

Comparative Analysis of the NHANES III Public-Use and Restricted-Use Linked Mortality Files: 2010 Data Release

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Introduction

In 2009, NCHS completed a mortality update for [NHANES III](#) survey participants (1988-1994), with mortality ascertained through December 31, 2006. Due to requirements to protect the confidentiality of the NHANES III participants, a restricted-use version of the NHANES III Linked Mortality File was made available only through the [NCHS Research Data Center \(RDC\)](#). To complement the restricted-use file and increase data access, NCHS has developed a plan to allow for a public-use release of linked mortality data.

In 2010, NCHS released a public-use version of the NHANES III Linked Mortality File. The public-use data release includes the addition of perturbed data and was developed with the intent of eliminating re-identification risk to survey participants, maximizing the amount of mortality data included in the public-use release, while at the same time limiting the amount of synthetic data introduced to the data file.

This report describes a comparative analysis of the public-use and restricted-use NHANES III Linked Mortality Files. We used Cox proportional hazards models to compare the relative risk estimates for a standard set of socio-demographic covariates for all-cause as well as cause-specific mortality risk. NCHS is conducting this comparative analysis to demonstrate the comparability between the two versions of linked mortality files. NCHS recommends that researchers use these new linked mortality files as they supersede all prior data releases of the NHANES III Linked Mortality Files.

Description of NHANES III Linked Mortality Data Resources

Mortality status for eligible NHANES III survey participants is ascertained primarily through probabilistic record matching with the [National Death Index \(NDI\)](#). For a

complete description on the matching methodology please refer to http://www.cdc.gov/nchs/data/datalinkage/matching_methodology_nhanes3_final.pdf.

The [restricted-use file](#) includes detailed mortality information for all eligible survey participants including children. The restricted-use file includes the following variables: survey respondent eligibility status, mortality status, age at death, age last known alive, date of death (month, day and year), underlying and multiple causes of death, date of birth, and NHANES III interview and exam dates (month, day, and year).

Due to confidentiality protections, the [public-use file](#) includes only eligible survey participants 17 years and older and a limited set of mortality variables. In addition, the public-use version was subjected to data perturbation techniques to reduce the risk of respondent re-identification. Synthetic data were substituted for the actual date of death and underlying cause-of-death data for selected decedent records. Information regarding vital status was not perturbed. Variables provided on the public-use NHANES III Linked Mortality File includes: survey respondent eligibility status, mortality status, person months of follow-up from interview date, person months of follow-up from exam date, and 113 grouped recodes of underlying causes of death. In addition, three variables were created to indicate the presence of diabetes, hypertension, or hip fracture in the multiple cause-of-death codes, when these conditions are reported as contributing, rather than underlying causes of death.

Methods

Sample selection

To effectively compare the restricted-use and public-use data, we merged the public-use NHANES III interview file with the accompanying public-use and restricted-use mortality files, respectively, to create the analytic samples. We restricted all analyses to those eligible for mortality follow-up, who were at least 25 years of age at the time of the NHANES III interview, who were non-Hispanic white, non-Hispanic black, or Mexican American, with no missing values for education level, and with person months of follow-up greater than zero. The public-use and restricted-use NHANES III Linked Mortality

Files each contain 33,994 records. Due largely to the sample restrictions of eligible adults 25 years and older, the final sample for the comparative analyses included 15,992 records for all cause mortality and 11,956 for cause-specific mortality due to the additional exclusion of Mexican Americans from cause-specific analysis.

Outcome measurement

We examined all-cause and cause-specific mortality in the public-use and restricted-use NHANES III Linked Mortality files using person-months of follow-up from the NHANES III interview until death. Respondents who were not identified as deceased by the end of the follow-up period were assumed to be alive. For the public-use file, we used the person-months of follow-up variable from interview date that is provided on the data file. More information on the calculation of this variable can be found at (http://www.cdc.gov/nchs/data/datalinkage/nh3_file_layout_public_2010.pdf). For the restricted-use file, person-months of follow-up was calculated using complete information on the month, day, and year of the NHANES III interview and the month, day, and year of death or, for respondents assumed alive, until the end of the follow-up period (December 31, 2006).

In addition to all-cause mortality, we examined eight causes of death that are among the leading causes of death in the United States and/or contribute to most years of potential life lost.¹ The NHANES III Linked Mortality file encompasses both the Ninth Revision of the *International Classification of Diseases* (ICD-9) and the Tenth Revision (ICD-10) cause-of-death coding for all U.S. deaths. In order to have the same cause-of-death codes across all years in the study period, we used the ICD-10 underlying cause-of-death 113 group recode, which recodes all deaths occurring prior to 1999 into ICD-10 codes.² Although the code numbers are the same for all years of mortality data, the coding rules for determining underlying cause-of-death differ for deaths that occurred prior to 1999 under ICD-9 and those that occurred in later years under ICD-10. The analyses presented in this paper do not control for the transition in coding rules between ICD-9 and ICD-10 because that transition does not affect the comparisons of interest in this paper.

The cause-specific death categories include the following [Underlying Cause-of-Death Recoded 113 Groups](#): heart disease (55-68), ischemic heart disease (59-61), cancer from all sites (20-44), lung cancer (27), cerebrovascular diseases (70), diabetes (46), pneumonia and influenza (77-78) and unintentional injuries (114-123).

Covariates

We included in all models a standard set of socio-demographic characteristics, which were reported at the time of the NHANES III interview: age in continuous years, sex, race/ethnicity (non-Hispanic black, non-Hispanic white, Mexican American), and educational attainment (less than high school, high school diploma or GED, more than high school).

Data Analysis

We used Cox proportional hazards models to compare the relative risk estimates for the covariates for all-cause as well as cause-specific mortality risk. All relative risk estimates were calculated with the survival procedure in Software for Survey Data Analysis (SUDAAN), version 10.0. to take into account the complex survey design of the NHANES III.³ Due to an insufficient number of deaths for Mexican Americans, the cause-specific mortality analyses are restricted to non-Hispanic whites and non-Hispanic blacks.

Results

Descriptive Results

[Table 1](#) shows the unweighted sample counts (n) and weighted percentage distributions for the covariates used in the analyses. Note that these descriptive statistics for covariates do not differ between the public-use and restricted-use files because the only differences between the two files are associated with the variables taken from the mortality file. Briefly, the distributions of covariates are as expected: the average age of this sample is 47.7 years and fewer than two percent of respondents are aged 85 or above. Females outnumber males, and non-Hispanic whites make up 84.0 percent of the sample while

non-Hispanic blacks (11.4 percent) and Mexican Americans (4.9 percent) account for considerably smaller proportions.

The number and weighted percentage of persons, in our sample, who were identified as dying in each of the two files ($n = 5,023$; Percent = 20.6) is identical, since for the public-use file the vital status of individuals was not changed as a result of the perturbation process. The public-use file includes perturbed information for date of death for selected decedents, which affects the calculation of months of follow-up. Yet, the mean months of follow-up (weighted) for both files is almost identical (approximately 164 months). We examined the cause-specific percentage distributions for the eight causes of death studied. Overall, the distributions are quite similar when comparing the two files. For example, for both files, the percentage of deaths attributed to heart disease and cancer is approximately 34% and 25%, respectively. For less prevalent causes of death, such as diabetes and unintentional injury, the percentage of deaths attributed to these causes is approximately 3% for each cause in both files (data not shown).

All-Cause Mortality Model Results

[Table 2.1](#) displays results from two Cox proportional hazards models of all-cause mortality: one estimated from the public-use file and one estimated from the restricted-use file. Recall that while fact of death was not changed between the two files, there are differences in the duration of follow-up variables due to the perturbation of date of death for selected decedents in the public-use file. The results of both models are consistent. Age, sex, race/ethnicity and education are all related to the risk of adult mortality in the expected directions. For example, non-Hispanic blacks and persons with less than a high school education display the highest risks of mortality compared to their respective counterpart subgroups. Moreover, the relative risks and 95% confidence intervals are nearly identical for results from the public-use and restricted-use files.

The results of the all-cause Cox proportional hazards models of adult mortality that are estimated separately by sex are shown in [Table 2.2](#). For each sex, results from the public-use and restricted-use files are shown, respectively. The sex-specific models yield

consistent results, when the public-use and restricted-use files are compared. Finally, [Table 2.3](#) shows the results of separate proportional hazards models for non-Hispanic whites, non-Hispanic blacks, and Mexican Americans, respectively. Again, there are only non-substantive differences when comparing the results from the public-use and restricted-use files for each of the three racial/ethnic groups. For each group, covariates exhibit relationships with all-cause mortality that are consistent with what one would expect; for example, males exhibit higher mortality than females in each racial/ethnic group and persons with less than a high school education demonstrate higher mortality risks over the follow-up period, although this association is not statistically significant for Mexican Americans.

Cause-Specific Mortality Model Results

[Tables 3.1 through 3.8](#) display the results of the Cox proportional hazards models for eight specific underlying causes of death. Each cause-specific table provides a comparison of the model results from the public-use version and the restricted-use version of the NHANES III Linked Mortality File. As previously mentioned, these cause-specific results are limited to those identified as non-Hispanic white or non-Hispanic black. Some of the specific causes (e.g., lung cancer, ischemic heart disease) are subsets of a larger underlying cause category (e.g., all-cancer, heart disease).

A comparison of the results for the public-use and restricted-use files for each of the eight causes yields similar results. In general, the conclusions to be reached from the models are identical and there are only minor differences when comparing the actual coefficients and standards errors of the models.

To illustrate an example of the consistency between results from the public-use data and restricted-use data, [Table 3.3](#) provides comparative models that specify all-cancer mortality as the outcome variable. Mortality increases just over seven percent for each additional year of age in both the public-use data model and the restricted-use data model. Males experience 50 percent higher cancer mortality risk than females over the course of the follow-up period according to the public-use data and 47 percent higher cancer

mortality risk than females according to the restricted-use data. However, for lung cancer mortality ([Table 3.4](#)) there are slight differences in the results for education. Although the relative risk estimates are consistent between the two files, the public-use file shows statistically significant results. For example, in the public-use file, compared to having more than a high school education, the relative risk of lung cancer mortality associated with having less than a high school education is (RR=1.8, p-value = 0.04), while in the restricted-use file the p-value associated with the relative risk is p= 0.06. The public-use file has more deaths attributed to lung cancer, resulting in a slightly smaller standard error for estimates, which in this instance led to differences in obtaining statistical significance at the 0.05 level.

Discussion

This report describes analyses comparing results obtained from the public-use version and restricted-use version of the NHANES III Linked Mortality File, with mortality follow-up through 2006. In the public-use version of the data file, a limited amount of information for decedents was perturbed. Further, there is less detail on mortality information in the public-use version, compared to the restricted-use file, where no information has been perturbed and there is complete information on date of death; including month, day and year.

The comparative analysis finds that the two data files yield very similar descriptive and model results. This is particularly true when examining all-cause mortality. Because the perturbation process in the public-use file did not affect the vital status of any individuals in the file, differences in results between the two files when examining overall (all-cause) mortality arise because the public-use file has perturbed date of death information that is included in the calculated duration of follow-up variables provided on the public-use file. Differences in results for all-cause mortality between the public-use file and restricted-use file were very minor.

The comparative analysis of cause-specific mortality across the public-use and restricted-use versions of the NHANES III Linked Mortality File also yielded only very slight

differences in model results. The perturbation process in the public-use version will impact the frequency distributions for cause-of-death and should be kept in mind when conducting cause-specific analyses of the public-use file. Yet, overall the percentage of deaths attributed to the leading causes of death for both files remained quite similar and the coefficients and standard errors in the cause-specific models that we have estimated demonstrate that such differences in the identification of causes of death for some cases result in only small differences in the comparative results, which do not lead to substantive differences in the interpretation of results.

Our findings should provide analysts with the confidence to use these most recent public-use data files providing mortality follow-up for eligible adult NHANES III respondents. However, there are some analytic considerations that should be noted by all potential users. First, we used the statistical software package SUDAAN 10.0 because it fits Cox proportional hazard models to sample surveys. Moreover, caution in using the public-use file is urged when examining the mortality patterns of small subgroups of the population, such as numerically small racial/ethnic minority groups, very old individuals, or young adults. This is particularly the case when cause-specific analyses of such numerically small demographic subgroups are performed. Caution is also urged when conducting analyses that allow participants to age into varying age strata over the follow-up period. The availability of more precise and detailed age and follow-up information on the restricted use file could lead to different samples being obtained in the various age strata. Researchers using the public-use data for such analyses are strongly encouraged to confirm their findings with the restricted-use data.

In sum, the 2010 release of a public-use version of the NHANES III Linked Mortality File provides the public health, social science, demographic, and medical communities with a data set that is easily available, nationally representative, and rich in detail for both mortality covariates and specificity in outcomes. The public-use file is an important resource for researchers and policymakers in further understanding the adult mortality trends and patterns.

References

1. National Center for Health Statistics. *Health, United States, 2009*. Hyattsville, MD: 2010.
2. Anderson RN, Minino AM, Hoyert DL, Rosenberg HM. Comparability of cause of death between ICD-9 and ICD-10: Preliminary estimates. National Center for Health Statistics. *National Vital Statistics Reports 49*. 2001;No.2.
3. SUDAAN: Software for the Statistical Analysis of Correlated Data, 10.0. RTI International.

Table 1. Baseline sample characteristics, NHANES III (1988-1994): n = 15,992

	Unweighted n	Weighted percentage or mean
Age in years, mean		47.7
Age (grouped)		
25-44	6,721	51.0%
45-64	4,279	29.4
65-84	4,343	18.0
85+	649	1.6
Sex		
Male	7,478	47.4%
Female	8,514	52.6
Race/Ethnicity		
non-Hispanic white	7,565	83.7%
non-Hispanic black	4,391	11.4
Mexican American	4,036	4.9
Education level		
Less than high school	6,788	24.6%
High school/GED	4,724	34.2
More than high school	4,480	41.3

Table 2.1. Relative Risks for all-cause mortality: NHANES III (1988-1994) linked mortality file, mortality follow-up through 2006 (n =15,992)

	Public-use			Restricted-use		
	Relative Risk	Lower Bound 95% CI	Upper Bound 95% CI	Relative Risk	Lower Bound 95% CI	Upper Bound 95% CI
Age in years	1.095	1.089	1.101	1.095	1.089	1.101
Sex (female)						
Male	1.452	1.352	1.558	1.452	1.353	1.558
Race/ethnicity (NHW)						
NHB	1.353	1.217	1.505	1.354	1.217	1.506
Mexican American	0.882	0.758	1.025	0.881	0.757	1.026
Education (More than high school)						
Less than high school	1.490	1.315	1.690	1.490	1.314	1.689
High school	1.345	1.226	1.474	1.345	1.227	1.474

Notes:

Relative Risks are estimated from a Cox proportional hazards model.

All models adjust for sample weights and the NHANES III complex survey design using the SUDAAN software program (10.0).

NHW refers to non-Hispanic white; NHB refers to non-Hispanic black.

Values in parenthesis are reference categories.

Table 2.2. Relative Risks for all-cause mortality by sex: NHANES III (1988-1994) linked mortality file, mortality follow-up through 2006 (n =15,992)

	Men						Women					
	Public-use			Restricted-use			Public-use			Restricted-use		
	Relative Risk	Lower Bound 95% CI	Upper Bound 95% CI	Relative Risk	Lower Bound 95% CI	Upper Bound 95% CI	Relative Risk	Lower Bound 95% CI	Upper Bound 95% CI	Relative Risk	Lower Bound 95% CI	Upper Bound 95% CI
Age in years	1.095	1.087	1.103	1.095	1.087	1.103	1.094	1.088	1.101	1.094	1.088	1.101
Race/ethnicity (NHW)												
NHB	1.488	1.275	1.735	1.489	1.276	1.737	1.234	1.100	1.385	1.235	1.102	1.385
Mexican American	0.977	0.789	1.210	0.977	0.789	1.211	0.776	0.657	0.916	0.775	0.656	0.915
Education (more than high school)												
Less than high school	1.534	1.296	1.817	1.533	1.295	1.816	1.430	1.202	1.701	1.431	1.203	1.701
High school	1.509	1.321	1.725	1.509	1.320	1.724	1.198	1.034	1.388	1.199	1.035	1.389

Notes:

Relative Risks are estimated from a Cox proportional hazards model.

All models adjust for sample weights and the NHANES III complex survey design using the SUDAAN software program (10.0).

NHW refers to non-Hispanic white; NHB refers to non-Hispanic black.

Values in parenthesis are reference categories.

Table 2.3. Relative Risks for all-cause mortality by race/ethnicity: NHANES III (1988-1994) linked mortality file, mortality follow-up through 2006 (n = 15,992)

	non-Hispanic whites						non-Hispanic blacks					
	Public-use			Restricted-use			Public-use			Restricted-use		
	Relative Risk	Lower Bound 95% CI	Upper Bound 95% CI	Relative Risk	Lower Bound 95% CI	Upper Bound 95% CI	Relative Risk	Lower Bound 95% CI	Upper Bound 95% CI	Relative Risk	Lower Bound 95% CI	Upper Bound 95% CI
Age in years	1.099	1.091	1.106	1.099	1.091	1.106	1.077	1.071	1.082	1.077	1.071	1.082
Sex (female)												
Male	1.430	1.318	1.551	1.430	1.318	1.551	1.605	1.439	1.790	1.605	1.440	1.790
Education (More than high school)												
Less than high school	1.458	1.266	1.681	1.458	1.266	1.681	1.878	1.550	2.275	1.878	1.551	2.275
High school	1.311	1.179	1.458	1.311	1.179	1.458	1.716	1.468	2.006	1.717	1.469	2.006
<hr/>												
Mexican Americans												
	Public-use			Restricted-use								
	Relative Risk	Lower Bound 95% CI	Upper Bound 95% CI	Relative Risk	Lower Bound 95% CI	Upper Bound 95% CI						
Age	1.087	1.077	1.097	1.087	1.077	1.097						
Sex (female)												
Male	1.705	1.390	2.092	1.704	1.390	2.090						
Education (More than high school)												
Less than high school	1.301	0.865	1.958	1.298	0.863	1.953						
High school	0.960	0.645	1.430	0.958	0.644	1.427						

Notes:
 Relative Risks are estimated from a Cox proportional hazards model.
 All models adjust for sample weights and the NHANES III complex survey design using the SUDAAN software program (10.0).
 Values in parenthesis are reference categories.

Table 3.1. Relative Risks for heart disease mortality: NHANES III (1988-1994) linked mortality file, mortality follow-up through 2006 (n =11,956)

	Public-use			Restricted-use		
	Relative Risk	Lower Bound 95% CI	Upper Bound 95% CI	Relative Risk	Lower Bound 95% CI	Upper Bound 95% CI
Age in years	1.114	1.104	1.124	1.113	1.104	1.123
Sex (female)						
Male	1.653	1.505	1.815	1.667	1.517	1.833
Race/ethnicity (NHW)						
NHB	1.253	1.061	1.480	1.235	1.044	1.460
Education (More than high school)						
Less than high school	1.442	1.220	1.704	1.492	1.276	1.743
High school	1.196	1.015	1.409	1.255	1.067	1.475

Notes:

Relative Risks are estimated from a Cox proportional hazards model.

All models use sample weights and take into account the NHANES III complex survey design using the SUDAAN software program (10.0).

NHW refers to non-Hispanic white; NHB refers to non-Hispanic black.

Values in parenthesis are reference categories.

Table 3.2. Relative Risks for ischemic heart disease mortality: NHANES III (1988-1994) linked mortality file, mortality follow-up through 2006 (n =11,956)

	Public-use			Restricted-use		
	Relative Risk	Lower Bound 95% CI	Upper Bound 95% CI	Relative Risk	Lower Bound 95% CI	Upper Bound 95% CI
Age in years	1.090	1.077	1.104	1.090	1.076	1.103
Sex (female)						
Male	1.998	1.590	2.513	2.000	1.588	2.519
Race/ethnicity (NHW)						
NHB	0.913	0.661	1.262	0.877	0.642	1.197
Education (More than high school)						
Less than high school	1.763	1.258	2.470	1.780	1.278	2.479
High school	1.268	0.906	1.776	1.332	0.954	1.861

Notes:

Relative Risks are estimated from a Cox proportional hazards model.

All models use sample weights and take into account the NHANES III complex survey design using the SUDAAN software program (10.0).

NHW refers to non-Hispanic white; NHB refers to non-Hispanic black.

Values in parenthesis are reference categories.

Table 3.3. Relative Risks for all cancer mortality: NHANES III (1988-1994) linked mortality file, mortality follow-up through 2006 (n =11,956)

	Public-use			Restricted-use		
	Relative Risk	Lower Bound 95% CI	Upper Bound 95% CI	Relative Risk	Lower Bound 95% CI	Upper Bound 95% CI
Age in years	1.074	1.064	1.085	1.075	1.064	1.086
Sex (female)						
Male	1.496	1.242	1.800	1.471	1.224	1.769
Race/ethnicity (NHW)						
NHB	1.381	1.116	1.708	1.357	1.093	1.685
Education (More than high school)						
Less than high school	1.383	0.992	1.927	1.374	0.966	1.954
High school	1.535	1.205	1.955	1.474	1.144	1.899

Notes:

Relative Risks are estimated from a Cox proportional hazards model.

All models use sample weights and take into account the NHANES III complex survey design using the SUDAAN software program (10.0).

NHW refers to non-Hispanic white; NHB refers to non-Hispanic black.

Values in parenthesis are reference categories.

Table 3.4. Relative Risks for lung cancer mortality: NHANES III (1988-1994) linked mortality file, mortality follow-up through 2006 (n =11,956)

	Public-use			Restricted-use		
	Relative Risk	Lower Bound 95% CI	Upper Bound 95% CI	Relative Risk	Lower Bound 95% CI	Upper Bound 95% CI
Age in years	1.063	1.051	1.076	1.065	1.051	1.079
Sex (female)						
Male	1.891	1.359	2.632	1.863	1.312	2.644
Race/ethnicity (NHW)						
NHB	1.336	0.962	1.855	1.250	0.884	1.766
Education (More than high school)						
Less than high school	1.807	1.032	3.163	1.807	0.981	3.328
High school	1.629	1.035	2.563	1.507	0.949	2.394

Notes:

Relative Risks are estimated from a Cox proportional hazards model.

All models use sample weights and take into account the NHANES III complex survey design using the SUDAAN software program (10.0).

NHW refers to non-Hispanic white; NHB refers to non-Hispanic black.

Values in parenthesis are reference categories.

Table 3.5. Relative Risks for cerebrovascular diseases mortality: NHANES III (1988-1994) linked mortality file, mortality follow-up through 2006 (n =11,956)

	Public-use			Restricted-use		
	Relative Risk	Lower Bound 95% CI	Upper Bound 95% CI	Relative Risk	Lower Bound 95% CI	Upper Bound 95% CI
Age in years	1.127	1.110	1.145	1.127	1.110	1.145
Sex (female)						
Male	0.928	0.674	1.277	0.933	0.678	1.284
Race/ethnicity (NHW)						
NHB	1.619	1.158	2.262	1.690	1.204	2.373
Education (More than high school)						
Less than high school	0.953	0.615	1.478	0.954	0.619	1.471
High school	1.191	0.762	1.860	1.186	0.762	1.845

Notes:

Relative Risks are estimated from a Cox proportional hazards model.

All models use sample weights and take into account the NHANES III complex survey design using the SUDAAN software program (10.0).

NHW refers to non-Hispanic white; NHB refers to non-Hispanic black.

Values in parenthesis are reference categories.

Table 3.6. Relative Risks for pneumonia/influenza mortality: NHANES III (1988-1994) linked mortality file, mortality follow-up through 2006 (n =11,956)

	Public-use			Restricted-use		
	Relative Risk	Lower Bound 95% CI	Upper Bound 95% CI	Relative Risk	Lower Bound 95% CI	Upper Bound 95% CI
Age in years	1.172	1.143	1.202	1.171	1.142	1.201
Sex (female)						
Male	1.897	1.186	3.035	1.878	1.172	3.008
Race/ethnicity (NHW)						
NHB	1.307	0.775	2.206	1.360	0.813	2.276
Education (More than high school)						
Less than high school	1.693	0.805	3.561	1.694	0.804	3.567
High school	1.864	0.884	3.930	1.886	0.896	3.973

Notes:

Relative Risks are estimated from a Cox proportional hazards model.

All models use sample weights and take into account the NHANES III complex survey design using the SUDAAN software program (10.0).

NHW refers to non-Hispanic white; NHB refers to non-Hispanic black.

Values in parenthesis are reference categories.

Table 3.7. Relative Risks for diabetes mortality: NHANES III (1988-1994) linked mortality file, mortality follow-up through 2006 (n =11,956)

	Public-use			Restricted-use		
	Relative Risk	Lower Bound 95% CI	Upper Bound 95% CI	Relative Risk	Lower Bound 95% CI	Upper Bound 95% CI
Age in years	1.082	1.065	1.099	1.082	1.065	1.099
Sex (female)						
Male	1.031	0.657	1.617	1.043	0.668	1.629
Race/ethnicity (NHW)						
NHB	2.552	1.525	4.270	2.612	1.549	4.405
Education (More than high school)						
Less than high school	3.273	1.453	7.372	3.307	1.473	7.423
High school	2.696	1.184	6.142	2.702	1.186	6.157

Notes:

Relative Risks are estimated from a Cox proportional hazards model.

All models use sample weights and take into account the NHANES III complex survey design using the SUDAAN software program (10.0).

NHW refers to non-Hispanic white; NHB refers to non-Hispanic black.

Values in parenthesis are reference categories.

Table 3.8. Relative Risks for unintentional injury mortality: NHANES III (1988-1994) linked mortality file, mortality follow-up through 2006 (n =11,956)

	Public-use			Restricted-use		
	Relative Risk	Lower Bound 95% CI	Upper Bound 95% CI	Relative Risk	Lower Bound 95% CI	Upper Bound 95% CI
Age in years	1.023	0.989	1.059	1.024	0.990	1.059
Sex (female)						
Male	1.768	0.903	3.464	1.753	0.897	3.426
Race/ethnicity (NHW)						
NHB	0.935	0.498	1.755	0.971	0.510	1.848
Education (More than high school)						
Less than high school	3.845	1.748	8.459	3.751	1.709	8.233
High school	0.938	0.440	2.002	0.921	0.433	1.958

Notes:

Relative Risks are estimated from a Cox proportional hazards model.

All models use sample weights and take into account the NHANES III complex survey design using the SUDAAN software program (10.0).

NHW refers to non-Hispanic white; NHB refers to non-Hispanic black.

Values in parenthesis are reference categories.