6-10-2022

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Samuel Preston
University of Pennsylvania, spreston@sas.upenn.edu

Yana Vierboom
Max Planck Institute for Demographic Research, yvierboom@gmail.com

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Abstract

This paper estimates the contribution of changes in major risk factors to mortality trends in the United States during the period 1997-2015. The risk factors investigated include cigarette smoking, obesity, alcohol consumption, educational attainment, health insurance coverage, and mental distress. It uses National Health Interview Surveys followed into death records to investigate the relationship between mortality and risk factors and to identify changes in the prevalence of the risk factors over the period of observation. All models control for age, sex, and race/ethnicity. It concludes that increases in educational attainment and reductions in smoking prevalence are the most important contributors to mortality change over the period of study.

Keywords

mortality, risk factors, smoking, obesity, alcohol consumption, mental health, health insurance coverage, educational attainment, NHIS, National Health Interview Survey

Disciplines

Demography, Population, and Ecology | Medicine and Health | Social and Behavioral Sciences

June 10, 2022

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Samuel Preston
Population Studies Center
University of Pennsylvania

Yana Vierboom
Max Planck Institute for
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Abstract This paper estimates the contribution of changes in major risk factors to mortality trends in the United States during the period 1997-2015. The risk factors investigated include cigarette smoking, obesity, alcohol consumption, educational attainment, health insurance coverage, and mental distress. It uses National Health Interview Surveys followed into death records to investigate the relationship between mortality and risk factors and to identify changes in the prevalence of the risk factors over the period of observation. All models control for age, sex, and race/ethnicity. It concludes that increases in educational attainment and reductions in smoking prevalence are the most important contributors to mortality change over the period of study.

Introduction

Hundreds of factors affect levels of mortality in every population. Changes in the prevalence or fatality of these factors, and how they combine, produce changes in a population’s level of mortality. In turn, trends in mortality have important implications for quality of life, social and family relationships, and the fiscal viability of age-based programs of economic transfer (Trustees 2020).

Identifying various factors influencing mortality trends in large populations has been pursued through several routes. One common approach uses cause-of-death assignments on death certificates (e.g.,Woolf and Shoomaker 2019). Some of the underlying causes of death are the product of well-recognized causal processes, e.g., motor vehicle accidents, death in childbirth, and lung cancer. In such cases, changes in mortality by cause of death can contain a causal attribution that satisfies the standards of the investigator. This approach is less informative for the bulk of deaths that are multifactorial, including most cancers, cardiovascular diseases, and dementias. In these cases, cause of death assignments are nevertheless useful in limiting the range of search for causal factors.

A second approach measures the prevalence of various mortality-influencing factors at two points in time. It introduces data on the risks of mortality associated with a factor to estimate the contribution of changes in the prevalence of that factor to mortality change. The factors that are featured may focus on a behavioral risk factor such as smoking and obesity (e.g., Stewart and Cutler 2015) or elements of medical technology, such as patterns of pharmaceutical use (e.g., Buxbaum et al. 2020). The mortality risks or benefits associated with a particular factor are often assumed constant during the period of observation. Estimates of prevalence and relative risks are made independently and are sometimes based on different data sources, which may introduce biases (Flegal et al. 2014).

A third approach uses decompositional methods to estimate the relative effects of changes in the distribution of a variable and changes in the relation between that variable and mortality (e.g., Luy et al. 2019). The complexity of the decompositional method has limited its application to one or two variables at a time.

A fourth approach applies a statistical model to a single longitudinal micro-data source (Deeg et al. 2012; Preston, Vierboom, Stokes 2018). It simultaneously derives estimates of risk factor prevalence and changes therein, the risks associated with that factor, and mortality trends identifiable within the data set. The effect of a particular risk factor on mortality trends is investigated by adding that variable to a statistical model. This approach is adaptable to multivariate analysis and has the advantage of deriving estimates of prevalence of a variable and the mortality risks associated with it from a single source. The risks associated with a particular variable are typically assumed to be constant during the period of observation.

In this paper, we apply the latter approach to data from the National Health Interview Survey, the largest national data source on individuals and their health behaviors and circumstances. Linkage of surveyed individuals to subsequent deaths by the National Center for Health Statistics (NCHS) enables us to examine the contribution of various factors to rates of mortality change observed in NHIS data.

We begin with individuals surveyed in 1997, the year that many relevant data series were established in NHIS. We add individuals surveyed though 2014 and follow survival experience through the year 2015, the last year for which NCHS has linked deaths to NHIS records. The period 1997-2015 is one of relatively steady improvements in mortality in the United States (Kochanek et al. 2019: Figure 1), the last years of which initiated a period of relative stasis (Xu et al. 2020).

The goals of the research are to (1) identify the relationship between mortality and major risk factors in the United States during a recent period; (2) identify changes in the prevalence of the risk factors over the period of observation; and (3) ascertain the contribution of changes in the risk factors to mortality trends during the period.

Data and Methods

Data on mortality and risk factors are from the National Health Interview Survey (NHIS), made available by IPUMS (Blewett et al.2017). The NHIS is a nationally-representative and annual interview survey of a cross-section of US households, representing non-institutionalized civilians of all ages. . The NCHS links adults with sufficient information and who were interviewed through 2014 to death records through the end of 2015. We therefore use surveys from 1997-2014, with mortality linkage through 2015. Our sample includes 462,235 adults, and 2,499,647 person-years of follow-up. For most of the analysis, we used mortality weights for the sample population, called *mortsampwt* by IPUMS.

We use a Cox proportional hazards model that simultaneously estimates mortality trends and the relationship between various risk factors and mortality. We use time since survey as exposure time. Individuals remain exposed to the risk of death until they were censored by death, by reaching January 1, 2016, or by reaching age 85. To retain a narrow time frame between the recording of an individual's characteristics at survey and his or her exposure to the risk of death, we also censored all individuals after 5 whole years of observation.

A key variable is calendar year. After initial assignment to a particular year at survey, the year variable increases by one year for each year of follow-up. Since the Cox model predicts the natural log of the death rate, the coefficient of the year variable is the estimated annual rate of mortality decline during the period under study.

This paper examines how the estimated annual rate of mortality change is altered when a variable is introduced into the statistical model. The mediating effect of a risk factor combines both changes in prevalence of the risk factor and the estimated mortality associated with it. To ascertain the variables with the largest effect on mortality trends, we begin by adding each risk factor individually to an equation controlling only for the effects of age, sex, and race and examine its effect on the estimated mortality trend. Next, we add each risk factor to a model that includes all other variables and examine the effect of this addition on the estimated mortality trend.

Our logic is the following. In the equation including only date of observation and age, sex, and race, the coefficient on time provides an estimate of the actual national rate of mortality change. When we add smoking to that equation, for example, the change in the coefficient of time indicates how the rate of mortality change would be affected if we were able to control smoking behavior, including its effect on an individual's risk of death and changes in the distribution of the population with respect to smoking behavior. However, the coefficient for smoking in this model represents not only the mortality effects of smoking itself, but also the effects of all variables with which it is correlated and which themselves affect mortality, such as obesity or alcohol use. Those variables are acting as confounders of the effect of smoking and we may misinterpret the estimated effect of smoking on mortality trends by not including them in the model. On the other hand, when we include all variables except smoking in the model and estimate the effect of adding smoking, we are potentially committing the opposite error: in the equation that includes all variables except smoking, we are attributing to the other variables with which smoking is correlated many of the effects of smoking itself. Smoking is potentially confounding their estimated effects on mortality trends.

Our final estimate of the effect of smoking consists of the mean of the two values of the change in the time coefficient from (1) adding it to the basic demographic model and (2) adding it to a model that includes all other variables. In the first case, we are in essence attributing all of the joint effects of smoking and other variables to smoking; in the latter case, we are attributing none of the joint effects to smoking. This is clearly an ad-hoc method.

We include variables whose mortality risks have been well established and whose distribution is sufficiently heterogeneous that the variables produce a substantial population attributable risk of death. These include demographic characteristics of age, sex, and race/ethnicity; biobehavioral risk factors of smoking, alcohol consumption, and body mass index; a key social characteristic, educational attainment; a measure of access to health care; and a measure of psychological distress. More information on the variables' construction is given below.

Age and Sex

Age measures age at last birthday and, like calendar year, increases with each year of observation. We additionally include a squared term for age. Sex is treated as binary.

Race and Ethnicity

We use a conventional categorization: non-Hispanic White ("White"), non-Hispanic Black ("Black"); Hispanic; and Other. Mortality differentials by race/ethnicity have been widely documented (e.g. Martin and Soldo 1997; Curtin and Arias 2019; Hooper et al. 2020). Some of the differentials are a product of differences in the distribution of socioeconomic and behavioral variables among the groups, while others are a product of specific features of group membership, e.g. discrimination against African Americans (Jackson et al. 2011) and processes of migrant selectivity among Hispanics (Markides and Eschbach 2011).

Educational Attainment

Educational attainment has become the most prominent variable representing an individual's socio-economic status in studies of health and mortality (Elo 2009). One advantage of the variable is that data on educational attainment is typically available for all adults, unlike occupation or income. A second is that individuals typically complete their education in young adulthood so that the variable remains stable through life. As a result, it is not highly vulnerable to problems of reverse causation during adulthood. Other socioeconomic variables such as income and occupational status can change as a result of one's health status, creating problems of statistical inference. Survey reporting of educational attainment is more reliable and complete than that of other socio-economic variables (Hummer and Lariscy 2011).

Educational attainment reflects the stock of human capital established relatively early in life that is available to individuals throughout their life course (Elo 2009). That capital may include health-related knowledge, resources, and skills. In their summary of relevant literature, Hummer and Lariscy (2011) and Hummer and Hernandez (2013) identify powerful mortality effects associated with educational attainment.

We use what has become a standard set of categories for educational attainment: less than high school completion; high school diploma; some college; and college completion.

Smoking Status

Following a thorough account of smoking/mortality relations in NHIS (Lariscy et al. 2018), we use these categories of smoking status: *Current smokers* report smoking 100 or more cigarettes in their lifetime and now smoke every day or some days. *Current smokers* are further disaggregated by number of cigarettes smoked per day (<10, 10–19, 20–39, and 40+ cigarettes). *Former smokers* report smoking 100 or more cigarettes in their lifetime, but none currently. *Never smokers* report smoking fewer than 100 cigarettes in their entire life.

Body Mass Index (BMI)

The variable we use to represent overweight and obesity is an individual's number of BMI units above 25.0, the beginning of the "overweight" range. Using a continuous variable rather than the standard set of categorical variables has been shown to produce results that are much less sensitive to the common errors of self-reports (Preston, Fishman, and Stokes 2015). An individual's lifetime maximum BMI, a preferred variable because it is less affected by reverse causation resulting from disease-initiated weight loss (Stokes and Preston 2016a, 2016b), is not available in NHIS. BMI is treated as a second-degree polynomial.

Alcohol consumption status: Mortality attributable to excessive alcohol consumption has been rising (Vierboom 2020). We construct an alcohol variable that attempts to combine lifetime frequency with the frequency of binge drinking in the past year:

-Lifetime abstainer (<12 drinks in lifetime)

-Former drinker (no drinks last year)

-Current light/moderate drinker (>1 drink in the last year)

-Heavy drinker (drank 5+ drinks 60+ times in the past year)

-Unknown

Psychological Distress

A prominent explanation of rising mortality among middle-aged White people uses cause-of-death assignments to identify rising mortality from "deaths of despair", a category that includes deaths from suicide, drug poisoning, and alcoholic liver disease (Case and Deaton 2015, 2017, 2020). Despair is not a well-recognized psychological construct but it is related to depression and anxiety, for which widely validated scales exist and which have been included in the NHIS since 1997. We use the K-6 scale that combines depression and anxiety to capture "non-specific psychological distress" (Kessler et al. 2002; Lace et al. 2020). Three of the six K-6 questions appear to tap into a layman's concept of "despair": "During the past 30 days, how often did you feel (1) so sad that nothing could cheer you up? (2) hopeless? Or (3) worthless?" With six items, each of which is scored from 0 to 4, the additive K-6 variable takes on scores of 0-24. We trichotomize the variable and use 0-4 to indicate little to no psychological distress, 5-12 to indicate moderate psychological distress, and 13+ to indicate severe psychological distress (Tomitaka et al. 2019). Several studies have linked psychological distress to subsequent mortality (e.g. Keyes and Simoes 2012; Gilman et al. 2017).

Access to Health Care

Most of the variables in the NHIS that relate to the availability of medical care combine elements of availability with elements of the respondent's health history, e.g., "In the last 12 months have you needed but couldn't afford medical care?" We seek a measure of health care availability that does not depend on respondent's illnesses, which we would expect to correlate with subsequent survival for reasons unrelated to availability. For this purpose, we use a dummy variable indicating whether an individual has health insurance coverage. Wilper et al. (2009) use hazard models to estimate that 45,000 excess deaths are associated with a lack of health insurance each year.

Results

Table 1 shows the distribution of risk factors in the sample for adults interviewed in years 1997-2005 and 2006-2014. The data are age-standardized using the age distribution of the 2000 US Census.

The population underwent significant educational upgrading during this period, with the proportion having a bachelor's degree rising from 24.4% to 29.0%. A decline in the proportion of people who had ever smoked from 47.1% to 42.3%, along with a decrease in the proportion of smokers who smoke heavily, should also have contributed to declining mortality. On the other hand, mean units of BMI above 25 rose by 0.63 and the percentage reporting that they had health insurance coverage declined by 2 percentage points. Relatively little change is observed in alcohol consumption patterns or in our measure of mental distress (see also Tomitaka et al. 2019). Nevertheless, these variables could contribute to mortality change through their interaction with other variables whose distributions are changing.

Appendix Table 1 shows the coefficients of the hazard model when all variables are included. Variables are related to mortality in the expected direction: mortality falls with rising educational attainment and rises with smoking intensity, increased psychological distress, absence of health insurance coverage (insignificantly), and higher BMI (non-linearly). Coefficients of alcohol consumption are more complex. Relative to light to moderate current drinkers, former drinkers and current binge drinkers have higher mortality, but so do lifetime abstainers. This J-shaped relationship is commonly found, with the mortality nadir among light drinkers and higher mortality among nondrinkers and moderate to heavy drinkers (Rogers et al. 2013).

With all variables in the model, the coefficient of time is -0.0050. With only age, sex, and race in the model, the coefficient of time is -0.0117 (not shown). These results imply that we have been able to account for 0.0067/0.0117= 57% of the mortality trend controlling age, sex, and race/ethnicity.

How does the mortality trend implicit in the NHIS mortality linkages compare to that in national vital statistics? Using data from the National Center for Health Statistics (Hoyert et al. 1999; Murphy et al. 2017), the annualized rate of change in the age-standardized death rate among people aged 25-84 between 1997 and 2015 is -0.0122.[1] This compares to the rate of change that we estimate in the NHIS of -0.0117 controlling age, sex, and race and -0.0110 controlling only age and sex (not shown). Thus, there is quite good agreement in the estimated pace of adult mortality change over the period between NCHS official vital statistics and NHIS surveys linked to mortality. The NHIS rate of decline is also typical of that which occurred during a much longer period. Using Social Security Administration annual estimates of age/sex standardized death rates, the annual rate of change between 1960 and 2015 was - 0.0105 (derived from Trustees, 2020, Table V.A1).

Table 2 shows the changes in the rate of mortality change, i.e., in the value of the coefficient of date of observation, under various model specifications. The first column lists the change in the time coefficient when a variable is added to the basic demographic model. The second column lists the change in the time coefficient when the variable is added to a model including all other explanatory

[1] This calculation uses the age distribution of the US Census in 2000 to age-standardize death rates in 5-year wide age intervals in 1997 and 2015.

variables. The third column shows the mean of these two columns and is our best estimate of changes in the time trend associated with the explanatory variable.

The addition of educational attainment to a model has the greatest effect on the coefficient of time, regardless of whether the model to which it is added is the basic demographic model controlling age, sex, and race/ethnicity or whether it is the model controlling all other variables. The mean of these two effects suggests that rising educational attainment is responsible for nearly half (49%) of the decline in mortality over the period.

The second most important effect on mortality trends is associated with the decline in smoking, which we estimate to account for 22% of the mortality decline. Between them, rising educational attainment and declining smoking prevalence account for 71% of the decline in mortality over the period.

The remaining variables have weaker and largely offsetting effects on the mortality trend. The small reductions in the prevalence of binge drinking, former drinking and lifetime abstention relative to light/moderate drinking account for 10% of the mortality decline. Rising BMI and mental distress and declining health care access are estimated to have reduced the rate of decline during the period by small amounts, i.e., to have raised mortality.

The effect of adding mental distress depends on the model to which it is added. It has no effect on the mortality trend when added to the basic demographic model but reduces the rate of mortality decline by 0.10% when added to a model including all other variables, implying that rising distress has reduced the rate of improvement in mortality.

As noted, the time coefficient changes by 0.0067 when all variables are added to the basic demographic model. The changes associated with the introduction of variables one at a time, shown in the right-hand column of Table 2, add up to 0.0068. Of the changes that we are able to account for, rising education is responsible for 0.49/0.67= 73% of the total decline captured by our variables. and declining smoking 0.22/0.67 = 33%.

Discussion

We find that the variable having the most powerful effect on mortality trends in the US during 1997-2015, regardless of other variables in the model, is the rising educational attainment of the population. This result should not be surprising in view of the very strong relationship between educational attainment and mortality (Hummer and Lariscy 2011; Hummer and Hernandez 2013; Sasson and Hayward 2019) and the rapid improvement of the educational distribution of Americans (Table 1). Nevertheless, it may seem surprising because the variable is seldom featured in discussions of mortality trends. An important exception is the work of Wolfgang Lutz, who has used international cross-sections and time series to argue that the dominant factor in global improvement in mortality over the past century is an increase in adult educational attainment (e.g., Lutz and Kebede 2018; Lutz and Skirbekk 2014). Our results are consistent with his broader claims.

In a related study, Luy et al. (2019) decomposed changes in life expectancy at age 30 in three countries between 1990 and 2010 into effects associated with changes in the educational distribution and effects of mortality change at a given level of educational attainment. In the US, 19% of the gain was associated with educational upgrading. In Italy and Denmark, respectively, 20% and 24% of improvements in life expectancy were attributed to educational upgrading. Luy et al.'s estimated effect in the US is below that which we have estimated in Table 2 for a somewhat later period. But even at 19%, educational attainment would account for more of the mortality change than any other variable considered in the Table.[2]

[2] It should be noted that we are dealing with death rates directly while they are examining changes in life expectancy. With survival patterns similar to that in the US, the effect of a

Our results suggest that rising obesity has made a modest contribution towards slowing down the decline in mortality. These results contrast with those of Preston, Vierboom and Stokes (2018). Using a similar research design to that of the present paper, they conclude that rising obesity reduced the annual rate of mortality decline by 0.54/2.35 = 23% over the period 1988-2011. Mortality decline was faster during the 1988-2011 period than during the period that we examine here, but the principal difference between the studies is that different variables were used to represent obesity in the two studies. The present study uses NHIS data on body mass index at baseline while the earlier study used data on lifetime maximum BMI from the National Health and Nutrition Examination Survey. Lifetime maximum BMI is associated with much larger estimated mortality risks than is baseline BMI (Stokes and Preston 2016a, 2016b). A main reason for the difference is that people who develop a major disease lose substantial weight, on average (Vierboom, Preston, Stokes 2018). The inflow of sick individuals into lower weight categories creates large "reverse causation" biases in the relation between BMI and mortality when baseline weight is used. As a result, we believe that the effect of obesity on mortality trends is seriously underestimated in Table 2.

Although not the focus of their study, the effect of adding educational attainment and smoking to a hazards model including age, sex, and race/ethnicity were also investigated in Preston, Vierboom, and Stokes (2018). They find that rising educational attainment accounted for a decline in mortality of 0.63 annually, versus 0.66 in the present study (Table 2). Diminished smoking reduced mortality at an annual rate of 0.43 in the earlier study, versus 0.31 in the present study. So,

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proportionate change in death rates typically translates into a proportionate effect on life expectancy that is only about one-quarter as large (Keyfitz 1977). So our results are not strictly comparable to theirs.

with the exception of obesity, results are similar when comparable variables are used in different data sets representing overlapping periods.

The only other study that we have encountered that uses a similar design attempted to account for changes in mortality at ages 78-87 between 1996 and 2006 in Amsterdam (Deeg et al. 2012). The two strongest contributors to the mortality decline were declining smoking (22% of the decline) and rising educational attainment (15%), even though both variables were treated as dichotomies, which likely diminishes their explanatory power.

As noted, the estimated change in the mortality trend associated with mental distress is quite different when the model to which it is added includes all other variables (-0.10) rather than only the demographic variables (0.00). The null effect when only demographic variables are included is consistent with the negligible trend in mental distress shown in Table 1. But it is possible that the trend is not negligible once account is taken of trends in the variables with which it is associated. Once those variables such as educational attainment are in the model, mental distress conditional on their values is likely to be rising. Combined with the large coefficients for mental distress in the model (Appendix Table 1), such a rise may contribute to rising mortality over the period. So there is a possible role for "despair" in these results, although it is not a prominent one.

The variables in our model account for 0.67/1.17= 57% of the mortality decline during the period, a period with a relatively normal pace of mortality change. We are not able to account for the remaining 43% of the decline. We assume that improvements in techniques for preventing and curing many diseases are occurring throughout the period examined and were instrumental in driving mortality lower. Buxbaum et al. (2020) conclude that improvements in pharmaceutical practices, especially greater use of statins and blood pressure drugs, accounted for 35% of the US mortality decline over the period 1990-2015.

Such a fraction would account for the majority of the trend that we have left unexplained.[3]

For more than a century, mortality in advanced countries has declined steadily, encouraging the idea that future declines could be predicted by extrapolating rates of decline observed in the past (Vaupel et al. 2021). But the declines were not on automatic pilot; they were a result of human activity in many different spheres. Identifying the sources of change is an important activity that deserves more attention than it has received. A better understanding of the sources of past mortality changes can also inform projections of future mortality. Levels of educational attainment are readily predictable on a birth cohort basis since attainments change little after age 30 (Lutz and Samir 2011). Likewise, the effects of smoking changes on mortality are predictable by observing cohort patterns of lung cancer mortality (Preston et al. 2016). Studies of the sources of mortality change can not only cast light on the past but help illuminate the future.

[3] In addition to a longer period, their study focused on life expectancy at birth and includes infancy and childhood, so results are not strictly comparable to ours. Some of the same variables are considered, including smoking, obesity, and health care coverage. They find that improved "public health", including reductions in smoking and improved traffic safety, accounts for 45% of US mortality decline between 1990 and 2015. They do not consider the role of increased educational attainment.

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Table 1. Characteristics of sample ages 25-85 at cross-sectional interview, by period of interview. All characteristics are age-standardized[a] percent distributions, unless noted otherwise.

Characteristic	1997-2005	2006-2014
Mean age in years (std dev)[b]	48.77 (15.74)	50.09 (15.73)
Male	43.90	44.68
Educational attainment		
Less than high school	17.08	13.98
High school	31.28	28.17
Some college/Associate's	27.21	28.81
Bachelor's or greater	24.43	29.04
Cigarette smoking		
Never	52.88	57.73
Former	23.07	21.68
Current (<10/day)[c]	7.30	7.91
Current (10-19/day)	5.88	5.74
Current (20-39/day)	8.72	5.58
Current (40+/day)	1.43	0.58
Unknown	0.72	0.78
Alcohol consumption		
Lifetime abstainer	21.65	20.07
Former drinker	15.95	15.13
Current drinker	58.02	60.30
Heavy drinker	2.87	2.69
Unknown	1.50	1.81
Mean BMI above 25 (kg/m^2)	2.88	3.51
Health insurance coverage		
Yes	84.17	81.96
No	15.52	17.79
Unknown	0.32	0.25
Mental distress		
None (0-4 k6)	79.62	78.91
Moderate (5-12 k6)	15.61	15.92
Severe (13+ k6)	3.65	3.76
Unknown	1.13	1.41
N	237,792	224,443

a. Age standardized using the age distribution of the 2000 US Census.
b. Not age-standardized.
c. Respondents who report smoking on "some days" are classed as smoking <10 cigarettes/day.

Table 2. Change in the coefficient of time when a variable is added to the core demographic variables and when it is added to a model including all other variables

Variable	**Change in coefficient when variable is added to:**		
	Core demographic model	Model containing all other variables	Mean
Education	0.66	0.32	0.49
Smoking	0.31	0.13	0.22
Alcohol	0.14	0.06	0.10
BMI	-0.08	-0.03	-0.06
Mental distress	0.00	-0.10	-0.05
Health care access	-0.04	-0.01	-0.03
Sum	**0.99**	**0.37**	**0.68**[a]

a. This value compares to the amount of change in the coefficient of time (0.67) when all variables are included in the model (0.50) and only age, sex, and race are included (1.17).

Appendix Table 1. Coefficients from Cox proportional hazard model predicting mortality within 6 years of interview, 1997-2014.

Characteristic	Coefficient	Standard error
Mean age in years (std dev)[b]	-0.0050**	0.00186
Age	0.0220***	0.00451
Age^2	0.0004***	0.00003
Male	0.448***	0.0167
Educational attainment		
Less than high school	ref	Ref
High school	-0.168***	0.0211
Some college/Associate's	-0.254***	0.0245
Bachelor's or greater	-0.460***	0.0292
Race		
Non-Hispanic White	ref	Ref
Non-Hispanic Black	0.280***	0.0228
Hispanic	0.0971***	0.0292
Other	0.0229	0.0459
Cigarette smoking		
Never	ref	Ref
Former	0.404***	0.0213
Current (<10/day)[c]	0.789***	0.0354
Current (10-19/day)	0.720***	0.0388
Current (20-39/day)	0.822***	0.0314
Current (40+/day)	1.040***	0.0574
Unknown	0.435***	0.0963
Alcohol consumption		
Lifetime abstainer	0.381***	0.0225
Former drinker	0.441***	0.0202
Current drinker	ref	Ref
Heavy drinker	0.253***	0.0504
Unknown	0.263***	0.0767
Mean BMI above 25 (kg/m^2)	-0.025***	0.0051
BMI above 25^2	0.002***	0.0003
Health insurance coverage		
Yes	ref	Ref
No	0.041	0.0332
Unknown	0.102	0.1520
Mental distress		
None (0-4 k6)	ref	Ref
Moderate (5-12 k6)	0.475***	0.0206
Severe (13+ k6)	0.763***	0.0340
Unknown	0.610***	0.0589

Source: NHIS.
Using mortality weights for the adult sample population.