

DESCRPT Example #9

SUDAAN Statements and Results Illustrated

- MI_COUNT option
- SETENV
- RFORMAT
- NEST
- WEIGHT

Input Data Set(s): DESCRPT1.XPT - DESCRPT5.XPT

Example

Using the NHANES III Multiply Imputed Dataset, estimate the mean, standard error, and the 95% confidence interval of the mean among adults, by categories of sex and age (20-39, 40-59, 60+) for the following variables:.

Solution

BDPFNDMI = Bone mineral density femur neck (gm/cm sq);
BMPWSTMI = Waist circumference (cm);
BMI = Body mass index (derived from weight & height);
OVERWT = 100 if overweight, 0 else (derived from BMI);
SYSTOLIC = exam systolic BP (avg of three measurements);
FEPMI = serum iron (ug/dl); and
TCPMI = serum total cholesterol (mg/dl).

This example replicates results from an example provided by NCHS/CDC (National Center for Health Statistics at the Centers for Disease Control and Prevention) along with their documentation on the NHANES III Multiply Imputed Dataset. This documentation and the datasets can be obtained from their website. The example replicated is called *MI_Example_A* in the NCHS/CDC documentation.

In the program provided by NCHS for *MI_EXAMPLE_A*, five calls are made to DESCRPT. Each call to DESCRPT uses one of the five imputed datafiles derived from IMP1.DAT, . . . , IMP5.DAT and computes the means and standard error of the seven variables listed above. Their program uses the output from the five calls to DESCRPT to compute the final mean, standard errors, and 95% confidence intervals for the various measures by sex and age group.

This example illustrates how the same results can be obtained from SUDAAN using the MI_COUNT option with PROC DESCRPT. This example was run in SAS-Callable SUDAAN, and the programming code is presented in *Exhibit 1*. Note that the basic SUDAAN code is the same for both Standalone and SAS-Callable versions.

Exhibit 1. SAS-Callable SUDAAN Code

```
libname in1 xport "\\rtints29\sudaan\data\nhanes3\descrpt1.xpt";
libname in2 xport "\\rtints29\sudaan\data\nhanes3\descrpt2.xpt";
libname in3 xport "\\rtints29\sudaan\data\nhanes3\descrpt3.xpt";
libname in4 xport "\\rtints29\sudaan\data\nhanes3\descrpt4.xpt";
libname in5 xport "\\rtints29\sudaan\data\nhanes3\descrpt5.xpt";

options linesize=95 pagesize=60 nocenter;

data descrpt1; set in1.descrpt1;
data descrpt2; set in2.descrpt2;
data descrpt3; set in3.descrpt3;
data descrpt4; set in4.descrpt4;
data descrpt5; set in5.descrpt5;

proc format;
  value sex 1="1=Male"
           2="2=Female";
  value age 1="1=20-39"
           2="2=40-59"
           3="3=60+";

PROC DESCRIPT DATA=descrpt1 FILETYPE=SAS MI_COUNT=5 DESIGN=WR;
  NEST SDPSTRA6 SDPPSU6 / MISSUNIT;
  WEIGHT WTPFQX6;

  VAR BDPFNDMI BMPWSTMI BMI OVERWT SYSTOLIC FEPMI TCPMI;

  CLASS HSSEX AGEGRP;
  TABLES HSSEX*AGEGRP;

  SETENV colwidth=8 decwidth=4;
  PRINT MEAN SEMEAN DDFMEAN LOWMEAN UPMEAN / DDFMEANFMT=F8.1;
  RFORMAT HSSEX sex.;
  RFORMAT AGEGRP age.;
  RTITLE "DESCRIPT with NHANES III Multiply Imputed Data";
```

Exhibit 2. First Page of SUDAAN Output (SAS *.lst file)

```

                S U D A A N
      Software for the Statistical Analysis of Correlated Data
      Copyright      Research Triangle Institute      December 2011
                Release 11.0.0

DESIGN SUMMARY: Variances will be computed using the Taylor Linearization Method, Assuming a With
Replacement (WR) Design
      Sample Weight: WTPFQX6
      Stratification Variables(s): SDPSTRA6
      Primary Sampling Unit: SDPPSU6

Processing data for set 1 of imputed variables:
Number of observations read      : 18825      Weighted count :177180670
Denominator degrees of freedom :      49

Processing data for set 2 of imputed variables:
Number of observations read      : 18825      Weighted count :177180670
Denominator degrees of freedom :      49

Processing data for set 3 of imputed variables:
Number of observations read      : 18825      Weighted count :177180670
Denominator degrees of freedom :      49

Processing data for set 4 of imputed variables:
Number of observations read      : 18825      Weighted count :177180670
Denominator degrees of freedom :      49

Processing data for set 5 of imputed variables:
Number of observations read      : 18825      Weighted count :177180670
Denominator degrees of freedom :      49

```

In this example, the datasets DESCRPT1.XPT through DESCRPT5.XPT are five datasets derived from the IMP1.DAT through IMP5.DAT files supplied with the public use documentation. They all have 18,825 observations on them.

This example uses the shortcut MI_COUNT=5 to indicate the five files that are used by SUDAAN. The output from this example is displayed on the following pages.

Exhibit 3. Frequencies for CLASS Variable HSSEX

```

Frequencies and Values for CLASS Variables
Results for Summary Over All Imputations
-----
Sex              Frequency      Value
-----
Ordered
  Position:
    1              8816          1=Male
Ordered
  Position:
    2              10009         2=Female
-----

```

Exhibit 4. Frequencies for CLASS Variable AGEGRP

Frequencies and Values for CLASS Variables
Results for Summary Over All Imputations

AGEGRP	Frequency	Value
Ordered		
Position:		
1	7377	1=20-39
Ordered		
Position:		
2	4852	2=40-59
Ordered		
Position:		
3	6596	3=60+

Exhibit 5. DESCRIPT Results: Bone Density

Variance Estimation Method: Taylor Series (WR) Using Multiply Imputed Data
DESCRIPT with NHANES III Multiply Imputed Data
Results for Summary Over All Imputations
by: Variable, Sex, AGEGRP.
for: Variable = Bone minrl density femur neck-gm/cm sq.

Sex		AGEGRP			
		Total	1=20-39	2=40-59	3=60+
Total	Mean	0.8237	0.8937	0.8113	0.6978
	SE Mean	0.0027	0.0025	0.0027	0.0038
	DDF Mean	46.7	32.3	40.0	28.4
	Lower 95% Limit				
	Mean	0.8183	0.8886	0.8058	0.6902
	Upper 95% Limit				
	Mean	0.8291	0.8988	0.8168	0.7055
1=Male	Mean	0.8710	0.9355	0.8401	0.7679
	SE Mean	0.0029	0.0038	0.0038	0.0041
	DDF Mean	37.0	21.9	39.1	40.7
	Lower 95% Limit				
	Mean	0.8652	0.9276	0.8324	0.7596
	Upper 95% Limit				
	Mean	0.8769	0.9434	0.8478	0.7763
2=Female	Mean	0.7807	0.8531	0.7839	0.6454
	SE Mean	0.0033	0.0032	0.0035	0.0041
	DDF Mean	43.8	23.9	37.6	16.1
	Lower 95% Limit				
	Mean	0.7740	0.8466	0.7769	0.6367
	Upper 95% Limit				
	Mean	0.7873	0.8596	0.7910	0.6542

Exhibit 6. DESCRIPT Results: Waist Circumference

Variance Estimation Method: Taylor Series (WR) Using Multiply Imputed Data

DESCRIPT with NHANES III Multiply Imputed Data

Results for Summary Over All Imputations
by: Variable, Sex, AGEGRP.

for: Variable = Waist circumference (cm).

Sex		AGEGRP			
		Total	1=20-39	2=40-59	3=60+
Total	Mean	91.8776	87.3867	95.0592	96.6704
	SE Mean	0.2444	0.3351	0.3239	0.2431
	DDF Mean	46.2	45.9	46.1	40.2
	Lower 95% Limit				
	Mean	91.3857	86.7122	94.4073	96.1791
	Upper 95% Limit				
	Mean	92.3696	88.0612	95.7111	97.1617
1=Male	Mean	95.3156	90.8838	98.7542	100.3508
	SE Mean	0.2773	0.3995	0.3989	0.3342
	DDF Mean	44.5	45.2	43.6	44.2
	Lower 95% Limit				
	Mean	94.7569	90.0793	97.9501	99.6774
	Upper 95% Limit				
	Mean	95.8743	91.6882	99.5582	101.0241
2=Female	Mean	88.7527	83.9921	91.5530	93.9187
	SE Mean	0.3486	0.4671	0.4706	0.2967
	DDF Mean	46.0	46.8	44.4	41.5
	Lower 95% Limit				
	Mean	88.0511	83.0524	90.6048	93.3197
	Upper 95% Limit				
	Mean	89.4544	84.9319	92.5011	94.5176

Exhibit 7. DESCRIPT Results: BMI

Variance Estimation Method: Taylor Series (WR) Using Multiply Imputed Data

DESCRIPT with NHANES III Multiply Imputed Data

Results for Summary Over All Imputations
by: Variable, Sex, AGEGRP.

for: Variable = BMI.

Sex		AGEGRP			
		Total	1=20-39	2=40-59	3=60+
Total	Mean	26.4785	25.5951	27.5026	26.8734
	SE Mean	0.1082	0.1400	0.1411	0.1085
	DDF Mean	46.7	46.1	45.9	46.4
	Lower 95% Limit				
	Mean	26.2607	25.3133	27.2185	26.6551
	Upper 95% Limit				
	Mean	26.6963	25.8768	27.7867	27.0916
1=Male	Mean	26.5790	25.8686	27.4878	26.8257
	SE Mean	0.1069	0.1494	0.1585	0.1390
	DDF Mean	45.8	44.7	44.9	45.3
	Lower 95% Limit				
	Mean	26.3637	25.5677	27.1686	26.5458
	Upper 95% Limit				
	Mean	26.7942	26.1695	27.8070	27.1057
2=Female	Mean	26.3872	25.3295	27.5166	26.9090
	SE Mean	0.1512	0.2019	0.2051	0.1287
	DDF Mean	46.8	46.9	46.6	45.7
	Lower 95% Limit				
	Mean	26.0831	24.9233	27.1040	26.6499
	Upper 95% Limit				
	Mean	26.6913	25.7358	27.9292	27.1681

Exhibit 8. DESCRIPT Results: Overwt

Variance Estimation Method: Taylor Series (WR) Using Multiply Imputed Data

DESCRIPT with NHANES III Multiply Imputed Data

Results for Summary Over All Imputations
by: Variable, Sex, AGEGRP.

for: Variable = OVERWT.

Sex		AGEGRP			
		Total	1=20-39	2=40-59	3=60+
Total	Mean	34.1990	26.9193	41.1406	39.5125
	SE Mean	0.6865	0.9225	1.1091	1.0747
	DDF Mean	46.8	45.1	45.6	42.0
	Lower 95% Limit				
	Mean	32.8178	25.0614	38.9075	37.3439
	Upper 95% Limit				
	Mean	35.5803	28.7772	43.3737	41.6812
1=Male	Mean	32.6846	25.6281	39.5681	38.4953
	SE Mean	0.8994	1.2274	1.5370	1.3889
	DDF Mean	45.0	41.3	46.0	42.7
	Lower 95% Limit				
	Mean	30.8732	23.1498	36.4743	35.6937
	Upper 95% Limit				
	Mean	34.4959	28.1063	42.6619	41.2969
2=Female	Mean	35.5755	28.1727	42.6328	40.2731
	SE Mean	0.9450	1.4102	1.3679	1.4804
	DDF Mean	46.4	47.0	44.8	43.0
	Lower 95% Limit				
	Mean	33.6738	25.3356	39.8774	37.2876
	Upper 95% Limit				
	Mean	37.4773	31.0098	45.3882	43.2585

Exhibit 9. DESCRIPT Results: Systolic

Variance Estimation Method: Taylor Series (WR) Using Multiply Imputed Data

DESCRIPT with NHANES III Multiply Imputed Data

Results for Summary Over All Imputations
by: Variable, Sex, AGEGRP.

for: Variable = SYSTOLIC.

		AGEGRP			
Sex		Total	1=20-39	2=40-59	3=60+
Total	Mean	121.1273	112.6892	121.7014	137.5690
	SE Mean	0.3734	0.2956	0.3616	0.4819
	DDF Mean	46.2	38.0	40.0	32.6
	Lower 95% Limit				
	Mean	120.3757	112.0908	120.9706	136.5881
	Upper 95% Limit				
	Mean	121.8788	113.2876	122.4322	138.5498
1=Male	Mean	123.4720	117.5362	124.3262	136.0907
	SE Mean	0.4234	0.4247	0.5681	0.6575
	DDF Mean	43.0	26.0	33.7	39.3
	Lower 95% Limit				
	Mean	122.6181	116.6633	123.1713	134.7613
	Upper 95% Limit				
	Mean	124.3258	118.4091	125.4812	137.4202
2=Female	Mean	118.9961	107.9842	119.2107	138.6742
	SE Mean	0.4769	0.3213	0.4733	0.6560
	DDF Mean	46.6	46.6	40.7	28.1
	Lower 95% Limit				
	Mean	118.0365	107.3378	118.2546	137.3307
	Upper 95% Limit				
	Mean	119.9557	108.6307	120.1667	140.0176

Exhibit 10. DESCRIPT Results: Serum Iron

Variance Estimation Method: Taylor Series (WR) Using Multiply Imputed Data

DESCRIPT with NHANES III Multiply Imputed Data

Results for Summary Over All Imputations
by: Variable, Sex, AGEGRP.

for: Variable = Serum iron (ug/dl).

		AGEGRP			
Sex		Total	1=20-39	2=40-59	3=60+
Total	Mean	91.2341	96.8120	87.9444	84.3704
	SE Mean	0.6997	1.0470	0.9035	0.8222
	DDF Mean	44.1	36.6	42.4	31.3
	Lower 95% Limit				
	Mean	89.8240	94.6898	86.1216	82.6942
	Upper 95% Limit				
	Mean	92.6442	98.9341	89.7673	86.0466
1=Male	Mean	98.6262	104.2946	95.5580	90.1035
	SE Mean	0.8028	1.3692	1.2037	1.2441
	DDF Mean	33.6	28.6	32.1	40.5
	Lower 95% Limit				
	Mean	96.9939	101.4925	93.1065	87.5900
	Upper 95% Limit				
	Mean	100.2584	107.0967	98.0095	92.6169
2=Female	Mean	84.5153	89.5485	80.7198	80.0840
	SE Mean	0.8540	1.4165	1.1555	0.9039
	DDF Mean	44.4	34.8	45.6	15.8
	Lower 95% Limit				
	Mean	82.7947	86.6722	78.3933	78.1659
	Upper 95% Limit				
	Mean	86.2360	92.4248	83.0463	82.0022

Exhibit 11. DESCRIPT Results: Serum Cholesterol

Variance Estimation Method: Taylor Series (WR) Using Multiply Imputed Data

DESCRIPT with NHANES III Multiply Imputed Data

Results for Summary Over All Imputations
by: Variable, Sex, AGEGRP.

for: Variable = Serum cholesterol (mg/dL).

		AGEGRP			
Sex		Total	1=20-39	2=40-59	3=60+
Total	Mean	204.0814	188.3679	213.0604	223.8145
	SE Mean	0.7839	0.9700	1.1104	1.1029
	DDF Mean	43.2	39.3	36.9	40.4
	Lower 95% Limit				
	Mean	202.5009	186.4064	210.8103	221.5862
	Upper 95% Limit				
	Mean	205.6620	190.3293	215.3104	226.0429
1=Male	Mean	202.0179	190.5982	212.7610	212.0425
	SE Mean	0.8801	1.2186	1.2710	1.2546
	DDF Mean	45.2	35.2	33.9	46.0
	Lower 95% Limit				
	Mean	200.2454	188.1248	210.1778	209.5170
	Upper 95% Limit				
	Mean	203.7903	193.0716	215.3442	214.5679
2=Female	Mean	205.9571	186.2028	213.3444	232.6161
	SE Mean	0.9786	1.0492	1.3890	1.5527
	DDF Mean	39.2	41.6	37.1	33.4
	Lower 95% Limit				
	Mean	203.9780	184.0848	210.5304	229.4586
	Upper 95% Limit				
	Mean	207.9362	188.3209	216.1584	235.7736