

Logistic (RLOGIST) Example #7

SUDAAN Statements and Results Illustrated

- EFFECTS
- UNITS option
- EXP option
- SUBPOPX
- REFLEVEL

Input Data Set(s): SAMADULTED.SAS7bdat

Example

Using 2006 NHIS data, determine for white adults the impact of a 10-unit increase in age on the occurrence of not being able to afford prescription medications, controlling for education, gender, and region of country. Also determine the impact for each gender.

This example highlights the use of the new UNITS and EXP options on the EFFECTS statement in obtaining customized odds ratios for a d-unit change in a continuous covariate. We demonstrate this function first in a main effects model, then in an interaction model.

Solution

NHIS is an annual multipurpose health sample survey conducted by the National Center for Health Statistics (NCHS). The 2006 NHIS collected data on approximately 29,200 households; 29,900 families; 75,700 persons; 24,275 sample adults; and 9,800 sample children.

In the 2006 study, each sample adult was asked (variable AHCAFYR1):

“During the PAST 12 MONTHS, was there any time when you needed prescription medicine but didn’t get it because you couldn’t afford it?”

Possible answer codes are yes, no, don’t know, refused, and not ascertained. Only 0.96% of sample adults were coded as something other than yes or no. The constructed variable CANTAFMEDS is created from AHCAFYR1 and is coded as 1=*yes* (could not afford at least once in the past 12 months) or 0=*no* (event did not happen). All other responses are coded to missing.

This example uses RLOGIST to model the probability that the dependent variable CANTAFMEDS is equal to 1, but it focuses primarily on the EFFECTS statement to obtain customized odds ratio estimates and tests concerning the effect of the *continuous covariate* (AGE_P), first in a main effects model, then when interacted with gender.

For variance estimation purposes, the complex sampling plan is described as 300 pseudo-strata with two pseudo-PSUs per stratum. Sampling at the first PSU stage is assumed to be with replacement. Each unit of analysis (sample adult, sample child, person, etc.) is clustered within his/her PSU, and lower level sampling units are not identified.

In this example, we use the sample adult (age 18 and older) data file with 24,275 observations. The stratification and primary sampling unit variables are named STRAT_P and PSU_P, respectively, and appear on the NEST statement. The weight variable for the sample adult file is WTFA_SA and appears

on the WEIGHT statement. The PROC statements specify DESIGN=WR (*i.e.*, unequal probability sampling of PSUs with replacement), and Taylor Series linearization is used for variance estimation. The subpopulation is defined as white (MRACRPI2=1) and at least 25 years old (AGE_P >= 25).

The CLASS, MODEL, and EFFECTS statements of the first RLOGIST program (*Exhibit 1*) is as follows:

```
CLASS SEX EDUC_3 REGION MARRY_3;  
MODEL CANTAFMEDS = SEX AGE_P EDUC_3 REGION MARRY_3;  
EFFECTS AGE_P / exp units=10 name="AGE";
```

These statements identify CANTAFMEDS as the dependent variable; it is coded as 1=*incurred event (can't afford)* and 0=*did not incur event*. The independent variable AGE_P (age in years) is to be modelled as continuous, since it does not appear on the CLASS statement. The other independent variables (SEX, EDUC_3, REGION, and MARRY_3) are to be modeled as categorical, since they all appear on the CLASS statement. The default Wald-*F* test is used for all tests of hypotheses.

The model terms are as follows:

- Sex (SEX: 1=Male, 2=Female);
- Education at three levels (EDUC_3: 1=HS or Less, 2=Some College, 3=College Grad);
- Region of the U.S. at four levels (REGION: 1=NE, 2=Midwest, 3=South, 4=West); and
- Marital status at three levels (MARRY_3: 1=Married, 2=Widowed, 3=Unmarried).
- Age in years (AGE_P);

The SUBPOPX statement restricts the analysis to whites aged 25 years or more. The REFLEVEL statement defines the regression coefficient reference level for sex, region, and marital status to be the first level of each variable (REFLEVEL serves no key function in this example, and it could have been removed). Since education is not included on the REFLEVEL statement, the last level of each of these variables will be used as the reference level for estimating regression coefficients.

The EFFECTS statement in the main effects model above is used to obtain the customized odds ratio for not being able to afford prescription medications associated with a 10-unit increase in age. The EXP option tells SUDAAN to exponentiate the regression coefficient associated with the continuous covariate AGE_P, and the UNITS option tells SUDAAN to estimate the odds ratio associated with a *10-unit increase in AGE_P* (UNITS=10).

The CLASS, MODEL, and EFFECTS statements of the second RLOGIST program (*Exhibit 1*) adds the interaction term SEX*AGE_P to the model:

```
CLASS SEX EDUC 3 REGION MARRY 3;
MODEL CANTAFMEDS = SEX AGE_P EDUC_3 REGION MARRY_3 SEX*AGE_P;

EFFECTS AGE_P / SEX=1 exp units=10 name="AGE: Males";
EFFECTS AGE_P / SEX=2 exp units=10 name="AGE: Females";
EFFECTS AGE_P / reflevel exp units=10 name="AGE: SEX=reflevel";
```

The EFFECTS statement in the interaction model above is used to obtain the customized odds ratio for not being able to afford prescription medications associated with a *10-unit increase in age, separately for males and females*. The REFLEVEL option in the last EFFECTS statement computes the customized odds ratio at the reference cell for SEX, which is males (so this is the same as specifying SEX=1).

The EXP option tells SUDAAN to exponentiate the regression coefficient associated with the continuous covariate AGE_P, the UNITS option tells SUDAAN to estimate the odds ratio associated with a *10-unit increase in AGE_P* (UNITS=10), and the SEX=*value* option tells SUDAAN to compute the odds ratio at specific values of SEX (1 and 2).

This example was run in SAS-Callable SUDAAN, and the SAS program and *.LST files are provided.

Exhibit 1. SAS-Callable SUDAAN Code

```
libname in "c:\10winbetatest\AmJEpid";

options nocenter pagesize=70 linesize=95;
proc format;
  value educ 1="1=HS or Less"
           2="2=Some College"
           3="3=College+";
  value sex 1="1=Male"
           2="2=Female";
  value region 1="1=N.E."
              2="2=Midwest"
              3="3=South"
              4="4=West";
  value marry 1="1=Married"
             2="2=Widowed"
             3="3=Unmarried";
  value yesno 1="Yes"
             0="No";

Data samadult; set in.samadulted;
  if 0 le educ1 le 14 then educ_3=1;
  else if educ1=15 then educ_3=2;
  else if 16 le educ1 le 21 then educ_3=3;
  else educ_3=.;

  if 25 le age_p le 44 then age25_3=1;
  else if 45 le age_p le 64 then age25_3=2;
  else if age_p ge 65 then age25_3=3;

  if r_maritl in (1,2,3) then marry_3=1;
  else if r_maritl=4 then marry_3=2;
  else if r_maritl in (5,6,7,8) then marry_3=3;
  else marry_3=.;

  if ahcafyrl=1 then cantafmeds=1;
  else if ahcafyrl=2 then cantafmeds=0;
  else if ahcafyrl in (7,8,9) then cantafmeds=.;

proc sort data=samadult; by strat_p psu_p;
```

Exhibit 1. SAS-Callable SUDAAN Code (continued)

```
/* MAIN EFFECTS MODEL */

PROC RLOGIST DATA=samadult DESIGN=WR FILETYPE=SAS;
  NEST STRAT_P PSU_P;
  WEIGHT WTFA_SA;

  SUBPOPX AGE_P>24 AND MRACRPI2=1 / NAME="WHITES AGED 25+";
  CLASS SEX EDUC_3 REGION MARRY_3;

  REFLEVEL SEX=1 REGION=1 MARRY_3=1;
  MODEL CANTAFMEDS = SEX AGE P EDUC 3 REGION MARRY_3;
  EFFECTS AGE_P / exp units=10 name="AGE";

  setenv labwidth=17 colspce=1 colwidth=7 decwidth=4;
  print / betas=default sebetafmt=f8.4 t_betafmt=f6.2;

  setenv labwidth=20 colspce=4;
  print / risk=default tests=default expcntrst=default waldfmt=f6.2 waldfmt=f7.4
    dffmt=f7.0 orfmt=f5.3 loworfmt=f9.3 uporfmt=f9.3
    exp_cntrstfmt=f13.3 low_cntrstfmt=f5.3 up_cntrstfmt=f5.3 unitsfmt=f6.0;

  RLABEL age_p="Age";
  RLABEL cantafmeds="Can't Afford Meds Past 12m";
  RFORMAT sex sex.;
  RFORMAT educ_3 educ.;
  RFORMAT region region.;
  RFORMAT marry_3 marry.;
  RTITLE "Modelling Can't Afford Rx Meds Main Effect Model (with UNITS Option)";
  RFOOTNOTE "Data Source: NCHS National Health Interview Survey (2006)";

/* INTERACTION MODEL */

PROC RLOGIST DATA=samadult DESIGN=WR FILETYPE=SAS;
  NEST STRAT_P PSU_P;
  WEIGHT WTFA_SA;

  SUBPOPX AGE_P>24 AND MRACRPI2=1 / NAME="WHITES AGED 25+";
  CLASS SEX EDUC_3 REGION MARRY_3;

  REFLEVEL SEX=1 REGION=1 MARRY_3=1;
  MODEL CANTAFMEDS = SEX AGE P EDUC 3 REGION MARRY_3 SEX*AGE_P;
  EFFECTS AGE_P / SEX=1 exp units=10 name="AGE: Males";
  EFFECTS AGE_P / SEX=2 exp units=10 name="AGE: Females";
  EFFECTS AGE_P / refllevel exp units=10 name="AGE: SEX=reflevel";

  setenv labwidth=17 colspce=1 colwidth=7 decwidth=4;
  print / betas=default sebetafmt=f8.4 t_betafmt=f6.2;

  setenv labwidth=20 colspce=4;
  print / risk=default tests=default expcntrst=default waldfmt=f6.2 waldfmt=f7.4
    dffmt=f7.0 orfmt=f5.3 loworfmt=f9.3 uporfmt=f9.3
    exp_cntrstfmt=f13.3 low_cntrstfmt=f5.3 up_cntrstfmt=f5.3 unitsfmt=f6.0;

  RLABEL age_p="Age";
  RLABEL cantafmeds="Can't Afford Meds Past 12m";
  RFORMAT sex sex.;
  RFORMAT educ_3 educ.;
  RFORMAT region region.;
  RFORMAT marry_3 marry.;
  RTITLE "Modelling Can't Afford Rx Meds Interaction Model (with UNITS Option)";
  RFOOTNOTE "Data Source: NCHS National Health Interview Survey (2006)";
```

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      February 2011
              Release 11.0.0

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

Number of zero responses      : 14737
Number of non-zero responses : 1305

Independence parameters have converged in 6 iterations

Number of observations read      : 24275      Weighted count:220266693
Observations in subpopulation   : 16469      Weighted count:158409519
Observations used in the analysis : 16042      Weighted count:154637709
Denominator degrees of freedom  : 300

Maximum number of estimable parameters for the model is 10

File SAMADULT contains 600 Clusters
596 clusters were used to fit the model
Maximum cluster size is 71 records
Minimum cluster size is 1 records

Sample and Population Counts for Response Variable CANTAFMEDS
Based on observations used in the analysis
0: Sample Count 14737 Population Count 142746051
1: Sample Count 1305 Population Count 11891658

R-Square for dependent variable CANTAFMEDS (Cox & Snell, 1989): 0.032624

-2 * Normalized Log-Likelihood with Intercepts Only : 8699.01
-2 * Normalized Log-Likelihood Full Model           : 8166.93
Approximate Chi-Square (-2 * Log-L Ratio)           : 532.08
Degrees of Freedom                                  : 9

Note: The approximate Chi-Square is not adjusted for clustering.
      Refer to hypothesis test table for adjusted test.
```

Exhibit 2 indicates that 24,275 observations were read in; 16,469 are in the subpopulation defined as white adults over the age of 25; and 16,042 observations were used in the analysis (due to missing values for one or more model variables). The CLASS variable frequencies were generated but are not displayed here.

Exhibit 3. Regression Coefficients Table (Main Effects Model)

Variance Estimation Method: Taylor Series (WR)
 SE Method: Robust (Binder, 1983)
 Working Correlations: Independent
 Link Function: Logit
 Response variable CANTAFMEDS: Can't Afford Meds Past 12m
 For Subpopulation: WHITES AGED 25+

Modelling Can't Afford Rx Meds Main Effect Model (with UNITS Option)

by: Independent Variables and Effects.

Independent Variables and Effects	Beta Coeff.	SE Beta	Lower 95% Limit Beta	Upper 95% Limit Beta	T-Test B=0	P-value T-Test B=0
Intercept	-3.1108	0.1951	-3.4947	-2.7268	-15.94	0.0000
Sex						
1=Male	0.0000	0.0000	0.0000	0.0000	.	.
2=Female	0.5222	0.0822	0.3603	0.6840	6.35	0.0000
EDUC_3						
1=HS or Less	0.8696	0.0814	0.7095	1.0298	10.69	0.0000
2=Some College	0.8749	0.1025	0.6731	1.0767	8.53	0.0000
3=College+	0.0000	0.0000	0.0000	0.0000	.	.
Region						
1=N.E.	0.0000	0.0000	0.0000	0.0000	.	.
2=Midwest	0.3220	0.1262	0.0735	0.5704	2.55	0.0113
3=South	0.4871	0.1241	0.2427	0.7314	3.92	0.0001
4=West	0.3425	0.1364	0.0741	0.6109	2.51	0.0126
MARRY_3						
1=Married	0.0000	0.0000	0.0000	0.0000	.	.
2=Widowed	0.0422	0.1559	-0.2646	0.3491	0.27	0.7868
3=Unmarried	0.7889	0.0706	0.6499	0.9279	11.17	0.0000
Age	-0.0187	0.0027	-0.0242	-0.0133	-6.82	0.0000

Data Source: NCHS National Health Interview Survey (2006)

Exhibit 3 contains the regression coefficients for the main effects model. The regression coefficient for AGE (-0.0187) indicates that the log odds of the event is significantly reduced ($p=0.0000$) for every 1-year increase in AGE.

Exhibit 4. ANOVA Table (Main Effects Model)

Variance Estimation Method: Taylor Series (WR)
 SE Method: Robust (Binder, 1983)
 Working Correlations: Independent
 Link Function: Logit
 Response variable CANTAFMEDS: Can't Afford Meds Past 12m
 For Subpopulation: WHITES AGED 25+

Modelling Can't Afford Rx Meds Main Effect Model (with UNITS Option)

by: Contrast.

Contrast	Degrees of Freedom	Wald F	P-value Wald F
OVERALL MODEL	10	438.26	0.0000
MODEL MINUS INTERCEPT	9	43.65	0.0000
INTERCEPT	.	.	.
SEX	1	40.32	0.0000
EDUC_3	2	60.82	0.0000
REGION	3	5.21	0.0016
MARRY_3	2	63.98	0.0000
AGE_P	1	46.46	0.0000

Data Source: NCHS National Health Interview Survey (2006)

Exhibit 4 contains the overall effect for each model covariate. The main effect of AGE on not being able to afford prescription medications is statistically significant ($p=0.0000$).

Exhibit 5. Default Odds Ratios (Main Effects Model)

Variance Estimation Method: Taylor Series (WR)
 SE Method: Robust (Binder, 1983)
 Working Correlations: Independent
 Link Function: Logit
 Response variable CANTAFMEDS: Can't Afford Meds Past 12m
 For Subpopulation: WHITES AGED 25+

Modelling Can't Afford Rx Meds Main Effect Model (with UNITS Option)

by: Independent Variables and Effects.

Independent Variables and Effects	Odds Ratio	Lower 95% Limit OR	Upper 95% Limit OR
Intercept	0.045	0.030	0.065
Sex			
1=Male	1.000	1.000	1.000
2=Female	1.686	1.434	1.982
EDUC_3			
1=HS or Less	2.386	2.033	2.800
2=Some College	2.399	1.960	2.935
3=College+	1.000	1.000	1.000
Region			
1=N.E.	1.000	1.000	1.000
2=Midwest	1.380	1.076	1.769
3=South	1.628	1.275	2.078
4=West	1.408	1.077	1.842
MARRY_3			
1=Married	1.000	1.000	1.000
2=Widowed	1.043	0.767	1.418
3=Unmarried	2.201	1.915	2.529
Age	0.981	0.976	0.987

Data Source: NCHS National Health Interview Survey (2006)

Exhibit 5 contains the default odds ratios (RISK group on PRINT statement) corresponding to the estimated regression coefficients. The default odds ratio for AGE is 0.981, which indicates almost a 2% reduction in odds of not being able to afford prescription medications for each 1-unit (1-year) increase in AGE.

**Exhibit 6. User-Specified Odds Ratios from EFFECTS Statement
(Main Effects Model)**

Variance Estimation Method: Taylor Series (WR)
 SE Method: Robust (Binder, 1983)
 Working Correlations: Independent
 Link Function: Logit
 Response variable CANTAFMEDS: Can't Afford Meds Past 12m
 For Subpopulation: WHITES AGED 25+

Modelling Can't Afford Rx Meds Main Effect Model (with UNITS Option)

by: Contrast.

Contrast	Units	EXP(Contrast)	Lower 95% Limit	Upper 95% Limit
AGE	10	0.829	0.785	0.875

Data Source: NCHS National Health Interview Survey (2006)

Exhibit 6 contains the user-specified odds ratios (EXPCNTRST group on PRINT statement) from the EFFECTS statement. The odds ratio for a 10-unit increase in AGE is 0.829, which indicates almost a 17% reduction in odds of not being able to afford prescription medications for each 10-unit (10-year) increase in AGE.

Exhibit 7. First Page of SUDAAN Output (Interaction Model)

```

                S U D A A N
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                Release 11.0.0

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

Number of zero responses      : 14737
Number of non-zero responses : 1305

Independence parameters have converged in 6 iterations

Number of observations read      : 24275      Weighted count:220266693
Observations in subpopulation   : 16469      Weighted count:158409519
Observations used in the analysis : 16042      Weighted count:154637709
Denominator degrees of freedom  : 300

Maximum number of estimable parameters for the model is 11

File SAMADULT contains 600 Clusters
596 clusters were used to fit the model
Maximum cluster size is 71 records
Minimum cluster size is 1 records

Sample and Population Counts for Response Variable CANTAFMEDS
Based on observations used in the analysis
0: Sample Count 14737 Population Count 142746051
1: Sample Count 1305 Population Count 11891658

R-Square for dependent variable CANTAFMEDS (Cox & Snell, 1989): 0.033109

-2 * Normalized Log-Likelihood with Intercepts Only : 8699.01
-2 * Normalized Log-Likelihood Full Model           : 8158.89
Approximate Chi-Square (-2 * Log-L Ratio)           : 540.12
Degrees of Freedom                                  : 10

Note: The approximate Chi-Square is not adjusted for clustering.
      Refer to hypothesis test table for adjusted test.
```

Exhibit 7 contains the first page of SUDAAN output for the RLOGIST interaction model.

Exhibit 8. Regression Coefficients from Interaction Model

Variance Estimation Method: Taylor Series (WR)
 SE Method: Robust (Binder, 1983)
 Working Correlations: Independent
 Link Function: Logit
 Response variable CANTAFMEDS: Can't Afford Meds Past 12m
 For Subpopulation: WHITES AGED 25+

Modelling Can't Afford Rx Meds Interaction Model (with UNITS Option)

by: Independent Variables and Effects.

Independent Variables and Effects	Beta Coeff.	SE Beta	Lower 95% Limit Beta	Upper 95% Limit Beta	T-Test B=0	P-value T-Test B=0
Intercept	-3.4418	0.2503	-3.9345	-2.9492	-13.75	0.0000
Sex						
1=Male	0.0000	0.0000	0.0000	0.0000	.	.
2=Female	1.0653	0.2300	0.6127	1.5179	4.63	0.0000
EDUC_3						
1=HS or Less	0.8787	0.0817	0.7180	1.0394	10.76	0.0000
2=Some College	0.8778	0.1025	0.6761	1.0795	8.57	0.0000
3=College+	0.0000	0.0000	0.0000	0.0000	.	.
Region						
1=N.E.	0.0000	0.0000	0.0000	0.0000	.	.
2=Midwest	0.3237	0.1263	0.0752	0.5722	2.56	0.0109
3=South	0.4865	0.1242	0.2421	0.7310	3.92	0.0001
4=West	0.3437	0.1364	0.0752	0.6122	2.52	0.0123
MARRY_3						
1=Married	0.0000	0.0000	0.0000	0.0000	.	.
2=Widowed	0.1226	0.1522	-0.1768	0.4220	0.81	0.4210
3=Unmarried	0.7996	0.0700	0.6619	0.9373	11.43	0.0000
Age	-0.0117	0.0042	-0.0200	-0.0033	-2.75	0.0062
Sex, Age						
1=Male, 1	0.0000	0.0000	0.0000	0.0000	.	.
2=Female, 1	-0.0120	0.0046	-0.0210	-0.0029	-2.59	0.0099

Data Source: NCHS National Health Interview Survey (2006)

Exhibit 8 contains the regression coefficients for the interaction model (where the interaction effect is sex*age). The coefficient for AGE (-0.0117) corresponds to a reduction in the log-odds of occurrence for every 1-year increase in AGE, *at the reference cell of SEX (males)*.

Exhibit 9. ANOVA Table from Interaction Model

```

Variance Estimation Method: Taylor Series (WR)
SE Method: Robust (Binder, 1983)
Working Correlations: Independent
Link Function: Logit
Response variable CANTAFMEDS: Can't Afford Meds Past 12m
For Subpopulation: WHITES AGED 25+

Modelling Can't Afford Rx Meds Interaction Model (with UNITS Option)

by: Contrast.
-----
Contrast                Degrees
                        of
                        Freedom    Wald F    P-value
                        Wald F
-----
OVERALL MODEL                11    401.79    0.0000
MODEL MINUS
INTERCEPT                10    45.96    0.0000
INTERCEPT                  .         .         .
SEX                          1    21.46    0.0000
EDUC_3                       2    61.53    0.0000
REGION                       3     5.18    0.0017
MARRY_3                      2    65.67    0.0000
AGE_P                        .         .         .
AGE_P * SEX                  1     6.73    0.0099

AGE: Males                   1     7.59    0.0062
AGE: Females                  1    63.27    0.0000
AGE: SEX=reflevel            1     7.59    0.0062
-----
Data Source: NCHS National Health Interview Survey (2006)

```

Exhibit 9 contains the test of significance for each term in the model, plus the user-specified contrasts on the EFFECTS statements (last 3 lines). We see that the AGE*SEX interaction term is significant, and the effects of AGE for Males and Females are also both significant. From the size of the Wald F statistics, it appears that the AGE effect is larger for Females compared to Males.

Exhibit 10. Default Odds Ratios from Interaction Model

```

Variance Estimation Method: Taylor Series (WR)
SE Method: Robust (Binder, 1983)
Working Correlations: Independent
Link Function: Logit
Response variable CANTAFMEDS: Can't Afford Meds Past 12m
For Subpopulation: WHITES AGED 25+

Modelling Can't Afford Rx Meds Interaction Model (with UNITS Option)

by: Independent Variables and Effects.
-----
Independent
Variables and      Odds   Lower 95%   Upper 95%
Effects           Ratio  Limit OR   Limit OR
-----
Intercept         0.032      0.020      0.052
Sex
  1=Male          1.000      1.000      1.000
  2=Female        2.902      1.845      4.563
EDUC_3
  1=HS or Less    2.408      2.050      2.828
  2=Some College  2.406      1.966      2.943
  3=College+      1.000      1.000      1.000
Region
  1=N.E.          1.000      1.000      1.000
  2=Midwest       1.382      1.078      1.772
  3=South         1.627      1.274      2.077
  4=West          1.410      1.078      1.844
MARRY_3
  1=Married       1.000      1.000      1.000
  2=Widowed       1.130      0.838      1.525
  3=Unmarried     2.225      1.939      2.553
Age               0.988      0.980      0.997
Sex, Age
  1=Male, 1       1.000      1.000      1.000
  2=Female, 1     0.988      0.979      0.997
-----
Data Source: NCHS National Health Interview Survey (2006)

```

Exhibit 10 contains the default odds ratios (RISK group on PRINT statement) corresponding to all regression coefficients. The default odds ratio for AGE is 0.988, which indicates a little more than a 1% reduction in odds of not being able to afford prescription medications for each 1-unit (1-year) increase in AGE, among males (reference cell of SEX).

Exhibit 11. User-Specified Odds Ratios from Interaction Model (EXPCNTRST Group)

Variance Estimation Method: Taylor Series (WR)
 SE Method: Robust (Binder, 1983)
 Working Correlations: Independent
 Link Function: Logit
 Response variable CANTAFMEDS: Can't Afford Meds Past 12m
 For Subpopulation: WHITES AGED 25+

Modelling Can't Afford Rx Meds Interaction Model (with UNITS Option)

by: Contrast.

Contrast	Units	EXP(Contrast)	Lower 95% Limit	Upper 95% Limit
AGE: Males	10	0.890	0.818	0.967
AGE: Females	10	0.789	0.745	0.837
AGE: SEX=reflevel	10	0.890	0.818	0.967

Data Source: NCHS National Health Interview Survey (2006)

Exhibit 11 contains the user-specified odds ratios (EXPCNTRST group on PRINT statement) from the EFFECTS statement. The odds ratio for a 10-unit increase in AGE is 0.890 for Males (11% reduction in odds of not being able to afford prescription medication for every 10-year increase in AGE) and 0.789 for Females (21% reduction in odds for every 10-year increase in AGE). From this we see that the AGE effect for females is much larger than the AGE effect for males.