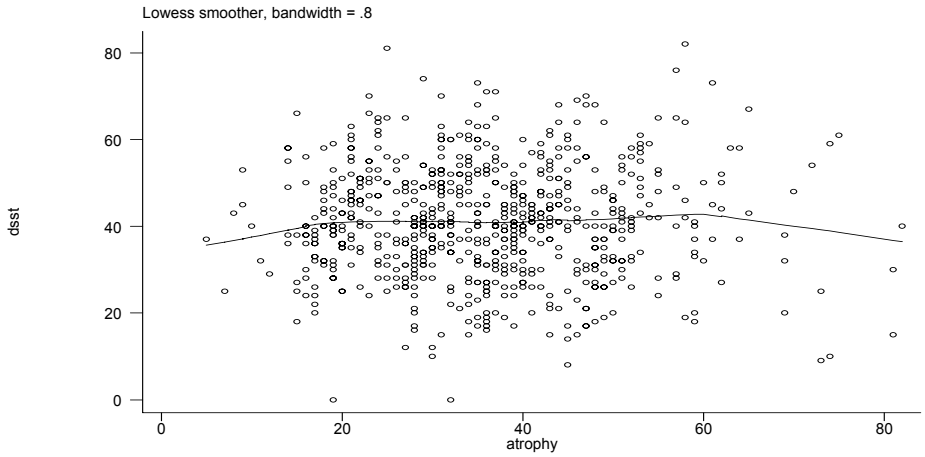
Appendix A:

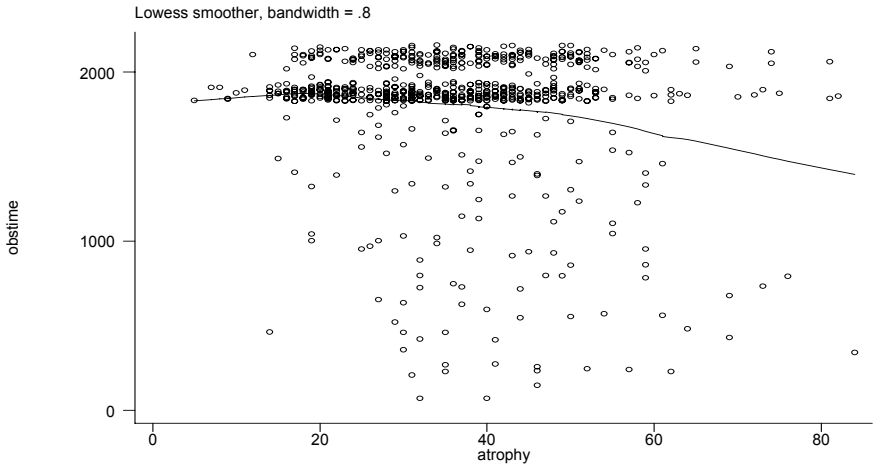
Descriptive statistics from a large cohort study involving 735 subjects aged 65 and older. Data available at study entry included demographic data, as well as selected measures of known risk factors for cardiovascular and cerebrovascular disease. Each subject also had an MRI exam of their brain which was measured for the evidence of cerebral atrophy (shrinking of the brain) on a scale from 0 (none) to 100 (severe atrophy). All subjects were followed at least 5 years for survival.

Variable	Obs	Mean	Std. Dev.	Min	Median	Max
mridate	735	76422.93	31896.42	10192	80992	123191
age	735	74.57	5.45	65	74	99
male	735	0.50	0.50	0	0	1
race	735	1.32	0.67	1	1	4
diabetes	735	0.11	0.31	0	0	1
genhlth	735	2.59	0.94	1	3	5
dsst	723	41.06	12.71	0	40	82
atrophy	735	35.98	12.92	5	35	84
obstime	735	1804.08	392.28	68	1879	2159
death	735	0.18	0.39	0	0	1

Scatterplot of DSST cognitive function test versus atrophy.



Scatterplot of observation time versus atrophy.



Appendix B

Correlation analysis

```
. corr atrophy dsst
(obs=723)

             |  atrophy     dsst
-------------+------------------
     atrophy |   1.0000
        dsst |   0.0065   1.0000
```

Linear regression of DSST (response) on atrophy (predictor)

```
. regress dsst atrophy

      Source |       SS       df       MS              Number of obs =     723
-------------+------------------------------           F(  1,   721) =    0.03
       Model |   4.9429913     1   4.9429913           Prob > F      =  0.8612
    Residual |  116563.732   721  161.669531           R-squared     =  0.0000
-------------+------------------------------           Adj R-squared = -0.0013
       Total |  116568.675   722  161.452458           Root MSE      =  12.715

------------------------------------------------------------------------------
        dsst |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     atrophy |   .0064855   .0370902     0.17   0.861    -.0663323    .0793032
       _cons |   40.82452   1.409547    28.96   0.000     38.05722    43.59183
------------------------------------------------------------------------------
```

Appendix C

Linear regression of observation time on atrophy

```
. regress obstime atrophy

      Source |       SS       df       MS              Number of obs =     735
-------------+------------------------------           F(  1,   733) =   17.74
       Model |  2668386.67     1  2668386.67           Prob > F      =  0.0000
    Residual |   110281512   733  150452.268           R-squared     =  0.0236
-------------+------------------------------           Adj R-squared =  0.0223
       Total |   112949899   734  153882.696           Root MSE      =  387.88

------------------------------------------------------------------------------
     obstime |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     atrophy |   -4.66568   1.107873    -4.21   0.000    -6.840662   -2.490698
       _cons |   1971.963   42.35495    46.56   0.000     1888.812    2055.115
------------------------------------------------------------------------------
```

Linear regression of atrophy on indicator of death in 5 years

```
. g DeadIn5 = 1
. replace DeadIn5= 0 if death==0 & obstime > 1826
(602 real changes made)
. regress atrophy DeadIn5

      Source |       SS       df       MS              Number of obs =     735
-------------+------------------------------           F(  1,   733) =   23.96
       Model |  3880.56505     1  3880.56505           Prob > F      =  0.0000
    Residual |  118699.239   733  161.936206           R-squared     =  0.0317
-------------+------------------------------           Adj R-squared =  0.0303
       Total |  122579.804   734  167.002458           Root MSE      =  12.725

------------------------------------------------------------------------------
     atrophy |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     DeadIn5 |   5.968526   1.219247     4.90   0.000     3.574894    8.362158
       _cons |   34.90365   .5186492    67.30   0.000     33.88544    35.92187
------------------------------------------------------------------------------
```

Linear regression of atrophy on indicator of death in 5 years with robust standard errors

```
. regress atrophy DeadIn5, robust

Regression with robust standard errors                Number of obs =     735
                                                      F(  1,   733) =   21.35
                                                      Prob > F      =  0.0000
                                                      R-squared     =  0.0317
                                                      Root MSE      =  12.725

------------------------------------------------------------------------------
             |               Robust
     atrophy |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     DeadIn5 |   5.968526   1.291698     4.62   0.000     3.432658    8.504394
       _cons |   34.90365   .5095702    68.50   0.000     33.90326    35.90405
------------------------------------------------------------------------------
```

Logistic regression of indicator of death in 5 years on atrophy

```
. logit DeadIn5 atrophy

Logit estimates                                   Number of obs   =        735
                                                  LR chi2(1)      =      22.55
                                                  Prob > chi2     =     0.0000
Log likelihood = -336.25623                       Pseudo R2       =     0.0324

------------------------------------------------------------------------------
     DeadIn5 |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     atrophy |   .0345403    .007331     4.71   0.000     .0201718    .0489088
       _cons |  -2.814668   .3051717    -9.22   0.000    -3.412794   -2.216542
------------------------------------------------------------------------------
```

Logistic regression of indicator of death in 5 years on atrophy with robust standard errors

```
. logit DeadIn5 atrophy, robust

Logit estimates                                   Number of obs   =        735
                                                  Wald chi2(1)    =      22.84
                                                  Prob > chi2     =     0.0000
Log likelihood = -336.25623                       Pseudo R2       =     0.0324

------------------------------------------------------------------------------
             |               Robust
     DeadIn5 |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     atrophy |   .0345403   .0072266     4.78   0.000     .0203765    .0487041
       _cons |  -2.814668   .3007298    -9.36   0.000    -3.404087   -2.225248
------------------------------------------------------------------------------
```

Proportional hazards regression of time to death on atrophy

```
. cox obstime atrophy, dead(death)

Cox regression -- Breslow method for ties
Entry time 0                                      Number of obs   =        735
                                                  LR chi2(1)      =      22.34
                                                  Prob > chi2     =     0.0000
Log likelihood = -844.04581                       Pseudo R2       =     0.0131

------------------------------------------------------------------------------
     obstime |
       death |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     atrophy |   .0304115   .0062138     4.89   0.000     .0182328    .0425903
------------------------------------------------------------------------------
```