STA2201s06: Multiple Regression with SENIC Data

```
/* 2201senicreg.sas */
title2 'Multiple regression with proc reg';
%include '2201senicdef.sas';
options pagesize=500;

/* Labels can get in the way. Create a new SAS data set without labels */
data without;
     set better;
     label id       = ' '  stay     = ' '  age      = ' '  infrisk = ' '
           culratio = ' '  xratio   = ' '  nbeds    = ' '  medschl = ' '
           region   = ' '  census   = ' '  nurses   = ' '  service = ' ';

proc reg;
     title3 'DV is infrisk, no monitoring in model';
     model infrisk = stay age nbeds census nurses mschool r1-r3;
          size1:  test nbeds=census=nurses=0;
          region: test r1=r2=r3=0;

proc reg;
     title3 'DV is infrisk, with monitoring in model';
     model infrisk = stay age nbeds census nurses mschool r1-r3
                     xratio culratio;
     size:    test nbeds=census=nurses=0;
     monitor: test xratio=culratio=0;
     region:  test r1=r2=r3=0;

proc reg;
     title3 'No monitoring in model, drop age';
     model infrisk = stay nbeds census nurses mschool r1-r3;
     size:    test nbeds=census=nurses=0;
     region:  test r1=r2=r3=0;
```

```
                              SENIC data                               1
                                      14:52 Sunday, February 19, 2006
                  DV is infrisk, no monitoring in model

                         The REG Procedure
                          Model: MODEL1
                     Dependent Variable: infrisk

                         Analysis of Variance
```

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	9	80.19637	8.91071	7.57	<.0001
Error	103	121.18346	1.17654		
Corrected Total	112	201.37982			

Root MSE	1.08468	R-Square	0.3982	
Dependent Mean	4.35487	Adj R-Sq	0.3457	
Coeff Var	24.90738			

```
                      Parameter Estimates

                   Parameter       Standard
     Variable    DF    Estimate         Error    t Value    Pr > |t|

     Intercept    1     1.35842       1.33291       1.02      0.3105
     stay         1     0.39886       0.07539       5.29     <.0001
     age          1    -0.02694       0.02451      -1.10      0.2745
     nbeds        1  -0.00020157       0.00307      -0.07      0.9478
     census       1    -0.00180       0.00397      -0.45      0.6517
     nurses       1     0.00446       0.00193       2.31      0.0227
     mschool      1    -0.32845       0.37608      -0.87      0.3845
     r1           1     0.23543       0.30510       0.77      0.4421
     r2           1     0.24506       0.27502       0.89      0.3750
     r3           1     0.87291       0.34244       2.55      0.0123
```

SENIC data   2
                          14:52 Sunday, February 19, 2006
        DV is infrisk, no monitoring in model

                The REG Procedure
                  Model: MODEL1

    Test size1 Results for Dependent Variable infrisk

                              Mean
     Source   DF   Square   F Value   Pr > F

     Numerator   3   3.66951   3.12   0.0293
     Denominator   103   1.17654

                        SENIC data   3
                          14:52 Sunday, February 19, 2006
        DV is infrisk, no monitoring in model

                The REG Procedure
                  Model: MODEL1

    Test region Results for Dependent Variable infrisk

                              Mean
     Source   DF   Square   F Value   Pr > F

     Numerator   3   2.55152   2.17   0.0962
     Denominator   103   1.17654

                         The REG Procedure
                          Model: MODEL1
                    Dependent Variable: infrisk

                       Analysis of Variance

                                Sum of   Mean
Source   DF   Squares   Square   F Value   Pr > F

Model   11   116.13916   10.55811   12.51   <.0001
Error   101   85.24066   0.84397
Corrected Total   112   201.37982

            Root MSE   0.91868   R-Square   0.5767
            Dependent Mean   4.35487   Adj R-Sq   0.5306
            Coeff Var   21.09540

                         Parameter Estimates

                       Parameter   Standard
       Variable   DF   Estimate   Error   t Value   Pr > |t|

       Intercept   1   -1.03455   1.19153   -0.87   0.3873
       stay   1   0.21534   0.07055   3.05   0.0029
       age   1   0.01757   0.02195   0.80   0.4252
       nbeds   1   -0.00199   0.00262   -0.76   0.4491
       census   1   0.00330   0.00345   0.96   0.3417
       nurses   1   0.00214   0.00167   1.28   0.2027
       mschool   1   -0.61974   0.32270   -1.92   0.0576
       r1   1   -0.03273   0.26175   -0.13   0.9007
       r2   1   0.20712   0.23409   0.88   0.3784
       r3   1   0.86947   0.29080   2.99   0.0035
       xratio   1   0.01109   0.00528   2.10   0.0381
       culratio   1   0.05667   0.01068   5.31   <.0001

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                         The REG Procedure
                          Model: MODEL1

          Test size Results for Dependent Variable infrisk

                                     Mean
            Source   DF   Square   F Value   Pr > F

            Numerator   3   3.52619   4.18   0.0078
            Denominator   101   0.84397

_____

         DV is infrisk, with monitoring in model

                         The REG Procedure
                          Model: MODEL1

        Test monitor Results for Dependent Variable infrisk

                                 Mean
          Source   DF   Square   F Value   Pr > F

          Numerator   2   17.97140   21.29   <.0001
          Denominator   101   0.84397

_____

         DV is infrisk, with monitoring in model

                         The REG Procedure
                          Model: MODEL1

        Test region Results for Dependent Variable infrisk

                                 Mean
          Source   DF   Square   F Value   Pr > F

          Numerator   3   2.80395   3.32   0.0228
          Denominator   101   0.84397

_____

              No monitoring in model, drop age

                         The REG Procedure
                          Model: MODEL1
                    Dependent Variable: infrisk

                        Analysis of Variance

                          Sum of   Mean
Source   DF   Squares   Square   F Value   Pr > F

Model   8   78.77606   9.84701   8.35   <.0001
Error   104 122.60376   1.17888
Corrected Total   112 201.37982

        Root MSE   1.08576   R-Square   0.3912
        Dependent Mean   4.35487   Adj R-Sq   0.3443
        Coeff Var   24.93218

```
                    Parameter Estimates

                   Parameter        Standard
   Variable    DF    Estimate          Error     t Value    Pr > |t|

   Intercept    1      0.08371        0.65689        0.13      0.8988
   stay         1      0.37893        0.07324        5.17      <.0001
   nbeds        1   -0.00042755       0.00306       -0.14      0.8893
   census       1     -0.00151        0.00397       -0.38      0.7050
   nurses       1      0.00453        0.00193        2.35      0.0208
   mschool      1     -0.27798        0.37363       -0.74      0.4586
   r1           1      0.24444        0.30530        0.80      0.4251
   r2           1      0.29569        0.27140        1.09      0.2785
   r3           1      0.86102        0.34261        2.51      0.0135
```

              No monitoring in model, drop age

                     The REG Procedure
                       Model: MODEL1

     Test size Results for Dependent Variable infrisk

```
                           Mean
      Source             DF      Square      F Value     Pr > F

      Numerator           3     3.81248        3.23      0.0253
      Denominator       104     1.17888
```

              No monitoring in model, drop age

                     The REG Procedure
                       Model: MODEL1

     Test region Results for Dependent Variable infrisk

```
                           Mean
      Source             DF      Square      F Value     Pr > F

      Numerator           3     2.49257        2.11      0.1029
      Denominator       104     1.17888
```