Comparative Analysis of the Public-Use and Restricted-Use NHIS Linked Mortality Files

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Introduction

Federally sponsored health surveys are a critical source of information on public health in the United States. Yet, access to nationally representative survey data that provide a longitudinal mortality component is limited. The National Center for Health Statistics (NCHS) periodically conducts mortality follow-up studies through record linkage to administrative data sources for its major population-based surveys (see NCHS Data Linkage Activities). These linked mortality files fill research gaps by creating data resources that contain high quality socio-demographic, health, and mortality information for nationally representative U.S. samples.

In 2004, NCHS completed a mortality follow-up study for the 1986 to 2000 National Health Interview Survey (NHIS) years. Due to confidentiality protections of the NHIS participants, the NHIS Linked Mortality Files were made available only through the NCHS Research Data Center (RDC). Recognizing that this would place restrictions on researchers' use of previously highly utilized public-use data files, NCHS has developed a data perturbation plan to allow for the continued public-use release of linked mortality data. The data release plan was developed to eliminate re-identification of survey participants and maximize the amount of data to be included in the release, and limit the amount of synthetic data introduced to the data file. In 2007, NCHS released a public-use version of the NHIS Linked Mortality Files for each of the 15 NHIS years 1986 to 2000.

This report describes a comparative analysis of the public-use and restricted-use NHIS Linked Mortality Files. We used Cox proportional hazards models to compare the relative hazards 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 the linked mortality files.

Description of Linked Mortality Data Resources
An updated linkage of the NHIS to death certificate data found in the National Death Index (NDI) was conducted for each of the 1986 to 2000 NHIS years, with mortality follow-up through December 31, 2002. Mortality information is based upon the results of a probabilistic match between NHIS and NDI death certificate records. For more information on the matching methodology, please refer to the 1986-2000 NHIS Linked Mortality File Matching Methodology Report. All NHIS participants are included on the linked mortality files, but only adult participants (those 18 years and older at the time of the survey) were eligible for mortality follow-up. Each NHIS survey year (1986-2000) is available on a separate data file, with a consistent file format for all years. NCHS has created two versions of the new NHIS Linked Mortality Files: restricted-use files that include detailed mortality information and public-use files that include a limited set of mortality variables.

The restricted-use files include the following variables: survey respondent eligibility status, mortality status, date of death (month, day and year), underlying and multiple cause-of-death, NHIS interview date (month, day, and year), adjusted sample weights, and new variance estimation variables. The public-use files were subjected to standard data perturbation techniques that introduce statistical noise into the data set, in order to reduce the risk of respondent re-identification. Synthetic data were substituted for the actual date and underlying cause-of-death data for selected decedent records. Information regarding vital status was not perturbed. Variables provided on the public-use NHIS Linked Mortality Files include: survey respondent eligibility status, mortality status, date of death (quarter and year), underlying cause-of-death 113-group recode, adjusted sample weights, and new variance estimation variables. In addition, three

variables were created to indicate the presence of diabetes, hypertension, or hip fracture in the multiple causes-of-death codes, as these conditions are most often reported as contributing, rather than underlying, causes of death.

The adjusted sample weight available on both the public-use and restricted-use NHIS Linked Mortality Files was created for those eligible for mortality linkage to compensate for those adults classified as being ineligible for mortality follow-up. In addition, since the 15 NHIS years included in the Linked Mortality Files span different NHIS survey design periods, any analysis that pools across these design periods must create new strata and primary sampling unit (PSU) variables for correct variance estimation. In order to facilitate analyses that pool several years of NHIS data files, new strata and PSU variables were created to represent strata and PSUs defined over the 15 years of data.

Methods

Analytic sample

To effectively compare the public-use and restricted-use data sets, we merged the public-use NHIS person level file for each year 1986 to 2000 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 NHIS interview, were non-Hispanic white, non-Hispanic black, or Hispanic, with a sample weight greater than zero, and with no missing values for education level, marital status, and cause of death.

Outcome measurement

We examined all-cause and cause-specific mortality in the public-use and restricted-use NHIS Linked Mortality Files using time from NHIS interview until death; respondents who were not identified as dying by the end of the follow-up period were assumed to be alive. For the public-use files, duration of follow-up was constructed using NHIS interview year and year of death. Respondents who died in the same year as their NHIS interview were given ½-year of follow-up time as their duration. All other decedents

were assumed to have a ½–year of follow-up during the year of their interview, a full year of follow-up for each year after their year of interview until the year prior to their death, and then another ½-year of follow-up during the year of their death. For respondents assumed alive, their follow-up time was calculated by assuming a ½-year of follow-up during their NHIS interview year and a full year of follow-up for each year thereafter until the end of 2002. For the restricted-use files, duration of follow-up was calculated using complete information on the month, day, and year of the NHIS interview and the month, day, and year of death or, for respondents assumed alive, until the end of the follow-up period, December 31, 2002. Thus, minor differences in model results may be evident in the comparative results below because of the differing calculations of the duration of follow-up time that were used for the two files.

In addition to all-cause mortality, we examined 14 causes of death that are among the ten leading causes of death in the United States and/or contribute to most years of potential life lost.[1] The NHIS Linked Mortality files encompass 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] However, even though 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 (UCOD-113): heart disease (55-68), ischemic heart disease (59-61), cancer from all sites (20-44), lung cancer (27), colorectal cancer (23), breast cancer (estimated for women only) (29), prostate cancer (estimated for men only) (33), cerebrovascular diseases (70), diabetes (46), pneumonia and influenza (77-78), chronic

liver diseases and Cirrhosis (94-95), unintentional injuries (114-123), suicide (125-126), and homicide (128-129).

Covariates

We included in all models a standard set of socio-demographic characteristics, which were measured at the time of NHIS interview: age in continuous years, sex, race/ethnicity (non-Hispanic black, non-Hispanic white, Hispanic), educational attainment (less than high school, high school diploma, some college, college degree or more), marital status (widowed, divorced/separated, never married, married), and region of the country (South, Midwest, Northeast, West).

Data Analysis

We used Cox proportional hazards models to compare the relative hazards for the covariates for all-cause as well as cause-specific mortality risk. All relative hazards were calculated with the survival procedure in Software for Survey Data Analysis (SUDAAN), version 9.0.1 to take into account the complex survey design of the NHIS.[3] The Efron method was used for handling tied failure times.[4]

Due to an insufficient number of deaths in certain population subgroups, the cause-specific mortality analyses differ from the all-cause mortality analyses in two ways. First, the cause-specific mortality models are restricted to non-Hispanic whites and non-Hispanic blacks. Second, educational attainment was collapsed into three categories for the cause-specific analyses from the four categories that were used in the all-cause mortality models.

Results

Descriptive Results

The public-use and restricted-use pooled 1986 to 2000 NHIS Linked Mortality Files each contain 1,576,171 records and 120,765 deaths (Table 1). The final sample for the comparative analyses included 897,232 records (Table 2) and 114,264 deaths. Table 3.1 shows the unweighted sample sizes and weighted percentage distributions for the

covariates used in the analysis. 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 weighted distributions of covariates are as expected: the average age of this sample is 47.9 years and fewer than two percent of respondents are aged 85 or above. Females outnumber males, and non-Hispanic whites make up just over 80 percent of the sample while non-Hispanic blacks (10.9 percent) and Hispanics (8.2 percent) account for considerably smaller proportions. A vast majority of the sample is married at the time of NHIS interview (over 69 percent) and the modal educational category is a high school degree or GED (36.0 percent). Over 35 percent of the sample resides in the South, while nearly 25 percent reside in the Midwest.

Table 3.2 shows the comparative descriptive statistics for mortality outcome variables among the public-use and restricted-use files, respectively. Note first that the total number and percentage of persons who were identified as dying in each of the two files (n = 114,264; Percent = 11.8) is identical. As mentioned above, this illustrates that the vital status of individuals was not changed for anyone as a result of the perturbation process for the public-use file. At the same time, however, there are some modest differences in the cause of death distributions when comparing the public-use and restricted-use files. While the cause-specific percentage distributions are, overall, quite similar when comparing the two files, there are some differences that should be noted. For example, the number of deaths attributed to heart disease (n = 37,272) and lung cancer (n = 8,838) in the public-use file is greater than the number of deaths attributed to heart disease (n = 36,689) and lung cancer (n = 8,395) in the restricted-use file, while the number of deaths attributed to cerebrovascular diseases in the public-use file is smaller (n = 7,802) than the number of deaths in the restricted-use file (n = 7,855). Similarly, there are modest differences when looking at the numbers and percentage distribution of deaths for the other underlying causes when comparing the two files (not shown).

All-Cause Mortality Model Results

Table 4.1 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. The results of both models are consistent with expectations, given the results
from similar models from past U.S. adult mortality research that used an earlier version
of this data set.[5] Age is very strongly and positively related to the risk of adult mortality
as well as there being differences in mortality risk by racial/ethnic, educational, marital
status, and regional groups. For example, non-Hispanic blacks, persons with less than a
high school education, never married individuals, and those living in the South display
the highest risks of mortality compared to their respective counterpart subgroups.
Moreover, coefficients and standard errors are nearly identical when comparing the
results from the public-use and restricted-use files, with only slight differences occurring
in the third and fourth decimal places of the coefficients and standard errors, respectively.
Recall that there are differences in the way that the duration of follow-up variable was
calculated for these two versions of the NHIS Linked Mortality Files; thus, these very
slight differences in model results for all-cause mortality are due to differences in the
duration of follow-up variables.

The results of all-cause Cox proportional hazards models of adult mortality that are
estimated separately by sex are shown in Table 4.2. For each sex, results from the
public-use and restricted-use files are shown. As seen when the two sexes were
combined, the sex-specific models yield results that are consistent with previous research
and with nearly identical coefficients and standard errors when the public-use and
restricted-use files are compared.

Finally, Table 4.3 shows the results of separate proportional hazards models for non-
Hispanic whites, non-Hispanic blacks, and Hispanics, respectively. Again, there are only
tiny and 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 from the U.S. adult mortality literature; for example, males exhibit 60-70 percent

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 in each racial/ethnic group compared to persons in the more highly educated groups.[5]

Cause-Specific Mortality Model Results

Tables 5.1 through 5.14 display the results of the Cox proportional hazards models for 14 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 NHIS Linked Mortality Files. As previously mentioned, these cause-specific results are limited to adult individuals who are 25 years of age or older at time of interview and who are identified as non-Hispanic white or non-Hispanic black. Females and males are combined in these cause-specific models, with a dummy variable for sex included in each model. Those with missing data on education, marital status, or cause of death were excluded. Some of the specific causes (e.g., lung cancer, colorectal cancer, breast cancer, prostate cancer) are subsets of a larger underlying cause category (e.g., all-cancer mortality).

A comparison of the results for the public-use and restricted-use files for each of the 14 causes yields no substantive differences in conclusions, and coefficients and standard errors that are very similar. That is, when comparing public-use and restricted-use coefficients and significance tests for each cause, 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. This is the case when both common underlying causes-of-death are specified as the outcome (e.g., heart disease mortality; all-cancer mortality) and less common underlying causes-of-death are specified (e.g., pneumonia/influenza mortality; homicide mortality) as the outcome, although there tends to be slightly more disagreement in the coefficients and standard errors for the less common causes of death when comparing results from the public-use data and restricted-use data models.

To illustrate an example of the consistency between results from the public-use data and restricted-use data, Table 5.3 provides comparative models that specify all-cancer mortality as the outcome variable. Mortality risk 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 58 percent higher cancer mortality risk than females over the course of the follow-up period according to the public-use data and 59 percent higher cancer mortality than females according to the restricted-use data. Educational differences in overall cancer mortality risk favor those with more than a high school education in both the public-use and restricted-use data sets, with those who have less than a high school education exhibiting 36 percent higher mortality risk over the follow-up period compared to those with more than a high school education. There are slight differences in the marital status coefficients when comparing the public-use data and restricted-use data results but, in both data sets, widowed individuals exhibit the lowest cancer mortality risk and divorced/separated individuals experience the highest mortality risk. Finally, there exist regional differences in all-cancer mortality risk, with persons residing in both the Northeast and South exhibiting 8-9 percent higher mortality than persons residing in the West. The magnitude of these regional cancer mortality risk differences is nearly identical when comparing the results of the public-use and restricted-use models.

Mortality from unintentional injuries is an example of an underlying cause that is far less common than all-cancer mortality; unintentional injury accounts for only 2.9 percent of deaths in both the public-use and restricted-use NHIS Linked Mortality Files. Table 5.12 shows that, when comparing public-use data and restricted-use data coefficients and standard errors for standard socio-demographic covariates of unintentional injury mortality, only trivial differences arise. For example, results from both the public-use and restricted-use files show that males are twice as likely as females to die from an unintentional injury. Also the public-use files show that those with less than a high school education experience 62 percent higher unintentional injury mortality risk during the follow-up period compared to those with more than a high school education; the

parallel results from the restricted-use files demonstrate 61 percent higher unintentional injury mortality risk among the less than high school education group.

Discussion

This report describes analyses comparing results obtained from the public-use version and restricted-use version of the NHIS Linked Mortality Files. In the public-use version of the data file, a limited amount of information for decedents was perturbed. Further, there is less detailed date of death 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.

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 files did not affect the vital status of any individuals in the file, the only differences in results between the two files when examining overall (all-cause) mortality arose because the public-use files have less specific information available regarding timing of death for individuals compared to the restricted-use files. In the end, the differences that resulted from the comparisons of all-cause mortality between the public-use files and restricted-use files, then, were very minor.

The comparative analysis of cause-specific mortality across the public-use and restricted-use versions of the NHIS Linked Mortality Files also yielded only very slight differences in model results, even for causes of death like diabetes, chronic liver disease and cirrhosis, homicide, unintentional injuries, and suicide that each represent fewer than three percent of all U.S. adult deaths. The frequency distributions that were shown for cause of death for the public-use and restricted-use versions of the NHIS Linked Mortality Files demonstrated that the perturbation process in the public-use version did have a minor impact on the number of persons identified as dying of each cause as well as the overall distribution of deaths. This should be kept in mind when conducting cause-specific analyses of the public-use files. Nevertheless, 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 very slight, and statistically and substantively insignificant, changes in the comparative results. Moreover, no differences in conclusions could be reached based on these cause-specific models when comparing the public-use and restricted-use data sets.

Our findings should provide analysts with the confidence to use these most recent data files providing mortality follow-up for eligible NHIS respondents. However, there are some analytic considerations that should be noted by all potential users. For the public-use files, length of follow-time was calculated for this report using only year of interview and year of death or for those assumed alive, the end of 2002 as the end-point of follow-up. Using only year information resulted in 32 distinct follow-up times. The resulting tied failure times could cause bias in model estimates if not handled correctly. We used the statistical software package SUDAAN 9.0.1 because it fits Cox proportional hazard models to sample surveys and uses Efron's likelihood for tied failure times as the default. Simulation studies and comparative analyses of methods used to handle ties in failure time suggest that the Efron method is preferred.[4] We conducted additional analyses using the available information on quarter of interview and quarter of death to calculate length of follow-time, which yielded 256 distinct failure times, and found no substantive or significant differences in results compared to those presented in this report. Moreover, caution in using the public-use files 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.

In sum, the new public-use version of the NHIS Linked Mortality Files provide the public health, social science, demographic, and medical communities with a data set that is easily available, very large, nationally representative, and rich in detail for both mortality covariates and specificity in outcomes. The public-use files are an important resource for researchers and policymakers in further understanding the adult mortality trends and patterns that characterize our diverse society.

References

1. National Center for Health Statistics. *Health, United States, 2006.* Hyattsville, MD: 2006.

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, 9.01. RTI International.

4. Hertz-Picciotto I; Rockhill B. Validity and efficiency of approximation methods for tied survival times in Cox regression. *Biometrics.* 1997;53:1151-1156.

5. Rogers R, Hummer RA., Nam CB. *Living and Dying in the U.S.A.* San Diego, CA: Academic Press. 2000.

Table 1. Number of records and deaths by NHIS survey year:
Public-use and restricted-use[1] NHIS Linked Mortality Files, 1986-2000

Survey year	Total records[2]	Total deaths
1986	62,052	8,492
1987	122,859	15,776
1988	122,310	14,695
1989	116,929	12,956
1990	119,631	12,061
1991	120,032	11,014
1992 [3]	120,700	10,225
1993	109,671	8,130
1994	116,179	7,911
1995	102,467	5,762
1996	63,402	3,004
1997	103,477	4,007
1998	98,785	3,009
1999	97,059	2,192
2000	100,618	1,531
Total	1,576,171	120,765

Notes:

[1]Available in the NCHS Research Data Center (RDC)

[2]From the NHIS person/core file

[3]Records from the 1992 NHIS modified file that has the 1991 Hispanic oversample removed.

Table 2. Selection criteria for comparative analyses: Pooled records for the 1986-2000 NHIS Linked Mortality Files

	Number of records	Excluded cases
Total records	1,576,171	
Analytic sample selection criteria		
Eligible for mortality follow-up[1]		489,743
Age 25 years or older at time of NHIS interview		140,108
Person-level annual sample weight greater than 0.0[2]		883
Race/ethnicity restricted to non-Hispanic whites, non-Hispanic blacks, and Hispanics. No missing values for marital status and education		48,176
No missing values for underlying cause-of-death 113 recode		29
Total number of excluded cases		678,939
Records included in analytic sample	**897,232**	

Notes:

[1]Only NHIS participants 18 years and older with sufficient linkage information were eligible for mortality follow-up.

[2]Sample weights less than or equal to zero were given to military personnel who were sampled.

Table 3.1. Sample characteristics, pooled NHIS person level variables: n = 897,232

	Unweighted n	Weighted percentage
Age in years, mean	48.1	47.9
Age in years (grouped)		
25-44	440,598	49.6
45-64	282,426	31.3
65-84	159,913	17.6
85+	14,295	1.6
Sex		
Male	414,366	47.4
Female	482,866	52.6
Race/Ethnicity		
non-Hispanic white	685,454	80.9
non-Hispanic black	116,933	10.9
Hispanic	94,845	8.2
Marital status		
Married	615,557	69.0
Widowed	76,218	8.2
Divorced/separated	104,389	11.5
Never married	101,068	11.3
Education level		
Less than high school	201,087	20.4
High school/GED	324,724	36.0
Some college	185,104	21.4
College degree or more	186,317	22.1
Region		
Northeast	185,195	20.8
Midwest	219,370	24.8
South	312,295	35.3
West	180,372	19.1

Table 3.2. Sample characteristics, pooled NHIS linked mortality variables: n = 897,232

	Public-use		Restricted-use	
	Unweighted n	Weighted percentage	Unweighted n	Weighted percentage
Follow-up period in years, mean	9.1	8.7	9.1	8.6
Assigned vital status				
Dead	114,264	11.8	114,264	11.8
Alive	782,968	88.2	782,968	88.2
Cause-specific deaths (113 group recode)[1]				
Diseases of the heart (55-68)	37,272	32.5	36,689	32.0
Ischemic heart disease (59-61)	11,434	10.0	11,290	9.8
Cancer, all sites (20-44)	30,220	26.6	30,197	26.5
Lung cancer (27)	8,838	7.8	8,395	7.4
Colorectal cancer (23)	3,044	2.6	3,094	2.7
Breast cancer[2] (29)	2,421	4.3	2,372	4.2
Prostate cancer[3] (33)	1,762	3.0	1,786	3.0
Cerebrovascular diseases (70)	7,802	6.8	7,855	6.8
Diabetes (46)	3,361	2.9	3,384	2.9
Pneumonia/Influenza (77-78)	3,306	2.9	3,342	2.9
Chronic liver disease/Cirrhosis (94-95)	1,238	1.1	1,268	1.1
Unintentional injuries (114-123)	3,242	2.9	3,294	2.9
Suicide (125-126)	1,097	1.0	1,117	1.1
Homicide (128-129)	410	0.3	425	0.4

Notes:

[1]Weighted percentages based upon sample of decedents (n = 114,264)

[2]Females only (n = 57,046)

[3]Males only (n = 57,218)

Table 4.1. Relative hazard for all-cause mortality: Comparative analyses of public-use and restricted-use NHIS Linked Mortality Files (n = 897,232)

	Public-use			Restricted-use		
	Coefficient	SE	Relative hazard	Coefficient	SE	Relative hazard
Age in years	0.083 ***	0.0003	1.087	0.084 ***	0.0003	1.087
Sex (Female)						
Male	0.525 ***	0.0068	1.690	0.526 ***	0.0069	1.691
Race/ethnicity (NHW)						
NHB	0.142 ***	0.0117	1.152	0.142 ***	0.0117	1.152
Hispanic	-0.114 ***	0.0162	0.893	-0.112 ***	0.0159	0.894
Education (College grad+)						
Less than high school	0.519 ***	0.0118	1.680	0.518 ***	0.0119	1.679
High school	0.340 ***	0.0113	1.405	0.340 ***	0.0113	1.405
Some college	0.247 ***	0.0129	1.281	0.247 ***	0.0131	1.281
Marital status (Married)						
Widowed	0.204 ***	0.0089	1.226	0.204 ***	0.0089	1.227
Divorced/Separated	0.334 ***	0.0125	1.397	0.335 ***	0.0125	1.398
Never married	0.393 ***	0.0156	1.482	0.394 ***	0.0155	1.482
Region (West)						
Northeast	-0.026	0.0137	0.974	-0.025	0.0132	0.976
Midwest	-0.013	0.0138	0.987	-0.012	0.0134	0.988
South	0.051 ***	0.0130	1.052	0.051 ***	0.0126	1.052

Notes:

Relative hazards are estimated from a Cox proportional hazards model.

All models use sample weights and take into account the NHIS complex survey design using the SUDAAN software program (9.0.1).

NHW is non-Hispanic white; NHB is non-Hispanic black. The values in parentheses are reference categories.

*** $p < .001$.

Table 4.2. Relative hazard for all-cause mortality by sex: Comparative analyses of public-use and restricted-use NHIS Linked Mortality Files (n = 897,232)

	Men						Women					
	Public-use			Restricted-use			Public-use			Restricted-use		
	Coefficient	SE	Relative hazard	Coefficient	SE	Relative hazard	Coefficient	SE	Relative hazard	Coefficient	SE	Relative hazard
Age in years	0.084 ***	0.0004	1.088	0.084 ***	0.0004	1.088	0.083 ***	0.0004	1.087	0.083 ***	0.0004	1.087
Race/ethnicity (NHW)												
NHB	0.149 ***	0.0167	1.160	0.148 ***	0.0168	1.160	0.136 ***	0.0150	1.145	0.136 ***	0.0151	1.145
Hispanic	-0.102 ***	0.0239	0.903	-0.101 ***	0.0238	0.904	-0.122 ***	0.0210	0.885	-0.121 ***	0.0210	0.887
Education (College grad+)												
Less than high school	0.563 ***	0.0140	1.756	0.563 ***	0.0140	1.755	0.439 ***	0.0173	1.551	0.438 ***	0.0177	1.549
High school	0.382 ***	0.0144	1.465	0.382 ***	0.0144	1.465	0.264 ***	0.0167	1.303	0.264 ***	0.0172	1.302
Some college	0.290 ***	0.0166	1.337	0.291 ***	0.0166	1.337	0.170 ***	0.0193	1.185	0.170 ***	0.0198	1.185
Marital status (Married)												
Widowed	0.164 ***	0.0162	1.178	0.165 ***	0.0165	1.179	0.221 ***	0.0114	1.247	0.221 ***	0.0113	1.247
Divorced/Separated	0.370 ***	0.0176	1.448	0.371 ***	0.0176	1.449	0.297 ***	0.0171	1.346	0.298 ***	0.0170	1.347
Never married	0.451 ***	0.0208	1.570	0.452 ***	0.0207	1.571	0.323 ***	0.0206	1.381	0.323 ***	0.0204	1.381
Region (West)												
Northeast	0.009	0.0168	1.009	0.010	0.0165	1.010	-0.060 ***	0.0177	0.942	-0.058 ***	0.0174	0.943
Midwest	-0.005	0.0156	0.995	-0.005	0.0155	0.995	-0.022	0.0177	0.978	-0.021	0.0173	0.980
South	0.092 ***	0.0153	1.096	0.092 ***	0.0150	1.096	0.007	0.0168	1.007	0.007	0.0164	1.007

Notes:
Relative hazards are estimated from a Cox proportional hazards model.
All models use sample weights and take into account the NHIS complex survey design using the
SUDAAN software program (9.0.1).
NHW is non-Hispanic white; NHB is non-Hispanic black. The values in parentheses are reference categories.
*** p <.001.

Table 4.3. Relative hazard for all-cause mortality by race/ethnicity: Comparative analyses of public-use and restricted-use NHIS Linked Mortality Files (n= 897,232)

	non-Hispanic whites						non-Hispanic blacks					
	Public-use			Restricted-use			Public-use			Restricted-use		
	Coefficient	SE	Relative hazard	Coefficient	SE	Relative hazard	Coefficient	SE	Relative hazard	Coefficient	SE	Relative hazard
Age in years	0.087 ***	0.0003	1.091	0.087 ***	0.0003	1.091	0.070 ***	0.0007	1.073	0.070 ***	0.0007	1.073
Sex (Female)												
Male	0.532 ***	0.0074	1.702	0.533 ***	0.0075	1.704	0.508 ***	0.0202	1.662	0.508 ***	0.0203	1.663
Education (College grad+)												
Less than high school	0.512 ***	0.0130	1.669	0.512 ***	0.0131	1.668	0.518 ***	0.0375	1.679	0.515 ***	0.0380	1.674
High school	0.330 ***	0.0124	1.391	0.330 ***	0.0124	1.391	0.349 ***	0.0388	1.417	0.348 ***	0.0396	1.416
Some college	0.236 ***	0.0140	1.267	0.237 ***	0.0141	1.267	0.241 ***	0.0446	1.272	0.241 ***	0.0436	1.273
Marital status (Married)												
Widowed	0.200 ***	0.0098	1.221	0.200 ***	0.0098	1.222	0.194 ***	0.0256	1.214	0.192 ***	0.0260	1.212
Divorced/Separated	0.377 ***	0.0143	1.458	0.378 ***	0.0143	1.459	0.229 ***	0.0289	1.258	0.230 ***	0.0291	1.259
Never married	0.366 ***	0.0180	1.443	0.367 ***	0.0178	1.443	0.403 ***	0.0304	1.496	0.403 ***	0.0302	1.496
Region (West)												
Northeast	-0.025	0.0151	0.976	-0.024	0.0146	0.977	-0.006	0.0481	0.994	-0.001	0.0488	0.999
Midwest	-0.015	0.0151	0.985	-0.015	0.0148	0.985	0.059	0.0424	1.061	0.065	0.0418	1.067
South	0.052 ***	0.0145	1.054	0.052 ***	0.0141	1.054	0.085 *	0.0400	1.089	0.088 *	0.0400	1.093

	Hispanics					
	Public-use			Restricted-use		
	Coefficient	SE	Relative hazard	Coefficient	SE	Relative hazard
Age in years	0.068 ***	0.0012	1.070	0.068 ***	0.0012	1.070
Sex (Female)						
Male	0.477 ***	0.0300	1.612	0.477 ***	0.0301	1.611
Education (College grad+)						
Less than high school	0.503 ***	0.0552	1.653	0.503 ***	0.0571	1.653
High school	0.269 ***	0.0609	1.308	0.269 ***	0.0622	1.309
Some college	0.217 ***	0.0637	1.243	0.217 ***	0.0644	1.242
Marital status (Married)						
Widowed	0.197 ***	0.0434	1.218	0.196 ***	0.0433	1.217
Divorced/Separated	0.143 **	0.0498	1.154	0.142 **	0.0500	1.153
Never married	0.246 ***	0.0616	1.279	0.247 ***	0.0615	1.280
Region (West)						
Northeast	-0.043	0.0432	0.958	-0.043	0.0411	0.958
Midwest	-0.104	0.0534	0.901	-0.102	0.0550	0.903
South	0.101 **	0.0341	1.106	0.102 **	0.0338	1.107

Notes:
Relative hazards are estimated from a Cox proportional hazards model.
All models use sample weights and take into account the NHIS complex survey design using the
SUDAAN software program (9.0.1).
The values in parentheses are reference categories.
* p <.05; ** p <.01; *** p <.001.

Table 5.1. Relative hazard for heart disease mortality: Comparative analyses of public-use and restricted-use NHIS Linked Mortality Files, non-Hispanic whites and non-Hispanic blacks only (n = 802,387)

	Public-use		Relative hazard	Restricted-use		Relative hazard
	Coefficient	SE		Coefficient	SE	
Age in years	0.099 ***	0.0006	1.104	0.099 ***	0.0006	1.104
Sex (Female)						
Male	0.637 ***	0.0120	1.892	0.650 ***	0.0121	1.915
Race/ethnicity (NHW)						
NHB	0.135 ***	0.0200	1.144	0.119 ***	0.0203	1.126
Education (More than high school)						
Less than high school	0.435 ***	0.0159	1.545	0.447 ***	0.0161	1.563
High school	0.204 ***	0.0160	1.226	0.220 ***	0.0162	1.246
Marital status (Married)						
Widowed	0.290 ***	0.0152	1.337	0.295 ***	0.0151	1.343
Divorced/Separated	0.332 ***	0.0235	1.394	0.337 ***	0.0237	1.401
Never married	0.404 ***	0.0279	1.497	0.390 ***	0.0276	1.476
Region (West)						
Northeast	0.044 *	0.0211	1.045	0.046 *	0.0210	1.047
Midwest	0.028	0.0216	1.029	0.028	0.0216	1.029
South	0.073 ***	0.0214	1.076	0.082 ***	0.0214	1.085

Notes:

Relative hazards are estimated from a Cox proportional hazards model.

All models use sample weights and take into account the NHIS complex survey design using the SUDAAN software program (9.0.1).

NHW is non-Hispanic white; NHB is non-Hispanic black. The values in parentheses are reference categories.

* p <.05; ** p<.01; *** p <.001.

Table 5.2. Relative hazard for ischemic heart disease mortality: Comparative analyses of public-use and restricted-use NHIS Linked Mortality Files, non-Hispanic whites and non-Hispanic blacks only (n = 802,387)

| | Public-use | | | Restricted-use | | |
	Coefficient	SE	Relative hazard	Coefficient	SE	Relative hazard
Age in years	0.088 ***	0.0010	1.092	0.091 ***	0.0010	1.095
Sex (Female)						
Male	0.748 ***	0.0229	2.112	0.764 ***	0.0232	2.146
Race/ethnicity (NHW)						
NHB	-0.088 *	0.0353	0.916	-0.110 **	0.0369	0.896
Education (More than high school)						
Less than high school	0.539 ***	0.0315	1.714	0.551 ***	0.0326	1.735
High school	0.265 ***	0.0301	1.303	0.279 ***	0.0307	1.322
Marital status (Married)						
Widowed	0.218 ***	0.0285	1.244	0.222 ***	0.0289	1.249
Divorced/Separated	0.295 ***	0.0387	1.344	0.289 ***	0.0395	1.335
Never married	0.240 ***	0.0461	1.272	0.242 ***	0.0459	1.274
Region (West)						
Northeast	0.126 ***	0.0368	1.345	0.121 **	0.0373	1.129
Midwest	0.202 ***	0.0373	1.224	0.194 ***	0.0380	1.214
South	0.297 ***	0.0364	1.345	0.305 ***	0.0372	1.356

Notes:

Relative hazards are estimated from a Cox proportional hazards model.

All models use sample weights and take into account the NHIS complex survey design using the SUDAAN software program (9.0.1).

NHW is non-Hispanic white; NHB is non-Hispanic black. The values in parentheses are reference categories.

* p <.05; ** p<.01; *** p <.001.

Table 5.3. Relative hazard for all-cancer mortality: Comparative analyses of public-use and restricted-use NHIS Linked Mortality Files, non-Hispanic whites and non-Hispanic blacks only (n = 802,387)

	Public-use			Restricted-use		
	Coefficient	SE	Relative hazard	Coefficient	SE	Relative hazard
Age in years	0.071 ***	0.0005	1.074	0.073 ***	0.0005	1.075
Sex (Female)						
Male	0.454 ***	0.0137	1.575	0.463 ***	0.0139	1.588
Race/ethnicity (NHW)						
NHB	0.161 ***	0.0191	1.175	0.163 ***	0.0194	1.176
Education (More than high school)						
Less than high school	0.309 ***	0.0180	1.362	0.313 ***	0.0180	1.368
High school	0.217 ***	0.0172	1.243	0.217 ***	0.0172	1.243
Marital status (Married)						
Widowed	-0.146 ***	0.0193	0.864	-0.134 ***	0.0189	0.875
Divorced/Separated	0.256 ***	0.0218	1.292	0.253 ***	0.0219	1.288
Never married	-0.081 *	0.0292	0.922	-0.065 *	0.0286	0.937
Region (West)						
Northeast	0.080 ***	0.0228	1.083	0.080 ***	0.0227	1.083
Midwest	0.043	0.0221	1.044	0.046 *	0.0218	1.047
South	0.089 ***	0.0217	1.093	0.091 ***	0.0216	1.095

Notes:

Relative hazards are estimated from a Cox proportional hazards model.

All models use sample weights and take into account the NHIS complex survey design using the SUDAAN software program (9.0.1).

NHW is non-Hispanic white; NHB is non-Hispanic black. The values in parentheses are reference categories.

* $p <.05$; ** $p<.01$; *** $p <.001$.

Table 5.4. Relative hazard for lung cancer mortality: Comparative analyses of public-use and restricted-use NHIS Linked Mortality Files, non-Hispanic whites and non-Hispanic blacks only (n = 802,387)

	Public-use			Restricted-use		
	Coefficient	SE	Relative hazard	Coefficient	SE	Relative hazard
Age in years	0.066 ***	0.0007	1.068	0.068 ***	0.0007	1.070
Sex (Female)						
Male	0.774 ***	0.0251	2.167	0.787 ***	0.0263	2.196
Race/ethnicity (NHW)						
NHB	0.034	0.0389	1.035	-0.026	0.0406	0.975
Education (More than high school)						
Less than high school	0.615 ***	0.0340	1.850	0.655 ***	0.0358	1.925
High school	0.386 ***	0.0340	1.472	0.431 ***	0.0352	1.538
Marital status (Married)						
Widowed	-0.127 ***	0.0368	0.881	-0.107 **	0.0366	0.899
Divorced/Separated	0.447 ***	0.0384	1.564	0.426 ***	0.0394	1.532
Never married	-0.150 **	0.0577	0.861	-0.232 ***	0.0612	0.793
Region (West)						
Northeast	0.013	0.0413	1.013	0.015	0.0421	1.015
Midwest	0.020	0.0420	1.020	0.012	0.0427	1.012
South	0.158 ***	0.0392	1.171	0.173 ***	0.0400	1.189

Notes:

Relative hazards are estimated from a Cox proportional hazards model.

All models use sample weights and take into account the NHIS complex survey design using the SUDAAN software program (9.0.1).

NHW is non-Hispanic white; NHB is non-Hispanic black. The values in parentheses are reference categories.

$* \ p < .05; ** \ p < .01; *** \ p < .001.$

Table 5.5. Relative hazard for colon cancer mortality: Comparative analyses of public-use and restricted-use NHIS Linked Mortality Files, non-Hispanic whites and non-Hispanic blacks only (n = 802,387)

	Public-use			Restricted-use		
	Coefficient	SE	Relative hazard	Coefficient	SE	Relative hazard
Age in years	0.079 ***	0.0015	1.083	0.081 ***	0.0014	1.084
Sex (Female)						
Male	0.405 ***	0.0419	1.500	0.425 ***	0.0421	1.530
Race/ethnicity (NHW)						
NHB	0.313 ***	0.0572	1.367	0.332 ***	0.0574	1.394
Education (More than high school)						
Less than high school	0.332 ***	0.0557	1.394	0.330 ***	0.0544	1.391
High school	0.287 ***	0.0500	1.333	0.271 ***	0.0500	1.311
Marital status (Married)						
Widowed	-0.082	0.0529	0.921	-0.058	0.0529	0.944
Divorced/Separated	0.187 *	0.0730	1.205	0.200 **	0.0733	1.221
Never married	0.216 *	0.0896	1.241	0.238 **	0.0912	1.269
Region (West)						
Northeast	0.313 ***	0.0635	1.367	0.306 ***	0.0647	1.358
Midwest	0.192 **	0.0619	1.212	0.194 **	0.0629	1.214
South	0.094	0.0602	1.099	0.083	0.0618	1.086

Notes:

Relative hazards are estimated from a Cox proportional hazards model.

All models use sample weights and take into account the NHIS complex survey design using the SUDAAN software program (9.0.1).

NHW is non-Hispanic white; NHB is non-Hispanic black. The values in parentheses are reference categories.

* p <.05; ** p<.01; *** p <.001.

Table 5.6. Relative hazard for breast cancer mortality: Comparative analyses of public-use and restricted-use NHIS Linked Mortality Files, non-Hispanic whites and non-Hispanic blacks only (n=432,252)

	Public-use			Restricted-use		
	Coefficient	SE	Relative hazard	Coefficient	SE	Relative hazard
Age in years	0.045 ***	0.0016	1.046	0.049 ***	0.0016	1.050
Race/ethnicity (NHW)						
NHB	0.294 ***	0.0705	1.341	0.308 ***	0.0719	1.360
Education (More than high school)						
Less than high school	0.023	0.0659	1.023	0.023	0.0665	1.023
High school	0.081	0.0527	1.084	0.104	0.0536	1.109
Marital status (Married)						
Widowed	-0.058	0.0641	0.943	-0.063	0.0649	0.939
Divorced/Separated	0.130	0.0728	1.139	0.107	0.0757	1.113
Never married	0.091	0.0951	1.095	0.040	0.1017	1.041
Region (West)						
Northeast	0.082	0.0822	1.086	0.092	0.0824	1.096
Midwest	0.008	0.0765	1.008	0.009	0.0766	1.009
South	-0.074	0.0762	0.929	-0.048	0.0764	0.953

Notes:

Relative hazards are estimated from a Cox proportional hazards model.

All models use sample weights and take into account the NHIS complex survey design using the SUDAAN software program (9.0.1).

NHW is non-Hispanic white; NHB is non-Hispanic black. The values in parentheses are reference categories.

* p <.05; ** p<.01; *** p <.001.

Table 5.7. Relative hazard for prostate cancer mortality: Comparative analyses of public-use and restricted-use NHIS Linked Mortality Files, non-Hispanic whites and non-Hispanic blacks only (n =370,135)

	Public-use			Restricted-use		
	Coefficient	SE	Relative hazard	Coefficient	SE	Relative hazard
Age in years	0.131 ***	0.0022	1.140	0.133 ***	0.0022	1.142
Race/ethnicity (NHW)						
NHB	0.913 ***	0.0739	2.491	0.918 ***	0.0744	2.505
Education (More than high school)						
Less than high school	0.024	0.0694	1.025	0.041	0.0682	1.041
High school	0.038	0.0733	1.038	0.035	0.0726	1.036
Marital status (Married)						
Widowed	-0.135	0.0847	0.874	-0.129	0.0850	0.879
Divorced/Separated	-0.011	0.1227	0.989	-0.014	0.1219	0.986
Never married	-0.014	0.1399	0.987	0.022	0.1393	1.022
Region (West)						
Northeast	-0.002	0.0872	0.998	-0.009	0.0875	0.991
Midwest	0.033	0.0819	1.034	0.035	0.0823	1.035
South	0.012	0.0814	1.013	0.006	0.0819	1.006

Notes:

Relative hazards are estimated from a Cox proportional hazards model.

All models use sample weights and take into account the NHIS complex survey design using the SUDAAN software program (9.0.1).

NHW is non-Hispanic white; NHB is non-Hispanic black. The values in parentheses are reference categories.

* p <.05; ** p<.01; *** p <.001.

Table 5.8. Relative hazard for cerebrovascular diseases mortality: Comparative analyses of public-use and restricted-use NHIS Linked Mortality Files, non-Hispanic whites and non-Hispanic blacks only (n = 802,387)

	Public-use		Relative hazard	Restricted-use		Relative hazard
	Coefficient	SE		Coefficient	SE	
Age in years	0.114 ***	0.0013	1.121	0.116 ***	0.0013	1.123
Sex (Female)						
Male	0.156 ***	0.0281	1.169	0.176 ***	0.0277	1.192
Race/ethnicity (NHW)						
NHB	0.202 ***	0.0377	1.224	0.213 ***	0.0388	1.237
Education (More than high school)						
Less than high school	0.268 ***	0.0338	1.307	0.269 ***	0.0337	1.309
High school	0.168 ***	0.0351	1.183	0.165 ***	0.0347	1.180
Marital status (Married)						
Widowed	0.120 ***	0.0319	1.127	0.127 ***	0.0316	1.136
Divorced/Separated	0.261 ***	0.0550	1.298	0.265 ***	0.0545	1.303
Never married	0.188 **	0.0575	1.207	0.196 ***	0.0566	1.217
Region (West)						
Northeast	-0.282 ***	0.0429	0.754	-0.277 ***	0.0434	0.758
Midwest	-0.050	0.0420	0.951	-0.046	0.0424	0.955
South	-0.044	0.0406	0.957	-0.046	0.0410	0.955

Notes:

Relative hazards are estimated from a Cox proportional hazards model.

All models use sample weights and take into account the NHIS complex survey design using the SUDAAN software program (9.0.1).

NHW is non-Hispanic white; NHB is non-Hispanic black. The values in parentheses are reference categories.

* p <.05; ** p<.01; *** p <.001.

Table 5.9. Relative hazard for diabetes mortality: Comparative analyses of public-use and restricted-use NHIS Linked Mortality Files, non-Hispanic whites and non-Hispanic blacks only (n = 802,387)

	Public-use		Relative hazard	Restricted-use		Relative hazard
	Coefficient	SE		Coefficient	SE	
Age in years	0.073 ***	0.0014	1.075	0.074 ***	0.0014	1.076
Sex (Female)						
Male	0.282 ***	0.0475	1.326	0.288 ***	0.0476	1.334
Race/ethnicity (NHW)						
NHB	0.621 ***	0.0510	1.862	0.628 ***	0.0505	1.874
Education (More than high school)						
Less than high school	0.583 ***	0.0604	1.792	0.588 ***	0.0614	1.801
High school	0.385 ***	0.0587	1.469	0.377 ***	0.0580	1.457
Marital status (Married)						
Widowed	0.234 ***	0.0551	1.264	0.236 ***	0.0549	1.266
Divorced/Separated	0.347 ***	0.0674	1.415	0.350 ***	0.0662	1.419
Never married	0.463 ***	0.0769	1.589	0.471 ***	0.0775	1.601
Region (West)						
Northeast	0.095	0.0757	1.099	0.099	0.0747	1.104
Midwest	0.174 *	0.0706	1.191	0.182 **	0.0687	1.200
South	0.177 *	0.0684	1.193	0.179 **	0.0674	1.196

Notes:

Relative hazards are estimated from a Cox proportional hazards model.

All models use sample weights and take into account the NHIS complex survey design using the SUDAAN software program (9.0.1).

NHW is non-Hispanic white; NHB is non-Hispanic black. The values in parentheses are reference categories.

* $p < .05$; ** $p < .01$; *** $p < .001$.

Table 5.10. Relative hazard for pneumonia and influenza mortality: Comparative analyses of public-use and restricted-use NHIS Linked Mortality Files, non-Hispanic whites and non-Hispanic blacks only (n = 802,387)

| | Public-use | | | Restricted-use | | |
	Coefficient	SE	Relative hazard	Coefficient	SE	Relative hazard
Age in years	0.127 ***	0.0025	1.136	0.129 ***	0.0026	1.138
Sex (Female)						
Male	0.626 ***	0.0431	1.870	0.650 ***	0.0431	1.916
Race/ethnicity (NHW)						
NHB	-0.031	0.0683	0.969	-0.013	0.0667	0.987
Education (More than high school)						
Less than high school	0.428 ***	0.0536	1.534	0.438 ***	0.0528	1.549
High school	0.255 ***	0.0561	1.290	0.256 ***	0.0548	1.291
Marital status (Married)						
Widowed	0.248 ***	0.0494	1.282	0.259 ***	0.0486	1.295
Divorced/Separated	0.326 ***	0.0846	1.385	0.338 ***	0.0827	1.401
Never married	0.657 ***	0.0888	1.929	0.687 ***	0.0873	1.987
Region (West)						
Northeast	-0.342 ***	0.0607	0.710	-0.342 ***	0.0615	0.710
Midwest	-0.281 ***	0.0614	0.755	-0.281 ***	0.0628	0.756
South	-0.193 ***	0.0545	0.825	-0.197 ***	0.0555	0.821

Notes:

Relative hazards are estimated from a Cox proportional hazards model.

All models use sample weights and take into account the NHIS complex survey design using the SUDAAN software program (9.0.1).

NHW is non-Hispanic white; NHB is non-Hispanic black. The values in parentheses are reference categories.

* p <.05; ** p<.01; *** p <.001.

Table 5.11. Relative hazard for chronic liver disease and cirrhosis mortality: Comparative analyses of public-use and restricted-use NHIS Linked Mortality Files, non-Hispanic whites and non-Hispanic blacks only (n = 802,387)

	Public-use		Relative hazard	Restricted-use		Relative hazard
	Coefficient	SE		Coefficient	SE	
Age in years	0.040 ***	0.0024	1.041	0.042 ***	0.0024	1.043
Sex (Female)						
Male	0.702 ***	0.0784	2.017	0.699 ***	0.0751	2.011
Race/ethnicity (NHW)						
NHB	-0.034	0.1084	0.967	0.010	0.1048	1.010
Education (More than high school)						
Less than high school	0.421 ***	0.0961	1.523	0.406 ***	0.0970	1.501
High school	0.253 **	0.0858	1.288	0.236 **	0.0873	1.266
Marital status (Married)						
Widowed	0.291 *	0.1341	1.338	0.320 *	0.1350	1.378
Divorced/Separated	1.025 ***	0.0891	2.788	1.052 ***	0.0874	2.862
Never married	0.628 ***	0.1156	1.873	0.668 ***	0.1151	1.951
Region (West)						
Northeast	-0.258 *	0.1220	0.773	-0.248 *	0.1164	0.780
Midwest	-0.346 **	0.1044	0.707	-0.354 ***	0.1000	0.702
South	-0.138	0.1015	0.871	-0.144	0.0972	0.866

Notes:

Relative hazards are estimated from a Cox proportional hazards model.

All models use sample weights and take into account the NHIS complex survey design using the SUDAAN software program (9.0.1).

NHW is non-Hispanic white; NHB is non-Hispanic black. The values in parentheses are reference categories.

* $p < .05$; ** $p < .01$; *** $p < .001$.

Table 5.12. Relative hazard for all unintentional injury mortality: Comparative analyses of public-use and restricted-use NHIS Linked Mortality Files, non-Hispanic whites and non-Hispanic blacks only (n = 802,387)

	Public-use			Restricted-use		
	Coefficient	SE	Relative hazard	Coefficient	SE	Relative hazard
Age in years	0.033 ***	0.0017	1.033	0.035 ***	0.0017	1.035
Sex (Female)						
Male	0.726 ***	0.0436	2.068	0.732 ***	0.0433	2.078
Race/ethnicity (NHW)						
NHB	0.001	0.0637	1.001	0.028	0.0622	1.028
Education (More than high school)						
Less than high school	0.481 ***	0.0577	1.617	0.475 ***	0.0566	1.608
High school	0.283 ***	0.0519	1.327	0.266 ***	0.0521	1.304
Marital status (Married)						
Widowed	0.490 ***	0.0680	1.631	0.480 ***	0.0682	1.617
Divorced/Separated	0.456 ***	0.0630	1.578	0.463 ***	0.0631	1.589
Never married	0.596 ***	0.0672	1.815	0.622 ***	0.0668	1.863
Region (West)						
Northeast	-0.199 **	0.0673	0.819	-0.201 **	0.0684	0.818
Midwest	-0.046	0.0664	0.955	-0.048	0.0683	0.953
South	0.080	0.0596	1.083	0.072	0.061	1.075

Notes:

Relative hazards are estimated from a Cox proportional hazards model.

All models use sample weights and take into account the NHIS complex survey design using the SUDAAN software program (9.0.1).

NHW is non-Hispanic white; NHB is non-Hispanic black. The values in parentheses are reference categories.

* p <.05; ** p<.01; *** p <.001.

Table 5.13. Relative hazard for suicide mortality: Comparative analyses of public-use and restricted-use NHIS Linked Mortality Files, non-Hispanic whites and non-Hispanic blacks only (n = 802,387)

	Public-use			Restricted-use		
	Coefficient	SE	Relative hazard	Coefficient	SE	Relative hazard
Age in years	0.008 **	0.0027	1.008	0.008 **	0.0028	1.008
Sex (Female)						
Male	1.456 ***	0.0895	4.290	1.438 ***	0.0889	4.211
Race/ethnicity (NHW)						
NHB	-1.006 ***	0.1385	0.366	-0.964 ***	0.1386	0.381
Education (More than high school)						
Less than high school	0.332 ***	0.0979	1.393	0.327 ***	0.0985	1.387
High school	0.257 ***	0.0763	1.293	0.250 **	0.0764	1.284
Marital status (Married)						
Widowed	0.478 ***	0.1421	1.613	0.514 ***	0.1381	1.672
Divorced/Separated	0.709 ***	0.0978	2.031	0.713 ***	0.0940	2.041
Never married	0.662 ***	0.1116	1.939	0.645 ***	0.1126	1.905
Region (West)						
Northeast	-0.445 ***	0.1316	0.641	-0.453 ***	0.1302	0.636
Midwest	-0.260 *	0.1128	0.771	-0.268 *	0.1137	0.765
South	-0.079	0.1108	0.924	-0.078	0.1113	0.925

Notes:
Relative hazards are estimated from a Cox proportional hazards model.
All models use sample weights and take into account the NHIS complex survey design using the SUDAAN software program (9.0.1).
NHW is non-Hispanic white; NHB is non-Hispanic black. The values in parentheses are reference categories.
* p <.05; ** p<.01; *** p <.001.

Table 5.14. Relative hazard for homicide mortality: Comparative analyses of public-use and restricted-use NHIS Linked Mortality Files, non-Hispanic whites and non-Hispanic blacks only (n= 802,387)

	Public-use		Relative hazard	Restricted-use		Relative hazard
	Coefficient	SE		Coefficient	SE	
Age in years	-0.017 **	0.0052	0.984	-0.015 **	0.0052	0.985
Sex (Female)						
Male	0.994 ***	0.1203	2.701	0.993 ***	0.1176	2.698
Race/ethnicity (NHW)						
NHB	1.388 ***	0.1450	4.008	1.361 ***	0.1469	3.900
Education (More than high school)						
Less than high school	0.893 ***	0.1829	2.441	0.836 ***	0.1762	2.307
High school	0.498 **	0.1542	1.645	0.437 **	0.1485	1.548
Marital status (Married)						
Widowed	0.232	0.3034	1.262	0.407	0.2729	1.502
Divorced/Separated	0.467 **	0.1658	1.596	0.480 **	0.1734	1.617
Never married	0.632 ***	0.1797	1.882	0.638 ***	0.1796	1.892
Region (West)						
Northeast	-0.781 ***	0.2190	0.458	-0.781 ***	0.2216	0.458
Midwest	-0.204	0.1959	0.816	-0.225	0.1983	0.799
South	0.071	0.1763	1.074	0.032	0.1813	1.032

Notes:

Relative hazards are estimated from a Cox proportional hazards model.

All models use sample weights and take into account the NHIS complex survey design using the SUDAAN software program (9.0.1).

NHW is non-Hispanic white; NHB is non-Hispanic black. The values in parentheses are reference categories.

* $p < .05$; ** $p < .01$; *** $p < .001$.