

## **Comparative Analysis of the NHIS Public-Use and Restricted-Use Linked Mortality Files: 2015 Public-use Data Release**

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### **Introduction**

In 2013, NCHS completed a mortality update for the National Health Interview Survey (NHIS) participants for the years 1985 to 2009, with mortality ascertained through December 31, 2011. Due to requirements to protect the confidentiality of the NHIS participants, restricted-use versions of the NHIS Linked Mortality Files were made available only through the NCHS Research Data Center (RDC). To complement the restricted-use files and increase data access, NCHS developed a plan to allow for a public-use release of linked mortality files.

In 2015, NCHS released public-use versions of the NHIS Linked Mortality Files. 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 NHIS 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 conducted 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 NHIS Linked Mortality Files.

### *Description of NHIS Linked Mortality Data Resources*

Mortality status for eligible NHIS 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\\_nhis\\_final.pdf](http://www.cdc.gov/nchs/data/datalinkage/matching_methodology_nhis_final.pdf).

The restricted-use files include detailed mortality information for all eligible survey participants including children. The restricted-use files include 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, NHIS interview date (month, day, and year) and adjusted sample weights.

Due to confidentiality protections, the public-use files include only eligible survey participants 18 years and older and a limited set of mortality variables. In addition, the public-use versions were subjected to data perturbation techniques to reduce the risk of participant 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), leading underlying causes of death and adjusted sample weights. In addition, two variables were created to indicate the presence of diabetes or hypertension in the multiple causes of death codes, as these conditions are reported as contributing, rather than underlying, causes of death.

## **Methods**

### *Sample selection*

To effectively compare the restricted and public-use data sets, we merged the public-use NHIS person level files for each year 1986 to 2009 with the accompanying public and restricted-use mortality files, respectively, to create the analytic samples. We limited 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, 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 deceased 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 2011. 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, 2011.

In addition to all-cause mortality, we examined 9 leading causes of death in the United States in 2010.<sup>1</sup> 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, the leading causes of death were based on the ICD-10 underlying cause-of-death 113 group recode, which recodes all deaths occurring prior to 1999 into ICD-10 codes.<sup>2</sup> 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 groups from the underlying cause-of-death 113 recodes: heart disease (55-64), cancer (malignant neoplasms) (19-43), chronic lower respiratory disease (82-86), cerebrovascular diseases (70), diabetes (46), pneumonia and influenza (76-78), Alzheimer's disease (52), kidney disease (97-101), unintentional injuries (114-123).

### *Covariates*

We included in all models a standard set of socio-demographic characteristics, which were reported 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 or GED, 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 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 SUDAAN version 11.0 to take into account the complex survey design of the NHIS.<sup>3</sup> The Efron method was used for handling tied failure times.<sup>4</sup>

## **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 48.6 years and fewer than two percent of respondents are aged 85 or above. Females outnumber males, and non-Hispanic whites make up just under 80 percent (78.7 percent) of the sample while non-Hispanic blacks (11.2 percent) and Hispanics (10.1 percent)

account for considerably smaller proportions. A vast majority of the sample is married at the time of NHIS interview (66.8 percent) and the modal educational category is a high school diploma or GED (33.4 percent).

The number and weighted percentage of persons, in our sample, who were identified as dying in each of the two files ( $n = 243,375$ ; Percent = 16.4) 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 uses less detailed date information (year information only) and includes perturbed information for year of death for selected decedents, which affects the calculation of months of follow-up. Yet, for the pooled NHIS years 1986 to 2009, the mean years of follow-up (weighted) for both files are very similar (approximately 11.7 years). We examined the cause-specific percentage distributions for the 9 leading causes of death studied. Overall, the distributions are quite similar when comparing the two files. For example, heart disease (22%) and cancer (25%) account for the same percentage of deaths in both files. Even for the less prevalent causes of death, the percentages of deaths attributed to a specific cause were less than 0.1% different (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 files and one estimated from the restricted-use files. 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 files and different level of detail for the date of death information used in the calculation. The results of both models are consistent. Age, race/ethnicity, education and marital status are all related to the risk of adult mortality in the expected directions. 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, the relative risks and 95% confidence intervals are nearly identical for results from the public-use and restricted-use files.

The results of 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. Table 2.3 shows the results of separate proportional hazards models for non-Hispanic whites, non-Hispanic blacks, and Hispanics, 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 in each racial/ethnic group compared to persons in the more highly educated groups.

#### *Cause-Specific Mortality Model Results*

Tables 3.1 through 3.9 display the results of the Cox proportional hazards models for 9 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.

A comparison of the results for the public-use and restricted-use files for each of the 9 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 standard 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; cancer mortality) and less common underlying causes of death are specified (e.g., pneumonia/influenza mortality) as the outcome.

To illustrate an example of the consistency between results from the public-use data and restricted-use data, Table 3.2 provides comparative models that specify 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 an approximately 58 and 59 percent higher cancer mortality risk than females over the course of the follow-up period in the public- and restricted-use files, respectively. Educational differences in overall cancer mortality risk favor those with a college degree or more in both the public-use and restricted-use data sets, with those who have less than a high school education exhibiting approximately 67 or 68 percent higher, respectively, mortality risk over the follow-up period compared to those with a college degree or more. Finally, there exist regional differences in all-cancer mortality risk, with the magnitude of these regional cancer mortality risk differences 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 cancer mortality; unintentional injury accounts for only 3.2 percent of deaths in both the public-use and restricted-use NHIS Linked Mortality Files. Table 3.5 shows that when comparing public-use data and restricted-use data relative risks and 95% confidence intervals for standard socio-demographic covariates of unintentional injury mortality are consistent. For example, results from both the public-use and restricted-use files show that males are more than twice as likely as females to die from an unintentional injury and those with less than a high school education experience more than twice the unintentional injury mortality risk compared to those with at least a college degree.

Also, in order to examine different samples, we repeated the analysis of cause-specific mortality on a subset of the 1986 to 2009 NHIS data files. We examined the NHIS years 1997 to 2009 and limited the analysis to the sample adult population, which is part of the most recent sample design. Overall, comparisons of the public-use and restricted-use linked mortality files again produced consistent results. Tables 4.1 through 4.9 show that most estimates and confidence intervals are very comparable and estimates that were statistically significant in the restricted files remained statistically significant in the public files.

## **Discussion**

This report describes analyses comparing results obtained from the public-use version and restricted-use version of the NHIS Linked Mortality Files, with mortality follow-up through 2011. In the public-use version of the data files, 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 files, 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 files, differences in results between the two files when examining overall (all-cause) mortality arise because the public-use files include perturbed information for date of death as well as less specific information regarding date 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 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 consistent model results, even for causes of death like diabetes, unintentional injuries, and Alzheimer's disease that each represent three percent or fewer of all U.S. adult deaths. The perturbation process in the public-use files will impact the frequency distributions for causes of death and should be kept in mind when conducting cause-specific analyses of the public-use files. Yet, overall, the percentage of death attributed to the leading causes of death for both files remained similar.

Our findings should provide analysts with the confidence to use these most recent public-use data files providing mortality follow-up for eligible adult NHIS respondents.

However, there are some analytic considerations that should be noted by all potential

users. We used the statistical software package SUDAAN 11.0 because it fits Cox proportional hazard models to sample surveys and uses Efron's likelihood for tied failure times as the default.<sup>4</sup> Using only interview year and year of death to calculate follow-up time in the public-use files, results in more tied failure times than if the additional information on quarter of interview and quarter of death had been included<sup>1</sup>. 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 2015 release of a 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 adult mortality trends and patterns.

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<sup>1</sup> On an earlier release of the public-use NHIS Linked Mortality Files, we had conducted additional analyses using the available information on quarter of interview and quarter of death to calculate length of follow-time and found no substantive or significant differences in results compared to those presented in this report.

## References

1. Murphy SL, Xu JQ, Kochanek KD. Deaths: Final data for 2010. National vital statistics reports; vol 61 no 4. Hyattsville, MD: National Center for Health Statistics. 2013.
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, 11.0. 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.

**Table 1. Baseline sample characteristics, 1986-2009 NHIS: n = 1,284,997**

	Unweighted n	Weighted percentage or mean
Age in years, mean	1,284,997	48.6
Age in years (grouped)		
25-44	609,836	46.7%
45-64	430,929	34.3
65-84	222,316	17.2
85+	21,916	1.8
Sex		
Male	595,918	47.6%
Female	689,079	52.4
Race/Ethnicity		
non-Hispanic white	934,311	78.7%
non-Hispanic black	170,259	11.2
Hispanic	180,427	10.1
Marital status		
Married	858,722	66.8%
Widowed	103,860	7.8
Divorced/separated	162,203	12.7
Never married	160,212	12.7
Education level		
Less than high school	275,593	18.4%
High school/GED	437,557	33.4
Some college	290,748	24.0
College degree or more	281,099	24.1
Region		
Northeast	252,247	19.9%
Midwest	303,625	24.5
South	460,702	36.3
West	268,423	19.3

**Table 2.1. Relative Risks for all-cause mortality: NHIS 1986-2009 Linked Mortality Files, mortality follow-up through 2011 (n = 1,284,997)**

	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	1.091	1.090	1.091	1.091	1.090	1.091
Sex (Female)						
Male	1.618	1.603	1.634	1.619	1.604	1.635
Race/ethnicity (NHW)						
Hispanic	0.774	0.758	0.791	0.771	0.755	0.788
NHB	1.094	1.074	1.114	1.093	1.074	1.113
Education (College degree or more)						
Less than high school	1.836	1.807	1.866	1.835	1.806	1.865
High school	1.502	1.479	1.525	1.502	1.479	1.526
Some college	1.341	1.318	1.364	1.341	1.318	1.364
Marital status (Married)						
Widowed	1.237	1.221	1.253	1.237	1.221	1.253
Divorced/Separated	1.411	1.390	1.432	1.412	1.391	1.433
Never married	1.528	1.496	1.562	1.530	1.497	1.564
Region (West)						
Northeast	0.933	0.916	0.950	0.933	0.917	0.950
Midwest	0.985	0.963	1.004	0.985	0.967	1.004
South	1.072	1.054	1.090	1.072	1.055	1.090

Notes:

Relative Risks are estimated from a Cox proportional hazards model.

All models adjust for sample weights and the NHIS complex survey design using the SUDAAN software program (11.0).

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: NHIS 1986-2009 Linked Mortality Files, mortality follow-up through 2011 (n = 1,284,997)**

	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	1.090	1.089	1.091	1.090	1.090	1.091	1.091	1.091	1.092	1.091	1.091	1.092
Race/ethnicity (NHW)												
Hispanic	0.806	0.785	0.827	0.803	0.782	0.824	0.743	0.719	0.768	0.740	0.716	0.765
NHB	1.119	1.093	1.145	1.117	1.092	1.144	1.073	1.048	1.097	1.072	1.048	1.097
Education (College degree or more)												
Less than high school	1.883	1.845	1.921	1.883	1.845	1.921	1.742	1.702	1.783	1.741	1.701	1.782
High school	1.554	1.523	1.586	1.555	1.524	1.587	1.414	1.383	1.445	1.413	1.382	1.445
Some college	1.397	1.367	1.428	1.397	1.367	1.429	1.253	1.223	1.284	1.253	1.223	1.285
Marital status (Married)												
Widowed	1.185	1.155	1.214	1.184	1.155	1.214	1.252	1.233	1.273	1.252	1.233	1.273
Divorced/Separated	1.461	1.429	1.493	1.463	1.431	1.495	1.364	1.336	1.392	1.365	1.337	1.394
Never married	1.548	1.507	1.591	1.551	1.509	1.594	1.496	1.450	1.544	1.497	1.450	1.546
Region (West)												
Northeast	0.960	0.936	0.984	0.960	0.936	0.985	0.907	0.887	0.927	0.907	0.887	0.927
Midwest	0.998	0.974	1.023	0.998	0.974	1.022	0.970	0.948	0.993	0.971	0.949	0.993
South	1.124	1.100	1.149	1.124	1.100	1.149	1.020	0.998	1.042	1.020	0.998	1.042

Notes:

Relative Risks are estimated from a Cox proportional hazards model.

All models adjust for sample weights and the NHIS complex survey design using the SUDAAN software program (11.0).

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: NHIS 1986-2009 Linked Mortality Files, mortality follow-up through 2011 (n = 1,284,997)**

	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	1.094	1.094	1.095	1.094	1.094	1.095	1.075	1.074	1.076	1.075	1.074	1.077
Sex (Female)												
Male	1.620	1.603	1.637	1.621	1.604	1.638	1.609	1.570	1.648	1.609	1.570	1.649
Education (College degree or more)												
Less than high school	1.845	1.813	1.877	1.844	1.812	1.877	1.833	1.734	1.939	1.830	1.731	1.935
High school	1.488	1.463	1.513	1.488	1.463	1.513	1.520	1.437	1.607	1.518	1.436	1.606
Some college	1.329	1.305	1.354	1.330	1.305	1.355	1.329	1.250	1.412	1.328	1.250	1.412
Marital status (Married)												
Widowed	1.235	1.474	1.448	1.235	1.217	1.253	1.222	1.176	1.270	1.223	1.177	1.270
Divorced/Separated	1.474	1.448	1.500	1.475	1.450	1.501	1.261	1.217	1.306	1.263	1.219	1.308
Never married	1.514	1.477	1.552	1.516	1.479	1.554	1.462	1.404	1.523	1.464	1.405	1.524
Region (West)												
Northeast	0.940	0.921	0.959	0.940	0.921	0.959	0.895	0.841	0.952	0.898	0.844	0.955
Midwest	0.989	0.968	1.010	0.989	0.968	1.010	1.001	0.947	1.059	1.004	0.950	1.060
South	1.075	1.055	1.096	1.075	1.055	1.096	1.074	1.021	1.129	1.075	1.023	1.130

	Hispanics					
	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	1.081	1.079	1.082	1.081	1.079	1.082
Sex (Female)						
Male	1.644	1.499	1.740	1.642	1.584	1.703
Education (College grad+)						
Less than high school	1.615	1.499	1.740	1.611	1.495	1.736
High school	1.359	1.252	1.475	1.357	1.250	1.473
Some college	1.262	1.161	1.372	1.260	1.160	1.370
Marital status (Married)						
Widowed	1.198	1.135	1.265	1.195	1.132	1.262
Divorced/Separated	1.177	1.109	1.249	1.177	1.109	1.249
Never married	1.229	1.139	1.327	1.231	1.141	1.329
Region (West)						
Northeast	0.919	0.870	0.970	0.919	0.871	0.970
Midwest	0.840	0.783	0.902	0.844	0.787	0.905
South	1.066	1.018	1.115	1.066	1.019	1.116

Notes:

Relative Risks are estimated from a Cox proportional hazards model.

All models adjust for sample weights and the NHIS complex survey design using the SUDAAN software program (11.0).

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

Values in parenthesis are reference categories.

**Table 3.1. Relative Risks for heart disease mortality: NHIS 1986-2009 Linked Mortality Files, mortality follow-up through 2011 (n = 1,284,997)**

	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	1.103	1.102	1.104	1.104	1.103	1.105
Sex (Female)						
Male	1.986	1.945	2.028	1.996	1.955	2.038
Race/ethnicity (NHW)						
Hispanic	0.740	0.704	0.777	0.731	0.696	0.769
NHB	1.091	1.054	1.129	1.090	1.054	1.128
Education (College degree or more)						
Less than high school	1.983	1.916	2.053	1.997	1.929	2.067
High school	1.546	1.495	1.598	1.551	1.500	1.604
Some college	1.326	1.277	1.377	1.332	1.283	1.383
Marital status (Married)						
Widowed	1.346	1.311	1.381	1.353	1.318	1.389
Divorced/Separated	1.420	1.374	1.466	1.425	1.380	1.472
Never married	1.565	1.501	1.631	1.581	1.517	1.649
Region (West)						
Northeast	0.986	0.942	1.032	0.986	0.943	1.032
Midwest	0.972	0.929	1.018	0.974	0.931	1.020
South	1.029	0.986	1.073	1.032	0.990	1.076

Notes:

Relative Risks 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 (11.0).

NHW is non-Hispanic white; NHB is non-Hispanic black.

The values in parentheses are reference categories.

**Table 3.2. Relative Risks for cancer mortality: NHIS 1986-2009 Linked Mortality Files, mortality follow-up through 2011 (n = 1,284,997)**

	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	1.073	1.075	1.075	1.074	1.076
Sex (Female)						
Male	1.582	1.551	1.613	1.593	1.562	1.625
Race/ethnicity (NHW)						
Hispanic	0.734	0.708	0.761	0.729	0.703	0.756
NHB	1.130	1.099	1.161	1.128	1.097	1.159
Education (College degree or more)						
Less than high school	1.672	1.624	1.721	1.684	1.636	1.734
High school	1.451	1.413	1.490	1.453	1.416	1.492
Some college	1.297	1.257	1.337	1.301	1.261	1.342
Marital status (Married)						
Widowed	0.907	0.882	0.934	0.917	0.891	0.944
Divorced/Separated	1.300	1.264	1.337	1.303	1.267	1.340
Never married	0.974	0.938	1.011	0.985	0.949	1.023
Region (West)						
Northeast	1.018	0.987	1.049	1.016	0.986	1.047
Midwest	1.036	1.005	1.067	1.036	1.006	1.067
South	1.089	1.059	1.120	1.089	1.058	1.120

Notes:

Relative Risks 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 (11.0).

NHW is non-Hispanic white; NHB is non-Hispanic black.

The values in parentheses are reference categories.

**Table 3.3. Relative Risks for chronic lower respiratory disease mortality: NHIS 1986-2009 Linked Mortality Files, mortality follow-up through 2011 (n = 1,284,997)**

	Relative Risk	Public-use		Relative Risk	Restricted-use	
		Lower Bound 95% CI	Upper Bound 95% CI		Lower Bound 95% CI	Upper Bound 95% CI
Age in years	1.097	1.095	1.099	1.099	1.097	1.101
Sex (Female)						
Male	1.689	1.620	1.760	1.706	1.636	1.778
Race/ethnicity (NHW)						
Hispanic	0.330	0.295	0.370	0.326	0.291	0.366
NHB	0.493	0.454	0.536	0.490	0.451	0.533
Education (College degree or more)						
Less than high school	3.026	2.814	3.255	3.059	2.843	3.290
High school	2.121	1.979	2.272	2.131	1.989	2.283
Some college	1.709	1.581	1.847	1.716	1.588	1.855
Marital status (Married)						
Widowed	1.182	1.119	1.248	1.191	1.127	1.258
Divorced/Separated	1.875	1.765	1.991	1.887	1.776	2.004
Never married	1.096	0.994	1.208	1.110	1.007	1.223
Region (West)						
Northeast	0.707	0.655	0.763	0.705	0.653	0.761
Midwest	0.828	0.776	0.883	0.827	0.775	0.882
South	0.980	0.924	1.040	0.980	0.924	1.039

Notes:

Relative Risks 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 (11.0).

NHW is non-Hispanic white; NHB is non-Hispanic black.

The values in parentheses are reference categories.

**Table 3.4. Relative Risks for cerebrovascular disease mortality: NHIS 1986-2009 Linked Mortality Files, mortality follow-up through 2011 (n = 1,284,997)**

	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	1.118	1.116	1.120	1.120	1.118	1.122
Sex (Female)						
Male	1.153	1.110	1.196	1.166	1.123	1.211
Race/ethnicity (NHW)						
Hispanic	0.884	0.821	0.951	0.870	0.809	0.937
NHB	1.239	1.171	1.310	1.232	1.165	1.303
Education (College degree or more)						
Less than high school	1.588	1.494	1.687	1.601	1.507	1.701
High school	1.359	1.281	1.441	1.362	1.284	1.445
Some college	1.211	1.131	1.297	1.213	1.132	1.299
Marital status (Married)						
Widowed	1.082	1.030	1.136	1.089	1.037	1.144
Divorced/Separated	1.172	1.093	1.257	1.183	1.103	1.269
Never married	1.297	1.194	1.410	1.308	1.203	1.422
Region (West)						
Northeast	0.744	0.695	0.797	0.742	0.693	0.794
Midwest	0.936	0.880	0.995	0.935	0.879	0.994
South	0.999	0.942	1.060	0.998	0.942	1.059

Notes:

Relative Risks 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 (11.0).

NHW is non-Hispanic white; NHB is non-Hispanic black.

The values in parentheses are reference categories.

**Table 3.5. Relative Risks for unintentional injury mortality: NHIS 1986-2009 Linked Mortality Files, mortality follow-up through 2011 (n = 1,284,997)**

	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	1.037	1.035	1.039	1.038	1.036	1.041
Sex (Female)						
Male	2.117	2.011	2.228	2.129	2.022	2.241
Race/ethnicity (NHW)						
Hispanic	0.831	0.761	0.907	0.827	0.757	0.902
NHB	0.754	0.694	0.819	0.762	0.702	0.827
Education (College degree or more)						
Less than high school	2.111	1.926	2.314	2.108	1.924	2.309
High school	1.647	1.519	1.786	1.648	1.520	1.786
Some college	1.514	1.381	1.659	1.515	1.383	1.661
Marital status (Married)						
Widowed	1.804	1.659	1.961	1.814	1.669	1.972
Divorced/Separated	1.581	1.460	1.713	1.588	1.466	1.720
Never married	1.835	1.684	2.000	1.829	1.678	1.993
Region (West)						
Northeast	0.757	0.697	0.823	0.753	0.693	0.817
Midwest	0.913	0.843	0.988	0.911	0.842	0.986
South	1.053	0.983	1.128	1.051	0.981	1.126

Notes:

Relative Risks 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 (11.0).

NHW is non-Hispanic white; NHB is non-Hispanic black.

The values in parentheses are reference categories.

**Table 3.6. Relative Risks for Alzheimer's disease mortality: NHIS 1986-2009 Linked Mortality Files, mortality follow-up through 2011 (n = 1,284,997)**

	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	1.178	1.175	1.182	1.181	1.177	1.185
Sex (Female)						
Male	0.871	0.811	0.936	0.883	0.822	0.949
Race/ethnicity (NHW)						
Hispanic	0.779	0.689	0.880	0.761	0.673	0.860
NHB	0.796	0.713	0.890	0.790	0.797	0.882
Education (College degree or more)						
Less than high school	1.075	0.979	1.182	1.086	0.988	1.194
High school	1.183	1.080	1.296	1.189	1.085	1.303
Some college	1.138	1.024	1.264	1.144	1.029	1.272
Marital status (Married)						
Widowed	0.885	0.819	0.956	0.890	0.824	0.962
Divorced/Separated	0.989	0.870	1.123	0.997	0.877	1.132
Never married	0.937	0.807	1.087	0.953	0.820	1.108
Region (West)						
Northeast	0.584	0.527	0.647	0.584	0.527	0.647
Midwest	0.808	0.732	0.892	0.813	0.736	0.898
South	0.933	0.852	1.021	0.934	0.853	1.023

Notes:

Relative Risks 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 (11.0).

NHW is non-Hispanic white; NHB is non-Hispanic black.

The values in parentheses are reference categories.

**Table 3.7. Relative Risks for diabetes mortality: NHIS 1986-2009 Linked Mortality Files, mortality follow-up through 2011 (n = 1,284,997)**

	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	1.078	1.076	1.080	1.080	1.078	1.082
Sex (Female)						
Male	1.510	1.428	1.597	1.526	1.443	1.614
Race/ethnicity (NHW)						
Hispanic	1.594	1.456	1.745	1.576	1.440	1.724
NHB	1.870	1.748	2.001	1.862	1.740	1.992
Education (College degree or more)						
Less than high school	2.284	2.078	2.511	2.314	2.105	2.543
High school	1.782	1.624	1.957	1.795	1.635	1.970
Some college	1.419	1.276	1.579	1.432	1.287	1.594
Marital status (Married)						
Widowed	1.324	1.229	1.426	1.334	1.238	1.437
Divorced/Separated	1.526	1.411	1.649	1.535	1.420	1.660
Never married	1.586	1.440	1.746	1.606	1.460	1.767
Region (West)						
Northeast	0.896	0.818	0.980	0.896	0.818	0.980
Midwest	1.064	0.979	1.157	1.067	0.981	1.160
South	1.080	1.001	1.166	1.080	1.001	1.166

Notes:

Relative Risks 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 (11.0).

NHW is non-Hispanic white; NHB is non-Hispanic black.

The values in parentheses are reference categories.

**Table 3.8. Relative Risks for kidney disease mortality: NHIS 1986-2009 Linked Mortality Files, mortality follow-up through 2011 (n = 1,284,997)**

	Relative Risk	Public-use		Relative Risk	Restricted-use	
		Lower Bound 95% CI	Upper Bound 95% CI		Lower Bound 95% CI	Upper Bound 95% CI
Age in years	1.107	1.104	1.110	1.109	1.106	1.113
Sex (Female)						
Male	1.699	1.578	1.829	1.723	1.600	1.855
Race/ethnicity (NHW)						
Hispanic	1.147	1.008	1.304	1.126	0.991	1.281
NHB	1.979	1.805	2.170	1.966	1.793	2.155
Education (College degree or more)						
Less than high school	1.935	1.711	2.187	1.953	1.728	2.208
High school	1.585	1.400	1.794	1.597	1.410	1.808
Some college	1.350	1.175	1.551	1.357	1.181	1.559
Marital status (Married)						
Widowed	1.166	1.062	1.279	1.173	1.070	1.287
Divorced/Separated	1.279	1.136	1.439	1.292	1.148	1.454
Never married	1.448	1.265	1.657	1.460	1.276	1.671
Region (West)						
Northeast	1.575	1.402	1.770	1.569	1.398	1.761
Midwest	1.647	1.459	1.859	1.640	1.455	1.850
South	1.663	1.487	1.861	1.659	1.484	1.854

Notes:

Relative Risks 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 (11.0).

NHW is non-Hispanic white; NHB is non-Hispanic black.

The values in parentheses are reference categories.

**Table 3.9. Relative Risks for pneumonia/influenza mortality: NHIS 1986-2009 Linked Mortality Files, mortality follow-up through 2011 (n = 1,284,997)**

	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	1.128	1.125	1.132	1.130	1.127	1.134
Sex (Female)						
Male	1.652	1.551	1.761	1.676	1.572	1.786
Race/ethnicity (NHW)						
Hispanic	0.765	0.665	0.880	0.754	0.656	0.866
NHB	1.011	0.916	1.116	1.008	0.913	1.112
Education (College degree or more)						
Less than high school	1.920	1.739	2.119	1.939	1.757	2.139
High school	1.499	1.357	1.655	1.503	1.362	1.660
Some college	1.299	1.165	1.449	1.303	1.168	1.453
Marital status (Married)						
Widowed	1.320	1.226	1.422	1.332	1.236	1.434
Divorced/Separated	1.387	1.254	1.534	1.395	1.262	1.543
Never married	2.032	1.800	2.293	2.067	1.831	2.332
Region (West)						
Northeast	0.801	0.721	0.889	0.798	0.719	0.885
Midwest	0.772	0.696	0.857	0.772	0.696	0.857
South	0.880	0.800	0.968	0.879	0.800	0.967

Notes:

Relative Risks 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 (11.0).

NHW is non-Hispanic white; NHB is non-Hispanic black.

The values in parentheses are reference categories.

**Table 4.1. Relative Risks for heart disease mortality: NHIS 1997-2009 Linked Mortality Files, mortality follow-up through 2011 (n = 312,266)**

	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	1.105	1.102	1.107	1.106	1.103	1.109
Sex (Female)						
Male	2.207	2.082	2.339	2.224	2.098	2.358
Race/ethnicity (NHW)						
Hispanic	0.825	0.745	0.914	0.815	0.736	0.903
NHB	1.167	1.079	1.262	1.171	1.082	1.267
Education (College degree or more)						
Less than high school	2.100	1.916	2.302	2.102	1.918	2.303
High school	1.626	1.484	1.782	1.626	1.485	1.781
Some college	1.512	1.372	1.667	1.514	1.373	1.669
Marital status (Married)						
Widowed	1.492	1.388	1.603	1.507	1.403	1.620
Divorced/Separated	1.493	1.382	1.613	1.504	1.392	1.624
Never married	1.875	1.689	2.083	1.903	1.712	2.114
Region (West)						
Northeast	0.976	0.888	1.073	0.982	0.894	1.078
Midwest	1.020	0.933	1.114	1.028	0.942	1.122
South	1.051	0.966	1.145	1.059	0.973	1.151

Notes:

Relative Risks 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 (11.0).

NHW is non-Hispanic white; NHB is non-Hispanic black.

The values in parentheses are reference categories.

**Table 4.2. Relative Risks for cancer mortality: NHIS 1997-2009 Linked Mortality Files, mortality follow-up through 2011 (n = 312,266)**

	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	1.077	1.075	1.079	1.078	1.076	1.080
Sex (Female)						
Male	1.620	1.534	1.710	1.631	1.544	1.721
Race/ethnicity (NHW)						
Hispanic	0.730	0.663	0.803	0.726	0.660	0.799
NHB	1.159	1.076	1.248	1.153	1.071	1.241
Education (College degree or more)						
Less than high school	1.777	1.639	1.927	1.799	1.660	1.949
High school	1.489	1.380	1.606	1.491	1.383	1.608
Some college	1.313	1.205	1.432	1.314	1.205	1.432
Marital status (Married)						
Widowed	0.958	0.901	1.017	0.968	0.911	1.029
Divorced/Separated	1.277	1.196	1.363	1.284	1.202	1.370
Never married	1.019	0.922	1.125	1.035	0.938	1.142
Region (West)						
Northeast	1.058	0.977	1.145	1.062	0.981	1.150
Midwest	1.044	0.964	1.131	1.046	0.966	1.133
South	1.146	1.065	1.233	1.151	1.070	1.237

Notes:

Relative Risks 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 (11.0).

NHW is non-Hispanic white; NHB is non-Hispanic black.

The values in parentheses are reference categories.

**Table 4.3. Relative Risks for chronic lower respiratory disease mortality: NHIS 1997-2009 Linked Mortality Files, mortality follow-up through 2011 (n = 312,266)**

	<u>Public-use</u>			<u>Restricted-use</u>		
	Relative Risk	Lower Bound 95% CI	Upper Bound 95% CI	Relative Risk	Lower Bound 95% CI	Upper Bound 95% CI
Age in years	1.102	1.097	1.107	1.104	1.099	1.108
Sex (Female)						
Male	1.688	1.527	1.865	1.699	1.538	1.877
Race/ethnicity (NHW)						
Hispanic	0.248	0.198	0.311	0.247	0.197	0.310
NHB	0.420	0.339	0.520	0.419	0.339	0.519
Education (College degree or more)						
Less than high school	3.384	2.793	4.100	3.415	2.820	4.135
High school	2.109	1.756	2.533	2.117	1.764	2.542
Some college	1.819	1.500	2.206	1.818	1.499	2.205
Marital status (Married)						
Widowed	1.311	1.148	1.497	1.322	1.158	1.509
Divorced/Separated	1.906	1.648	2.204	1.924	1.663	2.226
Never married	1.375	1.109	1.705	1.388	1.119	1.721
Region (West)						
Northeast	0.779	0.648	0.936	0.779	0.650	0.934
Midwest	0.900	0.764	1.059	0.901	0.767	1.059
South	1.089	0.929	1.276	1.089	0.931	1.274

Notes:

Relative Risks 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 (11.0).

NHW is non-Hispanic white; NHB is non-Hispanic black.

The values in parentheses are reference categories.

**Table 4.4. Relative Risks for cerebrovascular disease mortality: NHIS 1997-2009 Linked Mortality Files, mortality follow-up through 2011 (n = 312,266)**

	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	1.126	1.119	1.132	1.127	1.121	1.134
Sex (Female)						
Male	1.075	0.960	1.203	1.091	0.975	1.222
Race/ethnicity (NHW)						
Hispanic	0.987	0.822	1.186	0.973	0.809	1.170
NHB	1.259	1.079	1.468	1.250	1.072	1.458
Education (College degree or more)						
Less than high school	1.713	1.411	2.080	1.742	1.434	2.115
High school	1.402	1.164	1.688	1.410	1.171	1.697
Some college	1.243	1.015	1.524	1.252	1.021	1.534
Marital status (Married)						
Widowed	1.020	0.899	1.157	1.030	0.908	1.169
Divorced/Separated	1.146	0.965	1.361	1.158	0.975	1.375
Never married	1.275	1.046	1.553	1.288	1.057	1.570
Region (West)						
Northeast	0.677	0.570	0.803	0.676	0.570	0.801
Midwest	0.876	0.756	1.015	0.876	0.757	1.015
South	0.937	0.819	1.073	0.938	0.820	1.073

Notes:

Relative Risks 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 (11.0).

NHW is non-Hispanic white; NHB is non-Hispanic black.

The values in parentheses are reference categories.

**Table 4.5. Relative Risks for unintentional injury mortality: NHIS 1997-2009 Linked Mortality Files, mortality follow-up through 2011 (n = 312,266)**

	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	1.033	1.028	1.039	1.0351	1.0291	1.0411
Sex (Female)						
Male	2.037	1.772	2.341	2.044	1.7764	2.352
Race/ethnicity (NHW)						
Hispanic	0.768	0.615	0.958	0.7746	0.6209	0.9663
NHB	0.686	0.550	0.855	0.6987	0.5608	0.8706
Education (College degree or more)						
Less than high school	2.288	1.775	2.949	2.2653	1.7605	2.9149
High school	1.521	1.212	1.909	1.5166	1.2086	1.9032
Some college	1.567	1.256	1.954	1.5459	1.2396	1.9279
Marital status (Married)						
Widowed	2.067	1.684	2.538	2.071	1.6871	2.5422
Divorced/Separated	1.603	1.329	1.934	1.6102	1.336	1.9406
Never married	1.846	1.486	2.293	1.8417	1.4783	2.2945
Region (West)						
Northeast	0.699	0.568	0.860	0.6885	0.5593	0.8475
Midwest	0.953	0.777	1.169	0.9464	0.7715	1.161
South	0.981	0.825	1.166	0.9711	0.8171	1.1542

Notes:

Relative Risks 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 (11.0).

NHW is non-Hispanic white; NHB is non-Hispanic black.

The values in parentheses are reference categories.

**Table 4.6. Relative Risks for Alzheimer's disease mortality: NHIS 1997-2009 Linked Mortality Files, mortality follow-up through 2011 (n = 312,266)**

	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	1.193	1.182	1.205	1.197	1.185	1.209
Sex (Female)						
Male	0.932	0.776	1.119	0.949	0.790	1.141
Race/ethnicity (NHW)						
Hispanic	0.763	0.557	1.046	0.749	0.547	1.025
NHB	0.729	0.533	0.996	0.724	0.530	0.988
Education (College degree or more)						
Less than high school	1.255	0.962	1.381	1.277	0.979	1.666
High school	1.287	1.012	1.636	1.295	1.019	1.648
Some college	1.147	0.877	1.502	1.156	0.883	1.513
Marital status (Married)						
Widowed	1.006	0.839	1.206	1.017	0.848	1.218
Divorced/Separated	0.998	0.751	1.325	1.008	0.759	1.339
Never married	1.193	0.821	1.734	1.205	0.830	1.751
Region (West)						
Northeast	0.523	0.405	0.676	0.524	0.405	0.677
Midwest	0.728	0.582	0.910	0.731	0.584	0.914
South	0.899	0.727	1.110	0.897	0.726	1.108

Notes:

Relative Risks 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 (11.0).

NHW is non-Hispanic white; NHB is non-Hispanic black.

The values in parentheses are reference categories.

**Table 4.7. Relative Risks for diabetes mortality: NHIS 1997-2009 Linked Mortality Files, mortality follow-up through 2011 (n = 312,266)**

	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	1.077	1.088	1.083	1.078	1.089
Sex (Female)						
Male	1.597	1.373	1.858	1.622	1.394	1.887
Race/ethnicity (NHW)						
Hispanic	1.504	1.228	1.842	1.473	1.203	1.804
NHB	1.920	1.601	2.302	1.913	1.599	2.290
Education (College degree or more)						
Less than high school	2.189	1.725	2.778	2.250	1.773	2.856
High school	1.842	1.470	2.309	1.876	1.498	2.349
Some college	1.336	1.046	1.706	1.350	1.058	1.723
Marital status (Married)						
Widowed	1.403	1.167	1.687	1.408	1.172	1.693
Divorced/Separated	1.707	1.432	2.035	1.689	1.415	2.016
Never married	1.665	1.295	2.139	1.697	1.324	2.174
Region (West)						
Northeast	0.933	0.748	1.165	0.944	0.760	1.173
Midwest	1.113	0.905	1.367	1.104	0.899	1.355
South	1.089	0.909	1.305	1.082	0.905	1.294

Notes:

Relative Risks 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 (11.0).

NHW is non-Hispanic white; NHB is non-Hispanic black.

The values in parentheses are reference categories.

**Table 4.8. Relative Risks for kidney disease mortality: NHIS 1997-2009 Linked Mortality Files, mortality follow-up through 2011 (n = 312,266)**

	<u>Public-use</u>			<u>Restricted-use</u>		
	Relative Risk	Lower Bound 95% CI	Upper Bound 95% CI	Relative Risk	Lower Bound 95% CI	Upper Bound 95% CI
Age in years	1.101	1.093	1.110	1.103	1.095	1.112
Sex (Female)						
Male	1.608	1.325	1.951	1.638	1.350	1.987
Race/ethnicity (NHW)						
Hispanic	0.990	0.722	1.358	0.978	0.713	1.341
NHB	2.457	1.981	3.049	2.438	1.964	3.027
Education (College degree or more)						
Less than high school	1.650	1.204	2.259	1.670	1.219	2.287
High school	1.602	1.188	2.161	1.625	1.205	2.190
Some college	1.057	0.763	1.464	1.063	0.767	1.472
Marital status (Married)						
Widowed	1.187	0.951	1.482	1.195	0.958	1.492
Divorced/Separated	1.137	0.872	1.482	1.154	0.885	1.503
Never married	1.245	0.907	1.709	1.259	0.917	1.728
Region (West)						
Northeast	1.533	1.144	2.054	1.542	1.150	2.066
Midwest	1.637	1.223	2.190	1.637	1.224	2.190
South	1.558	1.203	2.017	1.569	1.212	2.031

Notes:

Relative Risks 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 (11.0).

NHW is non-Hispanic white; NHB is non-Hispanic black.

The values in parentheses are reference categories.

**Table 4.9. Relative Risks for pneumonia/influenza mortality: NHIS 1997-2009 Linked Mortality Files, mortality follow-up through 2011 (n = 312,266)**

	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	1.118	1.107	1.128	1.120	1.109	1.130
Sex (Female)						
Male	1.497	1.265	1.772	1.528	1.290	1.808
Race/ethnicity (NHW)						
Hispanic	0.869	0.637	1.187	0.853	0.625	1.166
NHB	1.155	0.894	1.491	1.143	0.884	1.477
Education (College degree or more)						
Less than high school	1.948	1.468	2.584	1.990	1.501	2.638
High school	1.359	1.020	1.810	1.370	1.028	1.824
Some college	1.352	0.991	1.844	1.361	0.998	1.857
Marital status (Married)						
Widowed	1.623	1.319	1.998	1.645	1.337	2.024
Divorced/Separated	1.701	1.328	2.180	1.714	1.338	2.196
Never married	2.387	1.728	3.299	2.486	1.803	3.427
Region (West)						
Northeast	0.832	0.618	1.120	0.824	0.613	1.109
Midwest	0.721	0.555	0.936	0.715	0.551	0.927
South	0.923	0.728	1.169	0.918	0.726	1.162

Notes:

Relative Risks 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 (11.0).

NHW is non-Hispanic white; NHB is non-Hispanic black.

The values in parentheses are reference categories.