROC PRINT
 - PROC MEANS
 - PROC UNIVARIATE
 - PROC SORT
 - PROC CONTENTS

