



**APPENDIX AVAILABLE ON REQUEST**

**Special Report**

**Reanalysis of the Harvard Six Cities Study and the American Cancer  
Society Study of Particulate Air Pollution and Mortality**

**Part I: Replication and Validation**

**Appendix E. Computer Programs and Output Used in the Replication  
of the Original Analyses of the Harvard Six Cities Study**

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Jack Siemiatycki, Michal Abrahamowicz, Warren H. White, and Others**

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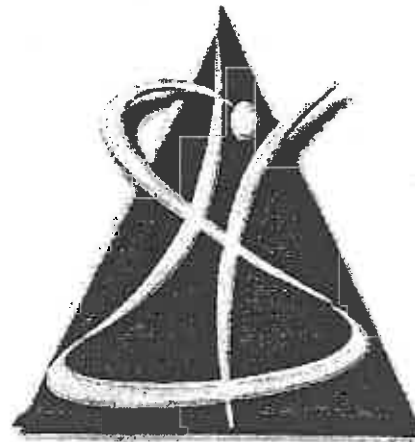




**UNIVERSITY OF OTTAWA**

**Faculty of Medicine**

**Faculty of Health Sciences**



**Re-analysis of the Harvard Six-Cities Study  
and the American Cancer Society Study  
of Air Pollution and Mortality,  
Phase I: Validation and Replication**

**Appendix E: Computer Programs and Output Used in the Replication  
of the Original Analysis of the Harvard Six Cities Study**

**R. Samuel McLaughlin Center for  
Population Health Risk Assessment  
Institute of Population Health  
University of Ottawa**

**July, 2000**



# Table of Contents

**Program 1** was used to replicate the results from Table 1 in Dockery et al. (1993). It was used for a validation analysis of the data summarized from the questionnaires as well as the air pollution readings in the six cities.

**Output 1a** (Original Data)

**Output 1b** Modified Data (Adjusted for Early Censoring)

**Program 2** was used to validate the adjusted mortality rate ratios estimated from Cox Proportional Hazard Models (Cox 1972). It examined a number of variables, such as the sex, smoking status, education and body-mass index of the participants. It also determined the mortality rate ratios based on residential status.

**Output 2a** (Original Data)

**Output 2b** Modified Data (Adjusted for Early Censoring)

**Program 3** was used to reanalyze the data found in Table 3. This examined Adjusted mortality risk ratios for the most polluted and least polluted cities according to smoking status, sex and occupational exposure. In this data set, the indicator of pollution used was concentration of fine particles.

**Output 3a** (Original Data)

**Output 3b** Modified Data (Adjusted for Early Censoring)

**Program 4** was used to validate the data presented in Table 4. It re-estimated the mortality rate ratios for the most polluted city compared with the least polluted city utilizing a variety of different models.

**Output 4a** (Original Data)

**Output 4b** Modified Data (Adjusted for Early Censoring)

**Programs 5 and 5Co** were used to validate the data presented in Table 5. Program 5 was used to replicate the data in Table 5, while Program 5Co was used to print out the covariance matrix generated from Program 5.

**Output 5a** (Original Data)

**Output 5b** Modified Data (Adjusted for Early Censoring)



# **Program #1**

```

/*****
*
* Repeat the results in
* Six-Cities Study paper
* (1993) -- Table One
*
*****/

libname six '/home/yuanli/sixcity/';
libname fmo '/home/fmo/';

options nocenter ps=64 ls=80 obs=max;

proc format;
    value city 1 = 'Watertown'
              2 = 'Kin/Harriman'
              4 = 'St. Louis'
              5 = 'Steubenville'
              6 = 'Portage'
              9 = 'Topeka'
              ;
    value dead 0 = 'Alive'
              1 = 'Dead'
              ;
    value sex 0 = 'Male'
              1 = 'Female'
              ;

data temp1;
    set fmo.mort6c;

proc sort;by city;
proc means n mean sum;
    class city;
    var timeon;
    by city;
    format city city.;
run;

proc freq;
    table dead*city sex1*city/nopercent norow;
    table smokest*city currcigl*city fsmoke*city/nopercent norow;
    table occu*city edd*city/nopercent norow;
    format city city. sex1 sex.;
run;

proc sort;by city;

```



```

proc means n mean;
  class city;
  var age_1 bmi;
  by city;
  format city city.;
run;

data temp2;
  set fmo.mort6c;

if cpack > 0 ;

proc sort;by city;
proc means n mean;
  class city;
  var cpack ;
  format city city.;

data temp3;
  set fmo.mort6c;

if fpack > 0 ;

proc sort;by city;
proc means n mean;
  class city;
  var fpack ;
  format city city.;
run;

data temp4;
  set fmo.mort6c;

n_pm15=pm15*28.3;
n_pm2_5=pm2_5*18.6;
n_tsp=tsp*55.8;
n_so2=so2*22.4;
n_so4=so4*8;
n_h=h*25.8;
n_no2=no2*15.8;

proc sort;by city;
proc means n mean;
  class city;
  var n_tsp n_pm15 n_pm2_5 n_so4 n_h n_so2 so2 n_no2 o3 ;
  by city;
  format city city.;
run;

```

```

label n_tsp = 'Total particles'
      n_pm15 = 'Inhalable particles'
      n_pm2_5 = 'Fine particles'
      n_so4 = 'Sulfate particles'
      n_so2 = 'Sulfate dioxide (ppb)'
      n_no2 = 'Nitrogen dioxide (ppb)'
      o3 = 'Ozone (ppb)'
      n_h = 'Aerosol acidety (nmol/m**3)';

proc sort;by city;
proc means n mean;
  class city;
  var n_tsp n_pm15 n_pm2_5 n_so4 n_h n_so2 so2 n_no2 o3 ;
  by city;
  format city city.;
  title1 'Table1: Characteristics of the Study Population and';
  title2 '          Mean Air-Pollution Levels in Six Cities';

run;

```

```

/*****
*
* Repeat the results in
* Six-Cities Study paper
* (1993) -- Table One
* Using New Censoring D.
*
*****/
libname six '/home/yuanli/sixcity/';

options nocenter ps=64 ls=80 obs=max;

proc format;
    value city 1 = 'Watertown'
              2 = 'Kin/Harriman'
              4 = 'St. Louis'
              5 = 'Steubenville'
              6 = 'Portage'
              9 = 'Topeka'
              ;
    value dead 0 = 'Alive'
              1 = 'Dead'
              ;
    value sex 0 = 'Male'
             1 = 'Female'
             ;

data temp1;
    set six.sc_newm;

proc sort;by city;
proc means n mean sum;
    class city;
    var timeon1 timeon2;
    by city;
    format city city.;
run;

proc freq;
    table dead1*city dead2*city sex1*city/nopercent norow;
    table smokest*city curr cig1*city fsmoke*city/nopercent norow;
    table occu*city edd*city/nopercent norow;
    format city city. sex1 sex.;
run;

proc sort;by city;
proc means n mean;

```

```
class city;
var age_1 bmi;
by city;
format city city.;
run;
```

```
data temp2;
set six.sc_newm;
```

```
if cpack > 0 ;
```

```
proc sort;by city;
proc means n mean;
class city;
var cpack ;
format city city.;
```

```
data temp3;
set six.sc_newm;
```

```
if fpack > 0 ;
```

```
proc sort;by city;
proc means n mean;
class city;
var fpack ;
format city city.;
```

```
data temp4;
set six.sc_newm;
```

```
n_pm15=pm15*28.3;
n_pm2_5=pm2_5*18.6;
n_tsp=tsp*55.8;
n_so2=so2*22.4;
n_so4=so4*8;
n_h=h*25.8;
n_no2=no2*15.8;
```

```
proc sort;by city;
proc means n mean;
class city;
var n_tsp n_pm15 n_pm2_5 n_so4 n_h n_so2 so2 n_no2 o3 ;
by city;
format city city.;
```

```
label n_tsp = 'Total particles'
n_pm15 = 'Inhalable particles'
```

X 6

```

n_pm2_5 = 'Fine particles'
n_so4 = 'Sulfate particles'
n_so2 = 'Sulfate dioxide (ppb)'
n_no2 = 'Nitrogen dioxide (ppb)'
o3 = 'Ozone (ppb)'
n_h = 'Aerosol acidity (nmol/m**3)';

proc sort;by city;
proc means n mean;
class city;
var n_tsp n_pm15 n_pm2_5 n_so4 n_h n_so2 so2 n_no2 o3 ;
by city;
format city city.;
title1 'SixCity Table1_a: Characteristics of the Study
Population and';
title2 '
Mean Air-Pollution Levels in Six
Cities';
run;

```

**Output #1a:**  
**Original Data**

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Table1: Characteristics of the Study Population and Mean Air-Pollution Levels in Six Cities

Analysis Variable : TIMEON Time on study (years)

CITY=Watertown

CITY	N Obs	N	Mean	Sum
Watertown	1336	1336	14.8816041	19881.82

CITY=Kin/Harriman

CITY	N Obs	N	Mean	Sum
Kin/Harriman	1258	1258	14.1774399	17835.22

CITY=St. Louis

CITY	N Obs	N	Mean	Sum
St. Louis	1296	1296	13.6688373	17714.81

CITY=Steubenville

CITY	N Obs	N	Mean	Sum
Steubenville	1351	1351	13.2599727	17914.22

CITY=Portage

CITY	N Obs	N	Mean	Sum
Portage	1631	1631	13.2546600	21618.35

CITY=Topeka

CITY	N Obs	N	Mean	Sum
Topeka	1239	1239	13.0034342	16111.25

Table1: Characteristics of the Study Population and Mean Air-Pollution Levels in Six Cities

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TABLE OF DEAD BY CITY

DEAD(Dead (1=yes)) CITY

Frequency Col Pct	Watertow n	Kin/Harr iman	St. Loui s	Steubenv ille	Portage	Topeka	Total
alive	1088 81.44	1036 82.35	1015 78.32	1060 78.46	1399 85.78	1083 87.41	6681
dead	248 18.56	222 17.65	281 21.68	291 21.54	232 14.22	156 12.59	1430
Total	1336	1258	1296	1351	1631	1239	8111

TABLE OF SEX1 BY CITY

SEX1(Gender (1=female)) CITY

Frequency Col Pct	Watertow n	Kin/Harr iman	St. Loui s	Steubenv ille	Portage	Topeka	Total
Male	586 43.86	582 46.26	578 44.60	600 44.41	779 47.76	546 44.07	3671
Female	750 56.14	676 53.74	718 55.40	751 55.59	852 52.24	693 55.93	4440
Total	1336	1258	1296	1351	1631	1239	8111

TABLE OF CURRCIG1 BY CITY

CURRCIG1(Current smoker (1=yes)) CITY

Frequency Col Pct	Watertow n	Kin/Harr iman	St. Loui s	Steubenv ille	Portage	Topeka	Total
0	807 60.40	793 63.04	848 65.48	878 64.99	1047 64.19	836 67.47	5209
1	529 39.60	465 36.96	447 34.52	473 35.01	584 35.81	403 32.53	2901
Total	1336	1258	1295	1351	1631	1239	8110

Frequency Missing = 1

Table1: Characteristics of the Study Population and Mean Air-Pollution Levels in Six Cities

TABLE OF FSMOKE BY CITY

FSMOKE(Former smoker (1=yes)) CITY

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Frequency Col Pct	Watertown	Kin/Harriman	St. Louis	Steubenville	Portage	Topeka	Total
0	997 74.63	993 78.93	983 75.85	1041 77.05	1234 75.66	926 74.74	6174
1	339 25.37	265 21.07	313 24.15	310 22.95	397 24.34	313 25.26	1937
Total	1336	1258	1296	1351	1631	1239	8111

TABLE OF OCCU BY CITY

OCCU(Occupation exposure (1=yes))

CITY

Frequency Col Pct	Watertown	Kin/Harriman	St. Louis	Steubenville	Portage	Topeka	Total
0	828 61.98	635 50.48	776 59.88	697 51.59	759 46.54	771 62.23	4466
1	508 38.02	623 49.52	520 40.12	654 48.41	872 53.46	468 37.77	3645
Total	1336	1258	1296	1351	1631	1239	8111

TABLE OF EDD BY CITY

EDD(< HS (1=yes))

CITY

Frequency Col Pct	Watertown	Kin/Harriman	St. Louis	Steubenville	Portage	Topeka	Total
0	1042 77.99	822 65.34	718 55.40	952 70.47	1217 74.62	1095 88.38	5846
1	294 22.01	436 34.66	578 44.60	399 29.53	414 25.38	144 11.62	2265
Total	1336	1258	1296	1351	1631	1239	8111

Table1: Characteristics of the Study Population and Mean Air-Pollution Levels in Six Cities

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CITY=Watertown

CITY	N Obs	Variable	Label	N	Mean
Watertown	1336	AGE_1	Age (years)	1336	48.4876561
		BMI	Body Mass Index (kg/m**2)	1332	25.5361352

CITY=Kin/Harriman

CITY	N Obs	Variable	Label	N	Mean
Kin/Harriman	1258	AGE_1	Age (years)	1258	49.4435808
		BMI	Body Mass Index (kg/m**2)	1258	25.1427296

CITY=St. Louis

CITY	N Obs	Variable	Label	N	Mean
St. Louis	1296	AGE_1	Age (years)	1296	51.8131443
		BMI	Body Mass Index (kg/m**2)	1293	26.0485182

CITY=Steubenville

CITY	N Obs	Variable	Label	N	Mean
Steubenville	1351	AGE_1	Age (years)	1351	51.6365184
		BMI	Body Mass Index (kg/m**2)	1346	26.3614125

CITY=Portage

CITY	N Obs	Variable	Label	N	Mean
Portage	1631	AGE_1	Age (years)	1631	48.4281723
		BMI	Body Mass Index (kg/m**2)	1630	26.2606438

CITY=Topeka

CITY	N Obs	Variable	Label	N	Mean
Topeka	1239	AGE_1	Age (years)	1239	48.2560808
		BMI	Body Mass Index (kg/m**2)	1238	25.2933196

Table1: Characteristics of the Study Population and Mean Air-Pollution Levels in Six Cities

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Analysis Variable : CPACK Current(curr cig1=1) smoker packyrs

CITY	N Obs	N	Mean
Watertown	529	529	25.1839051
Kin/Harriman	465	465	24.5302614
St. Louis	447	447	30.9176097
Steubenville	473	473	27.9821807
Portage	584	584	23.9826931

Topeka 403 403 25.6175115

Table1: Characteristics of the Study Population and Mean Air-Pollution Levels in Six Cities

Analysis Variable : FPACK Former smoker(fsmoke=1) packyrs

CITY	N Obs	N	Mean
Watertown	339	339	20.9536453
Kin/Harriman	265	265	21.0506738
St. Louis	313	313	22.0360565
Steubenville	310	310	25.0082950
Portage	397	397	18.0025190
Topeka	313	313	19.6905520

Table1: Characteristics of the Study Population and Mean Air-Pollution Levels in Six Cities

CITY=Watertown

CITY	N Obs	Variable	Label	N	Mean
Watertown	1336	N_TSP	Total particles	1336	49.2000000
		N_PM15	Inhalable particles	1336	24.2000000
		N_PM2_5	Fine particles	1336	14.9000000
		N_SO4	Sulfate particles	1336	6.5000000
		N_H	Aerosol acidity (nmol/m**3)	1336	20.3000000
		N_SO2	Sulfate dioxide (ppb)	1336	9.3000000
		SO2	SO2 (ppb)/22.4 (range)	1336	0.4151786
		N_NO2	Nitrogen dioxide (ppb)	1336	18.1000000
		O3	Ozone (ppb)	1336	19.7000000

CITY=Kin/Harriman

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CITY	N Obs	Variable	Label	N	Mean
Kin/Harriman	1258	N_TSP	Total particles	1258	49.4000000
		N_PM15	Inhalable particles	1258	32.5000000
		N_PM2_5	Fine particles	1258	20.8000000
		N_SO4	Sulfate particles	1258	8.1000000
		N_H	Aerosol acidity (nmol/m**3)	1258	36.1000000
		N_SO2	Sulfate dioxide (ppb)	1258	4.8000000
		SO2	SO2 (ppb)/22.4 (range)	1258	0.2142857
		N_NO2	Nitrogen dioxide (ppb)	1258	14.1000000
		O3	Ozone (ppb)	1258	20.7000000

CITY=St. Louis

CITY	N Obs	Variable	Label	N	Mean
St. Louis	1296	N_TSP	Total particles	1296	72.5000000

N_PM15	Inhalable particles	1296	31.4000000
N_PM2_5	Fine particles	1296	19.0000000
N_SO4	Sulfate particles	1296	8.1000000
N_H	Aerosol acidity (nmol/m**3)	1296	10.3000000
N_SO2	Sulfate dioxide (ppb)	1296	14.1000000
SO2	SO2 (ppb)/22.4 (range)	1296	0.6294643
N_NO2	Nitrogen dioxide (ppb)	1296	19.7000000
O3	Ozone (ppb)	1296	20.9000000

Table1: Characteristics of the Study Population and Mean Air-Pollution Levels in Six Cities

CITY=Steubenville

CITY	N Obs	Variable	Label	N	Mean
Steubenville	1351	N_TSP	Total particles	1351	89.9000000
		N_PM15	Inhalable particles	1351	46.5000000
		N_PM2_5	Fine particles	1351	29.6000000
		N_SO4	Sulfate particles	1351	12.8000000
		N_H	Aerosol acidity (nmol/m**3)	1351	25.2000000
		N_SO2	Sulfate dioxide (ppb)	1351	24.0000000
		SO2	SO2 (ppb)/22.4 (range)	1351	1.0714286
		N_NO2	Nitrogen dioxide (ppb)	1351	21.9000000
		O3	Ozone (ppb)	1351	22.3000000

CITY=Portage

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CITY	N Obs	Variable	Label	N	Mean
Portage	1631	N_TSP	Total particles	1631	34.1000000
		N_PM15	Inhalable particles	1631	18.2000000
		N_PM2_5	Fine particles	1631	11.0000000
		N_SO4	Sulfate particles	1631	5.3000000
		N_H	Aerosol acidity (nmol/m**3)	1631	10.5000000
		N_SO2	Sulfate dioxide (ppb)	1631	4.2000000
		SO2	SO2 (ppb)/22.4 (range)	1631	0.1875000
		N_NO2	Nitrogen dioxide (ppb)	1631	6.1000000
		O3	Ozone (ppb)	1631	28.0000000

CITY=Topeka

CITY	N Obs	Variable	Label	N	Mean
Topeka	1239	N_TSP	Total particles	1239	56.6000000
		N_PM15	Inhalable particles	1239	26.4000000
		N_PM2_5	Fine particles	1239	12.5000000
		N_SO4	Sulfate particles	1239	4.8000000
		N_H	Aerosol acidity (nmol/m**3)	1239	11.6000000
		N_SO2	Sulfate dioxide (ppb)	1239	1.6000000
		SO2	SO2 (ppb)/22.4 (range)	1239	0.0714286
		N_NO2	Nitrogen dioxide (ppb)	1239	10.6000000
		O3	Ozone (ppb)	1239	27.6000000

**Output 1b:**  
**Modified Data**  
**(Adjusted for Early Censoring)**

SixCity Table1\_a: Characteristics of the Study Population and Mean Air-Pollution Levels in Six Cities

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CITY=Watertown

CITY	N Obs	Variable	N	Mean	Sum
Watertown	1336	TIMEON1	1336	14.1563485	18912.88
		TIMEON2	1336	14.4772201	19341.57

CITY=Kin/Harriman

CITY	N Obs	Variable	N	Mean	Sum
Kin/Harriman	1258	TIMEON1	1258	13.5812046	17085.16
		TIMEON2	1258	13.8768446	17457.07

CITY=St. Louis

CITY	N Obs	Variable	N	Mean	Sum
St. Louis	1296	TIMEON1	1296	13.2446701	17165.09
		TIMEON2	1296	13.5695849	17586.18

CITY=Steubenville

CITY	N Obs	Variable	N	Mean	Sum
Steubenville	1351	TIMEON1	1351	12.8738871	17392.62
		TIMEON2	1351	13.1685820	17790.75

CITY=Portage

CITY	N Obs	Variable	N	Mean	Sum
Portage	1631	TIMEON1	1631	13.0802374	21333.87
		TIMEON2	1631	13.4630850	21958.29

CITY=Topeka

CITY	N Obs	Variable	N	Mean	Sum
Topeka	1239	TIMEON1	1239	12.8901794	15970.93
		TIMEON2	1239	13.2904315	16466.84

SixCity Table1\_a: Characteristics of the Study Population and Mean Air-Pollution Levels in Six Cities

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TABLE OF DEAD1 BY CITY

DEAD1 CITY

Frequency|

Col Pct	Watertown	Kin/Harriman	St. Louis	Steubenville	Portage	Topeka	Total
0	1089 81.51	1034 82.19	1015 78.32	1054 78.02	1396 85.59	1079 87.09	6667
1	247 18.49	224 17.81	281 21.68	297 21.98	235 14.41	160 12.91	1444
Total	1336	1258	1296	1351	1631	1239	8111

TABLE OF DEAD2 BY CITY

DEAD2 CITY

Frequency	Col Pct	Watertown	Kin/Harriman	St. Louis	Steubenville	Portage	Topeka	Total
0		1084 81.14	1031 81.96	1007 77.70	1051 77.79	1391 85.29	1072 86.52	6636
1		252 18.86	227 18.04	289 22.30	300 22.21	240 14.71	167 13.48	1475
Total		1336	1258	1296	1351	1631	1239	8111

TABLE OF SEX1 BY CITY

SEX1(Gender (1=female)) CITY

Frequency	Col Pct	Watertown	Kin/Harriman	St. Louis	Steubenville	Portage	Topeka	Total
Male		586 43.86	582 46.26	578 44.60	600 44.41	779 47.76	546 44.07	3671
Female		750 56.14	676 53.74	718 55.40	751 55.59	852 52.24	693 55.93	4440
Total		1336	1258	1296	1351	1631	1239	8111

SixCity Table\_a: Characteristics of the Study Population and Mean Air-Pollution Levels in Six Cities

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TABLE OF SMOKEST BY CITY

SMOKEST(Smoking status (ns,cs,fs)) CITY

Frequency	Col Pct	Watertown	Kin/Harriman	St. Louis	Steubenville	Portage	Topeka	Total
cs		529 39.60	465 36.96	447 34.49	473 35.01	584 35.81	403 32.53	2901

	339	265	313	310	397	313	1937
fs	25.37	21.07	24.15	22.95	24.34	25.26	
ns	468	528	536	568	650	523	3273
	35.03	41.97	41.36	42.04	39.85	42.21	
Total	1336	1258	1296	1351	1631	1239	8111

TABLE OF CURRCIG1 BY CITY

CURRCIG1(Current smoker (1=yes)) CITY

Frequency	Watertow	Kin/Harr	St. Loui	Steubenv	Portage	Topeka	Total
Col Pct	n	iman	s	ille			
0	807	793	848	878	1047	836	5209
	60.40	63.04	65.48	64.99	64.19	67.47	
1	529	465	447	473	584	403	2901
	39.60	36.96	34.52	35.01	35.81	32.53	
Total	1336	1258	1295	1351	1631	1239	8110

Frequency Missing = 1

SixCity Table1\_a: Characteristics of the Study Population and Mean Air-Pollution Levels in Six Cities

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TABLE OF FSMOKE BY CITY

FSMOKE(Former smoker (1=yes)) CITY

Frequency	Watertow	Kin/Harr	St. Loui	Steubenv	Portage	Topeka	Total
Col Pct	n	iman	s	ille			
0	997	993	983	1041	1234	926	6174
	74.63	78.93	75.85	77.05	75.66	74.74	
1	339	265	313	310	397	313	1937
	25.37	21.07	24.15	22.95	24.34	25.26	
Total	1336	1258	1296	1351	1631	1239	8111

TABLE OF OCCU BY CITY

OCCU(Occupation exposure (1=yes)) CITY

Frequency	Watertow	Kin/Harr	St. Loui	Steubenv	Portage	Topeka	Total
Col Pct	n	iman	s	ille			
0	828	635	776	697	759	771	4466
	61.98	50.48	59.88	51.59	46.54	62.23	
1	508	623	520	654	872	468	3645
	38.02	49.52	40.12	48.41	53.46	37.77	



Total	1336	1258	1296	1351	1631	1239	8111
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TABLE OF EDD BY CITY

EDD(< HS (1=yes)) CITY

Frequency Col Pct	Watertown	Kin/Harriman	St. Louis	Steubenville	Portage	Topeka	Total
0	1042 77.99	822 65.34	718 55.40	952 70.47	1217 74.62	1095 88.38	5846
1	294 22.01	436 34.66	578 44.60	399 29.53	414 25.38	144 11.62	2265
Total	1336	1258	1296	1351	1631	1239	8111

SixCity Table1\_a: Characteristics of the Study Population and Mean Air-Pollution Levels in Six Cities

42

CITY=Watertown

CITY	N Obs	Variable	Label	N	Mean
Watertown	1336	AGE_1	Age (years)	1336	48.4876561
		BMI	Body Mass Index (kg/m**2)	1332	25.5361352

CITY=Kin/Harriman

CITY	N Obs	Variable	Label	N	Mean
Kin/Harriman	1258	AGE_1	Age (years)	1258	49.4435808
		BMI	Body Mass Index (kg/m**2)	1258	25.1427296

CITY=St. Louis

CITY	N Obs	Variable	Label	N	Mean
St. Louis	1296	AGE_1	Age (years)	1296	51.8131443
		BMI	Body Mass Index (kg/m**2)	1293	26.0485182

CITY=Steubenville

CITY	N Obs	Variable	Label	N	Mean
Steubenville	1351	AGE_1	Age (years)	1351	51.6365184
		BMI	Body Mass Index (kg/m**2)	1346	26.3614125

CITY=Portage

CITY	N Obs	Variable	Label	N	Mean
Portage	1631	AGE_1	Age (years)	1631	48.4281723
		BMI	Body Mass Index (kg/m**2)	1630	26.2606438

CITY=Topeka

CITY	N Obs	Variable	Label	N	Mean
Topeka	1239	AGE_1	Age (years)	1239	48.2560808
		BMI	Body Mass Index (kg/m**2)	1238	25.2933196

SixCity Table1\_a: Characteristics of the Study Population and Mean Air-Pollution Levels in Six Cities

43

Analysis Variable : CPACK Current(currcig=1) smoker packyrs

CITY	N Obs	N	Mean
Watertown	529	529	25.1839051
Kin/Harriman	465	465	24.5302614
St. Louis	447	447	30.9176097
Steubenville	473	473	27.9821807
Portage	584	584	23.9826931
Topeka	403	403	25.6175115

SixCity Table1\_a: Characteristics of the Study Population and Mean Air-Pollution Levels in Six Cities

44

Analysis Variable : FPACK Former smoker(fsmoke=1) packyrs

CITY	N Obs	N	Mean
Watertown	339	339	20.9536453
Kin/Harriman	265	265	21.0506738
St. Louis	313	313	22.0360565
Steubenville	310	310	25.0082950
Portage	397	397	18.0025190
Topeka	313	313	19.6905520

SixCity Table1\_a: Characteristics of the Study Population and Mean Air-Pollution Levels in Six Cities

45

CITY=Watertown

CITY	N Obs	Variable	Label	N	Mean
------	-------	----------	-------	---	------

CITY	N	Obs	Variable	Label	N	Mean
Watertown	1336		N_TSP	Total particles	1336	49.2000000
			N_PM15	Inhalable particles	1336	24.2000000
			N_PM2_5	Fine particles	1336	14.9000000
			N_SO4	Sulfate particles	1336	6.5000000
			N_H	Aerosol acidity (nmol/m**3)	1336	20.3000000
			N_SO2	Sulfate dioxide (ppb)	1336	9.3000000
			SO2	SO2 (ppb)/22.4 (range)	1336	0.4151786
			N_NO2	Nitrogen dioxide (ppb)	1336	18.1000000
	O3	Ozone (ppb)	1336	19.7000000		

CITY=Kin/Harriman

CITY	N	Obs	Variable	Label	N	Mean
Kin/Harriman	1258		N_TSP	Total particles	1258	49.4000000
			N_PM15	Inhalable particles	1258	32.5000000
			N_PM2_5	Fine particles	1258	20.8000000
			N_SO4	Sulfate particles	1258	8.1000000
			N_H	Aerosol acidity (nmol/m**3)	1258	36.1000000
			N_SO2	Sulfate dioxide (ppb)	1258	4.8000000
			SO2	SO2 (ppb)/22.4 (range)	1258	0.2142857
			N_NO2	Nitrogen dioxide (ppb)	1258	14.1000000
	O3	Ozone (ppb)	1258	20.7000000		

CITY=St. Louis

CITY	N	Obs	Variable	Label	N	Mean
St. Louis	1296		N_TSP	Total particles	1296	72.5000000
			N_PM15	Inhalable particles	1296	31.4000000
			N_PM2_5	Fine particles	1296	19.0000000
			N_SO4	Sulfate particles	1296	8.1000000
			N_H	Aerosol acidity (nmol/m**3)	1296	10.3000000
			N_SO2	Sulfate dioxide (ppb)	1296	14.1000000
			SO2	SO2 (ppb)/22.4 (range)	1296	0.6294643
			N_NO2	Nitrogen dioxide (ppb)	1296	19.7000000
	O3	Ozone (ppb)	1296	20.9000000		

SixCity Table1\_a: Characteristics of the Study Population and Mean Air-Pollution Levels in Six Cities

46

CITY=Steubenville

CITY	N	Obs	Variable	Label	N	Mean
Steubenville	1351		N_TSP	Total particles	1351	89.9000000
			N_PM15	Inhalable particles	1351	46.5000000
			N_PM2_5	Fine particles	1351	29.6000000
			N_SO4	Sulfate particles	1351	12.8000000
			N_H	Aerosol acidity (nmol/m**3)	1351	25.2000000
			N_SO2	Sulfate dioxide (ppb)	1351	24.0000000
			SO2	SO2 (ppb)/22.4 (range)	1351	1.0714286
			N_NO2	Nitrogen dioxide (ppb)	1351	21.9000000
	O3	Ozone (ppb)	1351	22.3000000		

CITY=Portage

CITY	N	Obs	Variable	Label	N	Mean
------	---	-----	----------	-------	---	------

CITY	N	Obs	Variable	Label	N	Mean
Portage	1631		N_TSP	Total particles	1631	34.1000000
			N_PM15	Inhalable particles	1631	18.2000000
			N_PM2_5	Fine particles	1631	11.0000000
			N_SO4	Sulfate particles	1631	5.3000000
			N_H	Aerosol acidity (nmol/m**3)	1631	10.5000000
			N_SO2	Sulfate dioxide (ppb)	1631	4.2000000
			SO2	SO2 (ppb)/22.4 (range)	1631	0.1875000
			N_NO2	Nitrogen dioxide (ppb)	1631	6.1000000
			O3	Ozone (ppb)	1631	28.0000000

CITY=Topeka

CITY	N	Obs	Variable	Label	N	Mean
Topeka	1239		N_TSP	Total particles	1239	56.6000000
			N_PM15	Inhalable particles	1239	26.4000000
			N_PM2_5	Fine particles	1239	12.5000000
			N_SO4	Sulfate particles	1239	4.8000000
			N_H	Aerosol acidity (nmol/m**3)	1239	11.6000000
			N_SO2	Sulfate dioxide (ppb)	1239	1.6000000
			SO2	SO2 (ppb)/22.4 (range)	1239	0.0714286
			N_NO2	Nitrogen dioxide (ppb)	1239	10.6000000
			O3	Ozone (ppb)	1239	27.6000000

SixCity Table1\_a: Characteristics of the Study Population and Mean Air-Pollution Levels in Six Cities

47

CITY=Watertown

CITY	N	Obs	Variable	Label	N	Mean
Watertown	1336		N_TSP		1336	49.2000000
			N_PM15		1336	24.2000000
			N_PM2_5		1336	14.9000000
			N_SO4		1336	6.5000000
			N_H		1336	20.3000000
			N_SO2		1336	9.3000000
			SO2	SO2 (ppb)/22.4 (range)	1336	0.4151786
			N_NO2		1336	18.1000000
			O3	Daily Mean Ozone (ppb)	1336	19.7000000

CITY=Kin/Harriman

CITY	N	Obs	Variable	Label	N	Mean
Kin/Harriman	1258		N_TSP		1258	49.4000000
			N_PM15		1258	32.5000000
			N_PM2_5		1258	20.8000000
			N_SO4		1258	8.1000000
			N_H		1258	36.1000000
			N_SO2		1258	4.8000000
			SO2	SO2 (ppb)/22.4 (range)	1258	0.2142857
			N_NO2		1258	14.1000000
			O3	Daily Mean Ozone (ppb)	1258	20.7000000

CITY=St. Louis

CITY	N	Obs	Variable	Label	N	Mean
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St. Louis	1296	N_TSP		1296	72.5000000
		N_PM15		1296	31.4000000
		N_PM2_5		1296	19.0000000
		N_SO4		1296	8.1000000
		N_H		1296	10.3000000
		N_SO2		1296	14.1000000
		SO2	SO2 (ppb)/22.4 (range)	1296	0.6294643
		N_NO2		1296	19.7000000
		O3	Daily Mean Ozone (ppb)	1296	20.9000000

SixCity Table1\_a: Characteristics of the Study Population and Mean Air-Pollution Levels in Six Cities

48

CITY=Steubenville

CITY	N Obs	Variable	Label	N	Mean
Steubenville	1351	N_TSP		1351	89.9000000
		N_PM15		1351	46.5000000
		N_PM2_5		1351	29.6000000
		N_SO4		1351	12.8000000
		N_H		1351	25.2000000
		N_SO2		1351	24.0000000
		SO2	SO2 (ppb)/22.4 (range)	1351	1.0714286
		N_NO2		1351	21.9000000
		O3	Daily Mean Ozone (ppb)	1351	22.3000000

CITY=Portage

CITY	N Obs	Variable	Label	N	Mean
Portage	1631	N_TSP		1631	34.1000000
		N_PM15		1631	18.2000000
		N_PM2_5		1631	11.0000000
		N_SO4		1631	5.3000000
		N_H		1631	10.5000000
		N_SO2		1631	4.2000000
		SO2	SO2 (ppb)/22.4 (range)	1631	0.1875000
		N_NO2		1631	6.1000000
		O3	Daily Mean Ozone (ppb)	1631	28.0000000

CITY=Topeka

CITY	N Obs	Variable	Label	N	Mean
Topeka	1239	N_TSP		1239	56.6000000
		N_PM15		1239	26.4000000
		N_PM2_5		1239	12.5000000
		N_SO4		1239	4.8000000
		N_H		1239	11.6000000
		N_SO2		1239	1.6000000
		SO2	SO2 (ppb)/22.4 (range)	1239	0.0714286
		N_NO2		1239	10.6000000
		O3	Daily Mean Ozone (ppb)	1239	27.6000000

## **Program #2**

```

/*****
*
* Repeat the results in
* Six-Cities Study paper
* (1993) -- Table Two
*
*****/

libname six '/home/yuanli/sixcity/';
libname fmo '/home/fmo/';

options nocenter ps=64 ls=80 obs=max;

proc format;

    value sex 0 = 'Male'
              1 = 'Female'
              ;

data temp;
    set fmo.mort6c;

n_bmi = bmi/4.52;
n_cpack = cpack/25;
n_fpack = fpack/20;

proc phreg data=temp;
    model timeon*dead(0) = currcigl n_cpack fsmoke n_fpack edd
n_bmi top kin wat stl ste / rl;
    strata age_1 (25 to 75 by 5) sex1;
    format sex1 sex.;
label n_bmi = 'bmi/4.52'
      n_cpack = '25 Pack-years of smoking'
      n_fpack = '20 Pack-years of smoking';
run;

proc sort;by sex1;
proc phreg data=temp;
    model timeon*dead(0) = currcigl n_cpack fsmoke n_fpack edd
n_bmi top kin wat stl ste / rl;
    strata age_1 (25 to 75 by 5);
    by sex1;
    format sex1 sex.;
label n_bmi = 'bmi/4.52'
      n_cpack = '25 Pack-years of smoking'
      n_fpack = '20 Pack-years of smoking';
title1 'Table2: Adjusted Mortality-Rate Ratios Estimated from';
title2 'Cox Proportional-Hazards Models';

```

run;



```

/*****
*
*   Repeat the results in
*   Six-Cities Study paper
*   (1993) -- Table Two
*   Using New Censoring D.
*
*****/
libname six '/home/yuanli/sixcity/';
libname fmo '/home/fmo/';

options nocenter ps=64 ls=80 obs=max;

proc format;
    value sex 0 = 'Male'
              1 = 'Female'
            ;

data temp;
    set six.sc_newm;

n_bmi = bmi/4.52;
n_cpack = cpack/25;
n_fpack = fpack/20;

proc phreg;
    model timeon1*dead1(0) = currcigl n_cpack fsmoke n_fpack edd
n_bmi top kin wat stl ste / rl;
    strata age_1 (25 to 75 by 5) sex1;
    format sex1 sex.;
label n_bmi = 'bmi/4.52'
      n_cpack = '25 Pack-years of smoking'
      n_fpack = '20 Pack-years of smoking';
    title 'SixCity -- Table2: New Censoring Cutoff Date on 30th of
June, 1991';
run;

proc phreg;
    model timeon2*dead2(0) = currcigl n_cpack fsmoke n_fpack edd
n_bmi top kin wat stl ste / rl;
    strata age_1 (25 to 75 by 5) sex1;
    format sex1 sex.;
label n_bmi = 'bmi/4.52'
      n_cpack = '25 Pack-years of smoking'
      n_fpack = '20 Pack-years of smoking';
    title 'SixCity -- Table2: New Censoring Cutoff Date on 29th of
Feb., 1992';
run;

```

```

proc sort;by sex1;
proc phreg;
  model timeon1*dead1(0) = currcigl n_cpack fsmoke n_fpack edd
n_bmi top kin wat stl ste / rl;
  strata age_1 (25 to 75 by 5);
  by sex1;
  format sex1 sex.;
label n_bmi = 'bmi/4.52'
      n_cpack = '25 Pack-years of smoking'
      n_fpack = '20 Pack-years of smoking';
  title1 'SixCity -- Table2: New Censoring Cutoff Date on 30th of
June, 1991';
  title2 '          by Sex';
run;

```

```

proc phreg;
  model timeon2*dead2(0) = currcigl n_cpack fsmoke n_fpack edd
n_bmi top kin wat stl ste / rl;
  strata age_1 (25 to 75 by 5);
  by sex1;
  format sex1 sex.;
label n_bmi = 'bmi/4.52'
      n_cpack = '25 Pack-years of smoking'
      n_fpack = '20 Pack-years of smoking';
  title1 'SixCity -- Table2: New Censoring Cutoff Date on 29th of
Feb., 1992';
  title2 '          by Sex';
run;

```

**Output #2a:**  
**Original Data**

Table2: Adjusted Mortality-Rate Ratios Estimated from  
Cox Proportional-Hazards Models

The PHREG Procedure

Data Set: WORK.TEMP  
 Dependent Variable: TIMEON Time on study (years)  
 Censoring Variable: DEAD Dead (1=yes)  
 Censoring Value(s): 0  
 Ties Handling: BRESLOW

Summary of the Number of Event and Censored Values

Stratum	AGE_1	SEX1	Total	Event	Censored	Percent Censored
1	27.5	Female	447	3	444	99.33
2	27.5	Male	367	8	359	97.82
3	32.5	Female	387	4	383	98.97
4	32.5	Male	353	9	344	97.45
5	37.5	Female	360	10	350	97.22
6	37.5	Male	304	14	290	95.39
7	42.5	Female	374	14	360	96.26
8	42.5	Male	324	25	299	92.28
9	47.5	Female	573	39	534	93.19
10	47.5	Male	461	62	399	86.55
11	52.5	Female	612	59	553	90.36
12	52.5	Male	490	79	411	83.88
13	57.5	Female	511	89	422	82.58
14	57.5	Male	423	125	298	70.45
15	62.5	Female	493	120	373	75.66
16	62.5	Male	395	173	222	56.20
17	67.5	Female	403	139	264	65.51
18	67.5	Male	330	186	144	43.64
19	72.5	Female	268	122	146	54.48
20	72.5	Male	221	149	72	32.58
Total			8096	1429	6667	82.35

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	16203.335	15992.967	210.368 with 11 DF (p=0.0001)
Wald	.	.	231.016 with 11 DF (p=0.0001)
			223.078 with 11 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.462410	0.09763	22.43227	0.0001
N_CPACK	1	0.233193	0.04533	26.46586	0.0001
FSMOKE	1	0.183746	0.08803	4.35732	0.0369
N_FPACK	1	0.144387	0.03176	20.66694	0.0001
EDD	1	0.170538	0.05677	9.02468	0.0027
N_BMI	1	0.076902	0.02828	7.39622	0.0065
TOP	1	0.010320	0.10498	0.00966	0.9217
KIN	1	0.156332	0.09496	2.71049	0.0997

Table2: Adjusted Mortality-Rate Ratios Estimated from  
Cox Proportional-Hazards Models

The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
WAT	1	0.067629	0.09323	0.52623	0.4682
STL	1	0.131928	0.09012	2.14316	0.1432
STE	1	0.228775	0.08878	6.64045	0.0100

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.588	1.311	1.923	Current smoker (1=yes)
N_CPACK	1.263	1.155	1.380	25 Pack-years of smoking
FSMOKE	1.202	1.011	1.428	Former smoker (1=yes)
N_FPACK	1.155	1.086	1.230	20 Pack-years of smoking
EDD	1.186	1.061	1.326	< HS (1=yes)
N_BMI	1.080	1.022	1.141	bmi/4.52
TOP	1.010	0.822	1.241	Topeka
KIN	1.169	0.971	1.408	Kingston-Harriman
WAT	1.070	0.891	1.284	Watertown
STL	1.141	0.956	1.361	St. Louis
STE	1.257	1.056	1.496	Steubenville

Table2: Adjusted Mortality-Rate Ratios Estimated from  
Cox Proportional-Hazards Models

Gender (1=female)=Male

The PHREG Procedure

Data Set: WORK.TEMP

Dependent Variable: TIMEON Time on study (years)

Censoring Variable: DEAD Dead (1=yes)

Censoring Value(s): 0

Ties Handling: BRESLOW

Summary of the Number of Event and Censored Values

Stratum	AGE_1	Total	Event	Censored	Percent Censored
1	27.5	367	8	359	97.82
2	32.5	353	9	344	97.45
3	37.5	304	14	290	95.39
4	42.5	324	25	299	92.28
5	47.5	461	62	399	86.55
6	52.5	490	79	411	83.88

7	57.5	423	125	298	70.45
8	62.5	395	173	222	56.20
9	67.5	330	186	144	43.64
10	72.5	221	149	72	32.58
-----					
Total		3668	830	2838	77.37

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	9206.818	9042.995	163.823 with 11 DF (p=0.0001)
Wald			178.873 with 11 DF (p=0.0001)
			169.479 with 11 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.558351	0.14357	15.12482	0.0001
N_CPACK	1	0.230590	0.05569	17.14311	0.0001
FSMOKE	1	0.159356	0.11974	1.77117	0.1832
N_FPACK	1	0.158866	0.03458	21.10081	0.0001
EDD	1	0.198810	0.07414	7.19065	0.0073
N_BMI	1	0.033246	0.04176	0.63394	0.4259
TOP	1	0.034540	0.13746	0.06313	0.8016
KIN	1	0.194039	0.12072	2.58341	0.1080
WAT	1	-0.065433	0.12564	0.27121	0.6025
STL	1	0.136770	0.11656	1.37688	0.2406
STE	1	0.258111	0.11462	5.07134	0.0243

Table2: Adjusted Mortality-Rate Ratios Estimated from Cox Proportional-Hazards Models

Gender (1=female)=Male

The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and 95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.748	1.319	2.316	Current smoker (1=yes)
N_CPACK	1.259	1.129	1.405	25 Pack-years of smoking
FSMOKE	1.173	0.927	1.483	Former smoker (1=yes)
N_FPACK	1.172	1.095	1.254	20 Pack-years of smoking
EDD	1.220	1.055	1.411	< HS (1=yes)
N_BMI	1.034	0.953	1.122	bmi/4.52
TOP	1.035	0.791	1.355	Topeka
KIN	1.214	0.958	1.538	Kingston-Harriman
WAT	0.937	0.732	1.198	Watertown
STL	1.147	0.912	1.441	St. Louis
STE	1.294	1.034	1.621	Steubenville

Table2: Adjusted Mortality-Rate Ratios Estimated from Cox Proportional-Hazards Models

Gender (1=female)=Female

The PHREG Procedure

Data Set: WORK.TEMP

Dependent Variable: TIMEON Time on study (years)

Censoring Variable: DEAD Dead (1=yes)

Censoring Value(s): 0

Ties Handling: BRESLOW

Summary of the Number of Event and Censored Values

Stratum	AGE_1	Total	Event	Censored	Percent Censored
1	27.5	447	3	444	99.33
2	32.5	387	4	383	98.97
3	37.5	360	10	350	97.22
4	42.5	374	14	360	96.26
5	47.5	573	39	534	93.19
6	52.5	612	59	553	90.36
7	57.5	511	89	422	82.58
8	62.5	493	120	373	75.66
9	67.5	403	139	264	65.51
10	72.5	268	122	146	54.48
-----					
Total		4428	599	3829	86.47

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	6996.517	6935.747	60.769 with 11 DF (p=0.0001)
Wald	.	.	65.316 with 11 DF (p=0.0001)
			63.951 with 11 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.428539	0.14377	8.88445	0.0029
N_CPACK	1	0.168072	0.08956	3.52178	0.0606
FSMOKE	1	0.294008	0.13990	4.41680	0.0356
N_FPACK	1	0.134309	0.08455	2.52330	0.1122
EDD	1	0.123856	0.08922	1.92700	0.1651
N_BMI	1	0.108598	0.03868	7.88209	0.0050
TOP	1	-0.026731	0.16299	0.02690	0.8697
KIN	1	0.067606	0.15439	0.19174	0.6615
WAT	1	0.199444	0.14151	1.98643	0.1587
STL	1	0.123343	0.14304	0.74353	0.3885
STE	1	0.202814	0.14067	2.07861	0.1494

Table2: Adjusted Mortality-Rate Ratios Estimated from Cox Proportional-Hazards Models

Gender (1=female)=Female

The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.535	1.158	2.035	Current smoker (1=yes)
N_CPACK	1.183	0.993	1.410	25 Pack-years of smoking
FSMOKE	1.342	1.020	1.765	Former smoker (1=yes)
N_FPACK	1.144	0.969	1.350	20 Pack-years of smoking
EDD	1.132	0.950	1.348	< HS (1=yes)
N_BMI	1.115	1.033	1.203	bmi/4.52
TOP	0.974	0.707	1.340	Topeka
KIN	1.070	0.791	1.448	Kingston-Harriman
WAT	1.221	0.925	1.611	Watertown
STL	1.131	0.855	1.497	St. Louis
STE	1.225	0.930	1.614	Steubenville



**Output 2b:**  
**Modified Data**  
**(Adjusted for Early Censoring)**

## The PHREG Procedure

Data Set: WORK.TEMP  
 Dependent Variable: TIMEON1  
 Censoring Variable: DEAD1  
 Censoring Value(s): 0  
 Ties Handling: BRESLOW

## Summary of the Number of Event and Censored Values

Stratum	AGE_1	SEX1	Total	Event	Censored	Percent Censored
1	27.5	Female	447	2	445	99.55
2	27.5	Male	367	6	361	98.37
3	32.5	Female	387	4	383	98.97
4	32.5	Male	353	9	344	97.45
5	37.5	Female	360	10	350	97.22
6	37.5	Male	304	14	290	95.39
7	42.5	Female	374	14	360	96.26
8	42.5	Male	324	27	297	91.67
9	47.5	Female	573	40	533	93.02
10	47.5	Male	461	62	399	86.55
11	52.5	Female	612	59	553	90.36
12	52.5	Male	490	79	411	83.88
13	57.5	Female	511	92	419	82.00
14	57.5	Male	423	128	295	69.74
15	62.5	Female	493	121	372	75.46
16	62.5	Male	395	175	220	55.70
17	67.5	Female	403	140	263	65.26
18	67.5	Male	330	188	142	43.03
19	72.5	Female	268	123	145	54.10
20	72.5	Male	221	150	71	32.13
Total			8096	1443	6653	82.18

## Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	16245.703	16010.175	235.528 with 11 DF (p=0.0001)
Wald			257.939 with 11 DF (p=0.0001)
			248.502 with 11 DF (p=0.0001)

## Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.510583	0.09692	27.75345	0.0001
N_CPACK	1	0.229216	0.04491	26.05057	0.0001
FSMOKE	1	0.200673	0.08779	5.22474	0.0223
N_FPACK	1	0.139262	0.03181	19.17073	0.0001
EDD	1	0.214822	0.05654	14.43797	0.0001
N_BMI	1	0.088336	0.02827	9.76577	0.0018
TOP	1	0.033551	0.10399	0.10411	0.7470
KIN	1	0.199759	0.09456	4.46279	0.0346

SixCity -- Table2: New Censoring Cutoff Date on 30th of June, 1991

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## The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
WAT	1	0.109816	0.09268	1.40396	0.2361
STL	1	0.139323	0.08983	2.40571	0.1209
STE	1	0.267169	0.08812	9.19319	0.0024

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.666	1.378	2.015	Current smoker (1=yes)
N_CPACK	1.258	1.152	1.373	25 Pack-years of smoking
FSMOKE	1.222	1.029	1.452	Former smoker (1=yes)
N_FPACK	1.149	1.080	1.223	20 Pack-years of smoking
EDD	1.240	1.110	1.385	< HS (1=yes)
N_BMI	1.092	1.033	1.155	bmi/4.52
TOP	1.034	0.843	1.268	Topeka
KIN	1.221	1.015	1.470	Kingston-Harriman
WAT	1.116	0.931	1.338	Watertown
STL	1.149	0.964	1.371	St. Louis
STE	1.306	1.099	1.553	Steubenville

SixCity -- Table2: New Censoring Cutoff Date on 29th of Feb., 1992

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The PHREG Procedure

Data Set: WORK.TEMP  
 Dependent Variable: TIMEON2  
 Censoring Variable: DEAD2  
 Censoring Value(s): 0  
 Ties Handling: BRESLOW

Summary of the Number of Event and Censored Values

Stratum	AGE_1	SEX1	Total	Event	Censored	Percent Censored
1	27.5	Female	447	2	445	99.55
2	27.5	Male	367	6	361	98.37
3	32.5	Female	387	4	383	98.97
4	32.5	Male	353	9	344	97.45
5	37.5	Female	360	10	350	97.22
6	37.5	Male	304	15	289	95.07
7	42.5	Female	374	16	358	95.72
8	42.5	Male	324	27	297	91.67
9	47.5	Female	573	42	531	92.67
10	47.5	Male	461	63	398	86.33
11	52.5	Female	612	61	551	90.03
12	52.5	Male	490	82	408	83.27
13	57.5	Female	511	93	418	81.80
14	57.5	Male	423	130	293	69.27
15	62.5	Female	493	126	367	74.44
16	62.5	Male	395	178	217	54.94
17	67.5	Female	403	142	261	64.76
18	67.5	Male	330	193	137	41.52
19	72.5	Female	268	124	144	53.73
20	72.5	Male	221	151	70	31.67
Total			8096	1474	6622	81.79

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	16588.435	16341.490	246.945 with 11 DF (p=0.0001)
Wald	.	.	269.761 with 11 DF (p=0.0001)
			260.102 with 11 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.519037	0.09607	29.18972	0.0001
N_CPACK	1	0.229294	0.04454	26.50627	0.0001
FSMOKE	1	0.207760	0.08663	5.75167	0.0165
N_FPACK	1	0.146821	0.03104	22.36764	0.0001
EDD	1	0.212133	0.05599	14.35360	0.0002
N_BMI	1	0.096369	0.02785	11.97329	0.0005
TOP	1	0.041391	0.10220	0.16401	0.6855
KIN	1	0.221764	0.09352	5.62302	0.0177

SixCity -- Table2: New Censoring Cutoff Date on 29th of Feb., 1992

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The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
WAT	1	0.127517	0.09167	1.93493	0.1642
STL	1	0.167490	0.08864	3.57019	0.0588
STE	1	0.279617	0.08731	10.25753	0.0014

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and 95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.680	1.392	2.029	Current smoker (1=yes)
N_CPACK	1.258	1.153	1.372	25 Pack-years of smoking
FSMOKE	1.231	1.039	1.459	Former smoker (1=yes)
N_FPACK	1.158	1.090	1.231	20 Pack-years of smoking
EDD	1.236	1.108	1.380	< HS (1=yes)
N_BMI	1.101	1.043	1.163	bmi/4.52
TOP	1.042	0.853	1.273	Topeka
KIN	1.248	1.039	1.499	Kingston-Harriman
WAT	1.136	0.949	1.360	Watertown
STL	1.182	0.994	1.407	St. Louis
STE	1.323	1.115	1.569	Steubenville

SixCity -- Table2: New Censoring Cutoff Date on 30th of June, 1991 by Sex

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Gender (1=female)=Male

The PHREG Procedure

Data Set: WORK.TEMP  
 Dependent Variable: TIMEON1  
 Censoring Variable: DEAD1  
 Censoring Value(s): 0

Ties Handling: BRESLOW

Summary of the Number of Event and Censored Values

Stratum	AGE_1	Total	Event	Censored	Percent Censored
1	27.5	367	6	361	98.37
2	32.5	353	9	344	97.45
3	37.5	304	14	290	95.39
4	42.5	324	27	297	91.67
5	47.5	461	62	399	86.55
6	52.5	490	79	411	83.88
7	57.5	423	128	295	69.74
8	62.5	395	175	220	55.70
9	67.5	330	188	142	43.03
10	72.5	221	150	71	32.13
-----					
Total		3668	838	2830	77.15

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	9237.412	9063.618	173.794 with 11 DF (p=0.0001)
Wald	.	.	190.100 with 11 DF (p=0.0001)
			179.531 with 11 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.583254	0.14253	16.74660	0.0001
N_CPACK	1	0.231226	0.05535	17.45337	0.0001
FSMOKE	1	0.165172	0.11950	1.91038	0.1669
N_FPACK	1	0.154063	0.03473	19.67483	0.0001
EDD	1	0.230813	0.07400	9.72966	0.0018
N_BMI	1	0.033073	0.04168	0.62956	0.4275
TOP	1	0.096968	0.13558	0.51156	0.4745
KIN	1	0.236897	0.12022	3.88320	0.0488
WAT	1	-0.019342	0.12512	0.02390	0.8771
STL	1	0.149754	0.11623	1.66003	0.1976
STE	1	0.284559	0.11430	6.19819	0.0128

SixCity -- Table2: New Censoring Cutoff Date on 30th of June, 1991  
by Sex

54

Gender (1=female)=Male

The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.792	1.355	2.369	Current smoker (1=yes)
N_CPACK	1.260	1.131	1.405	25 Pack-years of smoking
FSMOKE	1.180	0.933	1.491	Former smoker (1=yes)
N_FPACK	1.167	1.090	1.249	20 Pack-years of smoking

EDD	1.260	1.090	1.456	< HS (1=yes)
N_BMI	1.034	0.953	1.122	bmi/4.52
TOP	1.102	0.845	1.437	Topeka
KIN	1.267	1.001	1.604	Kingston-Harriman
WAT	0.981	0.768	1.253	Watertown
STL	1.162	0.925	1.459	St. Louis
STE	1.329	1.062	1.663	Steubenville

SixCity -- Table2: New Censoring Cutoff Date on 30th of June, 1991  
by Sex

55

Gender (1=female)=Female

The PHREG Procedure

Data Set: WORK.TEMP  
Dependent Variable: TIMEON1  
Censoring Variable: DEAD1  
Censoring Value(s): 0  
Ties Handling: BRESLOW

Summary of the Number of Event and Censored Values

Stratum	AGE_1	Total	Event	Censored	Percent Censored
1	27.5	447	2	445	99.55
2	32.5	387	4	383	98.97
3	37.5	360	10	350	97.22
4	42.5	374	14	360	96.26
5	47.5	573	40	533	93.02
6	52.5	612	59	553	90.36
7	57.5	511	92	419	82.00
8	62.5	493	121	372	75.46
9	67.5	403	140	263	65.26
10	72.5	268	123	145	54.10
-----					
Total		4428	605	3823	86.34

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	7008.291	6931.228	77.064 with 11 DF (p=0.0001)
Wald			82.522 with 11 DF (p=0.0001)
			80.680 with 11 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.498307	0.14185	12.34001	0.0004
N_CPACK	1	0.160074	0.08729	3.36275	0.0667
FSMOKE	1	0.306685	0.13919	4.85467	0.0276
N_FPACK	1	0.148941	0.08469	3.09273	0.0786
EDD	1	0.187854	0.08845	4.51098	0.0337
N_BMI	1	0.129602	0.03866	11.23882	0.0008
TOP	1	-0.059019	0.16221	0.13238	0.7160
KIN	1	0.104342	0.15383	0.46010	0.4976
WAT	1	0.228603	0.14034	2.65358	0.1033
STL	1	0.113862	0.14244	0.63903	0.4241
STE	1	0.255331	0.13864	3.39193	0.0655

Gender (1=female)=Female

The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.646	1.246	2.173	Current smoker (1=yes)
N_CPACK	1.174	0.989	1.393	25 Pack-years of smoking
FSMOKE	1.359	1.034	1.785	Former smoker (1=yes)
N_FPACK	1.161	0.983	1.370	20 Pack-years of smoking
EDD	1.207	1.015	1.435	< HS (1=yes)
N_BMI	1.138	1.055	1.228	bmi/4.52
TOP	0.943	0.686	1.296	Topeka
KIN	1.110	0.821	1.501	Kingston-Harriman
WAT	1.257	0.955	1.655	Watertown
STL	1.121	0.848	1.481	St. Louis
STE	1.291	0.984	1.694	Steubenville

SixCity -- Table2: New Censoring Cutoff Date on 29th of Feb., 1992  
by Sex

Gender (1=female)=Male

The PHREG Procedure

Data Set: WORK.TEMP  
Dependent Variable: TIMEON2  
Censoring Variable: DEAD2  
Censoring Value(s): 0  
Ties Handling: BRESLOW

Summary of the Number of Event and Censored Values

Stratum	AGE_1	Total	Event	Censored	Percent Censored
1	27.5	367	6	361	98.37
2	32.5	353	9	344	97.45
3	37.5	304	15	289	95.07
4	42.5	324	27	297	91.67
5	47.5	461	63	398	86.33
6	52.5	490	82	408	83.27
7	57.5	423	130	293	69.27
8	62.5	395	178	217	54.94
9	67.5	330	193	137	41.52
10	72.5	221	151	70	31.67
Total		3668	854	2814	76.72

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	9416.707	9237.065	179.642 with 11 DF (p=0.0001)
Wald			195.574 with 11 DF (p=0.0001)
			184.734 with 11 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.605205	0.14195	18.17748	0.0001
N_CPACK	1	0.227136	0.05515	16.95935	0.0001
FSMOKE	1	0.184961	0.11832	2.44361	0.1180
N_FPACK	1	0.158859	0.03400	21.82513	0.0001
EDD	1	0.233729	0.07335	10.15367	0.0014
N_BMI	1	0.038778	0.04122	0.88524	0.3468
TOP	1	0.104147	0.13284	0.61463	0.4330
KIN	1	0.253545	0.11907	4.53411	0.0332
WAT	1	0.008355	0.12364	0.00457	0.9461
STL	1	0.171495	0.11486	2.22916	0.1354
STE	1	0.295606	0.11334	6.80198	0.0091

SixCity -- Table2: New Censoring Cutoff Date on 29th of Feb., 1992  
by Sex  
Gender (1=female)=Male

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The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.832	1.387	2.419	Current smoker (1=yes)
N_CPACK	1.255	1.126	1.398	25 Pack-years of smoking
FSMOKE	1.203	0.954	1.517	Former smoker (1=yes)
N_FPACK	1.172	1.097	1.253	20 Pack-years of smoking
EDD	1.263	1.094	1.459	< HS (1=yes)
N_BMI	1.040	0.959	1.127	bmi/4.52
TOP	1.110	0.855	1.440	Topeka
KIN	1.289	1.020	1.627	Kingston-Harriman
WAT	1.008	0.791	1.285	Watertown
STL	1.187	0.948	1.487	St. Louis
STE	1.344	1.076	1.678	Steubenville

SixCity -- Table2: New Censoring Cutoff Date on 29th of Feb., 1992  
by Sex  
Gender (1=female)=Female

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The PHREG Procedure

Data Set: WORK.TEMP  
Dependent Variable: TIMEON2  
Censoring Variable: DEAD2  
Censoring Value(s): 0  
Ties Handling: BRESLOW

Summary of the Number of Event and Censored Values

Stratum	AGE_1	Total	Event	Censored	Percent Censored
1	27.5	447	2	445	99.55
2	32.5	387	4	383	98.97
3	37.5	360	10	350	97.22
4	42.5	374	16	358	95.72
5	47.5	573	42	531	92.67
6	52.5	612	61	551	90.03
7	57.5	511	93	418	81.80



8	62.5	493	126	367	74.44
9	67.5	403	142	261	64.76
10	72.5	268	124	144	53.73
-----					
Total		4428	620	3808	86.00

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	7171.727	7089.521	82.206 with 11 DF (p=0.0001)
Wald			88.488 with 11 DF (p=0.0001)
			86.485 with 11 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.496797	0.13996	12.59864	0.0004
N_CPACK	1	0.167591	0.08559	3.83366	0.0502
FSMOKE	1	0.293607	0.13771	4.54573	0.0330
N_FPACK	1	0.166837	0.08226	4.11376	0.0425
EDD	1	0.175248	0.08750	4.01106	0.0452
N_BMI	1	0.139894	0.03795	13.58595	0.0002
TOP	1	-0.051730	0.16012	0.10437	0.7467
KIN	1	0.138061	0.15170	0.82831	0.3628
WAT	1	0.236500	0.13893	2.89780	0.0887
STL	1	0.153215	0.14034	1.19189	0.2749
STE	1	0.271019	0.13721	3.90118	0.0483

SixCity -- Table2: New Censoring Cutoff Date on 29th of Feb., 1992  
by Sex

60

Gender (1=female)=Female

The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.643	1.249	2.162	Current smoker (1=yes)
N_CPACK	1.182	1.000	1.398	25 Pack-years of smoking
FSMOKE	1.341	1.024	1.757	Former smoker (1=yes)
N_FPACK	1.182	1.006	1.388	20 Pack-years of smoking
EDD	1.192	1.004	1.414	< HS (1=yes)
N_BMI	1.150	1.068	1.239	bmi/4.52
TOP	0.950	0.694	1.300	Topeka
KIN	1.148	0.853	1.546	Kingston-Harriman
WAT	1.267	0.965	1.663	Watertown
STL	1.166	0.885	1.535	St. Louis
STE	1.311	1.002	1.716	Steubenville

## **Program #3**

```

/*****
*
*   Repeat the results in
*   Six-Cities Study paper
*   (1993) -- Table Three
*
*****/

libname six '/home/yuanli/sixcity/';
libname fmo '/home/fmo/';

options nocenter ps=64 ls=80 obs=max;

proc format;
    value sex 0 = 'Male'
            1 = 'Female'
            ;

data temp;
    set fmo.mort6c;

proc phreg data=temp;
    model timeon*dead(0) = currcig1 cpack fsmoke fpack edd bmi
pm2_5 / r1;
    strata age_1 (25 to 75 by 5) sex1;
    format sex1 sex.;
    title 'Table3_All';
run;

data temp2;
    set temp;

if smokest = 'ns';

proc phreg data=temp2;
    model timeon*dead(0) = edd bmi pm2_5/r1;
    strata age_1 (25 to 75 by 5) sex1;
    format sex1 sex.;
    title 'Table3_Nonsmoker';

proc sort;by sex1;
proc phreg data=temp2;
    model timeon*dead(0) = edd bmi pm2_5/r1;
    strata age_1 (25 to 75 by 5);
    by sex1;
    format sex1 sex.;
    title 'Table3_Nonsmoker by Sex';

data temp3;

```

```

set temp;

if smokest = 'fs';

proc phreg data=temp3;
  model timeon*dead(0) = edd bmi pm2_5/r1;
  strata age_1 (25 to 75 by 5) sex1;
  format sex1 sex.;
  title 'Table3_Former smoker';

proc sort;by sex1;
proc phreg data=temp3;
  model timeon*dead(0) = edd bmi pm2_5/r1;
  strata age_1 (25 to 75 by 5);
  by sex1;
  format sex1 sex.;
  title 'Table3_Former smoker by Sex';

data temp4;
  set temp;

if smokest = 'cs';

proc phreg data=temp4;
  model timeon*dead(0) = edd bmi pm2_5/r1;
  strata age_1 (25 to 75 by 5) sex1;
  format sex1 sex.;
  title 'Table3_Current smoker';

proc sort;by sex1;
proc phreg data=temp4;
  model timeon*dead(0) = edd bmi pm2_5/r1;
  strata age_1 (25 to 75 by 5);
  by sex1;
  format sex1 sex.;
  title 'Table3_Current smoker by Sex';

run;

data temp5;
  set temp;

if occu = 0;

proc phreg data=temp5;
  model timeon*dead(0) = currcig1 cpack fsmoke fpack edd bmi
pm2_5/r1;
  strata age_1 (25 to 75 by 5) sex1;
  format sex1 sex.;

```

```

    title 'Table3_No occupational exposure';

proc sort;by sex1;
proc phreg data=temp5;
    model timeon*dead(0) = curr cig1 cpack fsmoke fpack edd bmi
pm2_5/r1;
    strata age_1 (25 to 75 by 5);
    by sex1;
    format sex1 sex.;
    title 'Table3_No occupational exposure by Sex';

data temp6;
    set temp;

if occu = 1;

proc phreg data=temp6;
    model timeon*dead(0) = curr cig1 cpack fsmoke fpack edd bmi
pm2_5/r1;
    strata age_1 (25 to 75 by 5) sex1;
    format sex1 sex.;
    title 'Table3_Occupational exposure';

proc sort;by sex1;
proc phreg data=temp6;
    model timeon*dead(0) = curr cig1 cpack fsmoke fpack edd bmi
pm2_5/r1;
    strata age_1 (25 to 75 by 5);
    by sex1;
    format sex1 sex.;
    title 'Table3_Occupational exposure by Sex';

run;

```

```

/*****
*
* Repeat the results in
* Six-Cities Study paper
* (1993) -- Table Three
* Using New Censoring D.
*
*****/
libname six '/home/yuanli/sixcity/';
libname fmo '/home/fmo/';

options nocenter ps=64 ls=80 obs=max;

proc format;
    value sex 0 = 'Male'
              1 = 'Female'
            ;

data temp;
    set six.sc_newm;

proc phreg ;
    model timeon1*dead1(0) = curr cig1 cpack fsmoke fpack edd bmi
    pm2_5 / r1;
    strata age_1 (25 to 75 by 5) sex1;
    format sex1 sex.;
    title 'SixCity -- Table3: New Censoring Date on 30th of June,
1991';
run;

proc phreg ;
    model timeon2*dead2(0) = curr cig1 cpack fsmoke fpack edd bmi
    pm2_5 / r1;
    strata age_1 (25 to 75 by 5) sex1;
    format sex1 sex.;
    title 'SixCity -- Table3: New Censoring Date on 29th of Feb.,
1992';
run;

data temp2;
    set temp;

if smokest = 'ns';

proc phreg ;
    model timeon1*dead1(0) = edd bmi pm2_5/r1;
    strata age_1 (25 to 75 by 5) sex1;
    format sex1 sex.;
    title 'SixCity -- Table3: Nonsmoker, Censoring on 30th of June,

```

1991';

```
proc phreg ;  
  model timeon2*dead2(0) = edd bmi pm2_5/r1;  
  strata age_1 (25 to 75 by 5) sex1;  
  format sex1 sex.;  
  title 'SixCity -- Table3: Nonsmoker, Censoring on 29th of Feb.,  
1992';
```

```
proc sort;by sex1;  
proc phreg ;  
  model timeon1*dead1(0) = edd bmi pm2_5/r1;  
  strata age_1 (25 to 75 by 5);  
  by sex1;  
  format sex1 sex.;  
  title 'SixCity -- Table3: Nonsmoker by Sex, Censoring on 30th  
of June, 1991';
```

```
proc phreg ;  
  model timeon2*dead2(0) = edd bmi pm2_5/r1;  
  strata age_1 (25 to 75 by 5);  
  by sex1;  
  format sex1 sex.;  
  title 'SixCity -- Table3: Nonsmoker by Sex, Censoring on 29th  
of Feb., 1992';  
run;
```

```
data temp3;  
  set temp;
```

```
if smokest = 'fs';
```

```
proc phreg ;  
  model timeon1*dead1(0) = edd bmi pm2_5/r1;  
  strata age_1 (25 to 75 by 5) sex1;  
  format sex1 sex.;  
  title 'SixCity -- Table3: Former smoker, Censoring on 30th of  
June, 1991';
```

```
proc phreg ;  
  model timeon2*dead2(0) = edd bmi pm2_5/r1;  
  strata age_1 (25 to 75 by 5) sex1;  
  format sex1 sex.;  
  title 'SixCity -- Table3: Former smoker, Censoring on 29th of  
Feb., 1992';
```

```
proc sort;by sex1;  
proc phreg ;  
  model timeon1*dead1(0) = edd bmi pm2_5/r1;  
  strata age_1 (25 to 75 by 5);
```

```
by sex1;
format sex1 sex.;
title 'SixCity -- Table3: Former smoker by Sex, Censoring on
30th of June, 1991';
```

```
proc phreg ;
model timeon2*dead2(0) = edd bmi pm2_5/r1;
strata age_1 (25 to 75 by 5);
by sex1;
format sex1 sex.;
title 'SixCity -- Table3: Former smoker by Sex, Censoring on
29th of Feb., 1991';
run;
```

```
data temp4;
set temp;
```

```
if smokest = 'cs';
```

```
proc phreg ;
model timeon1*dead1(0) = edd bmi pm2_5/r1;
strata age_1 (25 to 75 by 5) sex1;
format sex1 sex.;
title 'SixCity -- Table3: Current smoker, Censoring on 30th of
June, 1991';
```

```
proc phreg ;
model timeon2*dead2(0) = edd bmi pm2_5/r1;
strata age_1 (25 to 75 by 5) sex1;
format sex1 sex.;
title 'SixCity -- Table3: Current smoker, Censoring on 29th of
Feb., 1992';
```

```
proc sort;by sex1;
proc phreg ;
model timeon1*dead1(0) = edd bmi pm2_5/r1;
strata age_1 (25 to 75 by 5);
by sex1;
format sex1 sex.;
title 'SixCity -- Table3: Current smoker by Sex, Censoring on
30th of June, 1991';
```

```
proc phreg ;
model timeon2*dead2(0) = edd bmi pm2_5/r1;
strata age_1 (25 to 75 by 5);
by sex1;
format sex1 sex.;
title 'SixCity -- Table3: Current smoker by Sex, Censoring on
29th of Feb., 1992';
run;
```



```

data temp5;
  set temp;

if occu = 0;

proc phreg ;
  model timeon1*dead1(0) = currcig1 cpack fsmoke fpack edd bmi
pm2_5/r1;
  strata age_1 (25 to 75 by 5) sex1;
  format sex1 sex.;
  title 'SixCity -- Table3: No occupational exposure, Censoring
on 30th of June, 1991';

proc phreg ;
  model timeon2*dead2(0) = currcig1 cpack fsmoke fpack edd bmi
pm2_5/r1;
  strata age_1 (25 to 75 by 5) sex1;
  format sex1 sex.;
  title 'SixCity -- Table3: No occupational exposure, Censoring
on 29th of Feb., 1992';

proc sort;by sex1;
proc phreg ;
  model timeon1*dead1(0) = currcig1 cpack fsmoke fpack edd bmi
pm2_5/r1;
  strata age_1 (25 to 75 by 5);
  by sex1;
  format sex1 sex.;
  title 'SixCity -- Table3: No occupational exposure by Sex,
Censoring on 30th of June,1991';

proc phreg ;
  model timeon2*dead2(0) = currcig1 cpack fsmoke fpack edd bmi
pm2_5/r1;
  strata age_1 (25 to 75 by 5);
  by sex1;
  format sex1 sex.;
  title 'SixCity -- Table3: No occupational exposure by Sex,
Censoring on 29th of Feb.,1992';
run;

data temp6;
  set temp;

if occu = 1;

proc phreg ;
  model timeon1*dead1(0) = currcig1 cpack fsmoke fpack edd bmi

```

```

pm2_5/r1;
  strata age_1 (25 to 75 by 5) sex1;
  format sex1 sex.;
  title 'SixCity -- Table3: Occupational exposure, Censoring on
30th of June,1991';

proc phreg ;
  model timeon2*dead2(0) = currcig1 cpack fsmoke fpack edd bmi
pm2_5/r1;
  strata age_1 (25 to 75 by 5) sex1;
  format sex1 sex.;
  title 'SixCity -- Table3: Occupational exposure, Censoring on
29th of Feb.,1992';

proc sort;by sex1;
proc phreg ;
  model timeon1*dead1(0) = currcig1 cpack fsmoke fpack edd bmi
pm2_5/r1;
  strata age_1 (25 to 75 by 5);
  by sex1;
  format sex1 sex.;
  title 'SixCity -- Table3: Occupational exposure by Sex,
Censoring on 30th of June, 1991';

proc phreg ;
  model timeon2*dead2(0) = currcig1 cpack fsmoke fpack edd bmi
pm2_5/r1;
  strata age_1 (25 to 75 by 5);
  by sex1;
  format sex1 sex.;
  title 'SixCity -- Table3: Occupational exposure by Sex,
Censoring on 29th of Feb., 1992';
run;

```

**Output #3a:**  
**Original Data**

Table3\_All

The PHREG Procedure

Data Set: WORK.TEMP

Dependent Variable: TIMEON Time on study (years)

Censoring Variable: DEAD Dead (1=yes)

Censoring Value(s): 0

Ties Handling: BRESLOW

Summary of the Number of Event and Censored Values

Stratum	AGE_1	SEX1	Total	Event	Censored	Percent Censored
1	27.5	Female	447	3	444	99.33
2	27.5	Male	367	8	359	97.82
3	32.5	Female	387	4	383	98.97
4	32.5	Male	353	9	344	97.45
5	37.5	Female	360	10	350	97.22
6	37.5	Male	304	14	290	95.39
7	42.5	Female	374	14	360	96.26
8	42.5	Male	324	25	299	92.28
9	47.5	Female	573	39	534	93.19
10	47.5	Male	461	62	399	86.55
11	52.5	Female	612	59	553	90.36
12	52.5	Male	490	79	411	83.88
13	57.5	Female	511	89	422	82.58
14	57.5	Male	423	125	298	70.45
15	62.5	Female	493	120	373	75.66
16	62.5	Male	395	173	222	56.20
17	67.5	Female	403	139	264	65.51
18	67.5	Male	330	186	144	43.64
19	72.5	Female	268	122	146	54.48
20	72.5	Male	221	149	72	32.58
Total			8096	1429	6667	82.35

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	16203.335	15993.344	209.991 with 7 DF (p=0.0001)
Wald			230.860 with 7 DF (p=0.0001)
			222.999 with 7 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.461424	0.09745	22.42195	0.0001
CPACK	1	0.009331	0.00180	26.79224	0.0001
FSMOKE	1	0.183392	0.08797	4.34599	0.0371
FPACK	1	0.007199	0.00159	20.56959	0.0001
EDD	1	0.176328	0.05534	10.15348	0.0014
BMI	1	0.016810	0.00623	7.28783	0.0069
PM2_5	1	0.230935	0.07705	8.98394	0.0027

Table3\_All

The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.586	1.311	1.920	Current smoker (1=yes)
CPACK	1.009	1.006	1.013	Current(currcig1=1) smoker packyrs
FSMOKE	1.201	1.011	1.427	Former smoker (1=yes)
FPACK	1.007	1.004	1.010	Former smoker(fsmoke=1) packyrs
EDD	1.193	1.070	1.329	< HS (1=yes)
BMI	1.017	1.005	1.029	Body Mass Index (kg/m**2)
PM2_5	1.260	1.083	1.465	PM2_5 (ug/m3)/18.6 (range)

Table3\_Nonsmoker

The PHREG Procedure

Data Set: WORK.TEMP2

Dependent Variable: TIMEON Time on study (years)

Censoring Variable: DEAD Dead (1=yes)

Censoring Value(s): 0

Ties Handling: BRESLOW

Summary of the Number of Event and Censored Values

Stratum	AGE_1	SEX1	Total	Event	Censored	Percent Censored
1	27.5	Female	236	3	233	98.73
2	27.5	Male	144	3	141	97.92
3	32.5	Female	160	1	159	99.38
4	32.5	Male	100	1	99	99.00
5	37.5	Female	162	3	159	98.15
6	37.5	Male	93	2	91	97.85
7	42.5	Female	165	4	161	97.58
8	42.5	Male	92	2	90	97.83
9	47.5	Female	276	9	267	96.74
10	47.5	Male	106	7	99	93.40
11	52.5	Female	296	20	276	93.24
12	52.5	Male	111	9	102	91.89
13	57.5	Female	244	30	214	87.70
14	57.5	Male	93	14	79	84.95
15	62.5	Female	275	53	222	80.73
16	62.5	Male	100	30	70	70.00
17	67.5	Female	265	82	183	69.06
18	67.5	Male	77	34	43	55.84
19	72.5	Female	201	87	114	56.72
20	72.5	Male	70	37	33	47.14
Total			3266	431	2835	86.80

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	4251.417	4236.443	14.973 with 3 DF (p=0.0018)
Wald	.	.	15.483 with 3 DF (p=0.0014)
			15.470 with 3 DF (p=0.0015)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
EDD	1	0.191537	0.10059	3.62602	0.0569
BMI	1	0.030165	0.00998	9.13019	0.0025
PM2_5	1	0.170041	0.14213	1.43128	0.2316

Table3\_Nonsmoker  
The PHREG Procedure

Analysis of Maximum Likelihood Estimates  
Conditional Risk Ratio and 95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
EDD	1.211	0.994	1.475	< HS (1=yes)
BMI	1.031	1.011	1.051	Body Mass Index (kg/m**2)
PM2_5	1.185	0.897	1.566	PM2_5 (ug/m3)/18.6 (range)

Table3\_Nonsmoker by Sex

Gender (1=female)=Male

The PHREG Procedure

Data Set: WORK.TEMP2  
Dependent Variable: TIMEON Time on study (years)  
Censoring Variable: DEAD Dead (1=yes)  
Censoring Value(s): 0  
Ties Handling: BRESLOW

Summary of the Number of Event and Censored Values

Stratum	AGE_1	Total	Event	Censored	Percent Censored
1	27.5	144	3	141	97.92
2	32.5	100	1	99	99.00
3	37.5	93	2	91	97.85
4	42.5	92	2	90	97.83
5	47.5	106	7	99	93.40
6	52.5	111	9	102	91.89
7	57.5	93	14	79	84.95
8	62.5	100	30	70	70.00
9	67.5	77	34	43	55.84
10	72.5	70	37	33	47.14
-----					
Total		986	139	847	85.90

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	1163.676	1156.579	7.097 with 3 DF (p=0.0689)
Wald	.	.	7.277 with 3 DF (p=0.0636)
			7.242 with 3 DF (p=0.0646)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
EDD	1	0.354468	0.17960	3.89526	0.0484
BMI	1	0.031313	0.02017	2.41062	0.1205
PM2_5	1	0.255412	0.24558	1.08165	0.2983

Table3\_Nonsmoker by Sex

Gender (1=female)=Male

The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and 95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
EDD	1.425	1.002	2.027	< HS (1=yes)
BMI	1.032	0.992	1.073	Body Mass Index (kg/m**2)
PM2_5	1.291	0.798	2.089	PM2_5 (ug/m3)/18.6 (range)

Table3\_Nonsmoker by Sex

Gender (1=female)=Female

The PHREG Procedure

Data Set: WORK.TEMP2

Dependent Variable: TIMEON Time on study (years)

Censoring Variable: DEAD Dead (1=yes)

Censoring Value(s): 0

Ties Handling: BRESLOW

Summary of the Number of Event and Censored Values

Stratum	AGE_1	Total	Event	Censored	Percent Censored
1	27.5	236	3	233	98.73
2	32.5	160	1	159	99.38
3	37.5	162	3	159	98.15
4	42.5	165	4	161	97.58
5	47.5	276	9	267	96.74
6	52.5	296	20	276	93.24

7	57.5	244	30	214	87.70
8	62.5	275	53	222	80.73
9	67.5	265	82	183	69.06
10	72.5	201	87	114	56.72
-----					
Total		2280	292	1988	87.19

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	3087.741	3078.568	9.173 with 3 DF (p=0.0271)
Wald			9.544 with 3 DF (p=0.0229)
			9.541 with 3 DF (p=0.0229)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
EDD	1	0.121378	0.12128	1.00169	0.3169
BMI	1	0.030371	0.01151	6.96618	0.0083
PM2_5	1	0.141284	0.17483	0.65303	0.4190

Table3\_Nonsmoker by Sex

Gender (1=female)=Female

The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
EDD	1.129	0.890	1.432	< HS (1=yes)
BMI	1.031	1.008	1.054	Body Mass Index (kg/m**2)
PM2_5	1.152	0.818	1.622	PM2_5 (ug/m3)/18.6 (range)

Table3\_Former smoker

The PHREG Procedure

Data Set: WORK.TEMP3  
 Dependent Variable: TIMEON Time on study (years)  
 Censoring Variable: DEAD Dead (1=yes)  
 Censoring Value(s): 0  
 Ties Handling: BRESLOW

Summary of the Number of Event and Censored Values

Stratum	AGE_1	SEX1	Total	Event	Censored	Percent Censored
---------	-------	------	-------	-------	----------	------------------



1	27.5	Female	49	0	49	100.00
2	27.5	Male	68	1	67	98.53
3	32.5	Female	58	1	57	98.28
4	32.5	Male	75	1	74	98.67
5	37.5	Female	58	0	58	100.00
6	37.5	Male	72	1	71	98.61
7	42.5	Female	46	1	45	97.83
8	42.5	Male	92	5	87	94.57
9	47.5	Female	92	11	81	88.04
10	47.5	Male	156	22	134	85.90
11	52.5	Female	100	11	89	89.00
12	52.5	Male	185	21	164	88.65
13	57.5	Female	87	19	68	78.16
14	57.5	Male	183	51	132	72.13
15	62.5	Female	89	26	63	70.79
16	62.5	Male	170	70	100	58.82
17	67.5	Female	60	19	41	68.33
18	67.5	Male	164	82	82	50.00
19	72.5	Female	31	18	13	41.94
20	72.5	Male	99	72	27	27.27

---

Total			1934	432	1502	77.66
-------	--	--	------	-----	------	-------

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	3894.210	3885.063	9.147 with 3 DF (p=0.0274)
Wald	.	.	9.430 with 3 DF (p=0.0241)
			9.413 with 3 DF (p=0.0243)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
EDD	1	0.100043	0.10286	0.94590	0.3308
BMI	1	0.019999	0.01218	2.69645	0.1006
PM2_5	1	0.296249	0.14090	4.42058	0.0355

Table3\_Former smoker  
The PHREG Procedure

Analysis of Maximum Likelihood Estimates  
Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
EDD	1.105	0.903	1.352	< HS (1=yes)
BMI	1.020	0.996	1.045	Body Mass Index (kg/m**2)
PM2_5	1.345	1.020	1.773	PM2_5 (ug/m3)/18.6 (range)

Table3\_Former smoker by Sex

Gender (1=female)=Male

The PHREG Procedure

Data Set: WORK.TEMP3  
 Dependent Variable: TIMEON Time on study (years)  
 Censoring Variable: DEAD Dead (1=yes)  
 Censoring Value(s): 0  
 Ties Handling: BRESLOW

Summary of the Number of Event and Censored Values

Stratum	AGE_1	Total	Event	Censored	Percent Censored
1	27.5	68	1	67	98.53
2	32.5	75	1	74	98.67
3	37.5	72	1	71	98.61
4	42.5	92	5	87	94.57
5	47.5	156	22	134	85.90
6	52.5	185	21	164	88.65
7	57.5	183	51	132	72.13
8	62.5	170	70	100	58.82
9	67.5	164	82	82	50.00
10	72.5	99	72	27	27.27
-----					
Total		1264	326	938	74.21

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	3044.801	3039.360	5.441 with 3 DF (p=0.1422)
Wald	.	.	5.594 with 3 DF (p=0.1331)
			5.585 with 3 DF (p=0.1336)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
EDD	1	0.069859	0.11799	0.35058	0.5538
BMI	1	0.019531	0.01484	1.73315	0.1880
PM2_5	1	0.269797	0.15966	2.85557	0.0911

Table3\_Former smoker by Sex  
 Gender (1=female)=Male

The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
 95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
EDD	1.072	0.851	1.351	< HS (1=yes)

BMI	1.020	0.990	1.050	Body Mass Index (kg/m**2)
PM2_5	1.310	0.958	1.791	PM2_5 (ug/m3)/18.6 (range)

Table3\_Former smoker by Sex  
Gender (1=female)=Female

The PHREG Procedure

Data Set: WORK.TEMP3  
Dependent Variable: TIMEON Time on study (years)  
Censoring Variable: DEAD Dead (1=yes)  
Censoring Value(s): 0  
Ties Handling: BRESLOW

Summary of the Number of Event and Censored Values

Stratum	AGE_1	Total	Event	Censored	Percent Censored
1	27.5	49	0	49	100.00
2	32.5	58	1	57	98.28
3	37.5	58	0	58	100.00
4	42.5	46	1	45	97.83
5	47.5	92	11	81	88.04
6	52.5	100	11	89	89.00
7	57.5	87	19	68	78.16
8	62.5	89	26	63	70.79
9	67.5	60	19	41	68.33
10	72.5	31	18	13	41.94
-----					
Total		670	106	564	84.18

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	849.409	845.257	4.152 with 3 DF (p=0.2455)
Wald			4.324 with 3 DF (p=0.2285)
			4.307 with 3 DF (p=0.2302)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
EDD	1	0.194071	0.20965	0.85694	0.3546
BMI	1	0.019414	0.02148	0.81657	0.3662
PM2_5	1	0.392213	0.29984	1.71102	0.1909

Table3\_Former smoker by Sex

Gender (1=female)=Female

The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
EDD	1.214	0.805	1.831	< HS (1=yes)
BMI	1.020	0.978	1.063	Body Mass Index (kg/m**2)
PM2_5	1.480	0.822	2.664	PM2_5 (ug/m3)/18.6 (range)

Table3\_Current smoker  
The PHREG Procedure

Data Set: WORK.TEMP4  
Dependent Variable: TIMEON Time on study (years)  
Censoring Variable: DEAD Dead (1=yes)  
Censoring Value(s): 0  
Ties Handling: BRESLOW

Summary of the Number of Event and Censored Values

Stratum	AGE_1	SEX1	Total	Event	Censored	Percent Censored
1	27.5	Female	162	0	162	100.00
2	27.5	Male	155	4	151	97.42
3	32.5	Female	169	2	167	98.82
4	32.5	Male	178	7	171	96.07
5	37.5	Female	140	7	133	95.00
6	37.5	Male	139	11	128	92.09
7	42.5	Female	163	9	154	94.48
8	42.5	Male	140	18	122	87.14
9	47.5	Female	205	19	186	90.73
10	47.5	Male	200	33	167	83.50
11	52.5	Female	216	28	188	87.04
12	52.5	Male	194	49	145	74.74
13	57.5	Female	180	40	140	77.78
14	57.5	Male	147	60	87	59.18
15	62.5	Female	129	41	88	68.22
16	62.5	Male	125	73	52	41.60
17	67.5	Female	78	38	40	51.28
18	67.5	Male	89	70	19	21.35
19	72.5	Female	36	17	19	52.78
20	72.5	Male	52	40	12	23.08
Total			2897	566	2331	80.46

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	5097.128	5083.869	13.259 with 3 DF (p=0.0041) 13.439 with 3 DF (p=0.0038)

Wald

13.383 with 3 DF (p=0.0039)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
EDD	1	0.232334	0.08763	7.02964	0.0080
BMI	1	0.001072	0.01080	0.00987	0.9209
PM2_5	1	0.278930	0.12228	5.20352	0.0225

Table3\_Current smoker

The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and 95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
EDD	1.262	1.062	1.498	< HS (1=yes)
BMI	1.001	0.980	1.022	Body Mass Index (kg/m**2)
PM2_5	1.322	1.040	1.680	PM2_5 (ug/m3)/18.6 (range)

Table3\_Current smoker by Sex

Gender (1=female)=Male

The PHREG Procedure

Data Set: WORK.TEMP4  
 Dependent Variable: TIMEON Time on study (years)  
 Censoring Variable: DEAD Dead (1=yes)  
 Censoring Value(s): 0  
 Ties Handling: BRESLOW

Summary of the Number of Event and Censored Values

Stratum	AGE_1	Total	Event	Censored	Percent Censored
1	27.5	155	4	151	97.42
2	32.5	178	7	171	96.07
3	37.5	139	11	128	92.09
4	42.5	140	18	122	87.14
5	47.5	200	33	167	83.50
6	52.5	194	49	145	74.74
7	57.5	147	60	87	59.18
8	62.5	125	73	52	41.60
9	67.5	89	70	19	21.35
10	72.5	52	40	12	23.08
Total		1419	365	1054	74.28

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	3238.207	3224.434	13.773 with 3 DF (p=0.0032)
Wald	.	.	13.904 with 3 DF (p=0.0030)
			13.818 with 3 DF (p=0.0032)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
EDD	1	0.291788	0.10818	7.27569	0.0070
BMI	1	-0.012170	0.01453	0.70162	0.4022
PM2_5	1	0.348130	0.15437	5.08566	0.0241

Table3\_Current smoker by Sex  
Gender (1=female)=Male

The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
EDD	1.339	1.083	1.655	< HS (1=yes)
BMI	0.988	0.960	1.016	Body Mass Index (kg/m**2)
PM2_5	1.416	1.047	1.917	PM2_5 (ug/m3)/18.6 (range)

Table3\_Current smoker by Sex  
Gender (1=female)=Female

The PHREG Procedure

Data Set: WORK.TEMP4  
Dependent Variable: TIMEON Time on study (years)  
Censoring Variable: DEAD Dead (1=yes)  
Censoring Value(s): 0  
Ties Handling: BRESLOW

Summary of the Number of Event and Censored Values

Stratum	AGE_1	Total	Event	Censored	Percent Censored
1	27.5	162	0	162	100.00
2	32.5	169	2	167	98.82
3	37.5	140	7	133	95.00
4	42.5	163	9	154	94.48
5	47.5	205	19	186	90.73
6	52.5	216	28	188	87.04
7	57.5	180	40	140	77.78
8	62.5	129	41	88	68.22
9	67.5	78	38	40	51.28
10	72.5	36	17	19	52.78

Total 1478 201 1277 86.40

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	1858.921	1855.941	2.980 with 3 DF (p=0.3947)
Wald			3.045 with 3 DF (p=0.3848)
			3.040 with 3 DF (p=0.3855)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
EDD	1	0.100545	0.15200	0.43753	0.5083
BMI	1	0.019043	0.01626	1.37110	0.2416
PM2_5	1	0.205624	0.20198	1.03643	0.3087

Table3\_Current smoker by Sex  
Gender (1=female)=Female

The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
EDD	1.106	0.821	1.490	< HS (1=yes)
BMI	1.019	0.987	1.052	Body Mass Index (kg/m**2)
PM2_5	1.228	0.827	1.825	PM2_5 (ug/m3)/18.6 (range)

Table3\_No occupational exposure  
The PHREG Procedure

Data Set: WORK.TEMP5

Dependent Variable: TIMEON Time on study (years)

Censoring Variable: DEAD Dead (1=yes)

Censoring Value(s): 0

Ties Handling: BRESLOW

Summary of the Number of Event and Censored Values

Stratum	AGE_1	SEX1	Total	Event	Censored	Percent Censored
1	27.5	Female	328	1	327	99.70
2	27.5	Male	149	2	147	98.66
3	32.5	Female	284	1	283	99.65
4	32.5	Male	128	3	125	97.66
5	37.5	Female	263	7	256	97.34

6	37.5	Male	122	6	116	95.08
7	42.5	Female	274	10	264	96.35
8	42.5	Male	128	6	122	95.31
9	47.5	Female	402	24	378	94.03
10	47.5	Male	153	21	132	86.27
11	52.5	Female	415	42	373	89.88
12	52.5	Male	151	22	129	85.43
13	57.5	Female	326	51	275	84.36
14	57.5	Male	138	39	99	71.74
15	62.5	Female	330	74	256	77.58
16	62.5	Male	133	55	78	58.65
17	67.5	Female	316	106	210	66.46
18	67.5	Male	122	60	62	50.82
19	72.5	Female	213	101	112	52.58
20	72.5	Male	80	55	25	31.25
-----						
Total			4455	686	3769	84.60

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	6979.440	6884.849	94.592 with 7 DF (p=0.0001)
Wald	.	.	105.349 with 7 DF (p=0.0001)
			100.784 with 7 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.423325	0.14236	8.84195	0.0029
CPACK	1	0.010899	0.00287	14.42018	0.0001
FSMOKE	1	0.290913	0.13125	4.91259	0.0267
FPACK	1	0.006380	0.00317	4.05593	0.0440
EDD	1	0.095193	0.08332	1.30545	0.2532
BMI	1	0.021938	0.00860	6.50990	0.0107
PM2_5	1	0.154295	0.11858	1.69311	0.1932

Table3\_No occupational exposure

The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and 95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.527	1.155	2.018	Current smoker (1=yes)
CPACK	1.011	1.005	1.017	Current(currrcig1=1) smoker packyrs
FSMOKE	1.338	1.034	1.730	Former smoker (1=yes)
FPACK	1.006	1.000	1.013	Former smoker(fsmoke=1) packyrs
EDD	1.100	0.934	1.295	< HS (1=yes)
BMI	1.022	1.005	1.040	Body Mass Index (kg/m**2)
PM2_5	1.167	0.925	1.472	PM2_5 (ug/m3)/18.6 (range)

Table3\_No occupational exposure by Sex



Gender (1=female)=Male

The PHREG Procedure

Data Set: WORK.TEMP5

Dependent Variable: TIMEON Time on study (years)

Censoring Variable: DEAD Dead (1=yes)

Censoring Value(s): 0

Ties Handling: BRESLOW

Summary of the Number of Event and Censored Values

Stratum	AGE_1	Total	Event	Censored	Percent Censored
1	27.5	149	2	147	98.66
2	32.5	128	3	125	97.66
3	37.5	122	6	116	95.08
4	42.5	128	6	122	95.31
5	47.5	153	21	132	86.27
6	52.5	151	22	129	85.43
7	57.5	138	39	99	71.74
8	62.5	133	55	78	58.65
9	67.5	122	60	62	50.82
10	72.5	80	55	25	31.25
-----					
Total		1304	269	1035	79.37

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	2398.151	2330.321	67.830 with 7 DF (p=0.0001)
Wald	.	.	75.587 with 7 DF (p=0.0001)
			68.243 with 7 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.680021	0.26040	6.81947	0.0090
CPACK	1	0.011257	0.00382	8.69638	0.0032
FSMOKE	1	0.491080	0.21788	5.08026	0.0242
FPACK	1	0.006384	0.00399	2.56580	0.1092
EDD	1	0.095387	0.13753	0.48103	0.4880
BMI	1	0.006607	0.01602	0.17016	0.6800
PM2_5	1	0.241348	0.20906	1.33277	0.2483

Table3\_No occupational exposure by Sex

Gender (1=female)=Male

The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Risk

Variable	Ratio	Lower	Upper	Label
CURRCIG1	1.974	1.185	3.288	Current smoker (1=yes)
CPACK	1.011	1.004	1.019	Current(currrcig1=1) smoker packyrs
FSMOKE	1.634	1.066	2.505	Former smoker (1=yes)
FPACK	1.006	0.999	1.014	Former smoker(fsmoke=1) packyrs
EDD	1.100	0.840	1.440	< HS (1=yes)
BMI	1.007	0.976	1.039	Body Mass Index (kg/m**2)
PM2_5	1.273	0.845	1.918	PM2_5 (ug/m3)/18.6 (range)

Table3\_No occupational exposure by Sex  
Gender (1=female)=Female

The PHREG Procedure

Data Set: WORK.TEMP5

Dependent Variable: TIMEON Time on study (years)

Censoring Variable: DEAD Dead (1=yes)

Censoring Value(s): 0

Ties Handling: BRESLOW

Summary of the Number of Event and Censored Values

Stratum	AGE_1	Total	Event	Censored	Percent Censored
1	27.5	328	1	327	99.70
2	32.5	284	1	283	99.65
3	37.5	263	7	256	97.34
4	42.5	274	10	264	96.35
5	47.5	402	24	378	94.03
6	52.5	415	42	373	89.88
7	57.5	326	51	275	84.36
8	62.5	330	74	256	77.58
9	67.5	316	106	210	66.46
10	72.5	213	101	112	52.58
Total		3151	417	2734	86.77

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	4581.290	4547.802	33.487 with 7 DF (p=0.0001)
Wald	.	.	35.569 with 7 DF (p=0.0001)
			34.990 with 7 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.462215	0.18539	6.21613	0.0127
CPACK	1	0.005556	0.00511	1.18140	0.2771
FSMOKE	1	0.232021	0.17481	1.76158	0.1844
FPACK	1	0.005803	0.00579	1.00414	0.3163
EDD	1	0.081475	0.10511	0.60082	0.4383
BMI	1	0.026467	0.01027	6.64621	0.0099
PM2_5	1	0.123461	0.14485	0.72649	0.3940

Table3\_No occupational exposure by Sex

Gender (1=female)=Female

The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.588	1.104	2.283	Current smoker (1=yes)
CPACK	1.006	0.996	1.016	Current(currrcig1=1) smoker packyrs
FSMOKE	1.261	0.895	1.777	Former smoker (1=yes)
FPACK	1.006	0.994	1.017	Former smoker(fsmoke=1) packyrs
EDD	1.085	0.883	1.333	< HS (1=yes)
BMI	1.027	1.006	1.048	Body Mass Index (kg/m**2)
PM2_5	1.131	0.852	1.503	PM2_5 (ug/m3)/18.6 (range)

Table3\_Occupational exposure

The PHREG Procedure

Data Set: WORK.TEMP6

Dependent Variable: TIMEON Time on study (years)

Censoring Variable: DEAD Dead (1=yes)

Censoring Value(s): 0

Ties Handling: BRESLOW

Summary of the Number of Event and Censored Values

Stratum	AGE_1	SEX1	Total	Event	Censored	Percent Censored
1	27.5	Female	119	2	117	98.32
2	27.5	Male	218	6	212	97.25
3	32.5	Female	103	3	100	97.09
4	32.5	Male	225	6	219	97.33
5	37.5	Female	97	3	94	96.91
6	37.5	Male	182	8	174	95.60
7	42.5	Female	100	4	96	96.00
8	42.5	Male	196	19	177	90.31
9	47.5	Female	171	15	156	91.23
10	47.5	Male	308	41	267	86.69
11	52.5	Female	197	17	180	91.37
12	52.5	Male	339	57	282	83.19
13	57.5	Female	185	38	147	79.46
14	57.5	Male	285	86	199	69.82
15	62.5	Female	163	46	117	71.78
16	62.5	Male	262	118	144	54.96
17	67.5	Female	87	33	54	62.07
18	67.5	Male	208	126	82	39.42
19	72.5	Female	55	21	34	61.82
20	72.5	Male	141	94	47	33.33
Total			3641	743	2898	79.59

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	7460.459	7345.583	114.875 with 7 DF (p=0.0001)
Wald	.	.	125.600 with 7 DF (p=0.0001)
			121.362 with 7 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.445607	0.13910	10.26174	0.0014
CPACK	1	0.008467	0.00238	12.68354	0.0004
FSMOKE	1	0.090301	0.12399	0.53039	0.4664
FPACK	1	0.007433	0.00184	16.29437	0.0001
EDD	1	0.232469	0.07705	9.10330	0.0026
BMI	1	0.009721	0.00912	1.13741	0.2862
PM2_5	1	0.299836	0.10258	8.54427	0.0035

Table3\_Occupational exposure

The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and 95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.561	1.189	2.051	Current smoker (1=yes)
CPACK	1.009	1.004	1.013	Current(currrcig1=1) smoker packyrs
FSMOKE	1.095	0.858	1.396	Former smoker (1=yes)
FPACK	1.007	1.004	1.011	Former smoker(fsmoke=1) packyrs
EDD	1.262	1.085	1.467	< HS (1=yes)
BMI	1.010	0.992	1.028	Body Mass Index (kg/m**2)
PM2_5	1.350	1.104	1.650	PM2_5 (ug/m3)/18.6 (range)

Table3\_Occupational exposure by Sex

Gender (1=female)=Male

The PHREG Procedure

Data Set: WORK.TEMP6

Dependent Variable: TIMEON Time on study (years)

Censoring Variable: DEAD Dead (1=yes)

Censoring Value(s): 0

Ties Handling: BRESLOW

Summary of the Number of Event and Censored Values

Stratum	AGE_1	Total	Event	Censored	Percent Censored
1	27.5	218	6	212	97.25
2	32.5	225	6	219	97.33
3	37.5	182	8	174	95.60
4	42.5	196	19	177	90.31
5	47.5	308	41	267	86.69
6	52.5	339	57	282	83.19
7	57.5	285	86	199	69.82
8	62.5	262	118	144	54.96
9	67.5	208	126	82	39.42
10	72.5	141	94	47	33.33
-----					
Total		2364	561	1803	76.27

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	5764.687	5668.173	96.514 with 7 DF (p=0.0001)
Wald			104.319 with 7 DF (p=0.0001)
			100.301 with 7 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.483206	0.17473	7.64750	0.0057
CPACK	1	0.007440	0.00280	7.07884	0.0078
FSMOKE	1	-0.021276	0.14638	0.02113	0.8844
FPACK	1	0.008165	0.00193	17.84929	0.0001
EDD	1	0.248562	0.08897	7.80524	0.0052
BMI	1	0.006312	0.01133	0.31041	0.5774
PM2_5	1	0.297889	0.11667	6.51915	0.0107

Table3\_Occupational exposure by Sex

Gender (1=female)=Male

The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.621	1.151	2.283	Current smoker (1=yes)
CPACK	1.007	1.002	1.013	Current(currcig1=1) smoker packyrs
FSMOKE	0.979	0.735	1.304	Former smoker (1=yes)
FPACK	1.008	1.004	1.012	Former smoker(fsmoke=1) packyrs
EDD	1.282	1.077	1.526	< HS (1=yes)
BMI	1.006	0.984	1.029	Body Mass Index (kg/m**2)
PM2_5	1.347	1.072	1.693	PM2_5 (ug/m3)/18.6 (range)

Table3\_Occupational exposure by Sex

Gender (1=female)=Female

The PHREG Procedure

Data Set: WORK.TEMP6

Dependent Variable: TIMEON Time on study (years)

Censoring Variable: DEAD Dead (1=yes)

Censoring Value(s): 0

Ties Handling: BRESLOW

Summary of the Number of Event and Censored Values

Stratum	AGE_1	Total	Event	Censored	Percent Censored
1	27.5	119	2	117	98.32
2	32.5	103	3	100	97.09
3	37.5	97	3	94	96.91
4	42.5	100	4	96	96.00
5	47.5	171	15	156	91.23
6	52.5	197	17	180	91.37
7	57.5	185	38	147	79.46
8	62.5	163	46	117	71.78
9	67.5	87	33	54	62.07
10	72.5	55	21	34	61.82
Total		1277	182	1095	85.75

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	1695.772	1671.163	24.609 with 7 DF (p=0.0009)
Wald	.	.	27.853 with 7 DF (p=0.0002)
			26.665 with 7 DF (p=0.0004)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.384691	0.23999	2.56942	0.1089
CPACK	1	0.008599	0.00508	2.87013	0.0902
FSMOKE	1	0.488693	0.23582	4.29456	0.0382
FPACK	1	0.006617	0.00584	1.28222	0.2575
EDD	1	0.187855	0.15581	1.45358	0.2280
BMI	1	0.015030	0.01546	0.94540	0.3309
PM2_5	1	0.277511	0.22173	1.56647	0.2107

Table3\_Occupational exposure by Sex

Gender (1=female)=Female

The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and 95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.469	0.918	2.352	Current smoker (1=yes)
CPACK	1.009	0.999	1.019	Current(currcig1=1) smoker packyrs
FSMOKE	1.630	1.027	2.588	Former smoker (1=yes)
FPACK	1.007	0.995	1.018	Former smoker(fsmoke=1) packyrs
EDD	1.207	0.889	1.638	< HS (1=yes)
BMI	1.015	0.985	1.046	Body Mass Index (kg/m**2)
PM2_5	1.320	0.855	2.038	PM2_5 (ug/m3)/18.6 (range)

**Output 3b:**  
**Modified Data**  
**(Adjusted for Early Censoring)**



## The PHREG Procedure

Data Set: WORK.TEMP  
 Dependent Variable: TIMEON1  
 Censoring Variable: DEAD1  
 Censoring Value(s): 0  
 Ties Handling: BRESLOW

## Summary of the Number of Event and Censored Values

Stratum	AGE_1	SEX1	Total	Event	Censored	Percent Censored
1	27.5	Female	447	2	445	99.55
2	27.5	Male	367	6	361	98.37
3	32.5	Female	387	4	383	98.97
4	32.5	Male	353	9	344	97.45
5	37.5	Female	360	10	350	97.22
6	37.5	Male	304	14	290	95.39
7	42.5	Female	374	14	360	96.26
8	42.5	Male	324	27	297	91.67
9	47.5	Female	573	40	533	93.02
10	47.5	Male	461	62	399	86.55
11	52.5	Female	612	59	553	90.36
12	52.5	Male	490	79	411	83.88
13	57.5	Female	511	92	419	82.00
14	57.5	Male	423	128	295	69.74
15	62.5	Female	493	121	372	75.46
16	62.5	Male	395	175	220	55.70
17	67.5	Female	403	140	263	65.26
18	67.5	Male	330	188	142	43.03
19	72.5	Female	268	123	145	54.10
20	72.5	Male	221	150	71	32.13
Total			8096	1443	6653	82.18

## Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L	16245.703	16010.948	234.755 with 7 DF (p=0.0001)
Score	.	.	257.463 with 7 DF (p=0.0001)
Wald	.	.	248.236 with 7 DF (p=0.0001)

## Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.510631	0.09669	27.88818	0.0001
CPACK	1	0.009177	0.00179	26.41371	0.0001
FSMOKE	1	0.200061	0.08771	5.20325	0.0225
FPAK	1	0.006970	0.00159	19.26810	0.0001
EDD	1	0.216830	0.05511	15.48236	0.0001
BMI	1	0.019236	0.00622	9.55573	0.0020
PM2_5	1	0.256754	0.07634	11.31044	0.0008

## The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.666	1.379	2.014	Current smoker (1=yes)
CPACK	1.009	1.006	1.013	Current(currrcig1=1) smoker packyrs
FSMOKE	1.221	1.029	1.451	Former smoker (1=yes)
FPACK	1.007	1.004	1.010	Former smoker(fsmoke=1) packyrs
EDD	1.242	1.115	1.384	< HS (1=yes)
BMI	1.019	1.007	1.032	Body Mass Index (kg/m**2)
PM2_5	1.293	1.113	1.501	PM2_5 (ug/m3)/18.6 (range)

SixCity -- Table3: New Censoring Date on 29th of Feb., 1992

63

The PHREG Procedure

Data Set: WORK.TEMP

Dependent Variable: TIMEON2

Censoring Variable: DEAD2

Censoring Value(s): 0

Ties Handling: BRESLOW

Summary of the Number of Event and Censored Values

Stratum	AGE_1	SEX1	Total	Event	Censored	Percent Censored
1	27.5	Female	447	2	445	99.55
2	27.5	Male	367	6	361	98.37
3	32.5	Female	387	4	383	98.97
4	32.5	Male	353	9	344	97.45
5	37.5	Female	360	10	350	97.22
6	37.5	Male	304	15	289	95.07
7	42.5	Female	374	16	358	95.72
8	42.5	Male	324	27	297	91.67
9	47.5	Female	573	42	531	92.67
10	47.5	Male	461	63	398	86.33
11	52.5	Female	612	61	551	90.03
12	52.5	Male	490	82	408	83.27
13	57.5	Female	511	93	418	81.80
14	57.5	Male	423	130	293	69.27
15	62.5	Female	493	126	367	74.44
16	62.5	Male	395	178	217	54.94
17	67.5	Female	403	142	261	64.76
18	67.5	Male	330	193	137	41.52
19	72.5	Female	268	124	144	53.73
20	72.5	Male	221	151	70	31.67
Total			8096	1474	6622	81.79

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	16588.435	16342.802	245.633 with 7 DF (p=0.0001)
Wald	.	.	268.954 with 7 DF (p=0.0001)
			259.566 with 7 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.517819	0.09585	29.18865	0.0001
CPACK	1	0.009203	0.00177	27.00281	0.0001
FSMOKE	1	0.207122	0.08655	5.72667	0.0167
FPACK	1	0.007344	0.00155	22.43202	0.0001
EDD	1	0.216490	0.05457	15.73970	0.0001
BMI	1	0.020896	0.00613	11.60879	0.0007
PM2_5	1	0.265901	0.07537	12.44517	0.0004

SixCity -- Table3: New Censoring Date on 29th of Feb., 1992

64

The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.678	1.391	2.025	Current smoker (1=yes)
CPACK	1.009	1.006	1.013	Current(currrcig1=1) smoker packyrs
FSMOKE	1.230	1.038	1.458	Former smoker (1=yes)
FPACK	1.007	1.004	1.010	Former smoker(fsmoke=1) packyrs
EDD	1.242	1.116	1.382	< HS (1=yes)
BMI	1.021	1.009	1.033	Body Mass Index (kg/m**2)
PM2_5	1.305	1.125	1.512	PM2_5 (ug/m3)/18.6 (range)

SixCity -- Table3: Nonsmoker, Censoring on 30th of June, 1991

65

The PHREG Procedure

Data Set: WORK.TEMP2  
Dependent Variable: TIMEON1  
Censoring Variable: DEAD1  
Censoring Value(s): 0  
Ties Handling: BRESLOW

Summary of the Number of Event and Censored Values

Stratum	AGE_1	SEX1	Total	Event	Censored	Percent Censored
1	27.5	Female	236	2	234	99.15
2	27.5	Male	144	2	142	98.61
3	32.5	Female	160	1	159	99.38
4	32.5	Male	100	1	99	99.00
5	37.5	Female	162	3	159	98.15
6	37.5	Male	93	2	91	97.85
7	42.5	Female	165	4	161	97.58
8	42.5	Male	92	2	90	97.83
9	47.5	Female	276	9	267	96.74
10	47.5	Male	106	7	99	93.40
11	52.5	Female	296	20	276	93.24
12	52.5	Male	111	9	102	91.89
13	57.5	Female	244	30	214	87.70
14	57.5	Male	93	14	79	84.95
15	62.5	Female	275	53	222	80.73
16	62.5	Male	100	30	70	70.00
17	67.5	Female	265	83	182	68.68
18	67.5	Male	77	35	42	54.55
19	72.5	Female	201	88	113	56.22
20	72.5	Male	70	38	32	45.71

-----  
 Total 3266 433 2833 86.74

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	4232.165	4213.492	18.673 with 3 DF (p=0.0003)
Wald	.	.	19.312 with 3 DF (p=0.0002)
			19.289 with 3 DF (p=0.0002)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
EDD	1	0.224468	0.10014	5.02495	0.0250
BMI	1	0.032607	0.00999	10.65655	0.0011
PM2_5	1	0.209695	0.14125	2.20396	0.1377

SixCity -- Table3: Nonsmoker, Censoring on 30th of June, 1991 66

The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and 95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
EDD	1.252	1.029	1.523	< HS (1=yes)
BMI	1.033	1.013	1.054	Body Mass Index (kg/m**2)
PM2_5	1.233	0.935	1.627	PM2_5 (ug/m3)/18.6 (range)

SixCity -- Table3: Nonsmoker, Censoring on 29th of Feb., 1992 67

The PHREG Procedure

Data Set: WORK.TEMP2  
 Dependent Variable: TIMEON2  
 Censoring Variable: DEAD2  
 Censoring Value(s): 0  
 Ties Handling: BRESLOW

Summary of the Number of Event and Censored Values

Stratum	AGE_1	SEX1	Total	Event	Censored	Percent Censored
1	27.5	Female	236	2	234	99.15
2	27.5	Male	144	2	142	98.61
3	32.5	Female	160	1	159	99.38
4	32.5	Male	100	1	99	99.00
5	37.5	Female	162	3	159	98.15
6	37.5	Male	93	2	91	97.85
7	42.5	Female	165	5	160	96.97
8	42.5	Male	92	2	90	97.83
9	47.5	Female	276	9	267	96.74
10	47.5	Male	106	7	99	93.40
11	52.5	Female	296	20	276	93.24

12	52.5	Male	111	9	102	91.89
13	57.5	Female	244	31	213	87.30
14	57.5	Male	93	14	79	84.95
15	62.5	Female	275	56	219	79.64
16	62.5	Male	100	30	70	70.00
17	67.5	Female	265	84	181	68.30
18	67.5	Male	77	36	41	53.25
19	72.5	Female	201	89	112	55.72
20	72.5	Male	70	38	32	45.71
Total			3266	441	2825	86.50

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	4309.374	4288.365	21.009 with 3 DF (p=0.0001)
Wald	.	.	21.830 with 3 DF (p=0.0001)
			21.811 with 3 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
EDD	1	0.214649	0.09923	4.67882	0.0305
BMI	1	0.035381	0.00982	12.98116	0.0003
PM2_5	1	0.224003	0.13934	2.58445	0.1079

SixCity -- Table3: Nonsmoker, Censoring on 29th of Feb., 1992

68

The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
EDD	1.239	1.020	1.506	< HS (1=yes)
BMI	1.036	1.016	1.056	Body Mass Index (kg/m**2)
PM2_5	1.251	0.952	1.644	PM2_5 (ug/m3)/18.6 (range)

SixCity -- Table3: Nonsmoker by Sex, Censoring on 30th of June, 1991

69

Gender (1=female)=Male

The PHREG Procedure

Data Set: WORK.TEMP2  
Dependent Variable: TIMEON1  
Censoring Variable: DEAD1  
Censoring Value(s): 0  
Ties Handling: BRESLOW

Summary of the Number of Event and Censored Values

Stratum	AGE_1	Total	Event	Censored	Percent Censored
1	27.5	144	2	142	98.61

2	32.5	100	1	99	99.00
3	37.5	93	2	91	97.85
4	42.5	92	2	90	97.83
5	47.5	106	7	99	93.40
6	52.5	111	9	102	91.89
7	57.5	93	14	79	84.95
8	62.5	100	30	70	70.00
9	67.5	77	35	42	54.55
10	72.5	70	38	32	45.71
<hr/>					
Total		986	140	846	85.80

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	1159.714	1152.502	7.213 with 3 DF (p=0.0654)
Wald			7.399 with 3 DF (p=0.0602)
			7.366 with 3 DF (p=0.0611)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
EDD	1	0.348368	0.17940	3.77072	0.0522
BMI	1	0.033410	0.02007	2.77059	0.0960
PM2_5	1	0.244886	0.24447	1.00342	0.3165

SixCity -- Table3: Nonsmoker by Sex, Censoring on 30th of June, 1991 70

Gender (1=female)=Male

The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
EDD	1.417	0.997	2.014	< HS (1=yes)
BMI	1.034	0.994	1.075	Body Mass Index (kg/m**2)
PM2_5	1.277	0.791	2.063	PM2_5 (ug/m3)/18.6 (range)

SixCity -- Table3: Nonsmoker by Sex, Censoring on 30th of June, 1991 71

Gender (1=female)=Female

The PHREG Procedure

Data Set: WORK.TEMP2  
Dependent Variable: TIMEON1  
Censoring Variable: DEAD1  
Censoring Value(s): 0  
Ties Handling: BRESLOW

Summary of the Number of Event and Censored Values

Stratum	AGE_1	Total	Event	Censored	Percent Censored
---------	-------	-------	-------	----------	------------------

1	27.5	236	2	234	99.15
2	32.5	160	1	159	99.38
3	37.5	162	3	159	98.15
4	42.5	165	4	161	97.58
5	47.5	276	9	267	96.74
6	52.5	296	20	276	93.24
7	57.5	244	30	214	87.70
8	62.5	275	53	222	80.73
9	67.5	265	83	182	68.68
10	72.5	201	88	113	56.22
-----					
Total		2280	293	1987	87.15

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	3072.451	3060.290	12.161 with 3 DF (p=0.0069)
Wald			12.648 with 3 DF (p=0.0055)
			12.642 with 3 DF (p=0.0055)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
EDD	1	0.170002	0.12064	1.98560	0.1588
BMI	1	0.032695	0.01153	8.04221	0.0046
PM2_5	1	0.201650	0.17346	1.35151	0.2450

SixCity -- Table3: Nonsmoker by Sex, Censoring on 30th of June, 1991

72

Gender (1=female)=Female

The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
EDD	1.185	0.936	1.501	< HS (1=yes)
BMI	1.033	1.010	1.057	Body Mass Index (kg/m**2)
PM2_5	1.223	0.871	1.719	PM2_5 (ug/m3)/18.6 (range)

SixCity -- Table3: Nonsmoker by Sex, Censoring on 29th of Feb., 1992

73

Gender (1=female)=Male

The PHREG Procedure

Data Set: WORK.TEMP2  
Dependent Variable: TIMEON2  
Censoring Variable: DEAD2  
Censoring Value(s): 0  
Ties Handling: BRESLOW

Summary of the Number of Event and Censored Values

Stratum	AGE_1	Total	Event	Censored	Percent Censored
---------	-------	-------	-------	----------	------------------

1	27.5	144	2	142	98.61
2	32.5	100	1	99	99.00
3	37.5	93	2	91	97.85
4	42.5	92	2	90	97.83
5	47.5	106	7	99	93.40
6	52.5	111	9	102	91.89
7	57.5	93	14	79	84.95
8	62.5	100	30	70	70.00
9	67.5	77	36	41	53.25
10	72.5	70	38	32	45.71
-----					
Total		986	141	845	85.70

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	1172.528	1165.055	7.473 with 3 DF (p=0.0583)
Wald	.	.	7.662 with 3 DF (p=0.0535)
			7.628 with 3 DF (p=0.0543)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
EDD	1	0.341006	0.17869	3.64177	0.0563
BMI	1	0.034341	0.01995	2.96300	0.0852
PM2_5	1	0.266704	0.24111	1.22359	0.2687

SixCity -- Table3: Nonsmoker by Sex, Censoring on 29th of Feb., 1992

74

Gender (1=female)=Male

The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
EDD	1.406	0.991	1.996	< HS (1=yes)
BMI	1.035	0.995	1.076	Body Mass Index (kg/m**2)
PM2_5	1.306	0.814	2.094	PM2_5 (ug/m3)/18.6 (range)

SixCity -- Table3: Nonsmoker by Sex, Censoring on 29th of Feb., 1992

75

Gender (1=female)=Female

The PHREG Procedure

Data Set: WORK.TEMP2  
 Dependent Variable: TIMEON2  
 Censoring Variable: DEAD2  
 Censoring Value(s): 0  
 Ties Handling: BRESLOW

Summary of the Number of Event and Censored Values

Stratum	AGE_1	Total	Event	Censored	Percent Censored
---------	-------	-------	-------	----------	------------------



1	27.5	236	2	234	99.15
2	32.5	160	1	159	99.38
3	37.5	162	3	159	98.15
4	42.5	165	5	160	96.97
5	47.5	276	9	267	96.74
6	52.5	296	20	276	93.24
7	57.5	244	31	213	87.30
8	62.5	275	56	219	79.64
9	67.5	265	84	181	68.30
10	72.5	201	89	112	55.72
-----					
Total		2280	300	1980	86.84

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	3136.846	3122.562	14.284 with 3 DF (p=0.0025)
Wald	.	.	14.948 with 3 DF (p=0.0019)
			14.943 with 3 DF (p=0.0019)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
EDD	1	0.159867	0.11930	1.79583	0.1802
BMI	1	0.036108	0.01130	10.20743	0.0014
PM2_5	1	0.211190	0.17111	1.52331	0.2171

SixCity -- Table3: Nonsmoker by Sex, Censoring on 29th of Feb., 1992 76

Gender (1=female)=Female

The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and 95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
EDD	1.173	0.929	1.482	< HS (1=yes)
BMI	1.037	1.014	1.060	Body Mass Index (kg/m**2)
PM2_5	1.235	0.883	1.727	PM2_5 (ug/m3)/18.6 (range)

SixCity -- Table3: Former smoker, Censoring on 30th of June, 1991 77

The PHREG Procedure

Data Set: WORK.TEMP3  
 Dependent Variable: TIMEON1  
 Censoring Variable: DEAD1  
 Censoring Value(s): 0  
 Ties Handling: BRESLOW

Summary of the Number of Event and Censored Values

Stratum	AGE_1	SEX1	Total	Event	Censored	Percent Censored
---------	-------	------	-------	-------	----------	------------------

1	27.5	Female	49	0	49	100.00
2	27.5	Male	68	0	68	100.00
3	32.5	Female	58	1	57	98.28
4	32.5	Male	75	1	74	98.67
5	37.5	Female	58	0	58	100.00
6	37.5	Male	72	1	71	98.61
7	42.5	Female	46	1	45	97.83
8	42.5	Male	92	5	87	94.57
9	47.5	Female	92	12	80	86.96
10	47.5	Male	156	22	134	85.90
11	52.5	Female	100	11	89	89.00
12	52.5	Male	185	21	164	88.65
13	57.5	Female	87	19	68	78.16
14	57.5	Male	183	52	131	71.58
15	62.5	Female	89	26	63	70.79
16	62.5	Male	170	71	99	58.24
17	67.5	Female	60	19	41	68.33
18	67.5	Male	164	83	81	49.39
19	72.5	Female	31	18	13	41.94
20	72.5	Male	99	72	27	27.27
Total			1934	435	1499	77.51

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	3893.455	3882.248	11.208 with 3 DF (p=0.0107)
Wald			11.566 with 3 DF (p=0.0090)
			11.547 with 3 DF (p=0.0091)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
EDD	1	0.144556	0.10241	1.99248	0.1581
BMI	1	0.023038	0.01206	3.64847	0.0561
PM2_5	1	0.281522	0.14023	4.03063	0.0447

SixCity -- Table3: Former smoker, Censoring on 30th of June, 1991 78

The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and 95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
EDD	1.156	0.945	1.412	< HS (1=yes)
BMI	1.023	0.999	1.048	Body Mass Index (kg/m**2)
PM2_5	1.325	1.007	1.744	PM2_5 (ug/m3)/18.6 (range)

SixCity -- Table3: Former smoker, Censoring on 29th of Feb., 1992 79

The PHREG Procedure

Data Set: WORK.TEMP3  
 Dependent Variable: TIMEON2  
 Censoring Variable: DEAD2  
 Censoring Value(s): 0  
 Ties Handling: BRESLOW

Summary of the Number of Event and Censored Values

Stratum	AGE_1	SEX1	Total	Event	Censored	Percent Censored
1	27.5	Female	49	0	49	100.00
2	27.5	Male	68	0	68	100.00
3	32.5	Female	58	1	57	98.28
4	32.5	Male	75	1	74	98.67
5	37.5	Female	58	0	58	100.00
6	37.5	Male	72	1	71	98.61
7	42.5	Female	46	1	45	97.83
8	42.5	Male	92	5	87	94.57
9	47.5	Female	92	13	79	85.87
10	47.5	Male	156	23	133	85.26
11	52.5	Female	100	11	89	89.00
12	52.5	Male	185	22	163	88.11
13	57.5	Female	87	19	68	78.16
14	57.5	Male	183	53	130	71.04
15	62.5	Female	89	27	62	69.66
16	62.5	Male	170	74	96	56.47
17	67.5	Female	60	20	40	66.67
18	67.5	Male	164	87	77	46.95
19	72.5	Female	31	18	13	41.94
20	72.5	Male	99	73	26	26.26
<hr/>						
Total			1934	449	1485	76.78

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	4008.067	3996.348	11.719 with 3 DF (p=0.0084)
Wald			12.078 with 3 DF (p=0.0071)
			12.057 with 3 DF (p=0.0072)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
EDD	1	0.157371	0.10069	2.44260	0.1181
BMI	1	0.022348	0.01188	3.53641	0.0600
PM2_5	1	0.279875	0.13841	4.08901	0.0432

SixCity -- Table3: Former smoker, Censoring on 29th of Feb., 1992 80

The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and 95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
EDD	1.170	0.961	1.426	< HS (1=yes)
BMI	1.023	0.999	1.047	Body Mass Index (kg/m**2)
PM2_5	1.323	1.009	1.735	PM2_5 (ug/m3)/18.6 (range)

SixCity -- Table3: Former smoker by Sex, Censoring on 30th of June, 1991 81

Gender (1=female)=Male

The PHREG Procedure

Data Set: WORK.TEMP3  
 Dependent Variable: TIMEON1  
 Censoring Variable: DEAD1  
 Censoring Value(s): 0  
 Ties Handling: BRESLOW

Summary of the Number of Event and Censored Values

Stratum	AGE_1	Total	Event	Censored	Percent Censored
1	27.5	68	0	68	100.00
2	32.5	75	1	74	98.67
3	37.5	72	1	71	98.61
4	42.5	92	5	87	94.57
5	47.5	156	22	134	85.90
6	52.5	185	21	164	88.65
7	57.5	183	52	131	71.58
8	62.5	170	71	99	58.24
9	67.5	164	83	81	49.39
10	72.5	99	72	27	27.27
-----					
Total		1264	328	936	74.05

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L	3043.770	3038.469	5.302 with 3 DF (p=0.1510)
Score			5.436 with 3 DF (p=0.1425)
Wald			5.430 with 3 DF (p=0.1429)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
EDD	1	0.104293	0.11746	0.78834	0.3746
BMI	1	0.019766	0.01473	1.79947	0.1798
PM2_5	1	0.228551	0.15879	2.07167	0.1501

SixCity -- Table3: Former smoker by Sex, Censoring on 30th of June, 1991

82

Gender (1=female)=Male

The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
EDD	1.110	0.882	1.397	< HS (1=yes)
BMI	1.020	0.991	1.050	Body Mass Index (kg/m**2)
PM2_5	1.257	0.921	1.716	PM2_5 (ug/m3)/18.6 (range)

SixCity -- Table3: Former smoker by Sex, Censoring on 30th of June, 1991

83

Gender (1=female)=Female

The PHREG Procedure

Data Set: WORK.TEMP3  
 Dependent Variable: TIMEON1  
 Censoring Variable: DEAD1  
 Censoring Value(s): 0  
 Ties Handling: BRESLOW

Summary of the Number of Event and Censored Values

Stratum	AGE_1	Total	Event	Censored	Percent Censored
1	27.5	49	0	49	100.00
2	32.5	58	1	57	98.28
3	37.5	58	0	58	100.00
4	42.5	46	1	45	97.83
5	47.5	92	12	80	86.96
6	52.5	100	11	89	89.00
7	57.5	87	19	68	78.16
8	62.5	89	26	63	70.79
9	67.5	60	19	41	68.33
10	72.5	31	18	13	41.94
Total		670	107	563	84.03

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	849.685	842.438	7.247 with 3 DF (p=0.0644)
Wald	.	.	7.641 with 3 DF (p=0.0541)
			7.596 with 3 DF (p=0.0551)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
EDD	1	0.267364	0.20805	1.65153	0.1988
BMI	1	0.027575	0.02110	1.70750	0.1913
PM2_5	1	0.483101	0.29945	2.60273	0.1067

SixCity -- Table3: Former smoker by Sex, Censoring on 30th of June, 1991 84

Gender (1=female)=Female

The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and 95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
EDD	1.307	0.869	1.964	< HS (1=yes)
BMI	1.028	0.986	1.071	Body Mass Index (kg/m**2)
PM2_5	1.621	0.901	2.915	PM2_5 (ug/m3)/18.6 (range)

Gender (1=female)=Male

The PHREG Procedure

Data Set: WORK.TEMP3  
 Dependent Variable: TIMEON2  
 Censoring Variable: DEAD2  
 Censoring Value(s): 0  
 Ties Handling: BRESLOW

## Summary of the Number of Event and Censored Values

Stratum	AGE_1	Total	Event	Censored	Percent Censored
1	27.5	68	0	68	100.00
2	32.5	75	1	74	98.67
3	37.5	72	1	71	98.61
4	42.5	92	5	87	94.57
5	47.5	156	23	133	85.26
6	52.5	185	22	163	88.11
7	57.5	183	53	130	71.04
8	62.5	170	74	96	56.47
9	67.5	164	87	77	46.95
10	72.5	99	73	26	26.26
-----					
Total		1264	339	925	73.18

## Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	3132.982	3126.909	6.074 with 3 DF (p=0.1081)
Wald	.	.	6.221 with 3 DF (p=0.1013)
			6.216 with 3 DF (p=0.1015)

## Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
EDD	1	0.132229	0.11527	1.31597	0.2513
BMI	1	0.021161	0.01442	2.15192	0.1424
PM2_5	1	0.212884	0.15685	1.84214	0.1747

SixCity -- Table3: Former smoker by Sex, Censoring on 29th of Feb., 1991

86

Gender (1=female)=Male

The PHREG Procedure

## Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
EDD	1.141	0.911	1.431	< HS (1=yes)

BMI 1.021 0.993 1.051 Body Mass Index (kg/m\*\*2)  
 PM2\_5 1.237 0.910 1.683 PM2\_5 (ug/m3)/18.6 (range)  
 SixCity -- Table3: Former smoker by Sex, Censoring on 29th of Feb., 1991 87

Gender (1=female)=Female

The PHREG Procedure

Data Set: WORK.TEMP3  
 Dependent Variable: TIMEON2  
 Censoring Variable: DEAD2  
 Censoring Value(s): 0  
 Ties Handling: BRESLOW

Summary of the Number of Event and Censored Values

Stratum	AGE_1	Total	Event	Censored	Percent Censored
1	27.5	49	0	49	100.00
2	32.5	58	1	57	98.28
3	37.5	58	0	58	100.00
4	42.5	46	1	45	97.83
5	47.5	92	13	79	85.87
6	52.5	100	11	89	89.00
7	57.5	87	19	68	78.16
8	62.5	89	27	62	69.66
9	67.5	60	20	40	66.67
10	72.5	31	18	13	41.94
-----					
Total		670	110	560	83.58

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	875.084	868.228	6.856 with 3 DF (p=0.0766)
Wald	.	.	7.215 with 3 DF (p=0.0653)
			7.169 with 3 DF (p=0.0667)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
EDD	1	0.237649	0.20593	1.33184	0.2485
BMI	1	0.023098	0.02113	1.19527	0.2743
PM2_5	1	0.527478	0.29398	3.21944	0.0728

SixCity -- Table3: Former smoker by Sex, Censoring on 29th of Feb., 1991 88

Gender (1=female)=Female

The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and 95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
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EDD 1.268 0.847 1.899 < HS (1=yes)  
 BMI 1.023 0.982 1.067 Body Mass Index (kg/m\*\*2)  
 PM2\_5 1.695 0.952 3.015 PM2\_5 (ug/m3)/18.6 (range)  
 SixCity -- Table3: Current smoker, Censoring on 30th of June, 1991 89

The PHREG Procedure

Data Set: WORK.TEMP4  
 Dependent Variable: TIMEON1  
 Censoring Variable: DEAD1  
 Censoring Value(s): 0  
 Ties Handling: BRESLOW

Summary of the Number of Event and Censored Values

Stratum	AGE_1	SEX1	Total	Event	Censored	Percent Censored
1	27.5	Female	162	0	162	100.00
2	27.5	Male	155	4	151	97.42
3	32.5	Female	169	2	167	98.82
4	32.5	Male	178	7	171	96.07
5	37.5	Female	140	7	133	95.00
6	37.5	Male	139	11	128	92.09
7	42.5	Female	163	9	154	94.48
8	42.5	Male	140	20	120	85.71
9	47.5	Female	205	19	186	90.73
10	47.5	Male	200	33	167	83.50
11	52.5	Female	216	28	188	87.04
12	52.5	Male	194	49	145	74.74
13	57.5	Female	180	43	137	76.11
14	57.5	Male	147	62	85	57.82
15	62.5	Female	129	42	87	67.44
16	62.5	Male	125	74	51	40.80
17	67.5	Female	78	38	40	51.28
18	67.5	Male	89	70	19	21.35
19	72.5	Female	36	17	19	52.78
20	72.5	Male	52	40	12	23.08
Total			2897	575	2322	80.15

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	5121.357	5102.799	18.558 with 3 DF (p=0.0003)
Wald	.	.	18.883 with 3 DF (p=0.0003)
			18.773 with 3 DF (p=0.0003)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
EDD	1	0.279783	0.08721	10.29273	0.0013
BMI	1	0.002285	0.01082	0.04460	0.8327
PM2_5	1	0.316012	0.12068	6.85726	0.0088

SixCity -- Table3: Current smoker, Censoring on 30th of June, 1991 90

The PHREG Procedure

Analysis of Maximum Likelihood Estimates



Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
EDD	1.323	1.115	1.569	< HS (1=yes)
BMI	1.002	0.981	1.024	Body Mass Index (kg/m**2)
PM2_5	1.372	1.083	1.738	PM2_5 (ug/m3)/18.6 (range)

SixCity -- Table3: Current smoker, Censoring on 29th of Feb., 1992 91

The PHREG Procedure

Data Set: WORK.TEMP4  
Dependent Variable: TIMEON2  
Censoring Variable: DEAD2  
Censoring Value(s): 0  
Ties Handling: BRESLOW

Summary of the Number of Event and Censored Values

Stratum	AGE_1	SEX1	Total	Event	Censored	Percent Censored
1	27.5	Female	162	0	162	100.00
2	27.5	Male	155	4	151	97.42
3	32.5	Female	169	2	167	98.82
4	32.5	Male	178	7	171	96.07
5	37.5	Female	140	7	133	95.00
6	37.5	Male	139	12	127	91.37
7	42.5	Female	163	10	153	93.87
8	42.5	Male	140	20	120	85.71
9	47.5	Female	205	20	185	90.24
10	47.5	Male	200	33	167	83.50
11	52.5	Female	216	30	186	86.11
12	52.5	Male	194	51	143	73.71
13	57.5	Female	180	43	137	76.11
14	57.5	Male	147	63	84	57.14
15	62.5	Female	129	43	86	66.67
16	62.5	Male	125	74	51	40.80
17	67.5	Female	78	38	40	51.28
18	67.5	Male	89	70	19	21.35
19	72.5	Female	36	17	19	52.78
20	72.5	Male	52	40	12	23.08
Total			2897	584	2313	79.84

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	5217.679	5197.568	20.111 with 3 DF (p=0.0002)
Wald	.	.	20.493 with 3 DF (p=0.0001)
			20.369 with 3 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
EDD	1	0.281400	0.08669	10.53727	0.0012
BMI	1	0.005399	0.01068	0.25574	0.6131
PM2_5	1	0.333422	0.11922	7.82166	0.0052

The PHREG Procedure

## Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
EDD	1.325	1.118	1.570	< HS (1=yes)
BMI	1.005	0.985	1.027	Body Mass Index (kg/m**2)
PM2_5	1.396	1.105	1.763	PM2_5 (ug/m3)/18.6 (range)

SixCity -- Table3: Current smoker by Sex, Censoring on 30th of June, 1991

93

Gender (1=female)=Male

The PHREG Procedure

Data Set: WORK.TEMP4  
 Dependent Variable: TIMEON1  
 Censoring Variable: DEAD1  
 Censoring Value(s): 0  
 Ties Handling: BRESLOW

## Summary of the Number of Event and Censored Values

Stratum	AGE_1	Total	Event	Censored	Percent Censored
1	27.5	155	4	151	97.42
2	32.5	178	7	171	96.07
3	37.5	139	11	128	92.09
4	42.5	140	20	120	85.71
5	47.5	200	33	167	83.50
6	52.5	194	49	145	74.74
7	57.5	147	62	85	57.82
8	62.5	125	74	51	40.80
9	67.5	89	70	19	21.35
10	72.5	52	40	12	23.08
-----					
Total		1419	370	1049	73.93

## Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	3253.526	3236.475	17.051 with 3 DF (p=0.0007)
Wald	.	.	17.236 with 3 DF (p=0.0006)
			17.106 with 3 DF (p=0.0007)

## Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
EDD	1	0.326302	0.10793	9.13969	0.0025
BMI	1	-0.013940	0.01454	0.91967	0.3376
PM2_5	1	0.377986	0.15299	6.10387	0.0135

Gender (1=female)=Male

The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
 95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
EDD	1.386	1.122	1.712	< HS (1=yes)
BMI	0.986	0.958	1.015	Body Mass Index (kg/m**2)
PM2_5	1.459	1.081	1.970	PM2_5 (ug/m3)/18.6 (range)

SixCity -- Table3: Current smoker by Sex, Censoring on 30th of June, 1991 95

Gender (1=female)=Female

The PHREG Procedure

Data Set: WORK.TEMP4  
 Dependent Variable: TIMEON1  
 Censoring Variable: DEAD1  
 Censoring Value(s): 0  
 Ties Handling: BRESLOW

Summary of the Number of Event and Censored Values

Stratum	AGE_1	Total	Event	Censored	Percent Censored
1	27.5	162	0	162	100.00
2	32.5	169	2	167	98.82
3	37.5	140	7	133	95.00
4	42.5	163	9	154	94.48
5	47.5	205	19	186	90.73
6	52.5	216	28	188	87.04
7	57.5	180	43	137	76.11
8	62.5	129	42	87	67.44
9	67.5	78	38	40	51.28
10	72.5	36	17	19	52.78
Total		1478	205	1273	86.13

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	1867.832	1862.276	5.555 with 3 DF (p=0.1354)
Wald	.	.	5.719 with 3 DF (p=0.1261)
			5.703 with 3 DF (p=0.1270)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
EDD	1	0.170289	0.15024	1.28465	0.2570

BMI	1	0.024222	0.01626	2.21922	0.1363
PM2_5	1	0.256137	0.19757	1.68083	0.1948

SixCity -- Table3: Current smoker by Sex, Censoring on 30th of June, 1991 96

Gender (1=female)=Female

The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
EDD	1.186	0.883	1.592	< HS (1=yes)
BMI	1.025	0.992	1.058	Body Mass Index (kg/m**2)
PM2_5	1.292	0.877	1.903	PM2_5 (ug/m3)/18.6 (range)

SixCity -- Table3: Current smoker by Sex, Censoring on 29th of Feb., 1992 97

Gender (1=female)=Male

The PHREG Procedure

Data Set: WORK.TEMP4  
 Dependent Variable: TIMEON2  
 Censoring Variable: DEAD2  
 Censoring Value(s): 0  
 Ties Handling: BRESLOW

Summary of the Number of Event and Censored Values

Stratum	AGE_1	Total	Event	Censored	Percent Censored
1	27.5	155	4	151	97.42
2	32.5	178	7	171	96.07
3	37.5	139	12	127	91.37
4	42.5	140	20	120	85.71
5	47.5	200	33	167	83.50
6	52.5	194	51	143	73.71
7	57.5	147	63	84	57.14
8	62.5	125	74	51	40.80
9	67.5	89	70	19	21.35
10	72.5	52	40	12	23.08
Total		1419	374	1045	73.64

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	3302.500	3285.447	17.053 with 3 DF (p=0.0007)
Wald			17.267 with 3 DF (p=0.0006)
			17.139 with 3 DF (p=0.0007)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
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EDD	1	0.319005	0.10748	8.80948	0.0030
BMI	1	-0.012074	0.01444	0.69911	0.4031
PM2_5	1	0.388753	0.15107	6.62216	0.0101

SixCity -- Table3: Current smoker by Sex, Censoring on 29th of Feb., 1992 98

Gender (1=female)=Male

The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
EDD	1.376	1.114	1.698	< HS (1=yes)
BMI	0.988	0.960	1.016	Body Mass Index (kg/m**2)
PM2_5	1.475	1.097	1.983	PM2_5 (ug/m3)/18.6 (range)

SixCity -- Table3: Current smoker by Sex, Censoring on 29th of Feb., 1992 99

Gender (1=female)=Female

The PHREG Procedure

Data Set: WORK.TEMP4  
Dependent Variable: TIMEON2  
Censoring Variable: DEAD2  
Censoring Value(s): 0  
Ties Handling: BRESLOW

Summary of the Number of Event and Censored Values

Stratum	AGE_1	Total	Event	Censored	Percent Censored
1	27.5	162	0	162	100.00
2	32.5	169	2	167	98.82
3	37.5	140	7	133	95.00
4	42.5	163	10	153	93.87
5	47.5	205	20	185	90.24
6	52.5	216	30	186	86.11
7	57.5	180	43	137	76.11
8	62.5	129	43	86	66.67
9	67.5	78	38	40	51.28
10	72.5	36	17	19	52.78
Total		1478	210	1268	85.79

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	1915.179	1907.871	7.308 with 3 DF (p=0.0627)
Wald	.	.	7.565 with 3 DF (p=0.0559)
			7.539 with 3 DF (p=0.0566)

Analysis of Maximum Likelihood Estimates

Parameter	Standard	Wald	Pr >
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Variable	DF	Estimate	Error	Chi-Square	Chi-Square
EDD	1	0.186039	0.14868	1.56573	0.2108
BMI	1	0.028322	0.01590	3.17175	0.0749
PM2_5	1	0.283766	0.19525	2.11230	0.1461

SixCity -- Table3: Current smoker by Sex, Censoring on 29th of Feb., 1992 100

Gender (1=female)=Female

The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
EDD	1.204	0.900	1.612	< HS (1=yes)
BMI	1.029	0.997	1.061	Body Mass Index (kg/m**2)
PM2_5	1.328	0.906	1.947	PM2_5 (ug/m3)/18.6 (range)

SixCity -- Table3: No occupational exposure, Censoring on 30th of June, 1991 101

The PHREG Procedure

Data Set: WORK.TEMP5  
Dependent Variable: TIMEON1  
Censoring Variable: DEAD1  
Censoring Value(s): 0  
Ties Handling: BRESLOW

Summary of the Number of Event and Censored Values

Stratum	AGE_1	SEX1	Total	Event	Censored	Percent Censored
1	27.5	Female	328	1	327	99.70
2	27.5	Male	149	1	148	99.33
3	32.5	Female	284	1	283	99.65
4	32.5	Male	128	3	125	97.66
5	37.5	Female	263	7	256	97.34
6	37.5	Male	122	6	116	95.08
7	42.5	Female	274	10	264	96.35
8	42.5	Male	128	7	121	94.53
9	47.5	Female	402	24	378	94.03
10	47.5	Male	153	21	132	86.27
11	52.5	Female	415	42	373	89.88
12	52.5	Male	151	22	129	85.43
13	57.5	Female	326	52	274	84.05
14	57.5	Male	138	41	97	70.29
15	62.5	Female	330	75	255	77.27
16	62.5	Male	133	55	78	58.65
17	67.5	Female	316	107	209	66.14
18	67.5	Male	122	61	61	50.00
19	72.5	Female	213	102	111	52.11
20	72.5	Male	80	56	24	30.00
Total			4455	694	3761	84.42

Testing Global Null Hypothesis: BETA=0

Without                  With

Criterion	Covariates	Covariates	Model Chi-Square
-2 LOG L Score	6992.448	6886.160	106.288 with 7 DF (p=0.0001)
Wald	.	.	118.180 with 7 DF (p=0.0001)
			112.792 with 7 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.476873	0.14141	11.37219	0.0007
CPACK	1	0.010823	0.00285	14.41943	0.0001
FSMOKE	1	0.297251	0.13053	5.18594	0.0228
FPAK	1	0.006525	0.00315	4.28072	0.0385
EDD	1	0.135674	0.08269	2.69195	0.1009
BMI	1	0.023797	0.00867	7.54074	0.0060
PM2_5	1	0.201960	0.11713	2.97294	0.0847

SixCity -- Table3: No occupational exposure, Censoring on 30th of June, 1991 102

The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.611	1.221	2.126	Current smoker (1=yes)
CPACK	1.011	1.005	1.017	Current(currcig1=1) smoker packyrs
FSMOKE	1.346	1.042	1.739	Former smoker (1=yes)
FPAK	1.007	1.000	1.013	Former smoker(fsmoke=1) packyrs
EDD	1.145	0.974	1.347	< HS (1=yes)
BMI	1.024	1.007	1.042	Body Mass Index (kg/m**2)
PM2_5	1.224	0.973	1.540	PM2_5 (ug/m3)/18.6 (range)

SixCity -- Table3: No occupational exposure, Censoring on 29th of Feb., 1992 103

The PHREG Procedure

Data Set: WORK.TEMP5  
Dependent Variable: TIMEON2  
Censoring Variable: DEAD2  
Censoring Value(s): 0  
Ties Handling: BRESLOW

Summary of the Number of Event and Censored Values

Stratum	AGE_1	SEX1	Total	Event	Censored	Percent Censored
1	27.5	Female	328	1	327	99.70
2	27.5	Male	149	1	148	99.33
3	32.5	Female	284	1	283	99.65
4	32.5	Male	128	3	125	97.66
5	37.5	Female	263	7	256	97.34
6	37.5	Male	122	6	116	95.08
7	42.5	Female	274	11	263	95.99
8	42.5	Male	128	7	121	94.53
9	47.5	Female	402	26	376	93.53
10	47.5	Male	153	21	132	86.27

11	52.5	Female	415	44	371	89.40
12	52.5	Male	151	24	127	84.11
13	57.5	Female	326	53	273	83.74
14	57.5	Male	138	41	97	70.29
15	62.5	Female	330	78	252	76.36
16	62.5	Male	133	57	76	57.14
17	67.5	Female	316	109	207	65.51
18	67.5	Male	122	65	57	46.72
19	72.5	Female	213	102	111	52.11
20	72.5	Male	80	56	24	30.00
Total			4455	713	3742	84.00

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	7186.958	7077.218	109.741 with 7 DF (p=0.0001)
Wald	.	.	121.675 with 7 DF (p=0.0001)
			116.241 with 7 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.469500	0.14019	11.21581	0.0008
CPACK	1	0.010922	0.00282	15.02110	0.0001
FSMOKE	1	0.304841	0.12798	5.67364	0.0172
FPACK	1	0.006698	0.00306	4.78073	0.0288
EDD	1	0.134718	0.08180	2.71207	0.0996
BMI	1	0.024317	0.00852	8.14640	0.0043
PM2_5	1	0.220993	0.11534	3.67092	0.0554

SixCity -- Table3: No occupational exposure, Censoring on 29th of Feb., 1992 104

The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.599	1.215	2.105	Current smoker (1=yes)
CPACK	1.011	1.005	1.017	Current(currcig1=1) smoker packyrs
FSMOKE	1.356	1.055	1.743	Former smoker (1=yes)
FPACK	1.007	1.001	1.013	Former smoker(fsmoke=1) packyrs
EDD	1.144	0.975	1.343	< HS (1=yes)
BMI	1.025	1.008	1.042	Body Mass Index (kg/m**2)
PM2_5	1.247	0.995	1.564	PM2_5 (ug/m3)/18.6 (range)

SixCity -- Table3: No occupational exposure by Sex, Censoring on 30th of Jun 105

Gender (1=female)=Male

The PHREG Procedure

Data Set: WORK.TEMP5  
 Dependent Variable: TIMEON1  
 Censoring Variable: DEAD1  
 Censoring Value(s): 0  
 Ties Handling: BRESLOW



Summary of the Number of Event and Censored Values

Stratum	AGE_1	Total	Event	Censored	Percent Censored
1	27.5	149	1	148	99.33
2	32.5	128	3	125	97.66
3	37.5	122	6	116	95.08
4	42.5	128	7	121	94.53
5	47.5	153	21	132	86.27
6	52.5	151	22	129	85.43
7	57.5	138	41	97	70.29
8	62.5	133	55	78	58.65
9	67.5	122	61	61	50.00
10	72.5	80	56	24	30.00
Total		1304	273	1031	79.06

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	2408.598	2337.182	71.416 with 7 DF (p=0.0001)
Wald	.	.	80.305 with 7 DF (p=0.0001)
			72.179 with 7 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.687458	0.25746	7.12980	0.0076
CPACK	1	0.011683	0.00377	9.58098	0.0020
FSMOKE	1	0.499118	0.21645	5.31733	0.0211
FPACK	1	0.006099	0.00396	2.37144	0.1236
EDD	1	0.118177	0.13705	0.74360	0.3885
BMI	1	0.007893	0.01608	0.24107	0.6234
PM2_5	1	0.241041	0.20773	1.34647	0.2459

SixCity -- Table3: No occupational exposure by Sex, Censoring on 30th of Jun 106

Gender (1=female)=Male

The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and 95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.989	1.201	3.294	Current smoker (1=yes)
CPACK	1.012	1.004	1.019	Current(currcig1=1) smoker packyrs
FSMOKE	1.647	1.078	2.518	Former smoker (1=yes)
FPACK	1.006	0.998	1.014	Former smoker(fsmoke=1) packyrs
EDD	1.125	0.860	1.472	< HS (1=yes)
BMI	1.008	0.977	1.040	Body Mass Index (kg/m**2)
PM2_5	1.273	0.847	1.912	PM2_5 (ug/m3)/18.6 (range)

SixCity -- Table3: No occupational exposure by Sex, Censoring on 30th of Jun 107

Gender (1=female)=Female

The PHREG Procedure

Data Set: WORK.TEMP5  
Dependent Variable: TIMEON1  
Censoring Variable: DEAD1  
Censoring Value(s): 0  
Ties Handling: BRESLOW

Summary of the Number of Event and Censored Values

Stratum	AGE_1	Total	Event	Censored	Percent Censored
1	27.5	328	1	327	99.70
2	32.5	284	1	283	99.65
3	37.5	263	7	256	97.34
4	42.5	274	10	264	96.35
5	47.5	402	24	378	94.03
6	52.5	415	42	373	89.88
7	57.5	326	52	274	84.05
8	62.5	330	75	255	77.27
9	67.5	316	107	209	66.14
10	72.5	213	102	111	52.11
-----					
Total		3151	421	2730	86.64

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	4583.850	4542.556	41.294 with 7 DF (p=0.0001)
Wald			43.879 with 7 DF (p=0.0001)
			43.056 with 7 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.535834	0.18384	8.49541	0.0036
CPACK	1	0.005159	0.00505	1.04390	0.3069
FSMOKE	1	0.224664	0.17492	1.64973	0.1990
FPACK	1	0.007018	0.00582	1.45558	0.2276
EDD	1	0.135324	0.10426	1.68462	0.1943
BMI	1	0.028655	0.01034	7.67960	0.0056
PM2_5	1	0.186474	0.14282	1.70463	0.1917

SixCity -- Table3: No occupational exposure by Sex, Censoring on 30th of Jun 108

Gender (1=female)=Female

The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and 95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
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CURRCIG1	1.709	1.192	2.450	Current smoker (1=yes)
CPACK	1.005	0.995	1.015	Current(currrcig1=1) smoker packyrs
FSMOKE	1.252	0.889	1.764	Former smoker (1=yes)
FPACK	1.007	0.996	1.019	Former smoker(fsmoke=1) packyrs
EDD	1.145	0.933	1.404	< HS (1=yes)
BMI	1.029	1.008	1.050	Body Mass Index (kg/m**2)
PM2_5	1.205	0.911	1.594	PM2_5 (ug/m3)/18.6 (range)

SixCity -- Table3: No occupational exposure by Sex, Censoring on 29th of Feb 109

Gender (1=female)=Male

The PHREG Procedure

Data Set: WORK.TEMP5  
 Dependent Variable: TIMEON2  
 Censoring Variable: DEAD2  
 Censoring Value(s): 0  
 Ties Handling: BRESLOW

Summary of the Number of Event and Censored Values

Stratum	AGE_1	Total	Event	Censored	Percent Censored
1	27.5	149	1	148	99.33
2	32.5	128	3	125	97.66
3	37.5	122	6	116	95.08
4	42.5	128	7	121	94.53
5	47.5	153	21	132	86.27
6	52.5	151	24	127	84.11
7	57.5	138	41	97	70.29
8	62.5	133	57	76	57.14
9	67.5	122	65	57	46.72
10	72.5	80	56	24	30.00
Total		1304	281	1023	78.45

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	2484.822	2412.346	72.477 with 7 DF (p=0.0001)
Wald	.	.	80.354 with 7 DF (p=0.0001)
			72.507 with 7 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.713487	0.25615	7.75833	0.0053
CPACK	1	0.011069	0.00377	8.63059	0.0033
FSMOKE	1	0.523403	0.21187	6.10289	0.0135
FPACK	1	0.005614	0.00386	2.11512	0.1459
EDD	1	0.146188	0.13474	1.17709	0.2779
BMI	1	0.007797	0.01576	0.24472	0.6208
PM2_5	1	0.274456	0.20429	1.80493	0.1791

SixCity -- Table3: No occupational exposure by Sex, Censoring on 29th of Feb 110

Gender (1=female)=Male

The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	2.041	1.235	3.372	Current smoker (1=yes)
CPACK	1.011	1.004	1.019	Current(currrcig1=1) smoker packyrs
FSMOKE	1.688	1.114	2.557	Former smoker (1=yes)
FPACK	1.006	0.998	1.013	Former smoker(fsmoke=1) packyrs
EDD	1.157	0.889	1.507	< HS (1=yes)
BMI	1.008	0.977	1.039	Body Mass Index (kg/m**2)
PM2_5	1.316	0.882	1.964	PM2_5 (ug/m3)/18.6 (range)

SixCity -- Table3: No occupational exposure by Sex, Censoring on 29th of Feb 111

Gender (1=female)=Female

The PHREG Procedure

Data Set: WORK.TEMP5  
 Dependent Variable: TIMEON2  
 Censoring Variable: DEAD2  
 Censoring Value(s): 0  
 Ties Handling: BRESLOW

Summary of the Number of Event and Censored Values

Stratum	AGE_1	Total	Event	Censored	Percent Censored
1	27.5	328	1	327	99.70
2	32.5	284	1	283	99.65
3	37.5	263	7	256	97.34
4	42.5	274	11	263	95.99
5	47.5	402	26	376	93.53
6	52.5	415	44	371	89.40
7	57.5	326	53	273	83.74
8	62.5	330	78	252	76.36
9	67.5	316	109	207	65.51
10	72.5	213	102	111	52.11
Total		3151	432	2719	86.29

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	4702.136	4658.442	43.694 with 7 DF (p=0.0001)
Wald	.	.	46.809 with 7 DF (p=0.0001)
			45.884 with 7 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.496323	0.18255	7.39241	0.0065
CPACK	1	0.006395	0.00496	1.66149	0.1974

FSMOKE	1	0.208452	0.17231	1.46344	0.2264
FPAK	1	0.008542	0.00555	2.36976	0.1237
EDD	1	0.118658	0.10338	1.31744	0.2511
BMI	1	0.029615	0.01018	8.47097	0.0036
PM2_5	1	0.200498	0.14055	2.03498	0.1537

SixCity -- Table3: No occupational exposure by Sex, Censoring on 29th of Feb 112

Gender (1=female)=Female

The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.643	1.149	2.349	Current smoker (1=yes)
CPACK	1.006	0.997	1.016	Current(currrcig1=1) smoker packyrs
FSMOKE	1.232	0.879	1.727	Former smoker (1=yes)
FPAK	1.009	0.998	1.020	Former smoker(fsmoke=1) packyrs
EDD	1.126	0.919	1.379	< HS (1=yes)
BMI	1.030	1.010	1.051	Body Mass Index (kg/m**2)
PM2_5	1.222	0.928	1.610	PM2_5 (ug/m3)/18.6 (range)

SixCity -- Table3: Occupational exposure, Censoring on 30th of June,1991 113

The PHREG Procedure

Data Set: WORK.TEMP6  
Dependent Variable: TIMEON1  
Censoring Variable: DEAD1  
Censoring Value(s): 0  
Ties Handling: BRESLOW

Summary of the Number of Event and Censored Values

Stratum	AGE_1	SEX1	Total	Event	Censored	Percent Censored
1	27.5	Female	119	1	118	99.16
2	27.5	Male	218	5	213	97.71
3	32.5	Female	103	3	100	97.09
4	32.5	Male	225	6	219	97.33
5	37.5	Female	97	3	94	96.91
6	37.5	Male	182	8	174	95.60
7	42.5	Female	100	4	96	96.00
8	42.5	Male	196	20	176	89.80
9	47.5	Female	171	16	155	90.64
10	47.5	Male	308	41	267	86.69
11	52.5	Female	197	17	180	91.37
12	52.5	Male	339	57	282	83.19
13	57.5	Female	185	40	145	78.38
14	57.5	Male	285	87	198	69.47
15	62.5	Female	163	46	117	71.78
16	62.5	Male	262	120	142	54.20
17	67.5	Female	87	33	54	62.07
18	67.5	Male	208	127	81	38.94
19	72.5	Female	55	21	34	61.82
20	72.5	Male	141	94	47	33.33
Total			3641	749	2892	79.43

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L	7468.735	7341.387	127.348 with 7 DF (p=0.0001)
Score	.	.	138.695 with 7 DF (p=0.0001)
Wald	.	.	133.726 with 7 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.493432	0.13780	12.82264	0.0003
CPACK	1	0.008222	0.00235	12.22440	0.0005
FSMOKE	1	0.108565	0.12367	0.77067	0.3800
FPACK	1	0.007085	0.00185	14.66674	0.0001
EDD	1	0.279061	0.07686	13.18077	0.0003
BMI	1	0.013684	0.00903	2.29884	0.1295
PM2_5	1	0.313426	0.10192	9.45628	0.0021

SixCity -- Table3: Occupational exposure, Censoring on 30th of June, 1991 114

The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.638	1.250	2.146	Current smoker (1=yes)
CPACK	1.008	1.004	1.013	Current(currrcig1=1) smoker packyrs
FSMOKE	1.115	0.875	1.420	Former smoker (1=yes)
FPACK	1.007	1.003	1.011	Former smoker(fsmoke=1) packyrs
EDD	1.322	1.137	1.537	< HS (1=yes)
BMI	1.014	0.996	1.032	Body Mass Index (kg/m**2)
PM2_5	1.368	1.120	1.671	PM2_5 (ug/m3)/18.6 (range)

SixCity -- Table3: Occupational exposure, Censoring on 29th of Feb., 1992 115

The PHREG Procedure

Data Set: WORK.TEMP6  
 Dependent Variable: TIMEON2  
 Censoring Variable: DEAD2  
 Censoring Value(s): 0  
 Ties Handling: BRESLOW

Summary of the Number of Event and Censored Values

Stratum	AGE_1	SEX1	Total	Event	Censored	Percent Censored
1	27.5	Female	119	1	118	99.16
2	27.5	Male	218	5	213	97.71
3	32.5	Female	103	3	100	97.09
4	32.5	Male	225	6	219	97.33
5	37.5	Female	97	3	94	96.91
6	37.5	Male	182	9	173	95.05

7	42.5	Female	100	5	95	95.00
8	42.5	Male	196	20	176	89.80
9	47.5	Female	171	16	155	90.64
10	47.5	Male	308	42	266	86.36
11	52.5	Female	197	17	180	91.37
12	52.5	Male	339	58	281	82.89
13	57.5	Female	185	40	145	78.38
14	57.5	Male	285	89	196	68.77
15	62.5	Female	163	48	115	70.55
16	62.5	Male	262	121	141	53.82
17	67.5	Female	87	33	54	62.07
18	67.5	Male	208	128	80	38.46
19	72.5	Female	55	22	33	60.00
20	72.5	Male	141	95	46	32.62
Total			3641	761	2880	79.10

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	7580.731	7445.856	134.875 with 7 DF (p=0.0001)
Wald	.	.	146.606 with 7 DF (p=0.0001)
			141.431 with 7 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.517105	0.13689	14.27066	0.0002
CPACK	1	0.008131	0.00234	12.03121	0.0005
FSMOKE	1	0.122495	0.12273	0.99619	0.3182
FPACK	1	0.007497	0.00181	17.23053	0.0001
EDD	1	0.282435	0.07630	13.70231	0.0002
BMI	1	0.016105	0.00890	3.27458	0.0704
PM2_5	1	0.323373	0.10087	10.27756	0.0013

SixCity -- Table3: Occupational exposure, Censoring on 29th of Feb.,1992 116

The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.677	1.283	2.193	Current smoker (1=yes)
CPACK	1.008	1.004	1.013	Current(currrcig1=1) smoker packyrs
FSMOKE	1.130	0.889	1.438	Former smoker (1=yes)
FPACK	1.008	1.004	1.011	Former smoker(fsmoke=1) packyrs
EDD	1.326	1.142	1.540	< HS (1=yes)
BMI	1.016	0.999	1.034	Body Mass Index (kg/m**2)
PM2_5	1.382	1.134	1.684	PM2_5 (ug/m3)/18.6 (range)

SixCity -- Table3: Occupational exposure by Sex, Censoring on 30th of June, 117

Gender (1=female)=Male

The PHREG Procedure

Data Set: WORK.TEMP6  
 Dependent Variable: TIMEON1  
 Censoring Variable: DEAD1  
 Censoring Value(s): 0  
 Ties Handling: BRESLOW

Summary of the Number of Event and Censored Values

Stratum	AGE_1	Total	Event	Censored	Percent Censored
1	27.5	218	5	213	97.71
2	32.5	225	6	219	97.33
3	37.5	182	8	174	95.60
4	42.5	196	20	176	89.80
5	47.5	308	41	267	86.69
6	52.5	339	57	282	83.19
7	57.5	285	87	198	69.47
8	62.5	262	120	142	54.20
9	67.5	208	127	81	38.94
10	72.5	141	94	47	33.33
Total		2364	565	1799	76.10

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	5770.475	5666.704	103.770 with 7 DF (p=0.0001)
Wald	.	.	111.993 with 7 DF (p=0.0001)
			107.361 with 7 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.512064	0.17338	8.72303	0.0031
CPACK	1	0.007410	0.00278	7.11959	0.0076
FSMOKE	1	-0.017723	0.14612	0.01471	0.9035
FPACK	1	0.007962	0.00194	16.83574	0.0001
EDD	1	0.283236	0.08885	10.16117	0.0014
BMI	1	0.005998	0.01129	0.28217	0.5953
PM2_5	1	0.300241	0.11596	6.70432	0.0096

SixCity -- Table3: Occupational exposure by Sex, Censoring on 30th of June, 118

Gender (1=female)=Male

The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and 95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.669	1.188	2.344	Current smoker (1=yes)
CPACK	1.007	1.002	1.013	Current(currcig1=1) smoker packyrs
FSMOKE	0.982	0.738	1.308	Former smoker (1=yes)



FPACK 1.008 1.004 1.012 Former smoker(fsmoke=1) packyrs  
 EDD 1.327 1.115 1.580 < HS (1=yes)  
 BMI 1.006 0.984 1.029 Body Mass Index (kg/m\*\*2)  
 PM2\_5 1.350 1.076 1.695 PM2\_5 (ug/m3)/18.6 (range)  
 SixCity -- Table3: Occupational exposure by Sex, Censoring on 30th of June, 119

Gender (1=female)=Female

The PHREG Procedure

Data Set: WORK.TEMP6  
 Dependent Variable: TIMEON1  
 Censoring Variable: DEAD1  
 Censoring Value(s): 0  
 Ties Handling: BRESLOW

Summary of the Number of Event and Censored Values

Stratum	AGE_1	Total	Event	Censored	Percent Censored
1	27.5	119	1	118	99.16
2	32.5	103	3	100	97.09
3	37.5	97	3	94	96.91
4	42.5	100	4	96	96.00
5	47.5	171	16	155	90.64
6	52.5	197	17	180	91.37
7	57.5	185	40	145	78.38
8	62.5	163	46	117	71.78
9	67.5	87	33	54	62.07
10	72.5	55	21	34	61.82
Total		1277	184	1093	85.59

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	1698.261	1666.480	31.780 with 7 DF (p=0.0001)
Wald	.	.	35.304 with 7 DF (p=0.0001)
			33.780 with 7 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.487738	0.23568	4.28276	0.0385
CPACK	1	0.007312	0.00491	2.21439	0.1367
FSMOKE	1	0.533647	0.23306	5.24307	0.0220
FPACK	1	0.006911	0.00589	1.37469	0.2410
EDD	1	0.263831	0.15470	2.90841	0.0881
BMI	1	0.026765	0.01511	3.13711	0.0765
PM2_5	1	0.334281	0.22052	2.29783	0.1296

SixCity -- Table3: Occupational exposure by Sex, Censoring on 30th of June, 120

Gender (1=female)=Female

The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.629	1.026	2.585	Current smoker (1=yes)
CPACK	1.007	0.998	1.017	Current(currcig1=1) smoker packyrs
FSMOKE	1.705	1.080	2.692	Former smoker (1=yes)
FPACK	1.007	0.995	1.019	Former smoker(fsmoke=1) packyrs
EDD	1.302	0.961	1.763	< HS (1=yes)
BMI	1.027	0.997	1.058	Body Mass Index (kg/m**2)
PM2_5	1.397	0.907	2.152	PM2_5 (ug/m3)/18.6 (range)

SixCity -- Table3: Occupational exposure by Sex, Censoring on 29th of Feb., 121

Gender (1=female)=Male

The PHREG Procedure

Data Set: WORK.TEMP6

Dependent Variable: TIMEON2

Censoring Variable: DEAD2

Censoring Value(s): 0

Ties Handling: BRESLOW

Summary of the Number of Event and Censored Values

Stratum	AGE_1	Total	Event	Censored	Percent Censored
1	27.5	218	5	213	97.71
2	32.5	225	6	219	97.33
3	37.5	182	9	173	95.05
4	42.5	196	20	176	89.80
5	47.5	308	42	266	86.36
6	52.5	339	58	281	82.89
7	57.5	285	89	196	68.77
8	62.5	262	121	141	53.82
9	67.5	208	128	80	38.46
10	72.5	141	95	46	32.62
Total		2364	573	1791	75.76

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	5853.952	5746.095	107.856 with 7 DF (p=0.0001)
Wald	.	.	116.369 with 7 DF (p=0.0001)
			111.599 with 7 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.534415	0.17296	9.54699	0.0020
CPACK	1	0.007391	0.00277	7.09574	0.0077
FSMOKE	1	0.003824	0.14518	0.0006938	0.9790
FPACK	1	0.008370	0.00189	19.56400	0.0001
EDD	1	0.280800	0.08828	10.11837	0.0015
BMI	1	0.007614	0.01117	0.46437	0.4956
PM2_5	1	0.303902	0.11480	7.00823	0.0081

SixCity -- Table3: Occupational exposure by Sex, Censoring on 29th of Feb., 122

Gender (1=female)=Male

The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.706	1.216	2.395	Current smoker (1=yes)
CPACK	1.007	1.002	1.013	Current(currcig1=1) smoker packyrs
FSMOKE	1.004	0.755	1.334	Former smoker (1=yes)
FPACK	1.008	1.005	1.012	Former smoker(fsmoke=1) packyrs
EDD	1.324	1.114	1.574	< HS (1=yes)
BMI	1.008	0.986	1.030	Body Mass Index (kg/m**2)
PM2_5	1.355	1.082	1.697	PM2_5 (ug/m3)/18.6 (range)

SixCity -- Table3: Occupational exposure by Sex, Censoring on 29th of Feb., 123

Gender (1=female)=Female

The PHREG Procedure

Data Set: WORK.TEMP6  
Dependent Variable: TIMEON2  
Censoring Variable: DEAD2  
Censoring Value(s): 0  
Ties Handling: BRESLOW

Summary of the Number of Event and Censored Values

Stratum	AGE_1	Total	Event	Censored	Percent Censored
1	27.5	119	1	118	99.16
2	32.5	103	3	100	97.09
3	37.5	97	3	94	96.91
4	42.5	100	5	95	95.00
5	47.5	171	16	155	90.64
6	52.5	197	17	180	91.37
7	57.5	185	40	145	78.38
8	62.5	163	48	115	70.55
9	67.5	87	33	54	62.07
10	72.5	55	22	33	60.00
Total		1277	188	1089	85.28

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	1726.780	1691.847	34.932 with 7 DF (p=0.0001)
Wald	.	.	38.682 with 7 DF (p=0.0001)
			37.052 with 7 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Parameter      Standard      Wald      Pr >

Variable	DF	Estimate	Error	Chi-Square	Chi-Square
CURRCIG1	1	0.521429	0.23181	5.05966	0.0245
CPACK	1	0.006979	0.00486	2.06319	0.1509
FSMOKE	1	0.528592	0.23251	5.16848	0.0230
FPACK	1	0.007079	0.00588	1.44950	0.2286
EDD	1	0.283954	0.15316	3.43698	0.0638
BMI	1	0.030400	0.01477	4.23460	0.0396
PM2_5	1	0.369126	0.21788	2.87026	0.0902

SixCity -- Table3: Occupational exposure by Sex, Censoring on 29th of Feb., 124

Gender (1=female)=Female

The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.684	1.069	2.653	Current smoker (1=yes)
CPACK	1.007	0.997	1.017	Current(currcig1=1) smoker packyrs
FSMOKE	1.697	1.076	2.676	Former smoker (1=yes)
FPACK	1.007	0.996	1.019	Former smoker(fsmoke=1) packyrs
EDD	1.328	0.984	1.793	< HS (1=yes)
BMI	1.031	1.001	1.061	Body Mass Index (kg/m**2)
PM2_5	1.446	0.944	2.217	PM2_5 (ug/m3)/18.6 (range)

## **Program #4**

```

/*****
*
*   Repeat the results in
*   Six-Cities Study paper
*   (1993) -- Table Four
*
*****/

```

```

libname six '/home/yuanli/sixcity/';
libname fmo '/home/fmo/';

```

```

options nocenter ps=64 ls=80 obs=max;

```

```

proc format;

```

```

    value sex 0 = 'Male'
             1 = 'Female'
;

```

```

data temp;
    set fmo.mort6c;

```

```

proc phreg data=temp;
    model timeon*dead(0) = pm2_5/r1;
    strata age_1 (25 to 75 by 5) sex1;
    format sex1 sex.;
    title 'Tbale4: Model one';

```

```

proc phreg data=temp nosummary;
    model timeon*dead(0) = currcig1 cpack fsmoke fpack pm2_5/r1;
    strata age_1 (25 to 75 by 5) sex1;
    format sex1 sex.;
    title 'Table4: Model two';

```

```

proc phreg data=temp nosummary;
    model timeon*dead(0) = currcig1 cpack fsmoke fpack edd
pm2_5/r1;
    strata age_1 (25 to 75 by 5) sex1;
    format sex1 sex.;
    title 'Table4: Model three';

```

```

proc phreg data=temp nosummary;
    model timeon*dead(0) = currcig1 cpack fsmoke fpack edd bmi
pm2_5/r1;
    strata age_1 (25 to 75 by 5) sex1;
    format sex1 sex.;
    title 'Table4: Model four';

```

```

proc phreg data=temp nosummary;
    model timeon*dead(0) = currcig1 cpack fsmoke fpack edd bmi occu

```

```

pm2_5/r1;
  strata age_1 (25 to 75 by 5) sex1;
  format sex1 sex.;
  title 'Table4: Model five';

data temp2;
  set temp;

if hi_bp = 0;

proc phreg data=temp2 nosummary;
  model timeon*dead(0) = curr cig1 cpack fsmoke fpack edd bmi occu
pm2_5/r1;
  strata age_1 (25 to 75 by 5) sex1;
  format sex1 sex.;
  title 'Table4: Model five -- excluding subjects with
hypertension';

data temp3;
  set temp;

if diab = 0;

proc phreg data=temp3 nosummay;
  model timeon*dead(0) = curr cig1 cpack fsmoke fpack edd bmi occu
pm2_5/r1;
  strata age_1 (25 to 75 by 5) sex1;
  format sex1 sex.;
  title 'Table4: Model five -- excluding subjects with diabetes';

run;

```

```

/*****
*
* Repeat the results in
* Six-Cities Study paper
* (1993) -- Table Four
* Using New Censoring D.
*
*****/
libname six '/home/yuanli/sixcity/';
libname fmo '/home/fmo/';

options nocenter ps=64 ls=80 obs=max;

proc format;

    value sex  0 = 'Male'
              1 = 'Female'
              ;

data temp;
    set six.sc_newm;

proc phreg nosummary;
    model timeon1*dead1(0) = pm2_5/r1;
    strata age_1 (25 to 75 by 5) sex1;
    format sex1 sex.;
    title 'SixCity -- Table4: Model one, Censoring on 30th of June,
1991';

proc phreg nosummary;
    model timeon2*dead2(0) = pm2_5/r1;
    strata age_1 (25 to 75 by 5) sex1;
    format sex1 sex.;
    title 'SixCity -- Table4: Model one, Censoring on 29th of Feb.,
1992';

proc phreg nosummary;
    model timeon1*dead1(0) = currcig1 cpack fsmoke fpack pm2_5/r1;
    strata age_1 (25 to 75 by 5) sex1;
    format sex1 sex.;
    title 'SixCity -- Table4: Model two, Censoring on 30th of June.
1991';

proc phreg nosummary;
    model timeon2*dead2(0) = currcig1 cpack fsmoke fpack pm2_5/r1;
    strata age_1 (25 to 75 by 5) sex1;
    format sex1 sex.;
    title 'SixCity -- Table4: Model two, Censoring on 29th of Feb.
1992';

```



```

proc phreg nosummary;
  model timeon1*dead1(0) = curr cig1 cpack fsmoke fpack edd
pm2_5/r1;
  strata age_1 (25 to 75 by 5) sex1;
  format sex1 sex.;
  title 'SixCity -- Table4: Model three, Censoring on 30th of
June, 1991';

proc phreg nosummary;
  model timeon2*dead2(0) = curr cig1 cpack fsmoke fpack edd
pm2_5/r1;
  strata age_1 (25 to 75 by 5) sex1;
  format sex1 sex.;
  title 'SixCity -- Table4: Model three, Censoring on 29th of
Feb. 1992';

proc phreg nosummary;
  model timeon1*dead1(0) = curr cig1 cpack fsmoke fpack edd bmi
pm2_5/r1;
  strata age_1 (25 to 75 by 5) sex1;
  format sex1 sex.;
  title 'SixCity -- Table4: Model four, Censoring on 30th of
June, 1991';

proc phreg nosummary;
  model timeon2*dead2(0) = curr cig1 cpack fsmoke fpack edd bmi
pm2_5/r1;
  strata age_1 (25 to 75 by 5) sex1;
  format sex1 sex.;
  title 'SixCity -- Table4: Model four, Censoring on 29th of Feb.
1992';

proc phreg nosummary;
  model timeon1*dead1(0) = curr cig1 cpack fsmoke fpack edd bmi
occu pm2_5/r1;
  strata age_1 (25 to 75 by 5) sex1;
  format sex1 sex.;
  title 'SixCity -- Table4: Model five, Censoring on 30th of
June, 1991';

proc phreg nosummary;
  model timeon2*dead2(0) = curr cig1 cpack fsmoke fpack edd bmi
occu pm2_5/r1;
  strata age_1 (25 to 75 by 5) sex1;
  format sex1 sex.;
  title 'SixCity -- Table4: Model five, Censoring on 29th of Feb.
1992';
run;

```

```

data temp2;
  set temp;

if hi_bp = 0;

proc phreg nosummary;
  model timeon1*dead1(0) = curr cig1 cpack fsmoke fpack edd bmi
occu pm2_5/r1;
  strata age_1 (25 to 75 by 5) sex1;
  format sex1 sex.;
  title1 'SixCity -- Table4: Model five -- excluding subjects
with hypertension';
  title2 '                               Censoring on 30th of
June, 1991';

```

```

proc phreg nosummary;
  model timeon2*dead2(0) = curr cig1 cpack fsmoke fpack edd bmi
occu pm2_5/r1;
  strata age_1 (25 to 75 by 5) sex1;
  format sex1 sex.;
  title1 'SixCity -- Table4: Model five -- excluding subjects
with hypertension';
  title2 '                               Censoring on 29th of
Feb. 1992';
run;

```

```

data temp3;
  set temp;

if diab = 0;

proc phreg nosummary;
  model timeon1*dead1(0) = curr cig1 cpack fsmoke fpack edd bmi
occu pm2_5/r1;
  strata age_1 (25 to 75 by 5) sex1;
  format sex1 sex.;
  title1 'SixCity -- Table4: Model five -- excluding subjects
with diabetes';
  title2 '                               Censoring on 30th of
June, 1991';

```

```

proc phreg nosummary;
  model timeon2*dead2(0) = curr cig1 cpack fsmoke fpack edd bmi
occu pm2_5/r1;
  strata age_1 (25 to 75 by 5) sex1;
  format sex1 sex.;
  title1 'SixCity -- Table4: Model five -- excluding subjects
with diabetes';
  title2 '                               Censoring on 29th of

```

Feb. 1992';  
run;

**Output #4a:**  
**Original Data**

Tbale4: Model one

The PHREG Procedure

Data Set: WORK.TEMP

Dependent Variable: TIMEON Time on study (years)

Censoring Variable: DEAD Dead (1=yes)

Censoring Value(s): 0

Ties Handling: BRESLOW

Summary of the Number of Event and Censored Values

Stratum	AGE_1	SEX1	Total	Event	Censored	Percent Censored
1	27.5	Female	448	3	445	99.33
2	27.5	Male	368	8	360	97.83
3	32.5	Female	388	4	384	98.97
4	32.5	Male	353	9	344	97.45
5	37.5	Female	362	10	352	97.24
6	37.5	Male	304	14	290	95.39
7	42.5	Female	374	14	360	96.26
8	42.5	Male	324	25	299	92.28
9	47.5	Female	575	39	536	93.22
10	47.5	Male	462	62	400	86.58
11	52.5	Female	613	59	554	90.38
12	52.5	Male	490	79	411	83.88
13	57.5	Female	513	89	424	82.65
14	57.5	Male	423	125	298	70.45
15	62.5	Female	494	120	374	75.71
16	62.5	Male	395	173	222	56.20
17	67.5	Female	404	139	265	65.59
18	67.5	Male	331	187	144	43.50
19	72.5	Female	269	122	147	54.65
20	72.5	Male	221	149	72	32.58
Total			8111	1430	6681	82.37

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	16218.761	16206.676	12.085 with 1 DF (p=0.0005)
Wald	.	.	12.330 with 1 DF (p=0.0004)
			12.306 with 1 DF (p=0.0005)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
PM2_5	1	0.267812	0.07634	12.30552	0.0005

Tbale4: Model one

The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
PM2_5	1.307	1.125	1.518	PM2_5 (ug/m3)/18.6 (range)

Table4: Model two

The PHREG Procedure

Data Set: WORK.TEMP  
 Dependent Variable: TIMEON      Time on study (years)  
 Censoring Variable: DEAD      Dead (1=yes)  
 Censoring Value(s): 0  
 Ties Handling: BRESLOW

Summary of the Number of Event and Censored Values

Stratum	AGE_1	SEX1	Total	Event	Censored	Percent Censored
1	27.5	Female	448	3	445	99.33
2	27.5	Male	368	8	360	97.83
3	32.5	Female	388	4	384	98.97
4	32.5	Male	353	9	344	97.45
5	37.5	Female	362	10	352	97.24
6	37.5	Male	304	14	290	95.39
7	42.5	Female	374	14	360	96.26
8	42.5	Male	324	25	299	92.28
9	47.5	Female	575	39	536	93.22
10	47.5	Male	461	62	399	86.55
11	52.5	Female	613	59	554	90.38
12	52.5	Male	490	79	411	83.88
13	57.5	Female	513	89	424	82.65
14	57.5	Male	423	125	298	70.45
15	62.5	Female	494	120	374	75.71
16	62.5	Male	395	173	222	56.20
17	67.5	Female	404	139	265	65.59
18	67.5	Male	331	187	144	43.50
19	72.5	Female	269	122	147	54.65
20	72.5	Male	221	149	72	32.58
Total			8110	1430	6680	82.37

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L	16218.443	16026.364	192.079 with 5 DF (p=0.0001)
Score	.	.	213.117 with 5 DF (p=0.0001)
Wald	.	.	205.397 with 5 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.430698	0.09695	19.73700	0.0001
CPACK	1	0.009550	0.00181	27.72676	0.0001
FSMOKE	1	0.170980	0.08766	3.80446	0.0511
FPACK	1	0.007598	0.00158	23.11331	0.0001
PM2_5	1	0.251722	0.07655	10.81294	0.0010

Table4: Model two

The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.538	1.272	1.860	Current smoker (1=yes)
CPACK	1.010	1.006	1.013	Current(currcig1=1) smoker packyrs
FSMOKE	1.186	0.999	1.409	Former smoker (1=yes)
FPACK	1.008	1.005	1.011	Former smoker(fsmoke=1) packyrs
PM2_5	1.286	1.107	1.494	PM2_5 (ug/m3)/18.6 (range)

Table4: Model three

The PHREG Procedure

Data Set: WORK.TEMP

Dependent Variable: TIMEON Time on study (years)

Censoring Variable: DEAD Dead (1=yes)

Censoring Value(s): 0

Ties Handling: BRESLOW

Summary of the Number of Event and Censored Values

Stratum	AGE_1	SEX1	Total	Event	Censored	Percent Censored
1	27.5	Female	448	3	445	99.33
2	27.5	Male	368	8	360	97.83
3	32.5	Female	388	4	384	98.97
4	32.5	Male	353	9	344	97.45
5	37.5	Female	362	10	352	97.24
6	37.5	Male	304	14	290	95.39
7	42.5	Female	374	14	360	96.26
8	42.5	Male	324	25	299	92.28
9	47.5	Female	575	39	536	93.22
10	47.5	Male	461	62	399	86.55
11	52.5	Female	613	59	554	90.38
12	52.5	Male	490	79	411	83.88
13	57.5	Female	513	89	424	82.65
14	57.5	Male	423	125	298	70.45
15	62.5	Female	494	120	374	75.71

16	62.5	Male	395	173	222	56.20
17	67.5	Female	404	139	265	65.59
18	67.5	Male	331	187	144	43.50
19	72.5	Female	269	122	147	54.65
20	72.5	Male	221	149	72	32.58
-----						
Total			8110	1430	6680	82.37

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	16218.443	16015.088	203.355 with 6 DF (p=0.0001)
Wald	.	.	224.148 with 6 DF (p=0.0001)
			216.104 with 6 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.429926	0.09694	19.67073	0.0001
CPACK	1	0.009396	0.00181	26.86615	0.0001
FSMOKE	1	0.172608	0.08782	3.86299	0.0494
FPACK	1	0.007361	0.00159	21.48773	0.0001
EDD	1	0.185979	0.05524	11.33342	0.0008
PM2_5	1	0.231958	0.07717	9.03390	0.0027

Table4: Model three

The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.537	1.271	1.859	Current smoker (1=yes)
CPACK	1.009	1.006	1.013	Current(currcig1=1) smoker packyrs
FSMOKE	1.188	1.000	1.412	Former smoker (1=yes)
FPACK	1.007	1.004	1.011	Former smoker(fsmoke=1) packyrs
EDD	1.204	1.081	1.342	< HS (1=yes)
PM2_5	1.261	1.084	1.467	PM2_5 (ug/m3)/18.6 (range)

Table4: Model four

The PHREG Procedure

Data Set: WORK.TEMP  
 Dependent Variable: TIMEON Time on study (years)  
 Censoring Variable: DEAD Dead (1=yes)  
 Censoring Value(s): 0  
 Ties Handling: BRESLOW



Summary of the Number of Event and Censored Values

Stratum	AGE_1	SEX1	Total	Event	Censored	Percent Censored
1	27.5	Female	447	3	444	99.33
2	27.5	Male	367	8	359	97.82
3	32.5	Female	387	4	383	98.97
4	32.5	Male	353	9	344	97.45
5	37.5	Female	360	10	350	97.22
6	37.5	Male	304	14	290	95.39
7	42.5	Female	374	14	360	96.26
8	42.5	Male	324	25	299	92.28
9	47.5	Female	573	39	534	93.19
10	47.5	Male	461	62	399	86.55
11	52.5	Female	612	59	553	90.36
12	52.5	Male	490	79	411	83.88
13	57.5	Female	511	89	422	82.58
14	57.5	Male	423	125	298	70.45
15	62.5	Female	493	120	373	75.66
16	62.5	Male	395	173	222	56.20
17	67.5	Female	403	139	264	65.51
18	67.5	Male	330	186	144	43.64
19	72.5	Female	268	122	146	54.48
20	72.5	Male	221	149	72	32.58
Total			8096	1429	6667	82.35

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	16203.335	15993.344	209.991 with 7 DF (p=0.0001)
Wald			230.860 with 7 DF (p=0.0001)
			222.999 with 7 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.461424	0.09745	22.42195	0.0001
CPACK	1	0.009331	0.00180	26.79224	0.0001
FSMOKE	1	0.183392	0.08797	4.34599	0.0371
FPACK	1	0.007199	0.00159	20.56959	0.0001
EDD	1	0.176328	0.05534	10.15348	0.0014
BMI	1	0.016810	0.00623	7.28783	0.0069
PM2_5	1	0.230935	0.07705	8.98394	0.0027

Table4: Model four

The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.586	1.311	1.920	Current smoker (1=yes)
CPACK	1.009	1.006	1.013	Current(currcig1=1) smoker packyrs
FSMOKE	1.201	1.011	1.427	Former smoker (1=yes)
FPAK	1.007	1.004	1.010	Former smoker(fsmoke=1) packyrs
EDD	1.193	1.070	1.329	< HS (1=yes)
BMI	1.017	1.005	1.029	Body Mass Index (kg/m**2)
PM2_5	1.260	1.083	1.465	PM2_5 (ug/m3)/18.6 (range)

Table4: Model five  
The PHREG Procedure

Data Set: WORK.TEMP

Dependent Variable: TIMEON Time on study (years)

Censoring Variable: DEAD Dead (1=yes)

Censoring Value(s): 0

Ties Handling: BRESLOW

Summary of the Number of Event and Censored Values

Stratum	AGE_1	SEX1	Total	Event	Censored	Percent Censored
1	27.5	Female	447	3	444	99.33
2	27.5	Male	367	8	359	97.82
3	32.5	Female	387	4	383	98.97
4	32.5	Male	353	9	344	97.45
5	37.5	Female	360	10	350	97.22
6	37.5	Male	304	14	290	95.39
7	42.5	Female	374	14	360	96.26
8	42.5	Male	324	25	299	92.28
9	47.5	Female	573	39	534	93.19
10	47.5	Male	461	62	399	86.55
11	52.5	Female	612	59	553	90.36
12	52.5	Male	490	79	411	83.88
13	57.5	Female	511	89	422	82.58
14	57.5	Male	423	125	298	70.45
15	62.5	Female	493	120	373	75.66
16	62.5	Male	395	173	222	56.20
17	67.5	Female	403	139	264	65.51
18	67.5	Male	330	186	144	43.64
19	72.5	Female	268	122	146	54.48
20	72.5	Male	221	149	72	32.58
Total			8096	1429	6667	82.35

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	16203.335	15991.843	211.492 with 8 DF (p=0.0001)
Wald	.	.	232.370 with 8 DF (p=0.0001)
			224.694 with 8 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.455119	0.09755	21.76783	0.0001
CPACK	1	0.009360	0.00180	27.01262	0.0001
FSMOKE	1	0.179078	0.08801	4.14064	0.0419
FPACK	1	0.007162	0.00158	20.44959	0.0001
EDD	1	0.164621	0.05614	8.59763	0.0034
BMI	1	0.016623	0.00623	7.11286	0.0077
OCCU	1	0.071710	0.05855	1.50022	0.2206
PM2_5	1	0.228521	0.07696	8.81793	0.0030

Table4: Model five  
The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.576	1.302	1.908	Current smoker (1=yes)
CPACK	1.009	1.006	1.013	Current(currrcig1=1) smoker packyrs
FSMOKE	1.196	1.007	1.421	Former smoker (1=yes)
FPACK	1.007	1.004	1.010	Former smoker(fsmoke=1) packyrs
EDD	1.179	1.056	1.316	< HS (1=yes)
BMI	1.017	1.004	1.029	Body Mass Index (kg/m**2)
OCCU	1.074	0.958	1.205	Occupation exposure (1=yes)
PM2_5	1.257	1.081	1.461	PM2_5 (ug/m3)/18.6 (range)

Table4: Model five -- excluding subjects with hypertension

The PHREG Procedure

Data Set: WORK.TEMP2

Dependent Variable: TIMEON Time on study (years)

Censoring Variable: DEAD Dead (1=yes)

Censoring Value(s): 0

Ties Handling: BRESLOW

Summary of the Number of Event and Censored Values

Stratum	AGE_1	SEX1	Total	Event	Censored	Percent Censored
1	27.5	Female	429	3	426	99.30
2	27.5	Male	352	8	344	97.73
3	32.5	Female	369	3	366	99.19
4	32.5	Male	337	8	329	97.63
5	37.5	Female	339	9	330	97.35
6	37.5	Male	275	12	263	95.64
7	42.5	Female	338	12	326	96.45
8	42.5	Male	296	21	275	92.91
9	47.5	Female	498	31	467	93.78

10	47.5	Male	401	44	357	89.03
11	52.5	Female	488	46	442	90.57
12	52.5	Male	402	61	341	84.83
13	57.5	Female	371	56	315	84.91
14	57.5	Male	319	84	235	73.67
15	62.5	Female	337	82	255	75.67
16	62.5	Male	291	117	174	59.79
17	67.5	Female	251	71	180	71.71
18	67.5	Male	247	139	108	43.72
19	72.5	Female	173	75	98	56.65
20	72.5	Male	144	96	48	33.33
Total			6657	978	5679	85.31

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	10554.186	10411.420	142.766 with 8 DF (p=0.0001)
Wald			155.549 with 8 DF (p=0.0001)
			150.314 with 8 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.481453	0.11577	17.29366	0.0001
CPACK	1	0.008339	0.00213	15.28606	0.0001
FSMOKE	1	0.149026	0.10688	1.94400	0.1632
FPACK	1	0.007049	0.00191	13.65231	0.0002
EDD	1	0.173727	0.06874	6.38785	0.0115
BMI	1	0.015621	0.00792	3.89302	0.0485
OCCU	1	0.034027	0.07086	0.23058	0.6311
PM2_5	1	0.223965	0.09295	5.80558	0.0160

Table4: Model five -- excluding subjects with hypertension

The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and 95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.618	1.290	2.031	Current smoker (1=yes)
CPACK	1.008	1.004	1.013	Current(curr cig1=1) smoker packyrs
FSMOKE	1.161	0.941	1.431	Former smoker (1=yes)
FPACK	1.007	1.003	1.011	Former smoker(fsmoke=1) packyrs
EDD	1.190	1.040	1.361	< HS (1=yes)
BMI	1.016	1.000	1.032	Body Mass Index (kg/m**2)
OCCU	1.035	0.900	1.189	Occupation exposure (1=yes)
PM2_5	1.251	1.043	1.501	PM2_5 (ug/m3)/18.6 (range)

Table4: Model five -- excluding subjects with diabetes

The PHREG Procedure

Data Set: WORK.TEMP3

Dependent Variable: TIMEON Time on study (years)

Censoring Variable: DEAD Dead (1=yes)

Censoring Value(s): 0

Ties Handling: BRESLOW

Summary of the Number of Event and Censored Values

Stratum	AGE_1	SEX1	Total	Event	Censored	Percent Censored
1	27.5	Female	429	3	426	99.30
2	27.5	Male	358	7	351	98.04
3	32.5	Female	371	3	368	99.19
4	32.5	Male	340	9	331	97.35
5	37.5	Female	347	10	337	97.12
6	37.5	Male	292	12	280	95.89
7	42.5	Female	354	14	340	96.05
8	42.5	Male	310	21	289	93.23
9	47.5	Female	523	34	489	93.50
10	47.5	Male	438	53	385	87.90
11	52.5	Female	564	48	516	91.49
12	52.5	Male	452	70	382	84.51
13	57.5	Female	483	78	405	83.85
14	57.5	Male	378	102	276	73.02
15	62.5	Female	451	103	348	77.16
16	62.5	Male	351	146	205	58.40
17	67.5	Female	361	117	244	67.59
18	67.5	Male	292	159	133	45.55
19	72.5	Female	234	101	133	56.84
20	72.5	Male	205	136	69	33.66
Total			7533	1226	6307	83.72

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	13671.347	13469.577	201.770 with 8 DF (p=0.0001)
Wald			221.378 with 8 DF (p=0.0001)
			212.631 with 8 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.524872	0.10575	24.63515	0.0001
CPACK	1	0.009606	0.00195	24.37772	0.0001
FSMOKE	1	0.255097	0.09519	7.18210	0.0074
FPAK	1	0.006668	0.00171	15.17420	0.0001
EDD	1	0.165698	0.06057	7.48449	0.0062
BMI	1	0.010306	0.00700	2.17041	0.1407
OCCU	1	0.048961	0.06343	0.59578	0.4402

PM2\_5            1            0.252007            0.08349            9.11102            0.0025

Table4: Model five -- excluding subjects with diabetes

The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.690	1.374	2.080	Current smoker (1=yes)
CPACK	1.010	1.006	1.014	Current(currcig1=1) smoker packyrs
FSMOKE	1.291	1.071	1.555	Former smoker (1=yes)
FPACK	1.007	1.003	1.010	Former smoker(fsmoke=1) packyrs
EDD	1.180	1.048	1.329	< HS (1=yes)
BMI	1.010	0.997	1.024	Body Mass Index (kg/m**2)
OCCU	1.050	0.927	1.189	Occupation exposure (1=yes)
PM2_5	1.287	1.092	1.515	PM2_5 (ug/m3)/18.6 (range)

**Output 4b:**  
**Modified Data**  
**(Adjusted for Early Censoring)**

## The PHREG Procedure

Data Set: WORK.TEMP  
 Dependent Variable: TIMEON1  
 Censoring Variable: DEAD1  
 Censoring Value(s): 0  
 Ties Handling: BRESLOW

## Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	16261.283	16246.488	14.795 with 1 DF (p=0.0001)
Wald			15.129 with 1 DF (p=0.0001)
			15.093 with 1 DF (p=0.0001)

## Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
PM2_5	1	0.293734	0.07561	15.09255	0.0001

## Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
PM2_5	1.341	1.157	1.556	PM2_5 (ug/m3)/18.6 (range)

SixCity -- Table4: Model one, Censoring on 29th of Feb., 1992

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## The PHREG Procedure

Data Set: WORK.TEMP  
 Dependent Variable: TIMEON2  
 Censoring Variable: DEAD2  
 Censoring Value(s): 0  
 Ties Handling: BRESLOW

## Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	16604.083	16587.753	16.330 with 1 DF (p=0.0001)
Wald			16.716 with 1 DF (p=0.0001)
			16.672 with 1 DF (p=0.0001)

## Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
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PM2\_5 1 0.304655 0.07461 16.67211 0.0001

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
PM2_5	1.356	1.172	1.570	PM2_5 (ug/m3)/18.6 (range)

SixCity -- Table4: Model two, Censoring on 30th of June, 1991 127

The PHREG Procedure

Data Set: WORK.TEMP  
Dependent Variable: TIMEON1  
Censoring Variable: DEAD1  
Censoring Value(s): 0  
Ties Handling: BRESLOW

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	16260.957	16051.777	209.180 with 5 DF (p=0.0001)
Wald	.	.	232.083 with 5 DF (p=0.0001)
			223.128 with 5 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.473562	0.09614	24.26093	0.0001
CPACK	1	0.009441	0.00180	27.56243	0.0001
FSMOKE	1	0.183779	0.08735	4.42606	0.0354
FPAK	1	0.007460	0.00158	22.28519	0.0001
PM2_5	1	0.282898	0.07579	13.93174	0.0002

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.606	1.330	1.939	Current smoker (1=yes)
CPACK	1.009	1.006	1.013	Current(currcig1=1) smoker packyrs
FSMOKE	1.202	1.013	1.426	Former smoker (1=yes)
FPAK	1.007	1.004	1.011	Former smoker(fsmoke=1) packyrs
PM2_5	1.327	1.144	1.539	PM2_5 (ug/m3)/18.6 (range)

SixCity -- Table4: Model two, Censoring on 29th of Feb. 1992 128

The PHREG Procedure

Data Set: WORK.TEMP  
Dependent Variable: TIMEON2

Censoring Variable: DEAD2  
 Censoring Value(s): 0  
 Ties Handling: BRESLOW

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	16603.762	16386.074	217.689 with 5 DF (p=0.0001)
Wald			241.123 with 5 DF (p=0.0001)
			231.989 with 5 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.477682	0.09533	25.10711	0.0001
CPACK	1	0.009459	0.00179	28.07546	0.0001
FSMOKE	1	0.189230	0.08620	4.81884	0.0282
FPACK	1	0.007844	0.00154	25.82504	0.0001
PM2_5	1	0.293396	0.07482	15.37648	0.0001

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and 95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.612	1.338	1.944	Current smoker (1=yes)
CPACK	1.010	1.006	1.013	Current(currcig1=1) smoker packyrs
FSMOKE	1.208	1.020	1.431	Former smoker (1=yes)
FPACK	1.008	1.005	1.011	Former smoker(fsmoke=1) packyrs
PM2_5	1.341	1.158	1.553	PM2_5 (ug/m3)/18.6 (range)

SixCity -- Table4: Model three, Censoring on 30th of June, 1991 129

The PHREG Procedure

Data Set: WORK.TEMP  
 Dependent Variable: TIMEON1  
 Censoring Variable: DEAD1  
 Censoring Value(s): 0  
 Ties Handling: BRESLOW

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	16260.957	16034.998	225.959 with 6 DF (p=0.0001)
Wald			248.670 with 6 DF (p=0.0001)
			239.268 with 6 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
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CURRCIG1	1	0.473070	0.09615	24.20615	0.0001
CPACK	1	0.009263	0.00180	26.54489	0.0001
FSMOKE	1	0.186653	0.08753	4.54729	0.0330
FPACK	1	0.007174	0.00159	20.40248	0.0001
EDD	1	0.226214	0.05505	16.88466	0.0001
PM2_5	1	0.258513	0.07649	11.42347	0.0007

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.605	1.329	1.938	Current smoker (1=yes)
CPACK	1.009	1.006	1.013	Current(currrcig1=1) smoker packyrs
FSMOKE	1.205	1.015	1.431	Former smoker (1=yes)
FPACK	1.007	1.004	1.010	Former smoker(fsmoke=1) packyrs
EDD	1.254	1.126	1.397	< HS (1=yes)
PM2_5	1.295	1.115	1.504	PM2_5 (ug/m3)/18.6 (range)

SixCity -- Table4: Model three, Censoring on 29th of Feb. 1992

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The PHREG Procedure

Data Set: WORK.TEMP  
 Dependent Variable: TIMEON2  
 Censoring Variable: DEAD2  
 Censoring Value(s): 0  
 Ties Handling: BRESLOW

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	16603.762	16368.894	234.869 with 6 DF (p=0.0001)
Wald	.	.	258.101 with 6 DF (p=0.0001)
			248.486 with 6 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.476663	0.09533	24.99934	0.0001
CPACK	1	0.009299	0.00178	27.15295	0.0001
FSMOKE	1	0.192046	0.08637	4.94434	0.0262
FPACK	1	0.007574	0.00155	23.84657	0.0001
EDD	1	0.226709	0.05452	17.29401	0.0001
PM2_5	1	0.268267	0.07552	12.61691	0.0004

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.611	1.336	1.942	Current smoker (1=yes)
CPACK	1.009	1.006	1.013	Current(currrcig1=1) smoker packyrs

FSMOKE	1.212	1.023	1.435	Former smoker (1=yes)	
FPACK	1.008	1.005	1.011	Former smoker(fsmoke=1) packyrs	
EDD	1.254	1.127	1.396	< HS (1=yes)	
PM2_5	1.308	1.128	1.516	PM2_5 (ug/m3)/18.6 (range)	

SixCity -- Table4: Model four, Censoring on 30th of June, 1991 131

The PHREG Procedure

Data Set: WORK.TEMP  
 Dependent Variable: TIMEON1  
 Censoring Variable: DEAD1  
 Censoring Value(s): 0  
 Ties Handling: BRESLOW.

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L	16245.703	16010.948	234.755 with 7 DF (p=0.0001)
Score			257.463 with 7 DF (p=0.0001)
Wald			248.236 with 7 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.510631	0.09669	27.88818	0.0001
CPACK	1	0.009177	0.00179	26.41371	0.0001
FSMOKE	1	0.200061	0.08771	5.20325	0.0225
FPACK	1	0.006970	0.00159	19.26810	0.0001
EDD	1	0.216830	0.05511	15.48236	0.0001
BMI	1	0.019236	0.00622	9.55573	0.0020
PM2_5	1	0.256754	0.07634	11.31044	0.0008

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.666	1.379	2.014	Current smoker (1=yes)
CPACK	1.009	1.006	1.013	Current(currrcig1=1) smoker packyrs
FSMOKE	1.221	1.029	1.451	Former smoker (1=yes)
FPACK	1.007	1.004	1.010	Former smoker(fsmoke=1) packyrs
EDD	1.242	1.115	1.384	< HS (1=yes)
BMI	1.019	1.007	1.032	Body Mass Index (kg/m**2)
PM2_5	1.293	1.113	1.501	PM2_5 (ug/m3)/18.6 (range)

SixCity -- Table4: Model four, Censoring on 29th of Feb. 1992 132

The PHREG Procedure

Data Set: WORK.TEMP  
 Dependent Variable: TIMEON2  
 Censoring Variable: DEAD2  
 Censoring Value(s): 0  
 Ties Handling: BRESLOW

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	16588.435	16342.802	245.633 with 7 DF (p=0.0001)
Wald	.	.	268.954 with 7 DF (p=0.0001)
			259.566 with 7 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.517819	0.09585	29.18865	0.0001
CPACK	1	0.009203	0.00177	27.00281	0.0001
FSMOKE	1	0.207122	0.08655	5.72667	0.0167
FPACK	1	0.007344	0.00155	22.43202	0.0001
EDD	1	0.216490	0.05457	15.73970	0.0001
BMI	1	0.020896	0.00613	11.60879	0.0007
PM2_5	1	0.265901	0.07537	12.44517	0.0004

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and 95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.678	1.391	2.025	Current smoker (1=yes)
CPACK	1.009	1.006	1.013	Current(currrcig1=1) smoker packyrs
FSMOKE	1.230	1.038	1.458	Former smoker (1=yes)
FPACK	1.007	1.004	1.010	Former smoker(fsmoke=1) packyrs
EDD	1.242	1.116	1.382	< HS (1=yes)
BMI	1.021	1.009	1.033	Body Mass Index (kg/m**2)
PM2_5	1.305	1.125	1.512	PM2_5 (ug/m3)/18.6 (range)

SixCity -- Table4: Model five, Censoring on 30th of June, 1991

133

The PHREG Procedure

Data Set: WORK.TEMP  
 Dependent Variable: TIMEON1  
 Censoring Variable: DEAD1  
 Censoring Value(s): 0  
 Ties Handling: BRESLOW

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	16245.703	16009.866	235.837 with 8 DF (p=0.0001)
Wald	.	.	258.581 with 8 DF (p=0.0001)
			249.541 with 8 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.505094	0.09680	27.22395	0.0001

CPACK	1	0.009200	0.00178	26.59874	0.0001
FSMOKE	1	0.196472	0.08774	5.01400	0.0251
FPACK	1	0.006935	0.00159	19.13955	0.0001
EDD	1	0.207014	0.05590	13.71457	0.0002
BMI	1	0.019069	0.00623	9.37659	0.0022
OCCU	1	0.060604	0.05828	1.08123	0.2984
PM2_5	1	0.254985	0.07627	11.17758	0.0008

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.657	1.371	2.003	Current smoker (1=yes)
CPACK	1.009	1.006	1.013	Current(currcig1=1) smoker packyrs
FSMOKE	1.217	1.025	1.445	Former smoker (1=yes)
FPACK	1.007	1.004	1.010	Former smoker(fsmoke=1) packyrs
EDD	1.230	1.102	1.372	< HS (1=yes)
BMI	1.019	1.007	1.032	Body Mass Index (kg/m**2)
OCCU	1.062	0.948	1.191	Occupation exposure (1=yes)
PM2_5	1.290	1.111	1.499	PM2_5 (ug/m3)/18.6 (range)

SixCity -- Table4: Model five, Censoring on 29th of Feb. 1992

134

The PHREG Procedure

Data Set: WORK.TEMP  
Dependent Variable: TIMEON2  
Censoring Variable: DEAD2  
Censoring Value(s): 0  
Ties Handling: BRESLOW

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	16588.435	16342.045	246.389 with 8 DF (p=0.0001)
Wald	.	.	269.758 with 8 DF (p=0.0001)
			260.541 with 8 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.513271	0.09596	28.61245	0.0001
CPACK	1	0.009223	0.00177	27.16936	0.0001
FSMOKE	1	0.204289	0.08659	5.56648	0.0183
FPACK	1	0.007314	0.00155	22.31220	0.0001
EDD	1	0.208392	0.05535	14.17524	0.0002
BMI	1	0.020753	0.00614	11.43397	0.0007
OCCU	1	0.050117	0.05764	0.75598	0.3846
PM2_5	1	0.264480	0.07531	12.33271	0.0004

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.671	1.384	2.016	Current smoker (1=yes)
CPACK	1.009	1.006	1.013	Current(currcig1=1) smoker packyrs
FSMOKE	1.227	1.035	1.454	Former smoker (1=yes)
FPACK	1.007	1.004	1.010	Former smoker(fsmoke=1) packyrs
EDD	1.232	1.105	1.373	< HS (1=yes)
BMI	1.021	1.009	1.033	Body Mass Index (kg/m**2)
OCCU	1.051	0.939	1.177	Occupation exposure (1=yes)
PM2_5	1.303	1.124	1.510	PM2_5 (ug/m3)/18.6 (range)
SixCity -- Table4: Model five -- excluding subjects with hypertension Censoring on 30th of June, 1991				

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## The PHREG Procedure

Data Set: WORK.TEMP2  
 Dependent Variable: TIMEON1  
 Censoring Variable: DEAD1  
 Censoring Value(s): 0  
 Ties Handling: BRESLOW

## Testing Global Null Hypothesis: BETA=0.

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	10560.306	10401.086	159.220 with 8 DF (p=0.0001)
Wald	.	.	173.560 with 8 DF (p=0.0001)
			167.358 with 8 DF (p=0.0001)

## Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.523691	0.11472	20.83784	0.0001
CPACK	1	0.008208	0.00211	15.12372	0.0001
FSMOKE	1	0.156411	0.10671	2.14828	0.1427
FPACK	1	0.006852	0.00191	12.81564	0.0003
EDD	1	0.214718	0.06853	9.81704	0.0017
BMI	1	0.016567	0.00792	4.38115	0.0363
OCCU	1	0.013234	0.07062	0.03512	0.8513
PM2_5	1	0.264940	0.09223	8.25252	0.0041

## Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.688	1.348	2.114	Current smoker (1=yes)
CPACK	1.008	1.004	1.012	Current(currcig1=1) smoker packyrs
FSMOKE	1.169	0.949	1.441	Former smoker (1=yes)
FPACK	1.007	1.003	1.011	Former smoker(fsmoke=1) packyrs
EDD	1.240	1.084	1.418	< HS (1=yes)
BMI	1.017	1.001	1.033	Body Mass Index (kg/m**2)
OCCU	1.013	0.882	1.164	Occupation exposure (1=yes)
PM2_5	1.303	1.088	1.562	PM2_5 (ug/m3)/18.6 (range)
SixCity -- Table4: Model five -- excluding subjects with hypertension Censoring on 29th of Feb. 1992				

136

The PHREG Procedure

Data Set: WORK.TEMP2  
 Dependent Variable: TIMEON2  
 Censoring Variable: DEAD2  
 Censoring Value(s): 0  
 Ties Handling: BRESLOW

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	10795.576	10628.983	166.593 with 8 DF (p=0.0001)
Wald	.	.	181.550 with 8 DF (p=0.0001)
			174.926 with 8 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.531430	0.11373	21.83375	0.0001
CPACK	1	0.008439	0.00209	16.30109	0.0001
FSMOKE	1	0.176733	0.10521	2.82197	0.0930
FPACK	1	0.007233	0.00187	15.02419	0.0001
EDD	1	0.213113	0.06784	9.86890	0.0017
BMI	1	0.016940	0.00782	4.69809	0.0302
OCCU	1	0.005208	0.06977	0.00557	0.9405
PM2_5	1	0.258252	0.09124	8.01123	0.0046

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.701	1.361	2.126	Current smoker (1=yes)
CPACK	1.008	1.004	1.013	Current(currcig1=1) smoker packyrs
FSMOKE	1.193	0.971	1.467	Former smoker (1=yes)
FPACK	1.007	1.004	1.011	Former smoker(fsmoke=1) packyrs
EDD	1.238	1.083	1.414	< HS (1=yes)
BMI	1.017	1.002	1.033	Body Mass Index (kg/m**2)
OCCU	1.005	0.877	1.153	Occupation exposure (1=yes)
PM2_5	1.295	1.083	1.548	PM2_5 (ug/m3)/18.6 (range)

SixCity -- Table4: Model five -- excluding subjects with diabetes  
 Censoring on 30th of June, 1991

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The PHREG Procedure

Data Set: WORK.TEMP3  
 Dependent Variable: TIMEON1  
 Censoring Variable: DEAD1  
 Censoring Value(s): 0  
 Ties Handling: BRESLOW

Testing Global Null Hypothesis: BETA=0



Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	13721.924	13498.602	223.322 with 8 DF (p=0.0001)
Wald	.	.	245.400 with 8 DF (p=0.0001)
			235.171 with 8 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.566214	0.10455	29.32906	0.0001
CPACK	1	0.009604	0.00192	25.08288	0.0001
FSMOKE	1	0.264711	0.09488	7.78380	0.0053
FPACK	1	0.006522	0.00171	14.54413	0.0001
EDD	1	0.206965	0.06026	11.79463	0.0006
BMI	1	0.012750	0.00701	3.31206	0.0688
OCCU	1	0.032444	0.06306	0.26468	0.6069
PM2_5	1	0.279040	0.08271	11.38249	0.0007

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and 95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.762	1.435	2.162	Current smoker (1=yes)
CPACK	1.010	1.006	1.013	Current(currcig1=1) smoker packyrs
FSMOKE	1.303	1.082	1.569	Former smoker (1=yes)
FPACK	1.007	1.003	1.010	Former smoker(fsmoke=1) packyrs
EDD	1.230	1.093	1.384	< HS (1=yes)
BMI	1.013	0.999	1.027	Body Mass Index (kg/m**2)
OCCU	1.033	0.913	1.169	Occupation exposure (1=yes)
PM2_5	1.322	1.124	1.554	PM2_5 (ug/m3)/18.6 (range)

SixCity -- Table4: Model five -- excluding subjects with diabetes  
Censoring on 29th of Feb. 1992

138

The PHREG Procedure

Data Set: WORK.TEMP3  
Dependent Variable: TIMEON2  
Censoring Variable: DEAD2  
Censoring Value(s): 0  
Ties Handling: BRESLOW

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	14029.982	13799.941	230.041 with 8 DF (p=0.0001)
Wald	.	.	252.537 with 8 DF (p=0.0001)
			242.134 with 8 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
----------	----	--------------------	----------------	-----------------	-----------------

CURRCIG1	1	0.567693	0.10361	30.02376	0.0001
CPACK	1	0.009682	0.00190	25.97334	0.0001
FSMOKE	1	0.272875	0.09358	8.50208	0.0035
FPACK	1	0.006740	0.00168	16.08072	0.0001
EDD	1	0.206846	0.05965	12.02637	0.0005
BMI	1	0.013770	0.00691	3.97008	0.0463
OCCU	1	0.020070	0.06233	0.10368	0.7475
PM2_5	1	0.286679	0.08162	12.33730	0.0004

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.764	1.440	2.161	Current smoker (1=yes)
CPACK	1.010	1.006	1.013	Current(curr cig1=1) smoker packyrs
FSMOKE	1.314	1.094	1.578	Former smoker (1=yes)
FPACK	1.007	1.003	1.010	Former smoker(fsmoke=1) packyrs
EDD	1.230	1.094	1.382	< HS (1=yes)
BMI	1.014	1.000	1.028	Body Mass Index (kg/m**2)
OCCU	1.020	0.903	1.153	Occupation exposure (1=yes)
PM2_5	1.332	1.135	1.563	PM2_5 (ug/m3)/18.6 (range)

## **Program #5**

```

/*****
*
*   Repeat the results in
*   Six-Cities Study paper
*   (1993) -- Table Five
*
*****/

libname six '/home/yuanli/sixcity/';
libname fmo '/home/fmo/';

options nocenter ps=64 ls=80 obs=max;

proc format;
    value city 1 = 'Watertown'
              2 = 'Kingston/Harriman'
              4 = 'St. Louis'
              5 = 'Steubenville'
              6 = 'Portage'
              9 = 'Topeka'
              ;
    value sex 0 = 'Male'
             1 = 'Female'
             ;
    value dead 0 = 'alive'
              1 = 'dead'
              ;

data temp;
    set fmo.mort6c;

n_cpack = cpack/25;
n_fpack = fpack/20;

if code = 'lunc' then dead_l=1;else dead_l=0;
if code = 'carp' then dead_c=1;else dead_c=0;
if code = 'othe' then dead_o=1;else dead_o=0;

proc freq;
    table code*city dead_l dead_c dead_o;
    format city city. dead_l dead_c dead_o dead.;
    title 'Table5: Causes of Death';
run;

proc phreg data=temp;
    model timeon*dead(0) = currcig1 n_cpack fsmoke n_fpack edd bmi
    pm2_5/rl;

```

```

strata age_1 (25 to 75 by 5) sex1;
format sex1 sex.;
label  n_cpack = '25 Pack-years of smoking'
       n_fpack = '20 Pack-years of smoking';
title 'Table5: Cause of Death Model -- All';

proc phreg data=temp;
  model timeon*dead_c(0) = curr cig1 n_cpack fsmoke n_fpack edd
bmi pm2_5/r1;
  strata age_1 (25 to 75 by 5) sex1;
  format sex1 sex.;
  label  n_cpack = '25 Pack-years of smoking'
       n_fpack = '20 Pack-years of smoking';
  title 'Table5: Cause of Death Model -- Cardiopulmonary';

proc phreg data=temp;
  model timeon*dead_l(0) = curr cig1 n_cpack fsmoke n_fpack edd
bmi pm2_5/r1;
  strata age_1 (25 to 75 by 5) sex1;
  format sex1 sex.;
  label  n_cpack = '25 Pack-years of smoking'
       n_fpack = '20 Pack-years of smoking';
  title 'Table5: Cause of Death Model -- Lung Cancer';

proc phreg data=temp;
  model timeon*dead_o(0) = curr cig1 n_cpack fsmoke n_fpack edd
bmi pm2_5/r1;
  strata age_1 (25 to 75 by 5) sex1;
  format sex1 sex.;
  label  n_cpack = '25 Pack-years of smoking'
       n_fpack = '20 Pack-years of smoking';
  title 'Table5: Cause of Death Model -- All Others';
run;

```

```

/*****
*
*   Repeat the results in
*   Six-Cities Study paper
*   (1993) -- Tab5 Covaria
*
*****/

libname six '/home/yuanli/sixcity/';
libname fmo '/home/fmo/';

options nocenter ps=64 ls=80 obs=max;

proc format;
    value city 1 = 'Watertown'
              2 = 'Kingston/Harriman'
              4 = 'St. Louis'
              5 = 'Steubenville'
              6 = 'Portage'
              9 = 'Topeka'
              ;
    value sex 0 = 'Male'
             1 = 'Female'
             ;
    value dead 0 = 'alive'
              1 = 'dead'
              ;
/*
data temp;
    set fmo.mort6c;

n_cpack = cpack/25;
n_fpack = fpack/20;

if code = 'lunc' then dead_l=1;else dead_l=0;
if code = 'carp' then dead_c=1;else dead_c=0;
if code = 'othe' then dead_o=1;else dead_o=0;

proc freq;
    table code*city dead_l dead_c dead_o;
    format city city. dead_l dead_c dead_o dead.;
    title 'Table5: Causes of Death';
run;

proc phreg data=temp covout outest=six.covall;
    model timeon*dead(0) = currcig1 n_cpack fsmoke
n_fpack edd bmi pm2_5/r1;
    strata age_1 (25 to 75 by 5) sex1;

```

```

format sex1 sex.;
label  n_cpack = '25 Pack-years of smoking'
       n_fpack = '20 Pack-years of smoking';
title 'Table5: Cause of Death Model -- All';

proc phreg data=temp covout outest=six.covcar;
  model timeon*dead_c(0) = curr cig1 n_cpack fsmoke
n_fpack edd bmi pm2_5/r1;
  strata age_1 (25 to 75 by 5) sex1;
  format sex1 sex.;
  label  n_cpack = '25 Pack-years of smoking'
       n_fpack = '20 Pack-years of smoking';
  title 'Table5: Cause of Death Model --
Cardiopulmonary';

proc phreg data=temp covout outest=six.covlung;
  model timeon*dead_l(0) = curr cig1 n_cpack fsmoke
n_fpack edd bmi pm2_5/r1;
  strata age_1 (25 to 75 by 5) sex1;
  format sex1 sex.;
  label  n_cpack = '25 Pack-years of smoking'
       n_fpack = '20 Pack-years of smoking';
  title 'Table5: Cause of Death Model -- Lung
Cancer';

proc phreg data=temp covout outest=six.covoth;
  model timeon*dead_o(0) = curr cig1 n_cpack fsmoke
n_fpack edd bmi pm2_5/r1;
  strata age_1 (25 to 75 by 5) sex1;
  format sex1 sex.;
  label  n_cpack = '25 Pack-years of smoking'
       n_fpack = '20 Pack-years of smoking';
  title 'Table5: Cause of Death Model -- All Others';

run; */

proc print data=six.covall;
  title 'Covariance Matrix for All Causes of death
in Six-cities Study';
proc print data=six.covcar;
  title 'Covariance Matrix for Cardiopulmonary death
in Six-cities Study';
proc print data=six.covlung;
  title 'Covariance Matrix for Lung Cancer death in
Six-cities Study';
proc print data=six.covoth;
  title 'Covariance Matrix for All Other Causes of
death in Six-cities Study';

run;

```

```

/*****
*
* Replicate the results in the Six-Cities Study correspondence
* with Dockery's paper (1993) Table 5: Covariance Matrix for
* Smokers
*
*
*****/
libname six '/home/yuanli/sixcity/';
libname fmo '/home/fmo/';

options nocenter ps=64 ls=80 obs=max;

proc format;
  value city 1 = 'Watertown'
            2 = 'Kingston/Harriman'
            4 = 'St. Louis'
            5 = 'Steubenville'
            6 = 'Portage'
            9 = 'Topeka'
            ;
  value sex 0 = 'Male'
           1 = 'Female'
           ;
  value dead 0 = 'alive'
            1 = 'dead'
            ;

data temp;
  set fmo.mort6c;

n_cpck = cpck/25;
n_fpck = fpck/20;

if code = 'lunc' then dead_l=1;else dead_l=0;
if code = 'carp' then dead_c=1;else dead_c=0;
if code = 'othe' then dead_o=1;else dead_o=0;

proc freq;
  table code*city dead_l dead_c dead_o;
  format city city. dead_l dead_c dead_o dead.;
  title 'Table5: Causes of Death';
  run;

proc phreg data=temp covout outest=six.covall;
  model timeon*dead(0) = curr cig1 n_cpck fsmoke n_fpck edd bmi
  pm2_5/r1;
  strata age_1 (25 to 75 by 5) sex1;
  format sex1 sex.;
  label n_cpck = '25 Pack-years of smoking'

```



```

        n_fpack = '20 Pack-years of smoking';
title 'Table5: Cause of Death Model -- All';

proc phreg data=temp covout outest=six.covcar;
    model timeon*dead_c(0) = currcigl n_cpack fsmoke n_fpack edd bmi
pm2_5/r1;
    strata age_1 (25 to 75 by 5) sex1;
    format sex1 sex.;
    label n_cpack = '25 Pack-years of smoking'
        n_fpack = '20 Pack-years of smoking';
title 'Table5: Cause of Death Model -- Cardiopulmonary';

proc phreg data=temp covout outest=six.covlung;
    model timeon*dead_l(0) = currcigl n_cpack fsmoke n_fpack edd bmi
pm2_5/r1;
    strata age_1 (25 to 75 by 5) sex1;
    format sex1 sex.;
    label n_cpack = '25 Pack-years of smoking'
        n_fpack = '20 Pack-years of smoking';
title 'Table5: Cause of Death Model -- Lung Cancer';

proc phreg data=temp covout outest=six.covoth;
    model timeon*dead_o(0) = currcigl n_cpack fsmoke n_fpack edd bmi
pm2_5/r1;
    strata age_1 (25 to 75 by 5) sex1;
    format sex1 sex.;
    label n_cpack = '25 Pack-years of smoking'
        n_fpack = '20 Pack-years of smoking';
title 'Table5: Cause of Death Model -- All Others';
run;

proc print data=six.covall;
title 'Covariance Matrix for All Causes of death in Six-cities
Study';
proc print data=six.covcar;
title 'Covariance Matrix for Cardiopulmonary death in Six-cities
Study';
proc print data=six.covlung;
title 'Covariance Matrix for Lung Cancer death in Six-cities
Study';
proc print data=six.covoth;
title 'Covariance Matrix for All Other Causes of death in
Six-cities Study';
run;

```

```

/*****
*
*   Repeat the results in
*   Six-Cities Study paper
*   (1993) -- Tables1_5
*   Using New Censoring D.
*
*****/
libname six '/home/yuanli/sixcity/';
libname her './';

options nocenter ps=64 ls=80 obs=max;

proc format;
    value city 1 = 'Watertown'
              2 = 'Kin/Harriman'
              4 = 'St. Louis'
              5 = 'Steubenville'
              6 = 'Portage'
              9 = 'Topeka'
              ;
    value dead 0 = 'Alive'
              1 = 'Dead'
              ;
    value sex . 0 = 'Male'
              1 = 'Female'
              ;

* Table_1;

data temp1;
    set six.sc_newm;

    proc sort;by city;
    proc means n mean sum;
        class city;
        var timeon3;
        by city;
        format city city.;
run;

proc freq;
    table dead3*city/nopercent norow;
    format city city. sex1 sex.;
run;

* Table_2;

data temp;

```

```

set six.sc_newm;

n_bmi = bmi/4.52;
n_cpack = cpack/25;
n_fpack = fpack/20;

proc phreg nosummary;
  model timeon3*dead3(0) = currcig1 n_cpack fsmoke n_fpack edd
n_bmi top kin wat stl ste / rl;
  strata age_1 (25 to 75 by 5) sex1;
  format sex1 sex.;
label n_bmi = 'bmi/4.52'
      n_cpack = '25 Pack-years of smoking'
      n_fpack = '20 Pack-years of smoking';
  title 'SixCity -- Table2: New Censoring Cutoff Date';
run;

proc sort;by sex1;
proc phreg nosummary;
  model timeon3*dead3(0) = currcig1 n_cpack fsmoke n_fpack edd
n_bmi top kin wat stl ste / rl;
  strata age_1 (25 to 75 by 5);
  by sex1;
  format sex1 sex.;
label n_bmi = 'bmi/4.52'
      n_cpack = '25 Pack-years of smoking'
      n_fpack = '20 Pack-years of smoking';
  title1 'SixCity -- Table2: New Censoring Cutoff Date';
  title2 '          by Sex';
run;

* Table_3;

data temp;
  set six.sc_newm;

proc freq;table dead3;
proc phreg nosummary;
  model timeon3*dead3(0) = currcig1 cpack fsmoke fpack edd bmi
pm2_5 / rl;
  strata age_1 (25 to 75 by 5) sex1;
  format sex1 sex.;
  title 'SixCity -- Table3: New Censoring Date';
run;

data temp2;
  set temp;

if smokest = 'ns';

```

```

proc phreg nosummary;
  model timeon3*dead3(0) = edd bmi pm2_5/r1;
  strata age_1 (25 to 75 by 5) sex1;
  format sex1 sex.;
  title 'SixCity -- Table3: Nonsmoker, Censoring';

proc sort;by sex1;
proc phreg nosummary;
  model timeon3*dead3(0) = edd bmi pm2_5/r1;
  strata age_1 (25 to 75 by 5);
  by sex1;
proc freq;table dead3*sex1;
  format sex1 sex.;
  title 'SixCity -- Table3: Nonsmoker by Sex, Censoring';

data temp3;
  set temp;

if smokest = 'fs';

proc phreg nosummary;
  model timeon3*dead3(0) = edd bmi pm2_5/r1;
  strata age_1 (25 to 75 by 5) sex1;
  format sex1 sex.;
  title 'SixCity -- Table3: Former smoker, Censoring';

proc sort;by sex1;
proc phreg nosummary;
  model timeon3*dead3(0) = edd bmi pm2_5/r1;
  strata age_1 (25 to 75 by 5);
  by sex1;
proc freq;table dead3*sex1;
  format sex1 sex.;
  title 'SixCity -- Table3: Former smoker by Sex, Censoring';

data temp4;
  set temp;

if smokest = 'cs';

proc phreg nosummary;
  model timeon3*dead3(0) = edd bmi pm2_5/r1;
  strata age_1 (25 to 75 by 5) sex1;
  format sex1 sex.;
  title 'SixCity -- Table3: Current smoker, Censoring';

proc sort;by sex1;
proc phreg nosummary;
  model timeon3*dead3(0) = edd bmi pm2_5/r1;

```

```

    strata age_1 (25 to 75 by 5);
    by sex1;
proc freq;table dead3*sex1;
    format sex1 sex.;
    title 'SixCity -- Table3: Current smoker by Sex, Censoring';

data temp5;
    set temp;

if occu = 0;

proc phreg nosummary;
    model timeon3*dead3(0) = currcigl cpack fsmoke fpack edd bmi
pm2_5/r1;
    strata age_1 (25 to 75 by 5) sex1;
    format sex1 sex.;
    title 'SixCity -- Table3: No occupational exposure, Censoring';

proc sort;by sex1;
proc phreg nosummary;
    model timeon3*dead3(0) = currcigl cpack fsmoke fpack edd bmi
pm2_5/r1;
    strata age_1 (25 to 75 by 5);
    by sex1;
proc freq;table dead3*sex1;
    format sex1 sex.;
    title 'SixCity -- Table3: No occupational exposure by Sex,
Censoring';

data temp6;
    set temp;

if occu = 1;

proc phreg nosummary;
    model timeon3*dead3(0) = currcigl cpack fsmoke fpack edd bmi
pm2_5/r1;
    strata age_1 (25 to 75 by 5) sex1;
    format sex1 sex.;
    title 'SixCity -- Table3: Occupational exposure, Censoring';

proc sort;by sex1;
proc phreg nosummary;
    model timeon3*dead3(0) = currcigl cpack fsmoke fpack edd bmi
pm2_5/r1;
    strata age_1 (25 to 75 by 5);
    by sex1;
proc freq;table dead3*sex1;

```

```

format sex1 sex.;
title 'SixCity -- Table3: Occupational exposure by Sex,
Censoring';
run;

* Table_4;

data temp;
  set six.sc_newm;

proc phreg nosummary;
  model timeon3*dead3(0) = pm2_5/r1;
  strata age_1 (25 to 75 by 5) sex1;
  format sex1 sex.;
  title 'SixCity -- Table4: Model one, Censoring';

proc phreg nosummary;
  model timeon3*dead3(0) = curr cig1 cpack fsmoke fpack pm2_5/r1;
  strata age_1 (25 to 75 by 5) sex1;
  format sex1 sex.;
  title 'SixCity -- Table4: Model two, Censoring';

proc phreg nosummary;
  model timeon3*dead3(0) = curr cig1 cpack fsmoke fpack edd
pm2_5/r1;
  strata age_1 (25 to 75 by 5) sex1;
  format sex1 sex.;
  title 'SixCity -- Table4: Model three, Censoring';

proc phreg nosummary;
  model timeon3*dead3(0) = curr cig1 cpack fsmoke fpack edd bmi
pm2_5/r1;
  strata age_1 (25 to 75 by 5) sex1;
  format sex1 sex.;
  title 'SixCity -- Table4: Model four, Censoring';

proc phreg nosummary;
  model timeon3*dead3(0) = curr cig1 cpack fsmoke fpack edd bmi
occu pm2_5/r1;
  strata age_1 (25 to 75 by 5) sex1;
  format sex1 sex.;
  title 'SixCity -- Table4: Model five, Censoring';
run;

data temp2;
  set temp;

if hi_bp = 0;

```

```

proc phreg nosummary;
  model timeon3*dead3(0) = curr cig1 cpack fsmoke fpack edd bmi
occu pm2_5/r1;
  strata age_1 (25 to 75 by 5) sex1;
  format sex1 sex.;
  title1 'SixCity -- Table4: Model five -- excluding subjects
with hypertension';
  title2 '                                Censoring';
run;

```

```

data temp3;
  set temp;

```

```

if diab = 0;

```

```

proc phreg nosummary;
  model timeon3*dead3(0) = curr cig1 cpack fsmoke fpack edd bmi
occu pm2_5/r1;
  strata age_1 (25 to 75 by 5) sex1;
  format sex1 sex.;
  title1 'SixCity -- Table4: Model five -- excluding subjects
with diabetes';
  title2 '                                Censoring';
run;

```

```

* Table_5;

```

```

data temp1;
  set six.sc_newm;

```

```

n_cpack = cpack/25;
n_fpack = fpack/20;

```

```

if code1 = 'lunc' & dead3 = 1 then dead_l=1;else dead_l=0;
if code1 = 'carp' & dead3 = 1 then dead_c=1;else dead_c=0;
if code1 = 'othe' & dead3 = 1 then dead_o=1;else dead_o=0;

```

```

proc freq;
  table code1*city dead_l dead_c dead_o;
  format city city. dead_l dead_c dead_o dead.;
  title 'Table5: Causes of Death -- Marthas Cut-off Date';
run;

```

```

proc phreg nosummary data=temp1 covout outest=her.covall;
  model timeon3*dead3(0) = curr cig1 n_cpack fsmoke n_fpack edd
bmi pm2_5/r1;
  strata age_1 (25 to 75 by 5) sex1;

```

```

format sex1 sex.;
label  n_cpack = '25 Pack-years of smoking'
       n_fpack = '20 Pack-years of smoking';
title  'Table5: Cause of Death Model -- All, New C.';

proc phreg nosummary data=temp1 covout outest=her.covcar;
  model timeon3*dead_c(0) = curr cig1 n_cpack fsmoke n_fpack edd
bmi pm2_5/r1;
  strata age_1 (25 to 75 by 5) sex1;
  format sex1 sex.;
  label  n_cpack = '25 Pack-years of smoking'
       n_fpack = '20 Pack-years of smoking';
  title  'Table5: Cause of Death Model -- Cardiopulmonary, New
C.';

proc phreg nosummary data=temp1 covout outest=her.covlung;
  model timeon3*dead_l(0) = curr cig1 n_cpack fsmoke n_fpack edd
bmi pm2_5/r1;
  strata age_1 (25 to 75 by 5) sex1;
  format sex1 sex.;
  label  n_cpack = '25 Pack-years of smoking'
       n_fpack = '20 Pack-years of smoking';
  title  'Table5: Cause of Death Model -- Lung Cancer, New C.';

proc phreg nosummary data=temp1 covout outest=her.covoth;
  model timeon3*dead_o(0) = curr cig1 n_cpack fsmoke n_fpack edd
bmi pm2_5/r1;
  strata age_1 (25 to 75 by 5) sex1;
  format sex1 sex.;
  label  n_cpack = '25 Pack-years of smoking'
       n_fpack = '20 Pack-years of smoking';
  title  'Table5: Cause of Death Model -- All Others, New C.';
run;

proc print data = her.covall;
  title 'Table5: Cause of Death Model -- All, Covariance';
proc print data = her.covcar;
  title 'Table5: Cause of Death Model -- Cardiopulmonary,
Covariance';
proc print data = her.covlung;
  title 'Table5: Cause of Death Model -- Lung Cancer,
Covariance';
proc print data = her.covoth;
  title 'Table5: Cause of Death Model -- All Others,
Covariance';
run;

```



**Output #5a:**  
**Original Data**

Table5: Causes of Death

TABLE OF CODE BY CITY

CODE(carp/luncg/othe/miss/live)	CITY						Total
Frequency Percent Row Pct Col Pct	Watertow n	Kingston /Harrima n	St. Loui s	Steubenv ille	Portage	Topeka	
carp	130 1.60 17.47 9.73	128 1.58 17.20 10.17	151 1.86 20.30 11.65	152 1.87 20.43 11.25	117 1.44 15.73 7.17	66 0.81 8.87 5.33	744 9.17
live	1088 13.41 16.28 81.44	1036 12.77 15.51 82.35	1015 12.51 15.19 78.32	1060 13.07 15.87 78.46	1399 17.25 20.94 85.78	1083 13.35 16.21 87.41	6681 82.37
lunc	14 0.17 11.86 1.05	20 0.25 16.95 1.59	30 0.37 25.42 2.31	25 0.31 21.19 1.85	15 0.18 12.71 0.92	14 0.17 11.86 1.13	118 1.45
miss	9 0.11 31.03 0.67	3 0.04 10.34 0.24	2 0.02 6.90 0.15	12 0.15 41.38 0.89	2 0.02 6.90 0.12	1 0.01 3.45 0.08	29 0.36
othe	95 1.17 17.63 7.11	71 0.88 13.17 5.64	98 1.21 18.18 7.56	102 1.26 18.92 7.55	98 1.21 18.18 6.01	75 0.92 13.91 6.05	539 6.65
Total	1336 16.47	1258 15.51	1296 15.98	1351 16.66	1631 20.11	1239 15.28	8111 100.00

DEAD_L	Frequency	Percent	Cumulative Frequency	Cumulative Percent
alive	7993	98.5	7993	98.5
dead	118	1.5	8111	100.0

DEAD_C	Frequency	Percent	Cumulative Frequency	Cumulative Percent
alive	7367	90.8	7367	90.8
dead	744	9.2	8111	100.0

Table5: Causes of Death

DEAD_O	Frequency	Percent	Cumulative Frequency	Cumulative Percent
alive	7572	93.4	7572	93.4
dead	539	6.6	8111	100.0

Table5: Cause of Death Model -- All

The PHREG Procedure

Data Set: WORK.TEMP

Dependent Variable: TIMEON Time on study (years)

Censoring Variable: DEAD Dead (1=yes)

Censoring Value(s): 0

Ties Handling: BRESLOW

Summary of the Number of Event and Censored Values

Stratum	AGE_1	SEX1	Total	Event	Censored	Percent Censored
1	27.5	Female	447	3	444	99.33
2	27.5	Male	367	8	359	97.82
3	32.5	Female	387	4	383	98.97
4	32.5	Male	353	9	344	97.45
5	37.5	Female	360	10	350	97.22
6	37.5	Male	304	14	290	95.39
7	42.5	Female	374	14	360	96.26
8	42.5	Male	324	25	299	92.28
9	47.5	Female	573	39	534	93.19
10	47.5	Male	461	62	399	86.55
11	52.5	Female	612	59	553	90.36
12	52.5	Male	490	79	411	83.88
13	57.5	Female	511	89	422	82.58
14	57.5	Male	423	125	298	70.45
15	62.5	Female	493	120	373	75.66
16	62.5	Male	395	173	222	56.20
17	67.5	Female	403	139	264	65.51
18	67.5	Male	330	186	144	43.64
19	72.5	Female	268	122	146	54.48
20	72.5	Male	221	149	72	32.58
Total			8096	1429	6667	82.35

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L	16203.335	15993.344	209.991 with 7 DF (p=0.0001)
Score			230.860 with 7 DF (p=0.0001)
Wald			222.999 with 7 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Parameter	Standard	Wald	Pr >
-----------	----------	------	------

Variable	DF	Estimate	Error	Chi-Square	Chi-Square
CURRCIG1	1	0.461424	0.09745	22.42195	0.0001
N_CPACK	1	0.233285	0.04507	26.79224	0.0001
FSMOKE	1	0.183392	0.08797	4.34599	0.0371
N_FPACK	1	0.143985	0.03175	20.56959	0.0001
EDD	1	0.176328	0.05534	10.15348	0.0014
BMI	1	0.016810	0.00623	7.28783	0.0069
PM2_5	1	0.230935	0.07705	8.98394	0.0027

Table5: Cause of Death Model -- All  
The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.586	1.311	1.920	Current smoker (1=yes)
N_CPACK	1.263	1.156	1.379	25 Pack-years of smoking
FSMOKE	1.201	1.011	1.427	Former smoker (1=yes)
N_FPACK	1.155	1.085	1.229	20 Pack-years of smoking
EDD	1.193	1.070	1.329	< HS (1=yes)
BMI	1.017	1.005	1.029	Body Mass Index (kg/m**2)
PM2_5	1.260	1.083	1.465	PM2_5 (ug/m3)/18.6 (range)

Table5: Cause of Death Model -- Cardiopulmonary

The PHREG Procedure

Data Set: WORK.TEMP

Dependent Variable: TIMEON Time on study (years)

Censoring Variable: DEAD\_C

Censoring Value(s): 0

Ties Handling: BRESLOW

Summary of the Number of Event and Censored Values

Stratum	AGE_1	SEX1	Total	Event	Censored	Percent Censored
1	27.5	Female	447	0	447	100.00
2	27.5	Male	367	1	366	99.73
3	32.5	Female	387	1	386	99.74
4	32.5	Male	353	3	350	99.15
5	37.5	Female	360	2	358	99.44
6	37.5	Male	304	10	294	96.71
7	42.5	Female	374	6	368	98.40
8	42.5	Male	324	9	315	97.22
9	47.5	Female	573	12	561	97.91
10	47.5	Male	461	29	432	93.71
11	52.5	Female	612	18	594	97.06
12	52.5	Male	490	44	446	91.02
13	57.5	Female	511	37	474	92.76
14	57.5	Male	423	68	355	83.92

15	62.5	Female	493	55	438	88.84
16	62.5	Male	395	104	291	73.67
17	67.5	Female	403	80	323	80.15
18	67.5	Male	330	97	233	70.61
19	72.5	Female	268	75	193	72.01
20	72.5	Male	221	92	129	58.37
Total			8096	743	7353	90.82

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	8344.124	8210.109	134.015 with 7 DF (p=0.0001)
Wald			144.140 with 7 DF (p=0.0001)
			138.694 with 7 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.636691	0.13764	21.39806	0.0001
N_CPACK	1	0.196901	0.06221	10.01640	0.0016
FSMOKE	1	0.297268	0.12226	5.91160	0.0150
N_FPACK	1	0.119982	0.04338	7.64840	0.0057
EDD	1	0.213537	0.07614	7.86468	0.0050
BMI	1	0.018886	0.00871	4.70194	0.0301
PM2_5	1	0.312966	0.10608	8.70362	0.0032

Table5: Cause of Death Model -- Cardiopulmonary

The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.890	1.443	2.476	Current smoker (1=yes)
N_CPACK	1.218	1.078	1.376	25 Pack-years of smoking
FSMOKE	1.346	1.059	1.711	Former smoker (1=yes)
N_FPACK	1.127	1.036	1.228	20 Pack-years of smoking
EDD	1.238	1.066	1.437	< HS (1=yes)
BMI	1.019	1.002	1.037	Body Mass Index (kg/m**2)
PM2_5	1.367	1.111	1.684	PM2_5 (ug/m3)/18.6 (range)

Table5: Cause of Death Model -- Lung Cancer

The PHREG Procedure

Data Set: WORK.TEMP  
 Dependent Variable: TIMEON Time on study (years)  
 Censoring Variable: DEAD\_L  
 Censoring Value(s): 0  
 Ties Handling: BRESLOW

Summary of the Number of Event and Censored Values

Stratum	AGE_1	SEX1	Total	Event	Censored	Percent Censored
1	27.5	Female	447	1	446	99.78
2	27.5	Male	367	0	367	100.00
3	32.5	Female	387	0	387	100.00
4	32.5	Male	353	0	353	100.00
5	37.5	Female	360	1	359	99.72
6	37.5	Male	304	0	304	100.00
7	42.5	Female	374	1	373	99.73
8	42.5	Male	324	3	321	99.07
9	47.5	Female	573	3	570	99.48
10	47.5	Male	461	6	455	98.70
11	52.5	Female	612	3	609	99.51
12	52.5	Male	490	14	476	97.14
13	57.5	Female	511	7	504	98.63
14	57.5	Male	423	14	409	96.69
15	62.5	Female	493	6	487	98.78
16	62.5	Male	395	21	374	94.68
17	67.5	Female	403	6	397	98.51
18	67.5	Male	330	20	310	93.94
19	72.5	Female	268	5	263	98.13
20	72.5	Male	221	7	214	96.83
Total			8096	118	7978	98.54

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	1352.608	1199.968	152.640 with 7 DF (p=0.0001)
Wald	.	.	202.472 with 7 DF (p=0.0001)
			144.795 with 7 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	1.522116	0.40686	13.99603	0.0002
N_CPACK	1	0.557187	0.09907	31.62980	0.0001
FSMOKE	1	0.438240	0.45070	0.94549	0.3309
N_FPACK	1	0.495621	0.07883	39.52823	0.0001
EDD	1	0.222314	0.19125	1.35125	0.2451
BMI	1	-0.062984	0.02534	6.17871	0.0129
PM2_5	1	0.314015	0.26825	1.37036	0.2418

Table5: Cause of Death Model -- Lung Cancer

The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	4.582	2.064	10.171	Current smoker (1=yes)
N_CPACK	1.746	1.438	2.120	25 Pack-years of smoking
FSMOKE	1.550	0.641	3.749	Former smoker (1=yes)
N_FPACK	1.642	1.407	1.916	20 Pack-years of smoking
EDD	1.249	0.859	1.817	< HS (1=yes)
BMI	0.939	0.893	0.987	Body Mass Index (kg/m**2)
PM2_5	1.369	0.809	2.316	PM2_5 (ug/m3)/18.6 (range)

Table5: Cause of Death Model -- All Others

The PHREG Procedure

Data Set: WORK.TEMP  
 Dependent Variable: TIMEON Time on study (years)  
 Censoring Variable: DEAD\_0  
 Censoring Value(s): 0  
 Ties Handling: BRESLOW

Summary of the Number of Event and Censored Values

Stratum	AGE_1	SEX1	Total	Event	Censored	Percent Censored
1	27.5	Female	447	1	446	99.78
2	27.5	Male	367	5	362	98.64
3	32.5	Female	387	3	384	99.22
4	32.5	Male	353	6	347	98.30
5	37.5	Female	360	6	354	98.33
6	37.5	Male	304	4	300	98.68
7	42.5	Female	374	7	367	98.13
8	42.5	Male	324	11	313	96.60
9	47.5	Female	573	22	551	96.16
10	47.5	Male	461	26	435	94.36
11	52.5	Female	612	35	577	94.28
12	52.5	Male	490	20	470	95.92
13	57.5	Female	511	43	468	91.59
14	57.5	Male	423	38	385	91.02
15	62.5	Female	493	57	436	88.44
16	62.5	Male	395	47	348	88.10
17	67.5	Female	403	53	350	86.85
18	67.5	Male	330	66	264	80.00
19	72.5	Female	268	40	228	85.07
20	72.5	Male	221	49	172	77.83
Total			8096	539	7557	93.34

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
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-2 LOG L	6174.790	6151.693	23.097 with 7 DF (p=0.0016)
Score	.	.	23.728 with 7 DF (p=0.0013)
Wald	.	.	23.653 with 7 DF (p=0.0013)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.342090	0.16182	4.46893	0.0345
N_CPACK	1	0.033756	0.09084	0.13810	0.7102
FSMOKE	1	0.075516	0.13887	0.29569	0.5866
N_FPACK	1	0.085263	0.05910	2.08118	0.1491
EDD	1	0.133611	0.09119	2.14701	0.1428
BMI	1	0.027930	0.00969	8.30540	0.0040
PM2_5	1	0.010396	0.12827	0.00657	0.9354

Table5: Cause of Death Model -- All Others

The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.408	1.025	1.933	Current smoker (1=yes)
N_CPACK	1.034	0.866	1.236	25 Pack-years of smoking
FSMOKE	1.078	0.821	1.416	Former smoker (1=yes)
N_FPACK	1.089	0.970	1.223	20 Pack-years of smoking
EDD	1.143	0.956	1.367	< HS (1=yes)
BMI	1.028	1.009	1.048	Body Mass Index (kg/m**2)
PM2_5	1.010	0.786	1.299	PM2_5 (ug/m3)/18.6 (range)



Covariance Matrix for All Causes of death in Six-cities Study

OBS	_TIES_	_TYPE_	_NAME_	CURRCIG1	N_CPACK	FSMOKE
1	BRESLOW	PARMS	ESTIMATE	0.46142	0.23328	0.18339
2	BRESLOW	COV	CURRCIG1	0.00950	-0.00313	0.00257
3	BRESLOW	COV	N_CPACK	-0.00313	0.00203	0.00017
4	BRESLOW	COV	FSMOKE	0.00257	0.00017	0.00774
5	BRESLOW	COV	N_FPACK	-0.00007	0.00006	-0.00151
6	BRESLOW	COV	EDD	-0.00005	-0.00006	0.00001
7	BRESLOW	COV	BMI	0.00008	-0.00000	0.00003
8	BRESLOW	COV	PM2_5	0.00008	-0.00005	0.00030

OBS	N_FPACK	EDD	BMI	PM2_5	_LNLIKE_
1	0.14399	0.17633	0.016810	0.23094	-7996.67
2	-0.00007	-0.00005	0.000076	0.00008	-7996.67
3	0.00006	-0.00006	-0.000003	-0.00005	-7996.67
4	-0.00151	0.00001	0.000028	0.00030	-7996.67
5	0.00101	-0.00008	-0.000008	-0.00016	-7996.67
6	-0.00008	0.00306	-0.000019	-0.00033	-7996.67
7	-0.00001	-0.00002	0.000039	-0.00001	-7996.67
8	-0.00016	-0.00033	-0.000008	0.00594	-7996.67

Covariance Matrix for Cardiopulmonary death in Six-cities Study

OBS	_TIES_	_TYPE_	_NAME_	CURRCIG1	N_CPACK	FSMOKE
1	BRESLOW	PARMS	ESTIMATE	0.63669	0.19690	0.29727
2	BRESLOW	COV	CURRCIG1	0.01894	-0.00609	0.00533
3	BRESLOW	COV	N_CPACK	-0.00609	0.00387	0.00032
4	BRESLOW	COV	FSMOKE	0.00533	0.00032	0.01495
5	BRESLOW	COV	N_FPACK	-0.00011	0.00010	-0.00283
6	BRESLOW	COV	EDD	-0.00011	-0.00010	0.00002
7	BRESLOW	COV	BMI	0.00015	-0.00001	0.00006
8	BRESLOW	COV	PM2_5	0.00012	-0.00010	0.00047

OBS	N_FPACK	EDD	BMI	PM2_5	_LNLIKE_
1	0.11998	0.21354	0.018886	0.31297	-4105.05
2	-0.00011	-0.00011	0.000148	0.00012	-4105.05
3	0.00010	-0.00010	-0.000007	-0.00010	-4105.05
4	-0.00283	0.00002	0.000057	0.00047	-4105.05
5	0.00188	-0.00014	-0.000016	-0.00029	-4105.05
6	-0.00014	0.00580	-0.000034	-0.00058	-4105.05
7	-0.00002	-0.00003	0.000076	-0.00002	-4105.05
8	-0.00029	-0.00058	-0.000015	0.01125	-4105.05

Covariance Matrix for Lung Cancer death in Six-cities Study

OBS	_TIES_	_TYPE_	_NAME_	CURRCIG1	N_CPACK	FSMOKE
1	BRESLOW	PARMS	ESTIMATE	1.52212	0.55719	0.43824
2	BRESLOW	COV	CURRCIG1	0.16554	-0.01801	0.11588
3	BRESLOW	COV	N_CPACK	-0.01801	0.00982	0.00209
4	BRESLOW	COV	FSMOKE	0.11588	0.00209	0.20313
5	BRESLOW	COV	N_FPACK	-0.00066	0.00037	-0.01623
6	BRESLOW	COV	EDD	0.00122	-0.00162	-0.00020
7	BRESLOW	COV	BMI	0.00120	-0.00009	0.00047

OBS	N_FPACK	EDD	BMI	PM2_5	_LNLIKE_
1	0.49562	0.22231	-0.062984	0.31401	-599.984
2	-0.00066	0.00122	0.001202	-0.00256	-599.984
3	0.00037	-0.00162	-0.000092	0.00025	-599.984
4	-0.01623	-0.00020	0.000468	0.00290	-599.984
5	0.00621	-0.00063	-0.000173	-0.00257	-599.984
6	-0.00063	0.03658	-0.000082	-0.00470	-599.984
7	-0.00017	-0.00008	0.000642	-0.00026	-599.984
8	-0.00257	-0.00470	-0.000263	0.07196	-599.984

Covariance Matrix for All Other Causes of death in Six-cities Study

OBS	_TIES_	_TYPE_	_NAME_	CURRCIG1	N_CPACK	FSMOKE
1	BRESLOW	PARMS	ESTIMATE	0.34209	0.033756	0.075516
2	BRESLOW	COV	CURRCIG1	0.02619	-0.010874	0.005303
3	BRESLOW	COV	N_CPACK	-0.01087	0.008251	0.000506
4	BRESLOW	COV	FSMOKE	0.00530	0.000506	0.019286
5	BRESLOW	COV	N_FPACK	-0.00029	0.000251	-0.004577
6	BRESLOW	COV	EDD	-0.00018	-0.000157	0.000049
7	BRESLOW	COV	BMI	0.00017	0.000007	0.000070
8	BRESLOW	COV	PM2_5	0.00027	-0.000068	0.000875

OBS	N_FPACK	EDD	BMI	PM2_5	_LNLIKE_
1	0.085263	0.13361	0.027930	0.010396	-3075.85
2	-0.000293	-0.00018	0.000171	0.000265	-3075.85
3	0.000251	-0.00016	0.000007	-0.000068	-3075.85
4	-0.004577	0.00005	0.000070	0.000875	-3075.85
5	0.003493	-0.00022	-0.000016	-0.000397	-3075.85
6	-0.000220	0.00831	-0.000061	-0.000993	-3075.85
7	-0.000016	-0.00006	0.000094	-0.000014	-3075.85
8	-0.000397	-0.00099	-0.000014	0.016453	-3075.85

**Output 5b:**  
**Modified Data**  
**(Adjusted for Early Censoring)**

Table5: Causes of Death -- Marthas Cut-off Date  
156

TABLE OF CODE BY CITY

CODE (carp/lungc/othe/miss/live)	CITY						Total
Frequency Percent Row Pct Col Pct	Watertow n	Kin/Harr iman	St. Loui s	Steubenv ille	Portage	Topeka	
carp	130	128	151	152	117	66	744
	1.60	1.58	1.86	1.87	1.44	0.81	9.17
	17.47	17.20	20.30	20.43	15.73	8.87	
	9.73	10.17	11.65	11.25	7.17	5.33	
live	1088	1036	1015	1060	1399	1083	6681
	13.41	12.77	12.51	13.07	17.25	13.35	82.37
	16.28	15.51	15.19	15.87	20.94	16.21	
	81.44	82.35	78.32	78.46	85.78	87.41	
lungc	14	20	30	25	15	14	118
	0.17	0.25	0.37	0.31	0.18	0.17	1.45
	11.86	16.95	25.42	21.19	12.71	11.86	
	1.05	1.59	2.31	1.85	0.92	1.13	
miss	9	3	2	12	2	1	29
	0.11	0.04	0.02	0.15	0.02	0.01	0.36
	31.03	10.34	6.90	41.38	6.90	3.45	
	0.67	0.24	0.15	0.89	0.12	0.08	
othe	95	71	98	102	98	75	539
	1.17	0.88	1.21	1.26	1.21	0.92	6.65
	17.63	13.17	18.18	18.92	18.18	13.91	
	7.11	5.64	7.56	7.55	6.01	6.05	
Total	1336	1258	1296	1351	1631	1239	8111
	16.47	15.51	15.98	16.66	20.11	15.28	100.00

DEAD_L	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Alive	7993	98.5	7993	98.5
Dead	118	1.5	8111	100.0

DEAD_C	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Alive	7367	90.8	7367	90.8
Dead	744	9.2	8111	100.0

Table5: Causes of Death -- Marthas Cut-off Date  
157

DEAD_O	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Alive	7572	93.4	7572	93.4
Dead	539	6.6	8111	100.0

Table5: Cause of Death Model -- All, New C.  
158

The PHREG Procedure

Data Set: WORK.TEMP1  
Dependent Variable: TIMEON3  
Censoring Variable: DEAD3  
Censoring Value(s): 0  
Ties Handling: BRESLOW

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	16374.714	16158.960	215.753 with 7 DF (p=0.0001)
Wald			236.682 with 7 DF (p=0.0001)
			228.551 with 7 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.476949	0.09677	24.29298	0.0001
N_CPACK	1	0.228998	0.04484	26.08207	0.0001
FSMOKE	1	0.186926	0.08779	4.53365	0.0332
N_FPACK	1	0.139987	0.03180	19.37735	0.0001
EDD	1	0.180361	0.05502	10.74510	0.0010
BMI	1	0.017113	0.00619	7.64647	0.0057
PM2_5	1	0.243796	0.07645	10.16946	0.0014

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.611	1.333	1.948	Current smoker (1=yes)
N_CPACK	1.257	1.152	1.373	25 Pack-years of smoking
FSMOKE	1.206	1.015	1.432	Former smoker (1=yes)
N_FPACK	1.150	1.081	1.224	20 Pack-years of smoking

EDD	1.198	1.075	1.334	< HS (1=yes)
BMI	1.017	1.005	1.030	Body Mass Index (kg/m**2)
PM2_5	1.276	1.099	1.482	PM2_5 (ug/m3)/18.6 (range)

Table5: Cause of Death Model -- Cardiopulmonary, New C.  
159

The PHREG Procedure

Data Set: WORK.TEMP1  
 Dependent Variable: TIMEON3  
 Censoring Variable: DEAD\_C  
 Censoring Value(s): 0  
 Ties Handling: BRESLOW

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	8358.723	8225.451	133.272 with 7 DF (p=0.0001)
Wald			143.542 with 7 DF (p=0.0001)
			138.134 with 7 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.622852	0.13727	20.58776	0.0001
N_CPACK	1	0.201522	0.06200	10.56525	0.0012
FSMOKE	1	0.296928	0.12240	5.88488	0.0153
N_FPACK	1	0.117838	0.04349	7.34189	0.0067
EDD	1	0.214158	0.07613	7.91311	0.0049
BMI	1	0.018428	0.00871	4.48159	0.0343
PM2_5	1	0.316847	0.10577	8.97329	0.0027

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.864	1.424	2.440	Current smoker (1=yes)
N_CPACK	1.223	1.083	1.381	25 Pack-years of smoking
FSMOKE	1.346	1.059	1.711	Former smoker (1=yes)
N_FPACK	1.125	1.033	1.225	20 Pack-years of smoking
EDD	1.239	1.067	1.438	< HS (1=yes)
BMI	1.019	1.001	1.036	Body Mass Index (kg/m**2)
PM2_5	1.373	1.116	1.689	PM2_5 (ug/m3)/18.6 (range)

Table5: Cause of Death Model -- Lung Cancer, New C.  
160

The PHREG Procedure

Data Set: WORK.TEMP1  
 Dependent Variable: TIMEON3  
 Censoring Variable: DEAD\_L  
 Censoring Value(s): 0  
 Ties Handling: BRESLOW

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	1354.202	1201.447	152.755 with 7 DF (p=0.0001)
Wald	.	.	202.975 with 7 DF (p=0.0001)
			145.205 with 7 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	1.513878	0.40654	13.86695	0.0002
N_CPACK	1	0.559933	0.09893	32.03328	0.0001
FSMOKE	1	0.435315	0.45074	0.93274	0.3342
N_FPACK	1	0.496013	0.07882	39.60274	0.0001
EDD	1	0.225601	0.19116	1.39273	0.2379
BMI	1	-0.063233	0.02534	6.22728	0.0126
PM2_5	1	0.314516	0.26765	1.38085	0.2400

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	4.544	2.048	10.081	Current smoker (1=yes)
N_CPACK	1.751	1.442	2.125	25 Pack-years of smoking
FSMOKE	1.545	0.639	3.739	Former smoker (1=yes)
N_FPACK	1.642	1.407	1.916	20 Pack-years of smoking
EDD	1.253	0.862	1.823	< HS (1=yes)
BMI	0.939	0.893	0.987	Body Mass Index (kg/m**2)
PM2_5	1.370	0.811	2.314	PM2_5 (ug/m3)/18.6 (range)

Table5: Cause of Death Model -- All Others, New C.  
161

The PHREG Procedure

Data Set: WORK.TEMP1  
 Dependent Variable: TIMEON3  
 Censoring Variable: DEAD\_O  
 Censoring Value(s): 0  
 Ties Handling: BRESLOW

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	6182.599	6159.640	22.959 with 7 DF (p=0.0017)
Wald			23.585 with 7 DF (p=0.0013)
			23.511 with 7 DF (p=0.0014)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.335725	0.16157	4.31764	0.0377
N_CPACK	1	0.036568	0.09067	0.16264	0.6867
FSMOKE	1	0.076190	0.13895	0.30064	0.5835
N_FPACK	1	0.083576	0.05917	1.99515	0.1578
EDD	1	0.134697	0.09116	2.18317	0.1395
BMI	1	0.027808	0.00969	8.23980	0.0041
PM2_5	1	0.018640	0.12796	0.02122	0.8842

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.399	1.019	1.920	Current smoker (1=yes)
N_CPACK	1.037	0.868	1.239	25 Pack-years of smoking
FSMOKE	1.079	0.822	1.417	Former smoker (1=yes)
N_FPACK	1.087	0.968	1.221	20 Pack-years of smoking
EDD	1.144	0.957	1.368	< HS (1=yes)
BMI	1.028	1.009	1.048	Body Mass Index (kg/m**2)
PM2_5	1.019	0.793	1.309	PM2_5 (ug/m3)/18.6 (range)



Analysis Variable : TIMEON3

CITY=Watertown

CITY	N Obs	N	Mean	Sum
Watertown	1336	1336	14.9322036	19949.42

CITY=Kin/Harriman

CITY	N Obs	N	Mean	Sum
Kin/Harriman	1258	1258	14.2376073	17910.91

CITY=St. Louis

CITY	N Obs	N	Mean	Sum
St. Louis	1296	1296	13.7260034	17788.90

CITY=Steubenville

CITY	N Obs	N	Mean	Sum
Steubenville	1351	1351	13.3622406	18052.39

CITY=Portage

CITY	N Obs	N	Mean	Sum
Portage	1631	1631	13.4650408	21961.48

CITY=Topeka

CITY	N Obs	N	Mean	Sum
Topeka	1239	1239	13.1897329	16342.08

Table5: Cause of Death Model -- All Others, New C.  
201

TABLE OF DEAD3 BY CITY

DEAD3 CITY

Frequency|

Col Pct	Watertown	Kin/Harriman	St. Louis	Steubenville	Portage	Topeka	Total
0	1089 81.51	1034 82.19	1015 78.32	1054 78.02	1396 85.59	1079 87.09	6667
1	247 18.49	224 17.81	281 21.68	297 21.98	235 14.41	160 12.91	1444
Total	1336	1258	1296	1351	1631	1239	8111

SixCity -- Table2: New Censoring Cutoff Date  
202

The PHREG Procedure

Data Set: WORK.TEMP  
Dependent Variable: TIMEON3  
Censoring Variable: DEAD3  
Censoring Value(s): 0  
Ties Handling: BRESLOW

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	16374.714	16158.649	216.065 with 11 DF (p=0.0001)
Wald			236.802 with 11 DF (p=0.0001)
			228.588 with 11 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.477986	0.09697	24.29939	0.0001
N_CPACK	1	0.229208	0.04510	25.82439	0.0001
FSMOKE	1	0.187720	0.08785	4.56591	0.0326
N_FPACK	1	0.140310	0.03183	19.43645	0.0001
EDD	1	0.176815	0.05648	9.80023	0.0017
N_BMI	1	0.078615	0.02810	7.82473	0.0052
TOP	1	0.030278	0.10399	0.08478	0.7709
KIN	1	0.169681	0.09440	3.23065	0.0723
WAT	1	0.069904	0.09299	0.56510	0.4522
STL	1	0.135693	0.08977	2.28489	0.1306
STE	1	0.246268	0.08809	7.81567	0.0052

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Risk

Variable	Ratio	Lower	Upper	Label
CURRCIG1	1.613	1.334	1.950	Current smoker (1=yes)
N_CPACK	1.258	1.151	1.374	25 Pack-years of smoking
FSMOKE	1.206	1.016	1.433	Former smoker (1=yes)
N_FPACK	1.151	1.081	1.225	20 Pack-years of smoking
EDD	1.193	1.068	1.333	< HS (1=yes)
N_BMI	1.082	1.024	1.143	bmi/4.52
TOP	1.031	0.841	1.264	Topeka
KIN	1.185	0.985	1.426	Kingston-Harriman
WAT	1.072	0.894	1.287	Watertown
STL	1.145	0.961	1.366	St. Louis
STE	1.279	1.076	1.520	Steubenville

SixCity -- Table2: New Censoring Cutoff Date  
203

by Sex

Gender (1=female)=Male

The PHREG Procedure

Data Set: WORK.TEMP  
Dependent Variable: TIMEON3  
Censoring Variable: DEAD3  
Censoring Value(s): 0  
Ties Handling: BRESLOW

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	9299.096	9133.177	165.919 with 11 DF (p=0.0001)
Wald			180.777 with 11 DF (p=0.0001)
			171.260 with 11 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.571372	0.14285	15.99750	0.0001
N_CPACK	1	0.225075	0.05557	16.40767	0.0001
FSMOKE	1	0.153150	0.11944	1.64412	0.1998
N_FPACK	1	0.157135	0.03463	20.59496	0.0001
EDD	1	0.203599	0.07381	7.60988	0.0058
N_BMI	1	0.028908	0.04153	0.48445	0.4864
TOP	1	0.082220	0.13560	0.36765	0.5443
KIN	1	0.215853	0.12003	3.23374	0.0721
WAT	1	-0.065505	0.12584	0.27096	0.6027
STL	1	0.151455	0.11615	1.70046	0.1922
STE	1	0.264279	0.11427	5.34843	0.0207

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.771	1.338	2.343	Current smoker (1=yes)
N_CPACK	1.252	1.123	1.397	25 Pack-years of smoking
FSMOKE	1.165	0.922	1.473	Former smoker (1=yes)
N_FPACK	1.170	1.093	1.252	20 Pack-years of smoking
EDD	1.226	1.061	1.417	< HS (1=yes)
N_BMI	1.029	0.949	1.117	bmi/4.52
TOP	1.086	0.832	1.416	Topeka
KIN	1.241	0.981	1.570	Kingston-Harriman
WAT	0.937	0.732	1.199	Watertown
STL	1.164	0.927	1.461	St. Louis
STE	1.302	1.041	1.629	Steubenville

SixCity -- Table2: New Censoring Cutoff Date  
204

by Sex

Gender (1=female)=Female

The PHREG Procedure

Data Set: WORK.TEMP  
Dependent Variable: TIMEON3  
Censoring Variable: DEAD3  
Censoring Value(s): 0  
Ties Handling: BRESLOW

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	7075.618	7009.519	66.099 with 11 DF (p=0.0001)
Wald			70.875 with 11 DF (p=0.0001)
			69.384 with 11 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.445225	0.14225	9.79659	0.0017
N_CPACK	1	0.166940	0.08824	3.57893	0.0585
FSMOKE	1	0.312137	0.13926	5.02404	0.0250
N_FPACK	1	0.127779	0.08477	2.27209	0.1317
EDD	1	0.134158	0.08864	2.29049	0.1302
N_BMI	1	0.115523	0.03841	9.04746	0.0026
TOP	1	-0.046138	0.16224	0.08087	0.7761
KIN	1	0.063993	0.15354	0.17370	0.6768
WAT	1	0.198946	0.14049	2.00520	0.1568
STL	1	0.109306	0.14234	0.58971	0.4425
STE	1	0.233542	0.13862	2.83864	0.0920

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and

95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.561	1.181	2.063	Current smoker (1=yes)
N_CPACK	1.182	0.994	1.405	25 Pack-years of smoking
FSMOKE	1.366	1.040	1.795	Former smoker (1=yes)
N_FPACK	1.136	0.962	1.342	20 Pack-years of smoking
EDD	1.144	0.961	1.361	< HS (1=yes)
N_BMI	1.122	1.041	1.210	bmi/4.52
TOP	0.955	0.695	1.312	Topeka
KIN	1.066	0.789	1.440	Kingston-Harriman
WAT	1.220	0.926	1.607	Watertown
STL	1.116	0.844	1.474	St. Louis
STE	1.263	0.963	1.657	Steubenville

SixCity -- Table2: New Censoring Cutoff Date  
205

by Sex

DEAD3	Frequency	Percent	Cumulative Frequency	Cumulative Percent
0	6667	82.2	6667	82.2
1	1444	17.8	8111	100.0

SixCity -- Table3: New Censoring Date

The PHREG Procedure

Data Set: WORK.TEMP  
Dependent Variable: TIMEON3  
Censoring Variable: DEAD3  
Censoring Value(s): 0  
Ties Handling: BRESLOW

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	16374.714	16158.960	215.753 with 7 DF (p=0.0001)
Wald	.	.	236.682 with 7 DF (p=0.0001)
			228.551 with 7 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.476949	0.09677	24.29298	0.0001
CPACK	1	0.009160	0.00179	26.08207	0.0001
FSMOKE	1	0.186926	0.08779	4.53365	0.0332
FPACK	1	0.006999	0.00159	19.37735	0.0001
EDD	1	0.180361	0.05502	10.74510	0.0010
BMI	1	0.017113	0.00619	7.64647	0.0057

PM2\_5 1 0.243796 0.07645 10.16946 0.0014

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.611	1.333	1.948	Current smoker (1=yes)
CPACK	1.009	1.006	1.013	Current(currcig1=1) smoker packyrs
FSMOKE	1.206	1.015	1.432	Former smoker (1=yes)
FPACK	1.007	1.004	1.010	Former smoker(fsmoke=1) packyrs
EDD	1.198	1.075	1.334	< HS (1=yes)
BMI	1.017	1.005	1.030	Body Mass Index (kg/m**2)
PM2_5	1.276	1.099	1.482	PM2_5 (ug/m3)/18.6 (range)
SixCity -- Table3: Nonsmoker, Censoring				207

The PHREG Procedure

Data Set: WORK.TEMP2  
 Dependent Variable: TIMEON3  
 Censoring Variable: DEAD3  
 Censoring Value(s): 0  
 Ties Handling: BRESLOW

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	4271.071	4255.072	15.998 with 3 DF (p=0.0011)
Wald	.	.	16.552 with 3 DF (p=0.0009)
			16.538 with 3 DF (p=0.0009)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
EDD	1	0.191784	0.10011	3.67016	0.0554
BMI	1	0.030811	0.00996	9.57413	0.0020
PM2_5	1	0.194478	0.14128	1.89485	0.1687

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
EDD	1.211	0.996	1.474	< HS (1=yes)
BMI	1.031	1.011	1.052	Body Mass Index (kg/m**2)
PM2_5	1.215	0.921	1.602	PM2_5 (ug/m3)/18.6 (range)

Gender (1=female)=0

The PHREG Procedure

Data Set: WORK.TEMP2  
 Dependent Variable: TIMEON3  
 Censoring Variable: DEAD3  
 Censoring Value(s): 0  
 Ties Handling: BRESLOW

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	1169.071	1161.590	7.482 with 3 DF (p=0.0580)
Wald			7.701 with 3 DF (p=0.0526)
			7.668 with 3 DF (p=0.0534)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
EDD	1	0.353625	0.17827	3.93475	0.0473
BMI	1	0.034202	0.01990	2.95398	0.0857
PM2_5	1	0.233762	0.24501	0.91029	0.3400

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and 95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
EDD	1.424	1.004	2.020	< HS (1=yes)
BMI	1.035	0.995	1.076	Body Mass Index (kg/m**2)
PM2_5	1.263	0.782	2.042	PM2_5 (ug/m3)/18.6 (range)

SixCity -- Table3: Nonsmoker, Censoring 209

Gender (1=female)=1

The PHREG Procedure

Data Set: WORK.TEMP2  
 Dependent Variable: TIMEON3  
 Censoring Variable: DEAD3  
 Censoring Value(s): 0  
 Ties Handling: BRESLOW

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L	3102.000	3092.247	9.753 with 3 DF (p=0.0208)
Score			10.143 with 3 DF (p=0.0174)
Wald			10.141 with 3 DF (p=0.0174)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
EDD	1	0.119903	0.12084	0.98453	0.3211
BMI	1	0.030186	0.01151	6.88137	0.0087
PM2_5	1	0.189672	0.17340	1.19656	0.2740

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
EDD	1.127	0.890	1.429	< HS (1=yes)
BMI	1.031	1.008	1.054	Body Mass Index (kg/m**2)
PM2_5	1.209	0.861	1.698	PM2_5 (ug/m3)/18.6 (range)

SixCity -- Table3: Nonsmoker by Sex, Censoring  
210

TABLE OF DEAD3 BY SEX1

DEAD3 SEX1(Gender (1=female))

Frequency Percent Row Pct Col Pct	SEX1		Total
	Male	Female	
0	846 25.85 29.79 85.80	1994 60.92 70.21 87.19	2840 86.77
1	140 4.28 32.33 14.20	293 8.95 67.67 12.81	433 13.23
Total	986 30.13	2287 69.87	3273 100.00

SixCity -- Table3: Former smoker, Censoring  
211



The PHREG Procedure

Data Set: WORK.TEMP3  
 Dependent Variable: TIMEON3  
 Censoring Variable: DEAD3  
 Censoring Value(s): 0  
 Ties Handling: BRESLOW

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	3925.088	3915.544	9.544 with 3 DF (p=0.0229)
Wald			9.847 with 3 DF (p=0.0199)
			9.832 with 3 DF (p=0.0201)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
EDD	1	0.104701	0.10242	1.04512	0.3066
BMI	1	0.021470	0.01205	3.17547	0.0748
PM2_5	1	0.286640	0.14026	4.17642	0.0410

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
EDD	1.110	0.908	1.357	< HS (1=yes)
BMI	1.022	0.998	1.046	Body Mass Index (kg/m**2)
PM2_5	1.332	1.012	1.753	PM2_5 (ug/m3)/18.6 (range)

SixCity -- Table3: Former smoker, Censoring  
212

Gender (1=female)=0

The PHREG Procedure

Data Set: WORK.TEMP3  
 Dependent Variable: TIMEON3  
 Censoring Variable: DEAD3  
 Censoring Value(s): 0  
 Ties Handling: BRESLOW

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
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-2 LOG L	3066.400	3061.677	4.723 with 3 DF (p=0.1933)
Score			4.846 with 3 DF (p=0.1834)
Wald			4.840 with 3 DF (p=0.1839)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
EDD	1	0.069098	0.11748	0.34595	0.5564
BMI	1	0.018233	0.01473	1.53140	0.2159
PM2_5	1	0.246421	0.15921	2.39559	0.1217

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
EDD	1.072	0.851	1.349	< HS (1=yes)
BMI	1.018	0.989	1.048	Body Mass Index (kg/m**2)
PM2_5	1.279	0.936	1.748	PM2_5 (ug/m3)/18.6 (range)

SixCity -- Table3: Former smoker, Censoring  
213

Gender (1=female)=1

The PHREG Procedure

Data Set: WORK.TEMP3  
Dependent Variable: TIMEON3  
Censoring Variable: DEAD3  
Censoring Value(s): 0  
Ties Handling: BRESLOW

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L	858.688	852.955	5.734 with 3 DF (p=0.1253)
Score			6.025 with 3 DF (p=0.1104)
Wald			5.998 with 3 DF (p=0.1117)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
EDD	1	0.210052	0.20846	1.01537	0.3136
BMI	1	0.026198	0.02104	1.55087	0.2130
PM2_5	1	0.430773	0.29672	2.10767	0.1466

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
EDD	1.234	0.820	1.856	< HS (1=yes)
BMI	1.027	0.985	1.070	Body Mass Index (kg/m**2)
PM2_5	1.538	0.860	2.752	PM2_5 (ug/m3)/18.6 (range)

SixCity -- Table3: Former smoker by Sex, Censoring  
214

TABLE OF DEAD3 BY SEX1

DEAD3 SEX1(Gender (1=female))

Frequency Percent Row Pct Col Pct	Male	Female	Total
0	936 48.32 62.36 73.99	565 29.17 37.64 84.08	1501 77.49
1	329 16.99 75.46 26.01	107 5.52 24.54 15.92	436 22.51
Total	1265 65.31	672 34.69	1937 100.00

SixCity -- Table3: Current smoker, Censoring  
215

The PHREG Procedure

Data Set: WORK.TEMP4  
Dependent Variable: TIMEON3  
Censoring Variable: DEAD3  
Censoring Value(s): 0  
Ties Handling: BRESLOW

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	5189.709	5175.485	14.224 with 3 DF (p=0.0026)
Wald	.	.	14.424 with 3 DF (p=0.0024)
			14.361 with 3 DF (p=0.0025)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
EDD	1	0.236070	0.08687	7.38427	0.0066
BMI	1	0.000624	0.01073	0.00339	0.9536
PM2_5	1	0.291033	0.12097	5.78790	0.0161

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
EDD	1.266	1.068	1.501	< HS (1=yes)
BMI	1.001	0.980	1.022	Body Mass Index (kg/m**2)
PM2_5	1.338	1.055	1.696	PM2_5 (ug/m3)/18.6 (range)

SixCity -- Table3: Current smoker, Censoring  
216

Gender (1=female)=0

The PHREG Procedure

Data Set: WORK.TEMP4  
Dependent Variable: TIMEON3  
Censoring Variable: DEAD3  
Censoring Value(s): 0  
Ties Handling: BRESLOW

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	3288.259	3273.614	14.645 with 3 DF (p=0.0021)
Wald			14.775 with 3 DF (p=0.0020)
			14.682 with 3 DF (p=0.0021)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
EDD	1	0.294108	0.10749	7.48671	0.0062
BMI	1	-0.014466	0.01448	0.99796	0.3178
PM2_5	1	0.356076	0.15288	5.42476	0.0199

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
EDD	1.342	1.087	1.657	< HS (1=yes)
BMI	0.986	0.958	1.014	Body Mass Index (kg/m**2)
PM2_5	1.428	1.058	1.927	PM2_5 (ug/m3)/18.6 (range)

SixCity -- Table3: Current smoker, Censoring  
217

Gender (1=female)=1

The PHREG Procedure

Data Set: WORK.TEMP4  
 Dependent Variable: TIMEON3  
 Censoring Variable: DEAD3  
 Censoring Value(s): 0  
 Ties Handling: BRESLOW

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	1901.449	1897.844	3.605 with 3 DF (p=0.3074)
Wald	.	.	3.691 with 3 DF (p=0.2968)
			3.685 with 3 DF (p=0.2976)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
EDD	1	0.104833	0.14992	0.48896	0.4844
BMI	1	0.020891	0.01606	1.69311	0.1932
PM2_5	1	0.225340	0.19920	1.27963	0.2580

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
EDD	1.111	0.828	1.490	< HS (1=yes)
BMI	1.021	0.989	1.054	Body Mass Index (kg/m**2)
PM2_5	1.253	0.848	1.851	PM2_5 (ug/m3)/18.6 (range)

SixCity -- Table3: Current smoker by Sex, Censoring  
218

TABLE OF DEAD3 BY SEX1

DEAD3 SEX1(Gender (1=female))

Frequency Percent Row Pct Col Pct	Male	Female	Total
0	1050 36.19 45.14 73.94	1276 43.98 54.86 86.16	2326 80.18
1	370 12.75 64.35 26.06	205 7.07 35.65 13.84	575 19.82
Total	1420 48.95	1481 51.05	2901 100.00

SixCity -- Table3: No occupational exposure, Censoring  
219

The PHREG Procedure

Data Set: WORK.TEMP5  
Dependent Variable: TIMEON3  
Censoring Variable: DEAD3  
Censoring Value(s): 0  
Ties Handling: BRESLOW

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	7057.217	6960.620	96.597 with 7 DF (p=0.0001)
Wald			107.371 with 7 DF (p=0.0001)
			102.736 with 7 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.436011	0.14140	9.50841	0.0020
CPACK	1	0.010689	0.00286	14.00273	0.0002
FSMOKE	1	0.296220	0.13073	5.13439	0.0235
FPACK	1	0.006123	0.00317	3.74248	0.0530
EDD	1	0.096192	0.08276	1.35084	0.2451
BMI	1	0.020836	0.00858	5.90348	0.0151
PM2_5	1	0.192427	0.11726	2.69296	0.1008

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and

95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.547	1.172	2.040	Current smoker (1=yes)
CPACK	1.011	1.005	1.016	Current(currcig1=1) smoker packyrs
FSMOKE	1.345	1.041	1.737	Former smoker (1=yes)
FPACK	1.006	1.000	1.012	Former smoker(fsmoke=1) packyrs
EDD	1.101	0.936	1.295	< HS (1=yes)
BMI	1.021	1.004	1.038	Body Mass Index (kg/m**2)
PM2_5	1.212	0.963	1.525	PM2_5 (ug/m3)/18.6 (range)

SixCity -- Table3: No occupational exposure, Censoring  
220

Gender (1=female)=0

The PHREG Procedure

Data Set: WORK.TEMP5  
Dependent Variable: TIMEON3  
Censoring Variable: DEAD3  
Censoring Value(s): 0  
Ties Handling: BRESLOW

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	2428.940	2359.695	69.245 with 7 DF (p=0.0001)
Wald	.	.	76.731 with 7 DF (p=0.0001)
			69.194 with 7 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.712257	0.25944	7.53677	0.0060
CPACK	1	0.010947	0.00381	8.27065	0.0040
FSMOKE	1	0.517928	0.21697	5.69802	0.0170
FPACK	1	0.005923	0.00398	2.21463	0.1367
EDD	1	0.087024	0.13664	0.40562	0.5242
BMI	1	0.004993	0.01594	0.09817	0.7540
PM2_5	1	0.252045	0.20729	1.47843	0.2240

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	2.039	1.226	3.390	Current smoker (1=yes)

CPACK	1.011	1.003	1.019	Current(curr cig1=1) smoker packyrs
FSMOKE	1.679	1.097	2.568	Former smoker (1=yes)
FPACK	1.006	0.998	1.014	Former smoker(fsmoke=1) packyrs
EDD	1.091	0.835	1.426	< HS (1=yes)
BMI	1.005	0.974	1.037	Body Mass Index (kg/m**2)
PM2_5	1.287	0.857	1.932	PM2_5 (ug/m3)/18.6 (range)

SixCity -- Table3: No occupational exposure, Censoring  
221

Gender (1=female)=1

The PHREG Procedure

Data Set: WORK.TEMP5  
Dependent Variable: TIMEON3  
Censoring Variable: DEAD3  
Censoring Value(s): 0  
Ties Handling: BRESLOW

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L	4628.276	4593.752	34.525 with 7 DF (p=0.0001)
Score			36.642 with 7 DF (p=0.0001)
Wald			36.040 with 7 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.468910	0.18389	6.50237	0.0108
CPACK	1	0.005386	0.00508	1.12508	0.2888
FSMOKE	1	0.225904	0.17479	1.67035	0.1962
FPACK	1	0.005843	0.00580	1.01390	0.3140
EDD	1	0.086266	0.10444	0.68218	0.4088
BMI	1	0.025546	0.01025	6.21259	0.0127
PM2_5	1	0.174623	0.14313	1.48849	0.2225

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.598	1.115	2.292	Current smoker (1=yes)
CPACK	1.005	0.995	1.015	Current(curr cig1=1) smoker packyrs
FSMOKE	1.253	0.890	1.766	Former smoker (1=yes)
FPACK	1.006	0.994	1.017	Former smoker(fsmoke=1) packyrs
EDD	1.090	0.888	1.338	< HS (1=yes)
BMI	1.026	1.005	1.047	Body Mass Index (kg/m**2)
PM2_5	1.191	0.900	1.576	PM2_5 (ug/m3)/18.6 (range)

SixCity -- Table3: No occupational exposure by Sex, Censoring



TABLE OF DEAD3 BY SEX1

DEAD3		SEX1(Gender (1=female))		
Frequency	Percent	Male	Female	Total
Row Pct	Col Pct			
0		1031	2740	3771
		23.09	61.35	84.44
		27.34	72.66	
		79.00	86.68	
1		274	421	695
		6.14	9.43	15.56
		39.42	60.58	
		21.00	13.32	
Total		1305	3161	4466
		29.22	70.78	100.00

SixCity -- Table3: Occupational exposure, Censoring  
223

#### The PHREG Procedure

Data Set: WORK.TEMP6  
Dependent Variable: TIMEON3  
Censoring Variable: DEAD3  
Censoring Value(s): 0  
Ties Handling: BRESLOW

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	7534.887	7416.938	117.950 with 7 DF (p=0.0001)
Wald			128.562 with 7 DF (p=0.0001)
			124.155 with 7 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.467786	0.13822	11.45415	0.0007
CPACK	1	0.008209	0.00236	12.06048	0.0005
FSMOKE	1	0.089992	0.12395	0.52710	0.4678
FPACK	1	0.007281	0.00185	15.57237	0.0001
EDD	1	0.241182	0.07672	9.88248	0.0017
BMI	1	0.011988	0.00903	1.76442	0.1841

PM2\_5 1 0.293281 0.10201 8.26652 0.0040

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.596	1.218	2.093	Current smoker (1=yes)
CPACK	1.008	1.004	1.013	Current(currcig1=1) smoker packyrs
FSMOKE	1.094	0.858	1.395	Former smoker (1=yes)
FPACK	1.007	1.004	1.011	Former smoker(fsmoke=1) packyrs
EDD	1.273	1.095	1.479	< HS (1=yes)
BMI	1.012	0.994	1.030	Body Mass Index (kg/m**2)
PM2_5	1.341	1.098	1.638	PM2_5 (ug/m3)/18.6 (range)

SixCity -- Table3: Occupational exposure, Censoring  
224

Gender (1=female)=0

The PHREG Procedure

Data Set: WORK.TEMP6  
Dependent Variable: TIMEON3  
Censoring Variable: DEAD3  
Censoring Value(s): 0  
Ties Handling: BRESLOW

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	5813.210	5715.567	97.643 with 7 DF (p=0.0001)
Wald			105.314 with 7 DF (p=0.0001)
			101.244 with 7 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.489311	0.17363	7.94197	0.0048
CPACK	1	0.007133	0.00279	6.53581	0.0106
FSMOKE	1	-0.046165	0.14603	0.09993	0.7519
FPACK	1	0.008196	0.00193	17.97341	0.0001
EDD	1	0.256457	0.08863	8.37302	0.0038
BMI	1	0.005445	0.01127	0.23350	0.6289
PM2_5	1	0.285151	0.11605	6.03720	0.0140

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and

95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.631	1.161	2.292	Current smoker (1=yes)
CPACK	1.007	1.002	1.013	Current(currrcig1=1) smoker packyrs
FSMOKE	0.955	0.717	1.271	Former smoker (1=yes)
FPACK	1.008	1.004	1.012	Former smoker(fsmoke=1) packyrs
EDD	1.292	1.086	1.538	< HS (1=yes)
BMI	1.005	0.983	1.028	Body Mass Index (kg/m**2)
PM2_5	1.330	1.059	1.670	PM2_5 (ug/m3)/18.6 (range)

SixCity -- Table3: Occupational exposure, Censoring  
225

Gender (1=female)=1

The PHREG Procedure

Data Set: WORK.TEMP6  
Dependent Variable: TIMEON3  
Censoring Variable: DEAD3  
Censoring Value(s): 0  
Ties Handling: BRESLOW

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	1721.678	1693.273	28.405 with 7 DF (p=0.0002)
Wald			31.778 with 7 DF (p=0.0001)
			30.387 with 7 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.444558	0.23725	3.51118	0.0610
CPACK	1	0.008222	0.00494	2.76463	0.0964
FSMOKE	1	0.546888	0.23353	5.48402	0.0192
FPACK	1	0.006066	0.00588	1.06598	0.3019
EDD	1	0.200993	0.15494	1.68279	0.1946
BMI	1	0.023019	0.01517	2.30138	0.1293
PM2_5	1	0.282728	0.22029	1.64727	0.1993

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.560	0.980	2.483	Current smoker (1=yes)

CPACK 1.008 0.999 1.018 Current(curr cig1=1) smoker packyrs  
 FSMOKE 1.728 1.093 2.731 Former smoker (1=yes)  
 FPACK 1.006 0.995 1.018 Former smoker(fsmoke=1) packyrs  
 EDD 1.223 0.902 1.656 < HS (1=yes)  
 BMI 1.023 0.993 1.054 Body Mass Index (kg/m\*\*2)  
 PM2\_5 1.327 0.862 2.043 PM2\_5 (ug/m3)/18.6 (range)  
 SixCity -- Table3: Occupational exposure by Sex, Censoring  
 226

TABLE OF DEAD3 BY SEX1

DEAD3		SEX1(Gender (1=female))		
Frequency	Percent	Male	Female	Total
0		1801	1095	2896
	49.41		30.04	79.45
	62.19		37.81	
	76.12		85.61	
1		565	184	749
	15.50		5.05	20.55
	75.43		24.57	
	23.88		14.39	
Total		2366	1279	3645
		64.91	35.09	100.00

SixCity -- Table4: Model one, Censoring 227

The PHREG Procedure

Data Set: WORK.TEMP  
 Dependent Variable: TIMEON3  
 Censoring Variable: DEAD3  
 Censoring Value(s): 0  
 Ties Handling: BRESLOW

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	16390.365	16376.890	13.475 with 1 DF (p=0.0002)
Wald	.	.	13.762 with 1 DF (p=0.0002)
			13.732 with 1 DF (p=0.0002)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
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PM2\_5. 1 0.280754 0.07576 13.73157 0.0002

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
PM2_5	1.324	1.141	1.536	PM2_5 (ug/m3)/18.6 (range)
SixCity -- Table4: Model two, Censoring 228				

The PHREG Procedure

Data Set: WORK.TEMP  
 Dependent Variable: TIMEON3  
 Censoring Variable: DEAD3  
 Censoring Value(s): 0  
 Ties Handling: BRESLOW

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	16390.052	16193.255	196.797 with 5 DF (p=0.0001)
Wald	.	.	217.915 with 5 DF (p=0.0001)
			209.947 with 5 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.445988	0.09629	21.45388	0.0001
CPACK	1	0.009375	0.00181	26.97201	0.0001
FSMOKE	1	0.174454	0.08747	3.97744	0.0461
FPACK	1	0.007417	0.00158	21.95468	0.0001
PM2_5	1	0.264623	0.07595	12.13877	0.0005

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.562	1.293	1.886	Current smoker (1=yes)
CPACK	1.009	1.006	1.013	Current(currcig1=1) smoker packyrs
FSMOKE	1.191	1.003	1.413	Former smoker (1=yes)
FPACK	1.007	1.004	1.011	Former smoker(fsmoke=1) packyrs
PM2_5	1.303	1.123	1.512	PM2_5 (ug/m3)/18.6 (range)
SixCity -- Table4: Model three, Censoring 229				

The PHREG Procedure

Data Set: WORK.TEMP  
 Dependent Variable: TIMEON3  
 Censoring Variable: DEAD3  
 Censoring Value(s): 0  
 Ties Handling: BRESLOW

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L	16390.052	16181.283	208.769 with 6 DF (p=0.0001)
Score			229.641 with 6 DF (p=0.0001)
Wald			221.331 with 6 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.444877	0.09627	21.35313	0.0001
CPACK	1	0.009225	0.00180	26.14533	0.0001
FSMOKE	1	0.176003	0.08764	4.03329	0.0446
FPACK	1	0.007173	0.00159	20.33645	0.0001
EDD	1	0.190523	0.05492	12.03339	0.0005
PM2_5	1	0.244711	0.07657	10.21280	0.0014

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
 95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.560	1.292	1.884	Current smoker (1=yes)
CPACK	1.009	1.006	1.013	Current(currcig1=1) smoker packyrs
FSMOKE	1.192	1.004	1.416	Former smoker (1=yes)
FPACK	1.007	1.004	1.010	Former smoker(fsmoke=1) packyrs
EDD	1.210	1.086	1.347	< HS (1=yes)
PM2_5	1.277	1.099	1.484	PM2_5 (ug/m3)/18.6 (range)

SixCity -- Table4: Model four, Censoring 230

The PHREG Procedure

Data Set: WORK.TEMP  
 Dependent Variable: TIMEON3  
 Censoring Variable: DEAD3  
 Censoring Value(s): 0  
 Ties Handling: BRESLOW

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	16374.714	16158.960	215.753 with 7 DF (p=0.0001)
Wald	.	.	236.682 with 7 DF (p=0.0001)
			228.551 with 7 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.476949	0.09677	24.29298	0.0001
CPACK	1	0.009160	0.00179	26.08207	0.0001
FSMOKE	1	0.186926	0.08779	4.53365	0.0332
FPACK	1	0.006999	0.00159	19.37735	0.0001
EDD	1	0.180361	0.05502	10.74510	0.0010
BMI	1	0.017113	0.00619	7.64647	0.0057
PM2_5	1	0.243796	0.07645	10.16946	0.0014

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and 95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.611	1.333	1.948	Current smoker (1=yes)
CPACK	1.009	1.006	1.013	Current(currcig1=1) smoker packyrs
FSMOKE	1.206	1.015	1.432	Former smoker (1=yes)
FPACK	1.007	1.004	1.010	Former smoker(fsmoke=1) packyrs
EDD	1.198	1.075	1.334	< HS (1=yes)
BMI	1.017	1.005	1.030	Body Mass Index (kg/m**2)
PM2_5	1.276	1.099	1.482	PM2_5 (ug/m3)/18.6 (range)
SixCity -- Table4: Model five, Censoring				231

The PHREG Procedure

Data Set: WORK.TEMP  
 Dependent Variable: TIMEON3  
 Censoring Variable: DEAD3  
 Censoring Value(s): 0  
 Ties Handling: BRESLOW

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	16374.714	16157.823	216.891 with 8 DF (p=0.0001)
Wald	.	.	237.830 with 8 DF (p=0.0001)
			229.859 with 8 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.471399	0.09688	23.67735	0.0001
CPACK	1	0.009186	0.00179	26.27582	0.0001
FSMOKE	1	0.183171	0.08783	4.34924	0.0370
FPACK	1	0.006967	0.00159	19.27205	0.0001
EDD	1	0.170205	0.05583	9.29413	0.0023
BMI	1	0.016955	0.00619	7.49359	0.0062
OCCU	1	0.062086	0.05824	1.13662	0.2864
PM2_5	1	0.241712	0.07638	10.01586	0.0016

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.602	1.325	1.937	Current smoker (1=yes)
CPACK	1.009	1.006	1.013	Current(currrcig1=1) smoker packyrs
FSMOKE	1.201	1.011	1.427	Former smoker (1=yes)
FPACK	1.007	1.004	1.010	Former smoker(fsmoke=1) packyrs
EDD	1.186	1.063	1.323	< HS (1=yes)
BMI	1.017	1.005	1.030	Body Mass Index (kg/m**2)
OCCU	1.064	0.949	1.193	Occupation exposure (1=yes)
PM2_5	1.273	1.096	1.479	PM2_5 (ug/m3)/18.6 (range)

SixCity -- Table4: Model five -- excluding subjects with hypertension  
232

Censoring

The PHREG Procedure

Data Set: WORK.TEMP2  
Dependent Variable: TIMEON3  
Censoring Variable: DEAD3  
Censoring Value(s): 0  
Ties Handling: BRESLOW

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	10649.753	10503.303	146.450 with 8 DF (p=0.0001)
Wald			159.024 with 8 DF (p=0.0001)
			153.616 with 8 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.504438	0.11524	19.15980	0.0001



CPACK	1	0.007952	0.00213	13.95037	0.0002
FSMOKE	1	0.147741	0.10682	1.91285	0.1666
FPACK	1	0.006904	0.00191	13.03654	0.0003
EDD	1	0.181293	0.06836	7.03298	0.0080
BMI	1	0.015188	0.00789	3.70967	0.0541
OCCU	1	0.019695	0.07054	0.07796	0.7801
PM2_5	1	0.245003	0.09225	7.05310	0.0079

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.656	1.321	2.076	Current smoker (1=yes)
CPACK	1.008	1.004	1.012	Current(currrcig1=1) smoker packyrs
FSMOKE	1.159	0.940	1.429	Former smoker (1=yes)
FPACK	1.007	1.003	1.011	Former smoker(fsmoke=1) packyrs
EDD	1.199	1.048	1.371	< HS (1=yes)
BMI	1.015	1.000	1.031	Body Mass Index (kg/m**2)
OCCU	1.020	0.888	1.171	Occupation exposure (1=yes)
PM2_5	1.278	1.066	1.531	PM2_5 (ug/m3)/18.6 (range)

SixCity -- Table4: Model five -- excluding subjects with diabetes  
233

Censoring

The PHREG Procedure

Data Set: WORK.TEMP3  
Dependent Variable: TIMEON3  
Censoring Variable: DEAD3  
Censoring Value(s): 0  
Ties Handling: BRESLOW

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	13838.221	13632.098	206.123 with 8 DF (p=0.0001)
Wald			226.122 with 8 DF (p=0.0001)
			217.057 with 8 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.536630	0.10487	26.18531	0.0001
CPACK	1	0.009456	0.00193	23.89858	0.0001
FSMOKE	1	0.250641	0.09497	6.96480	0.0083
FPACK	1	0.006554	0.00171	14.64883	0.0001
EDD	1	0.170591	0.06019	8.03388	0.0046
BMI	1	0.010483	0.00696	2.27161	0.1318
OCCU	1	0.033806	0.06302	0.28777	0.5917

PM2\_5 1 0.262473 0.08282 10.04429 0.0015

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.710	1.392	2.100	Current smoker (1=yes)
CPACK	1.010	1.006	1.013	Current(currrcig1=1) smoker packyrs
FSMOKE	1.285	1.067	1.548	Former smoker (1=yes)
FPACK	1.007	1.003	1.010	Former smoker(fsmoke=1) packyrs
EDD	1.186	1.054	1.334	< HS (1=yes)
BMI	1.011	0.997	1.024	Body Mass Index (kg/m**2)
OCCU	1.034	0.914	1.170	Occupation exposure (1=yes)
PM2_5	1.300	1.105	1.529	PM2_5 (ug/m3)/18.6 (range)

Table5: Causes of Death -- Marthas Cut-off Date  
234

TABLE OF CODE1 BY CITY

Frequency Percent Row Pct Col Pct	CITY						Total
	Watertow n	Kin/Harr iman	St. Loui s	Steubenv ille	Portage	Topeka	
carp	130 1.60 17.43 9.73	128 1.58 17.16 10.17	151 1.86 20.24 11.65	153 1.89 20.51 11.32	118 1.45 15.82 7.23	66 0.81 8.85 5.33	746 9.20
live	1088 13.41 16.30 81.44	1036 12.77 15.52 82.35	1015 12.51 15.21 78.32	1057 13.03 15.84 78.24	1397 17.22 20.93 85.65	1081 13.33 16.20 87.25	6674 82.28
lunc	14 0.17 11.76 1.05	20 0.25 16.81 1.59	30 0.37 25.21 2.31	26 0.32 21.85 1.92	15 0.18 12.61 0.92	14 0.17 11.76 1.13	119 1.47
miss	9 0.11 31.03 0.67	3 0.04 10.34 0.24	2 0.02 6.90 0.15	12 0.15 41.38 0.89	2 0.02 6.90 0.12	1 0.01 3.45 0.08	29 0.36
othe	95 1.17 17.50 7.11	71 0.88 13.08 5.64	98 1.21 18.05 7.56	103 1.27 18.97 7.62	99 1.22 18.23 6.07	77 0.95 14.18 6.21	543 6.69
Total	1336 16.47	1258 15.51	1296 15.98	1351 16.66	1631 20.11	1239 15.28	8111 100.00

DEAD_L	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Alive	7992	98.5	7992	98.5
Dead	119	1.5	8111	100.0

DEAD_C	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Alive	7365	90.8	7365	90.8
Dead	746	9.2	8111	100.0

Table5: Causes of Death -- Marthas Cut-off Date  
235

DEAD_O	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Alive	7568	93.3	7568	93.3
Dead	543	6.7	8111	100.0

Table5: Cause of Death Model -- All, New C.  
236

The PHREG Procedure

Data Set: WORK.TEMP1  
 Dependent Variable: TIMEON3  
 Censoring Variable: DEAD3  
 Censoring Value(s): 0  
 Ties Handling: BRESLOW

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	16374.714	16158.960	215.753 with 7 DF (p=0.0001)
Wald	.	.	236.682 with 7 DF (p=0.0001)
			228.551 with 7 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.476949	0.09677	24.29298	0.0001

N_CPACK	1	0.228998	0.04484	26.08207	0.0001
FSMOKE	1	0.186926	0.08779	4.53365	0.0332
N_FPACK	1	0.139987	0.03180	19.37735	0.0001
EDD	1	0.180361	0.05502	10.74510	0.0010
BMI	1	0.017113	0.00619	7.64647	0.0057
PM2_5	1	0.243796	0.07645	10.16946	0.0014

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.611	1.333	1.948	Current smoker (1=yes)
N_CPACK	1.257	1.152	1.373	25 Pack-years of smoking
FSMOKE	1.206	1.015	1.432	Former smoker (1=yes)
N_FPACK	1.150	1.081	1.224	20 Pack-years of smoking
EDD	1.198	1.075	1.334	< HS (1=yes)
BMI	1.017	1.005	1.030	Body Mass Index (kg/m**2)
PM2_5	1.276	1.099	1.482	PM2_5 (ug/m3)/18.6 (range)

Table5: Cause of Death Model -- Cardiopulmonary, New C.

237

The PHREG Procedure

Data Set: WORK.TEMP1  
 Dependent Variable: TIMEON3  
 Censoring Variable: DEAD\_C  
 Censoring Value(s): 0  
 Ties Handling: BRESLOW

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	8382.618	8247.100	135.518 with 7 DF (p=0.0001)
Wald			145.940 with 7 DF (p=0.0001)
			140.364 with 7 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.632965	0.13690	21.37792	0.0001
N_CPACK	1	0.200409	0.06186	10.49718	0.0012
FSMOKE	1	0.299391	0.12236	5.98661	0.0144
N_FPACK	1	0.118068	0.04347	7.37845	0.0066
EDD	1	0.214445	0.07602	7.95677	0.0048
BMI	1	0.018605	0.00869	4.58395	0.0323
PM2_5	1	0.318719	0.10561	9.10693	0.0025

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.883	1.440	2.463	Current smoker (1=yes)
N_CPACK	1.222	1.082	1.379	25 Pack-years of smoking
FSMOKE	1.349	1.061	1.715	Former smoker (1=yes)
N_FPACK	1.125	1.033	1.225	20 Pack-years of smoking
EDD	1.239	1.068	1.438	< HS (1=yes)
BMI	1.019	1.002	1.036	Body Mass Index (kg/m**2)
PM2_5	1.375	1.118	1.692	PM2_5 (ug/m3)/18.6 (range)

Table5: Cause of Death Model -- Lung Cancer, New C.  
238

The PHREG Procedure

Data Set: WORK.TEMP1  
Dependent Variable: TIMEON3  
Censoring Variable: DEAD\_L  
Censoring Value(s): 0  
Ties Handling: BRESLOW

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	1365.479	1211.519	153.959 with 7 DF (p=0.0001)
Wald	.	.	202.575 with 7 DF (p=0.0001)
			145.002 with 7 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	1.536764	0.40614	14.31764	0.0002
N_CPACK	1	0.551168	0.09931	30.80367	0.0001
FSMOKE	1	0.427481	0.45064	0.89987	0.3428
N_FPACK	1	0.495185	0.07884	39.44636	0.0001
EDD	1	0.210812	0.19036	1.22639	0.2681
BMI	1	-0.063980	0.02528	6.40555	0.0114
PM2_5	1	0.358423	0.26540	1.82389	0.1769

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	4.650	2.098	10.307	Current smoker (1=yes)

N_CPACK	1.735	1.428	2.108	25 Pack-years of smoking
FSMOKE	1.533	0.634	3.709	Former smoker (1=yes)
N_FPACK	1.641	1.406	1.915	20 Pack-years of smoking
EDD	1.235	0.850	1.793	< HS (1=yes)
BMI	0.938	0.893	0.986	Body Mass Index (kg/m**2)
PM2_5	1.431	0.851	2.408	PM2_5 (ug/m3)/18.6 (range)

Table5: Cause of Death Model -- All Others, New C.  
239

The PHREG Procedure

Data Set: WORK.TEMP1  
 Dependent Variable: TIMEON3  
 Censoring Variable: DEAD\_0  
 Censoring Value(s): 0  
 Ties Handling: BRESLOW

Testing Global Null Hypothesis: BETA=0

Criterion	Without Covariates	With Covariates	Model Chi-Square
-2 LOG L Score	6224.563	6201.894	22.668 with 7 DF (p=0.0019)
Wald	.	.	23.267 with 7 DF (p=0.0015)
			23.200 with 7 DF (p=0.0016)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
CURRCIG1	1	0.331558	0.16143	4.21857	0.0400
N_CPACK	1	0.033838	0.09070	0.13919	0.7091
FSMOKE	1	0.082211	0.13828	0.35348	0.5522
N_FPACK	1	0.077997	0.05925	1.73308	0.1880
EDD	1	0.135057	0.09080	2.21225	0.1369
BMI	1	0.028371	0.00964	8.65757	0.0033
PM2_5	1	0.013656	0.12758	0.01146	0.9148

Analysis of Maximum Likelihood Estimates

Conditional Risk Ratio and  
95% Confidence Limits

Variable	Risk Ratio	Lower	Upper	Label
CURRCIG1	1.393	1.015	1.912	Current smoker (1=yes)
N_CPACK	1.034	0.866	1.236	25 Pack-years of smoking
FSMOKE	1.086	0.828	1.424	Former smoker (1=yes)
N_FPACK	1.081	0.963	1.214	20 Pack-years of smoking
EDD	1.145	0.958	1.368	< HS (1=yes)
BMI	1.029	1.010	1.048	Body Mass Index (kg/m**2)
PM2_5	1.014	0.789	1.302	PM2_5 (ug/m3)/18.6 (range)