Appendix

Appendix A

Exhibit A1. STROBE Statement—Checklist of items that should be included in reports of cross-sectional studies

	Item No	Recommendation	Page No
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	2
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	5
Objectives	3	State specific objectives, including any prespecified hypotheses	5–6
Methods			
Study design	4	Present key elements of study design early in the paper	6
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	6–7
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants	6–7
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	8
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	6
Bias	9	Describe any efforts to address potential sources of bias	n.a.
Study size	10	Explain how the study size was arrived at	6
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	8
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	8
		(*b*) Describe any methods used to examine subgroups and interactions	8–9
		(*c*) Explain how missing data were addressed	6

	Item No	Recommendation	Page No
		(*d*) If applicable, describe analytical methods taking account of sampling strategy	n.a.
		(*e*) Describe any sensitivity analyses	n.a.
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	6
		(b) Give reasons for non-participation at each stage	n.a.
		(c) Consider use of a flow diagram	n.a.
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	9 if applicable
		(b) Indicate number of participants with missing data for each variable of interest	n.a.
Outcome data	15*	Report numbers of outcome events or summary measures	n.a.
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	9–16, Figure 1–3
		(*b*) Report category boundaries when continuous variables were categorized	n.a.
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	n.a.
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	n.a.
Discussion			
Key results	18	Summarise key results with reference to study objectives	16
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	17
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	17–18

	Item No	Recommendation	Page No
Generalisability	21	Discuss the generalisability (external validity) of the study results	17–18
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	18

SOURCE: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org. NOTES: *Give information separately for exposed and unexposed groups.

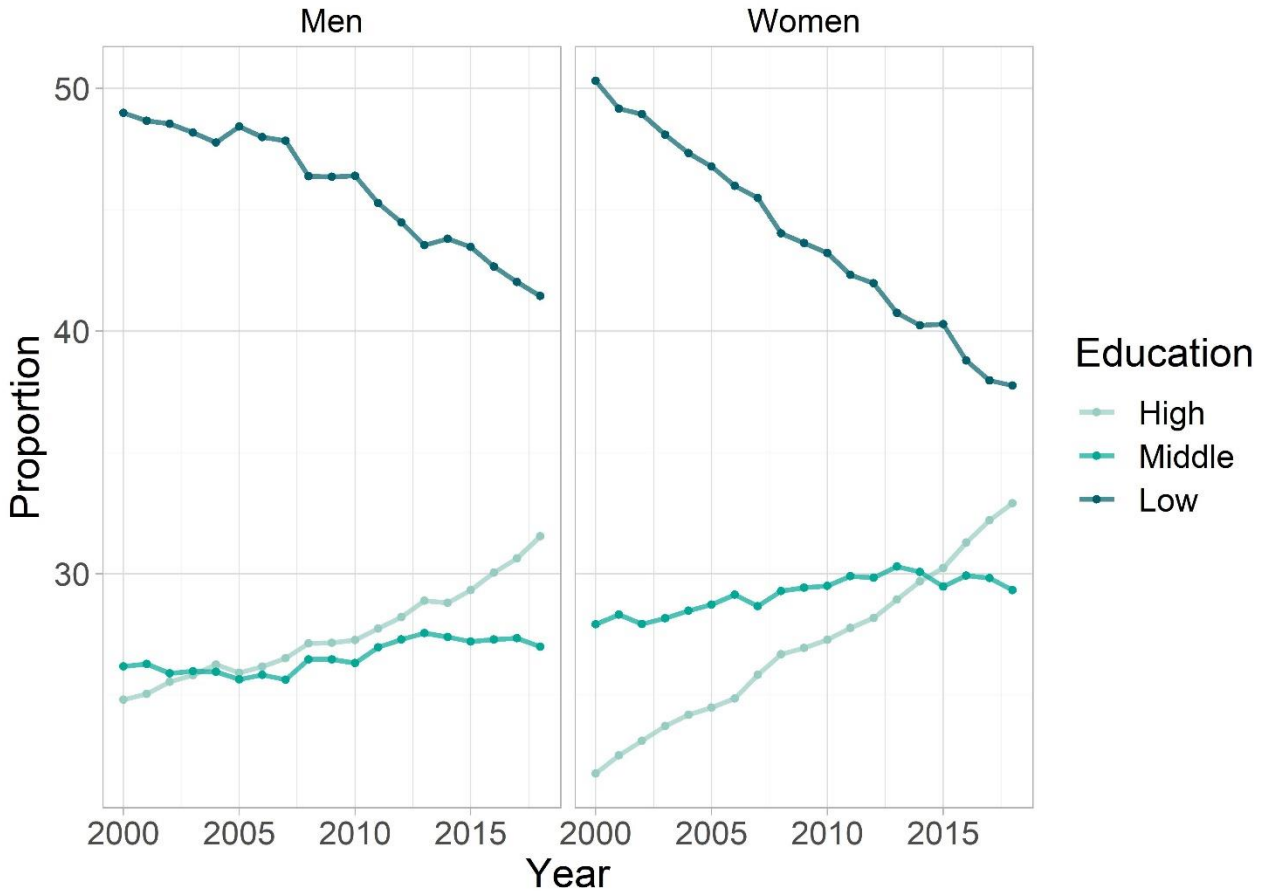
Exhibit A2. Selected cause of death categories and ICD-10 codes included in each category.

Cause category	ICD-10 codes	AAF*
Alcohol use disorders	F10–F10.9, G31.2, G62.1, G72.1, I42.6, K29.2, Q86.0, R78.0, X45–X45.9, Y15–Y15.9	100%
Liver disease and cirrhosis	K70, K71.3–K71.5, K71.7, K72–K74	63%
Pancreatitis	Acute pancreatitis: K85.0, K85.1, K85.2, K85.8, K85.9	29%
	Chronic pancreatitis: K86.0–K86.99	35%
Motor vehicle accidents	V02–V04, V09.0, V09.2, V12–V14, V19.0–V19.2, V19.4–V19.6, V20–V79, V80.3–V80.5, V81.0–V81.1, V82.0–V82.1, V83–V86, V87.0–V87.8, V88.0–V88.8, V89.0 and V89.2	30%
Other unintentional injuries	V01–X59, Y40–Y86, Y88–Y89 excluding X41, X42, X44, X45† and motor vehicle accidents	20%
Suicide	X60–X84, Y87.0	20%
Cancer	Breast cancer: C50	6%
	Pancreatic cancer: C25	6%
	Colorectal cancer: C18–C21	13%
	Esophageal cancer: C15	16%
	Laryngeal cancer: C32	20%
	Liver cancer: C22	24%
	Oral cavity and pharynx cancer: C00–C08, C09–C10, C12–C14	32%
Hemorrhagic stroke	I60–I62.9, I67.0–I67.1, I69.0–I69.298	16%
Hypertensive heart disease	I11	12%
Ischemic heart disease and ischemic stroke	Ischemic heart disease: I20–I25	2%
	Ischemic stroke: G45–G46.8, I63–I63.9, I65–I66.9, I67.2–I67.848, I69.3–I69.4	-6%
Diabetes mellitus	E10–E14	-4%
Lower respiratory infections: pneumonia	A48.1, A70, J09–J15.8, J16–J16.9, J20–J21.9, P23.0–P23.4	6%

SOURCE: AAFs were obtained from InterMAHP (20, 21) using alcohol exposure data for the year 2018 from Manthey et al. (2010) (55), using the methodology described in Shield et al. (2020) (14).

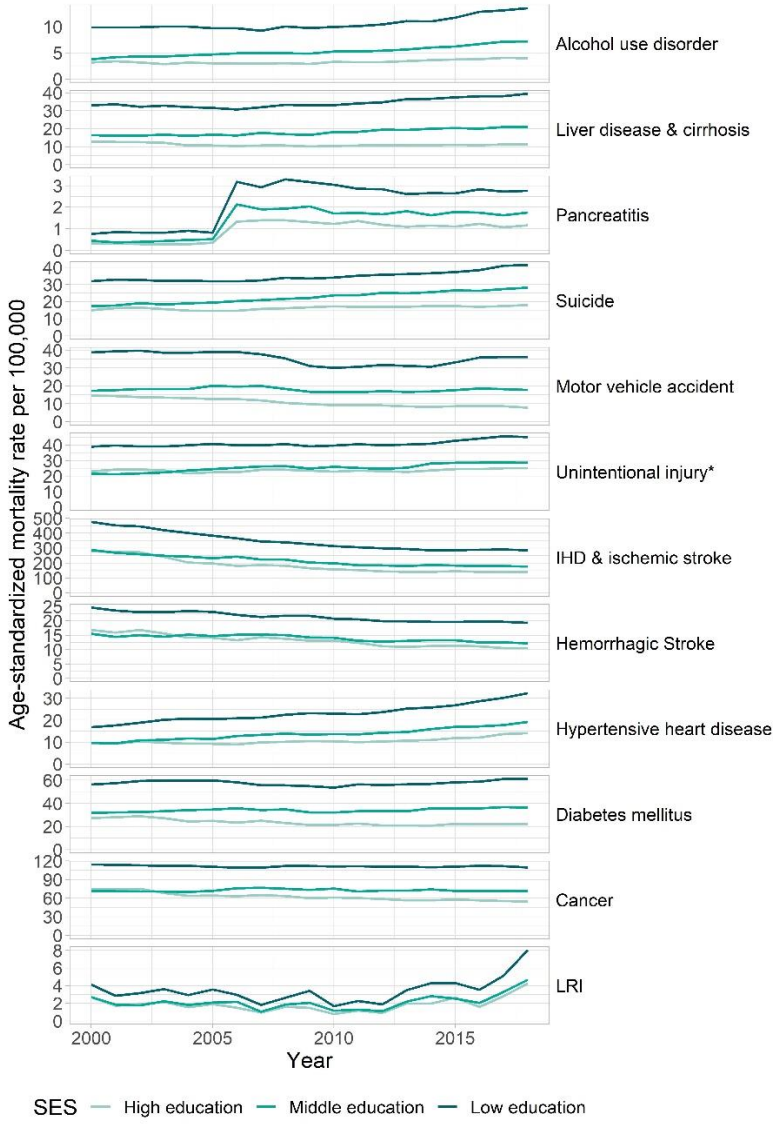
NOTES: AAF Alcohol-attributable fraction. Negative AAFs denote an overall beneficial impact of alcohol on the causes of death. † X45 is included under alcohol use disorders.

Exhibit A3. Proportion of men and women (18+) with low, middle and high educational attainment as indicator of socioeconomic status in the United States between 2000 and 2018.



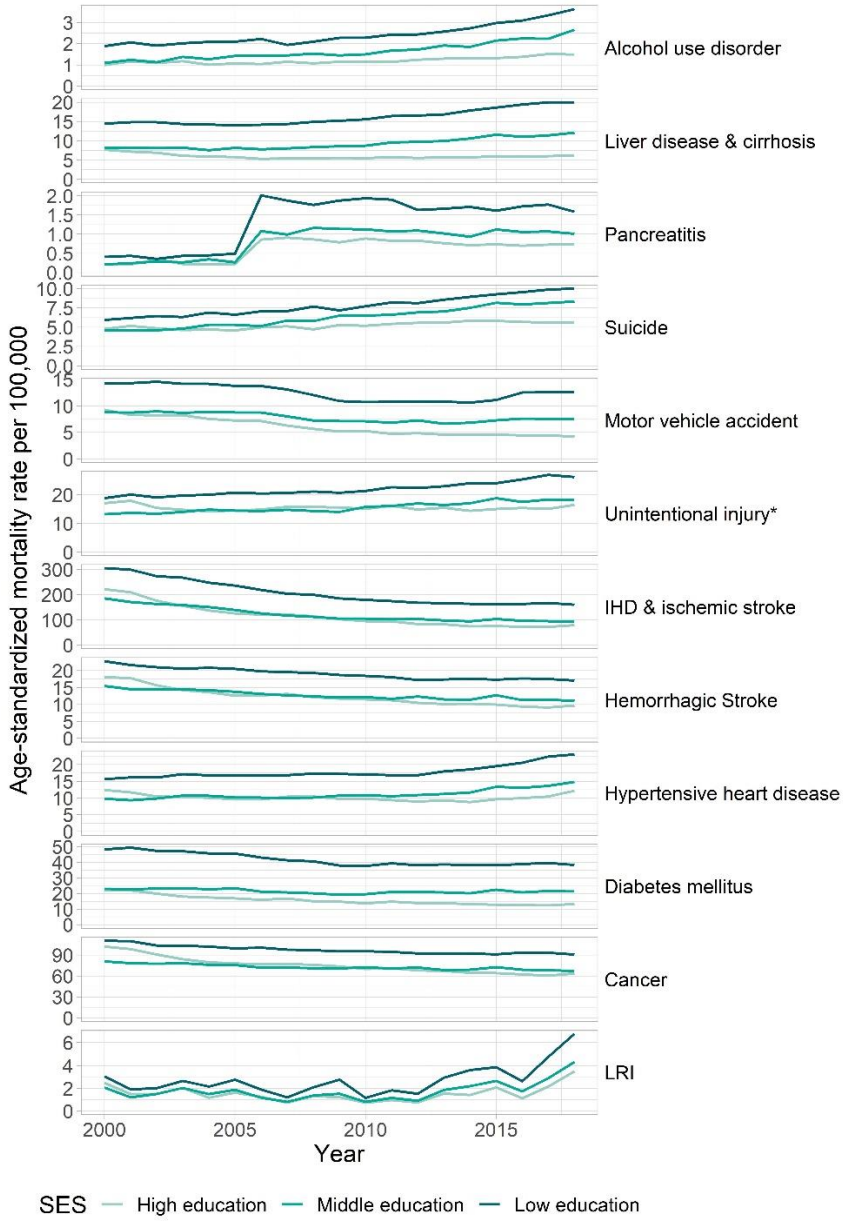
SOURCE: Authors' analysis of population data from Current Population Surveys. The coding of education on death certificates was revised in 2003. The 1989 classification of education (used until 2002) specified completed years of elementary, high school, and college education. From 2003 onwards the classification was revised to code education as educational attainment (e.g., 9–12th grade or Bachelor's degree). We harmonized entries using categories that were consistent throughout the whole observation period.

Exhibit A4. Age-standardized mortality rates among men (18+) in the United States between 2000 and 2018 by cause of death, sex, and educational attainment as indicator of socioeconomic status (SES). Standardized to population counts in 2018.



SOURCE: Authors' analysis of data on mortality from the National Vital Statistics System and on the population from Current Population Surveys.

Exhibit A5. Age-standardized mortality rates among women (18+) in the United States between 2000 and 2018 by cause of death, sex, and educational attainment as indicator of socioeconomic status (SES). Standardized to population counts in 2018.



SOURCE: Authors' analysis of data on mortality from the National Vital Statistics System and on the population from Current Population Surveys.

Exhibit A6. Cause-specific contributions (in years) to annual changes in life expectancy among US adult men and women by educational attainment as an indicator of socioeconomic status 2000-2018.

	High education				Middle education				Low education			
Years	**2000-2005**	**2005-2010**	**2010-2015**	**2015-2018**	**2000-2005**	**2005-2010**	**2010-2015**	**2015-2018**	**2000-2005**	**2005-2010**	**2010-2015**	**2015-2018**
Men												
Alcohol use disorder	0.00	0.00	-0.01	-0.01	-0.01	-0.01	-0.02	-0.01	0.00	0.00	-0.02	-0.02
Liver disease & cirrhosis	0.03	0.00	-0.01	-0.01	0.00	-0.02	-0.03	-0.01	0.03	-0.01	-0.04	-0.02
Pancreatitis	0.00	-0.01	0.00	0.00	0.00	-0.02	0.00	0.00	0.00	-0.02	0.00	0.00
Suicide	0.01	-0.06	0.00	-0.02	-0.04	-0.09	-0.06	-0.04	0.00	-0.03	-0.06	-0.08
Motor vehicle accident	0.03	0.08	0.02	0.02	-0.06	0.08	-0.03	0.01	0.00	0.18	-0.05	-0.05
Unintent. injury*	0.02	0.01	-0.02	-0.01	-0.04	-0.01	-0.04	0.00	0.01	0.04	-0.02	-0.02
IHD & ischemic stroke	0.98	0.59	0.18	0.05	0.67	0.39	0.22	0.11	0.54	0.45	0.18	-0.01
Hemorrhagic Stroke	0.04	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.01	0.00
Hypertensive heart disease	0.00	-0.02	-0.03	-0.04	-0.03	-0.03	-0.05	-0.03	-0.03	-0.02	-0.03	-0.04
Diabetes mellitus	0.03	0.05	-0.02	0.00	-0.04	0.03	-0.05	0.00	-0.02	0.04	-0.04	-0.04
Cancer	0.13	0.04	0.05	0.04	-0.01	-0.05	0.05	0.01	0.02	-0.01	0.00	0.01
LRI	0.01	0.02	-0.03	-0.03	0.01	0.01	-0.02	-0.03	0.00	0.01	-0.02	-0.03
Rest	1.17	0.32	-0.23	0.28	0.05	-0.25	-0.18	0.54	0.23	0.31	-0.35	-0.30
Total	*2.45*	*1.02*	*-0.07*	*0.31*	*0.51*	*0.04*	*-0.20*	*0.56*	*0.80*	*0.97*	*-0.44*	*-0.59*
Women												
Alcohol use disorder	0.00	0.00	0.00	0.00	-0.01	0.00	-0.01	-0.01	0.00	0.00	-0.01	-0.01
Liver disease & cirrhosis	0.03	0.00	-0.01	0.00	0.00	-0.01	-0.06	-0.01	0.00	-0.02	-0.04	-0.02
Pancreatitis	0.00	-0.01	0.00	0.00	0.00	-0.02	0.00	0.00	0.00	-0.01	0.00	0.00
Suicide	0.00	-0.01	-0.01	0.00	-0.02	-0.03	-0.04	-0.01	-0.01	-0.02	-0.03	-0.02
Motor vehicle accident	0.03	0.04	0.02	0.01	0.00	0.04	-0.01	0.00	0.00	0.07	-0.01	-0.03

	High education				Middle education				Low education			
Years	**2000-2005**	**2005-2010**	**2010-2015**	**2015-2018**	**2000-2005**	**2005-2010**	**2010-2015**	**2015-2018**	**2000-2005**	**2005-2010**	**2010-2015**	**2015-2018**
Uninten. injury*	0.03	−0.01	0.00	−0.04	−0.02	−0.03	−0.06	0.02	−0.02	0.00	−0.03	−0.02
IHD & ischemic stroke	1.22	0.52	0.44	−0.10	0.72	0.68	0.05	0.21	0.52	0.50	0.16	0.01
Hemorrhagic Stroke	0.07	0.02	0.03	0.00	0.03	0.03	−0.01	0.03	0.02	0.03	0.01	0.00
Hypertensive heart disease	0.03	0.00	0.00	−0.07	−0.01	−0.01	−0.05	−0.03	−0.02	−0.01	−0.03	−0.03
Diabetes mellitus	0.06	0.05	0.03	−0.01	−0.01	0.07	−0.05	0.02	0.02	0.07	−0.01	−0.01
Cancer	0.32	0.12	0.13	−0.01	0.08	0.06	−0.01	0.11	0.10	0.04	0.05	0.00
LRI	0.01	0.02	−0.03	−0.03	0.00	0.02	−0.04	−0.04	0.00	0.01	−0.03	−0.03
Rest	1.96	0.19	0.97	−0.52	0.12	0.18	−1.27	1.23	−0.06	0.04	−0.41	−0.21
Total	*3.77*	*0.92*	*1.56*	*−0.76*	*0.90*	*0.98*	*−1.56*	*1.53*	*0.55*	*0.70*	*−0.38*	*−0.38*

SOURCE: Authors' analysis of mortality data from the National Vital Statistics System and population data from Current Population Surveys. NOTES: Contributions for all remaining causes are not shown. Low education = high school degree or less; middle education = some college but no college degree; and high education = college degree or more. * Other than motor vehicle accidents. LRI lower respiratory infections.

Appendix B

Exhibit B1. Population counts and crude, cause-specific mortality rates per 100,000 population by sex, educational attainment, and year.

Year	Educational attainment	Sex	N population	All causes	Liver disease & cirrhosis	Pancreatitis	Diabetes mellitus	Ischemic heart disease & ischemic stroke	Hemorrhagic stroke	Hypertensive heart disease	Alcohol use disorder	Unintentional injury*	Motor vehicle accident	Suicide	Cancer	Lower respiratory diseases	Rest
2000	Low	Men	47469085	1735.2	29.1	0.7	48.6	411.8	21.6	14.6	9.0	36.6	40.2	32.2	97.4	3.6	990.0
2000	Middle	Men	25380565	599.8	11.6	0.3	16.7	136.5	8.3	5.5	3.1	14.0	17.2	16.1	38.2	1.3	330.9
2000	High	Men	24051503	711.4	10.4	0.3	17.7	168.7	10.9	6.4	2.9	15.8	12.1	14.0	50.4	1.6	400.3
2000	Low	Women	52758392	1726.7	15.5	0.5	58.4	402.0	27.3	20.0	1.9	23.7	14.8	5.9	128.6	3.8	1024.3
2000	Middle	Women	29274447	541.6	5.7	0.2	14.2	106.6	10.0	5.9	0.9	8.4	8.5	4.5	51.7	1.2	323.6
2000	High	Women	22828473	530.5	4.9	0.1	11.1	100.2	9.7	5.8	0.8	8.9	7.1	4.6	59.1	1.2	316.9
2001	Low	Men	47739650	1719.6	29.5	0.7	49.8	395.5	20.9	15.5	9.0	37.6	41.0	33.2	97.2	2.6	987.2
2001	Middle	Men	25790930	604.5	11.6	0.3	17.5	133.3	8.1	5.7	3.4	13.9	17.9	16.6	38.9	1.0	336.1
2001	High	Men	24582142	718.2	10.2	0.3	18.1	164.1	10.4	6.2	3.2	16.4	11.6	15.2	50.6	1.0	410.5
2001	Low	Women	52047638	1750.9	16.0	0.5	60.3	395.5	26.1	20.8	2.1	25.3	14.8	6.1	128.5	2.4	1052.5
2001	Middle	Women	29982096	541.5	6.0	0.2	14.3	101.5	9.6	5.9	1.1	9.0	8.5	4.5	51.5	0.8	328.6
2001	High	Women	23845059	521.4	4.7	0.1	11.2	95.5	9.4	5.6	0.9	9.1	6.5	5.0	57.4	0.8	315.1
2002	Low	Men	48883301	1690.5	28.6	0.7	50.8	381.2	20.1	16.4	9.1	36.3	41.4	32.8	95.6	2.8	974.9
2002	Middle	Men	26082139	618.2	11.7	0.3	18.1	133.9	8.5	6.8	3.7	14.6	18.3	17.8	40.0	0.9	343.4
2002	High	Men	25735693	704.7	10.2	0.2	18.2	159.1	10.7	7.1	3.0	15.9	11.4	15.3	50.5	1.1	401.7
2002	Low	Women	53221381	1717.1	16.1	0.4	59.0	375.5	25.9	21.2	1.9	25.0	15.1	6.4	123.9	2.7	1044.0
2002	Middle	Women	30383628	552.1	6.1	0.2	15.0	99.0	9.8	6.3	1.0	8.9	8.8	4.7	51.7	1.0	339.6
2002	High	Women	25148253	505.3	4.7	0.2	11.1	89.2	9.0	5.6	0.9	8.7	6.4	4.8	56.7	0.8	307.1
2003	Low	Men	49350383	1671.5	28.8	0.7	51.7	366.2	20.3	17.7	9.2	36.7	40.0	32.3	95.5	3.2	969.2
2003	Middle	Men	26622523	631.6	12.3	0.3	19.0	134.1	8.6	7.3	3.8	15.4	18.5	17.1	40.9	1.2	353.0
2003	High	Men	26458486	685.9	10.3	0.2	18.2	150.4	10.4	7.0	2.8	16.1	11.1	15.1	48.0	1.3	394.8

Year	Educational attainment	Sex	N population	All causes	Liver disease & cirrhosis	Pancreatitis	Diabetes mellitus	Ischemic heart disease & ischemic stroke	Hemorrhagic stroke	Hypertensive heart disease	Alcohol use disorder	Unintentional injury*	Motor vehicle accident	Suicide	Cancer	Lower respiratory diseases	Rest
2003	Low	Women	52990177	1744.2	15.6	0.5	59.0	370.6	25.5	22.7	2.0	26.0	14.8	6.3	124.3	3.5	1073.4
2003	Middle	Women	31046308	562.0	6.1	0.2	15.3	98.8	9.9	7.1	1.2	9.5	8.6	4.8	52.9	1.3	346.3
2003	High	Women	26153700	491.1	4.4	0.1	10.5	84.3	8.6	6.0	1.0	8.9	6.5	4.8	54.3	1.1	300.4
2004	Low	Men	49553967	1624.2	28.1	0.8	50.7	343.4	20.4	18.0	9.1	37.0	40.0	32.5	94.1	2.6	947.6
2004	Middle	Men	26940324	630.6	12.0	0.4	19.5	129.6	8.9	7.6	3.9	15.9	18.4	18.0	40.8	1.0	354.6
2004	High	Men	27252714	660.3	9.5	0.3	17.7	139.1	10.3	7.3	3.1	16.1	11.2	14.1	48.2	1.0	382.3
2004	Low	Women	52515887	1705.2	15.4	0.6	57.8	346.5	26.0	22.6	2.1	26.7	14.6	6.9	123.1	2.8	1060.2
2004	Middle	Women	31597569	551.6	5.8	0.2	14.9	93.1	9.7	7.0	1.1	10.0	8.9	5.4	52.0	1.0	342.4
2004	High	Women	26839745	472.4	4.3	0.2	10.2	76.4	8.4	5.9	0.9	8.7	6.2	4.8	52.7	0.7	292.9
2005	Low	Men	50835545	1604.3	27.8	0.7	50.8	328.3	20.1	17.9	8.9	37.8	40.3	32.0	92.5	3.1	943.9
2005	Middle	Men	26923012	662.4	12.9	0.4	20.8	130.4	9.0	7.7	4.1	16.9	20.2	18.3	43.5	1.2	377.0
2005	High	Men	27207704	685.5	9.6	0.3	18.6	140.9	10.5	7.5	3.1	17.3	11.0	14.4	49.8	1.3	401.2
2005	Low	Women	52581445	1726.1	15.3	0.6	58.2	335.3	26.0	23.2	2.1	28.0	14.2	6.6	121.4	3.8	1091.6
2005	Middle	Women	32294243	565.3	6.3	0.2	15.8	91.2	9.7	7.0	1.3	10.2	8.7	5.4	53.2	1.3	355.0
2005	High	Women	27533189	475.7	4.2	0.2	10.3	73.4	8.1	5.9	1.0	9.3	6.0	4.6	53.1	1.0	298.6
2006	Low	Men	51029100	1578.7	27.5	2.8	49.7	313.1	19.4	18.4	9.0	37.0	40.4	32.1	92.3	2.6	934.6
2006	Middle	Men	27480695	661.6	12.3	1.4	20.5	128.6	8.7	8.3	4.4	16.6	19.9	19.0	44.3	1.1	376.6
2006	High	Men	27835967	674.9	9.4	1.1	17.9	133.3	10.1	7.3	3.1	17.3	10.8	14.5	50.0	1.1	399.0
2006	Low	Women	52197312	1703.8	15.5	2.6	54.9	314.7	25.2	23.2	2.3	27.9	14.2	6.9	122.5	2.5	1091.6
2006	Middle	Women	33077450	556.5	6.3	0.8	15.0	84.7	9.6	7.2	1.3	10.3	8.7	5.2	52.4	0.9	354.1
2006	High	Women	28228924	466.6	4.1	0.6	9.9	69.1	8.0	5.8	1.0	9.3	5.9	5.0	52.6	0.8	294.7
2007	Low	Men	51588062	1544.7	28.6	2.6	47.6	295.1	18.7	18.6	8.5	36.6	39.1	32.6	92.3	1.6	922.9
2007	Middle	Men	27647642	676.0	13.8	1.3	20.5	125.4	9.3	8.9	4.4	17.4	20.3	19.7	46.9	0.6	387.5
2007	High	Men	28607309	676.1	9.6	1.1	18.2	128.8	10.2	7.7	2.9	17.5	10.2	15.2	49.1	0.7	404.8

Year	Educational attainment	Sex	N population	All causes	Liver disease & cirrhosis	Pancreatitis	Diabetes mellitus	Ischemic heart disease & ischemic stroke	Hemorrhagic stroke	Hypertensive heart disease	Alcohol use disorder	Unintentional injury*	Motor vehicle accident	Suicide	Cancer	Lower respiratory diseases	Rest
2007	Low	Women	52259331	1681.0	15.6	2.4	53.6	297.7	25.2	23.7	2.0	28.8	13.4	7.0	120.1	1.6	1089.8
2007	Middle	Women	32939033	569.7	6.7	0.8	15.1	82.7	9.5	7.5	1.3	11.0	8.2	6.0	54.1	0.6	366.1
2007	High	Women	29681214	452.2	4.1	0.6	9.7	63.2	7.7	5.7	1.0	9.0	5.0	5.1	51.0	0.5	289.5
2008	Low	Men	50493621	1597.4	29.9	3.0	48.1	298.3	19.4	20.1	9.4	38.0	36.3	34.0	95.4	2.4	963.1
2008	Middle	Men	28826464	671.1	13.5	1.3	20.8	122.0	8.9	9.2	4.4	17.1	18.2	20.4	46.6	1.0	387.7
2008	High	Men	29541552	679.0	9.9	1.1	17.0	127.8	10.0	8.0	3.1	17.8	9.1	15.8	49.3	1.1	408.8
2008	Low	Women	50995073	1749.7	16.4	2.3	53.7	300.1	25.6	25.0	2.1	30.3	12.4	7.5	122.3	3.0	1149.2
2008	Middle	Women	33930228	576.4	7.0	0.9	14.9	81.5	9.4	7.7	1.4	10.9	7.3	5.9	53.6	1.1	374.7
2008	High	Women	30916047	450.9	4.2	0.6	8.9	61.5	7.3	5.9	1.0	9.2	4.7	4.8	51.4	0.8	290.6
2009	Low	Men	51006700	1549.9	29.9	2.8	47.0	283.5	19.1	20.6	9.1	36.1	31.8	33.6	94.9	3.2	938.2
2009	Middle	Men	29134353	678.2	13.4	1.5	20.5	120.6	9.0	9.4	4.4	17.0	16.7	21.2	47.6	1.6	395.3
2009	High	Men	29885089	686.0	9.7	1.1	16.9	125.3	10.2	8.8	2.9	18.5	8.7	16.8	49.8	1.3	415.8
2009	Low	Women	51025575	1692.5	16.8	2.4	50.5	277.4	24.9	24.6	2.3	29.6	11.2	7.0	119.6	3.1	1123.0
2009	Middle	Women	34409911	571.3	7.2	0.9	14.3	77.1	9.3	8.3	1.3	10.8	7.2	6.5	53.9	1.3	373.2
2009	High	Women	31511548	450.3	4.5	0.5	9.3	58.4	7.5	5.9	1.1	9.5	4.3	5.4	52.2	1.0	290.8
2010	Low	Men	51578964	1537.3	30.2	2.8	46.6	274.6	18.5	20.6	9.4	36.8	30.5	34.1	95.6	1.5	936.2
2010	Middle	Men	29259058	697.7	14.8	1.3	20.7	120.3	9.1	9.7	4.7	18.0	16.5	22.8	50.1	0.8	408.9
2010	High	Men	30323658	701.7	10.1	1.1	17.7	125.4	10.7	9.1	3.5	18.9	8.4	17.4	52.1	0.6	426.8
2010	Low	Women	51030980	1702.2	17.1	2.5	50.0	268.9	24.6	24.5	2.3	30.8	11.1	7.5	120.2	1.5	1141.3
2010	Middle	Women	34835130	585.0	7.4	0.9	14.7	77.0	9.3	8.3	1.4	12.1	7.2	6.5	55.6	0.6	384.0
2010	High	Women	32212617	456.7	4.6	0.6	9.0	57.1	7.6	6.3	1.1	9.7	4.4	5.4	51.8	0.5	298.6
2011	Low	Men	50847712	1574.0	31.5	2.6	50.3	275.6	18.7	20.9	9.7	38.4	31.2	35.2	98.2	2.1	959.6
2011	Middle	Men	30298379	701.7	15.1	1.3	22.6	119.0	8.9	10.0	4.7	18.4	16.5	22.9	49.4	0.9	411.9
2011	High	Men	31154581	706.0	10.3	1.2	18.9	122.9	10.2	8.9	3.3	19.4	8.2	17.1	51.7	1.0	433.0

Year	Educational attainment	Sex	N population	All causes	Liver disease & cirrhosis	Pancreatitis	Diabetes mellitus	Ischemic heart disease & ischemic stroke	Hemorrhagic stroke	Hypertensive heart disease	Alcohol use disorder	Unintentional injury*	Motor vehicle accident	Suicide	Cancer	Lower respiratory diseases	Rest
2011	Low	Women	50320770	1745.7	18.2	2.5	52.7	265.1	24.4	24.4	2.5	33.1	11.0	7.9	120.6	2.4	1180.9
2011	Middle	Women	35557893	598.2	8.2	0.8	16.1	75.9	9.1	8.2	1.6	12.5	6.9	6.7	55.2	0.9	396.0
2011	High	Women	33014450	463.8	4.8	0.6	9.8	56.4	7.4	6.0	1.1	10.3	3.9	5.6	52.7	0.6	304.4
2012	Low	Men	50388035	1592.5	33.0	2.7	50.8	274.1	18.5	22.2	10.1	38.0	32.2	35.7	100.2	1.7	973.4
2012	Middle	Men	30927127	715.7	16.1	1.3	22.9	120.8	8.7	10.7	4.9	17.9	17.1	24.1	51.2	0.7	419.1
2012	High	Men	31964048	714.3	10.6	1.1	18.3	122.2	9.6	9.4	3.4	19.9	8.4	17.2	52.6	0.8	440.7
2012	Low	Women	50975256	1718.9	18.4	2.2	51.4	254.4	23.5	24.4	2.5	32.7	11.1	7.9	118.5	2.1	1170.0
2012	Middle	Women	36237547	604.5	8.4	0.9	16.1	75.5	9.4	8.3	1.6	12.9	7.3	6.9	56.3	0.7	400.1
2012	High	Women	34227388	462.6	4.7	0.6	9.6	54.3	7.3	6.2	1.2	10.0	4.1	5.7	52.4	0.5	305.7
2013	Low	Men	49833880	1634.3	34.6	2.5	52.4	277.2	18.8	24.0	10.6	39.2	31.6	36.0	101.6	3.4	1002.4
2013	Middle	Men	31541606	734.3	16.3	1.4	23.7	121.6	9.2	11.1	5.1	18.8	16.7	23.8	52.5	1.5	432.7
2013	High	Men	33071523	721.1	10.9	1.0	18.9	121.6	9.6	9.9	3.6	19.8	8.0	17.2	52.0	1.7	446.7
2013	Low	Women	49910609	1769.7	18.9	2.2	52.4	252.5	23.9	25.7	2.6	33.7	11.1	8.2	119.6	4.1	1214.8
2013	Middle	Women	37120934	611.3	8.7	0.8	16.4	74.1	9.1	8.9	1.8	12.8	6.7	7.0	55.3	1.5	408.2
2013	High	Women	35450490	465.7	5.0	0.5	9.8	53.9	7.1	6.4	1.3	10.5	3.9	5.7	52.3	1.1	308.1
2014	Low	Men	50754477	1616.7	35.1	2.5	52.8	267.8	18.6	24.6	10.7	39.3	31.1	36.4	101.8	4.1	991.8
2014	Middle	Men	31750479	759.4	16.9	1.3	25.1	124.0	9.2	12.0	5.5	20.2	16.9	24.4	54.0	2.1	447.9
2014	High	Men	33375127	735.2	11.0	1.1	18.9	122.6	10.0	10.2	3.8	20.8	7.7	17.7	52.7	1.8	457.0
2014	Low	Women	49673473	1766.5	20.1	2.3	51.6	247.0	24.3	26.6	2.8	35.1	10.8	8.6	119.9	4.6	1213.1
2014	Middle	Women	37133543	633.1	9.6	0.8	16.6	74.4	9.3	9.5	1.8	13.6	6.9	7.5	57.7	1.8	423.7
2014	High	Women	36653568	464.0	5.1	0.5	9.8	51.5	7.5	6.4	1.3	10.3	3.9	6.0	51.9	1.1	308.5
2015	Low	Men	50879238	1654.7	36.2	2.5	54.5	269.6	18.6	25.5	11.4	41.0	33.3	37.2	103.5	4.1	1017.5

Year	Educational attainment	Sex	N population	All causes	Liver disease & cirrhosis	Pancreatitis	Diabetes mellitus	Ischemic heart disease & ischemic stroke	Hemorrhagic stroke	Hypertensive heart disease	Alcohol use disorder	Unintentional injury*	Motor vehicle accident	Suicide	Cancer	Lower respiratory diseases	Rest
2015	Middle	Men	31846839	796.4	17.7	1.4	26.6	127.3	9.6	13.1	5.7	21.1	17.8	25.6	55.3	1.7	473.3
2015	High	Men	34325033	746.4	11.1	1.0	20.1	123.9	9.9	10.8	4.0	21.1	8.1	17.3	53.4	2.2	463.4
2015	Low	Women	50433545	1776.3	20.6	2.2	51.4	245.2	23.8	28.2	2.9	35.6	11.3	8.9	118.1	5.8	1222.5
2015	Middle	Women	36902368	671.4	10.5	0.9	18.4	79.0	10.1	10.5	2.0	14.5	7.3	8.1	60.4	2.0	447.5
2015	High	Women	37861017	474.8	5.5	0.6	9.8	53.4	7.5	7.1	1.4	10.9	4.0	6.0	52.9	1.5	314.2
2016	Low	Men	50526680	1688.0	36.5	2.7	55.0	271.6	18.7	27.3	12.4	42.4	36.0	38.3	104.7	3.3	1039.0
2016	Middle	Men	32345342	807.6	17.7	1.5	27.3	129.2	9.3	13.6	6.2	21.8	18.6	25.6	56.6	1.6	478.7
2016	High	Men	35595402	743.0	11.0	1.2	20.0	123.2	9.8	11.2	4.0	21.4	8.1	17.0	53.1	1.4	461.3
2016	Low	Women	49008561	1815.3	21.6	2.3	52.3	247.2	24.4	29.6	3.1	37.5	12.6	9.1	121.8	3.4	1250.7
2016	Middle	Women	37804914	667.5	10.2	0.9	17.9	78.7	9.5	10.9	2.2	14.4	7.7	7.9	60.2	1.5	445.5
2016	High	Women	39525644	470.6	5.4	0.5	9.8	52.4	7.1	7.4	1.4	11.4	3.9	5.8	52.0	0.9	312.4
2017	Low	Men	50072490	1733.9	37.1	2.6	58.3	279.6	19.0	29.2	12.8	44.5	36.4	40.8	106.3	5.0	1062.3
2017	Middle	Men	32590977	833.3	18.3	1.4	29.1	134.7	9.7	14.2	6.5	22.7	18.1	26.8	57.9	2.4	491.6
2017	High	Men	36506193	761.2	11.5	1.1	20.8	124.8	9.6	12.8	4.3	22.5	8.2	17.4	53.8	2.5	471.8
2017	Low	Women	48280357	1864.5	22.4	2.4	53.4	253.7	24.3	32.7	3.3	39.6	12.6	9.3	122.6	6.9	1281.4
2017	Middle	Women	37924137	693.6	10.6	0.9	19.4	82.1	10.0	11.9	2.1	16.0	7.6	8.0	61.3	2.5	461.1
2017	High	Women	40950845	478.1	5.7	0.6	10.0	53.8	7.2	8.0	1.5	11.5	4.0	5.7	52.0	1.6	316.4
2018	Low	Men	50032750	1747.8	38.4	2.7	59.7	281.6	19.0	31.8	13.2	44.7	36.3	41.2	106.3	8.0	1065.1
2018	Middle	Men	32585450	851.1	18.8	1.5	29.8	137.7	9.7	15.8	6.7	23.1	17.5	27.5	59.5	3.6	500.0
2018	High	Men	38087267	750.7	11.5	1.1	20.9	124.9	9.5	12.8	4.2	22.3	7.4	18.0	52.4	3.6	461.9
2018	Low	Women	48508513	1847.1	22.5	2.1	52.9	250.5	24.1	35.0	3.6	39.4	12.6	9.4	121.9	10.0	1263.3
2018	Middle	Women	37692192	709.2	11.4	0.9	19.6	84.1	10.1	13.3	2.5	16.3	7.6	8.2	62.4	3.9	468.8
2018	High	Women	42286921	479.1	5.7	0.6	10.2	53.9	7.1	8.4	1.5	11.6	3.7	5.7	52.2	2.5	315.9

Exhibit B2. Cause-specific contributions (in years) to annual changes in life expectancy at age 18 among US adult men and women by educational attainment as an indicator of socioeconomic status, 2000-2018. Low education = high school degree or less; middle education = some college but no college degree; and high education = college degree or more.

		Absolute increase/decrease in the life expectancy gap in years†				Percent contribution to total increases/decreases in the life expectancy gap			
		Men		Women		Men		Women	
Years	Cause of death	Middle compared to high education	Low compared to high education	Middle compared to high education	Low compared to high education	Middle compared to high education	Low compared to high education	Middle compared to high education	Low compared to high education
2000-2005	Alcohol use disorder	0.015	-0.004	0.006	0.002	0.8%	-0.2%	0.2%	0.1%
	Liver disease & cirrhosis	0.034	0.003	0.027	0.024	1.8%	0.2%	0.9%	0.8%
	Pancreatitis	0.001	-0.001	0.001	0.001	0.0%	-0.1%	0.0%	0.0%
	Suicide	0.046	0.003	0.017	0.015	2.4%	0.2%	0.6%	0.5%
	Motor vehicle accident	0.093	0.034	0.037	0.030	4.8%	2.0%	1.3%	0.9%
	Unintentional injury*	0.065	0.016	0.055	0.054	3.3%	1.0%	1.9%	1.7%
	IHD & ischemic stroke	0.312	0.446	0.496	0.695	16.1%	27.0%	17.3%	21.6%
	Hypertensive heart disease	0.030	0.036	0.037	0.046	1.5%	2.2%	1.3%	1.4%
	Hemorrhagic stroke	0.025	0.020	0.045	0.055	1.3%	1.2%	1.6%	1.7%
	LRI	0.000	0.004	0.004	0.005	0.0%	0.3%	0.2%	0.2%
	Cancer	0.130	0.102	0.234	0.215	6.7%	6.2%	8.1%	6.7%
	Diabetes mellitus	0.070	0.054	0.071	0.044	3.6%	3.3%	2.5%	1.4%
	Rest	1.115	0.938	1.841	2.025	57.6%	56.8%	64.1%	63.0%
	Total	1.936	1.652	2.870	3.212	100.0%	100.0%	100.0%	100.0%
2005-2010	Alcohol use disorder	0.004	-0.003	0.001	0.003	0.4%	-5.8%	-1.1%	1.1%
	Liver disease & cirrhosis	0.023	0.015	0.013	0.026	2.3%	28.0%	-21.4%	11.6%

		Absolute increase/decrease in the life expectancy gap in years†				Percent contribution to total increases/decreases in the life expectancy gap				
		Men			Women		Men			Women	
Years	Cause of death	Middle compared to high education	Low compared to high education		Middle compared to high education	Low compared to high education	Middle compared to high education	Low compared to high education		Middle compared to high education	Low compared to high education
	Pancreatitis	0.003	0.007		0.003	0.003	0.3%	12.9%		-5.2%	1.3%
	Suicide	0.032	-0.032		0.016	0.008	3.2%	-57.6%		-25.6%	3.5%
	Motor vehicle accident	-0.001	-0.106		0.007	-0.022	-0.1%	-191.7%		-11.2%	-9.7%
	Unintentional injury*	0.018	-0.038		0.017	-0.009	1.8%	-69.2%		-28.2%	-3.9%
	IHD & ischemic stroke	0.195	0.140		-0.159	0.014	19.7%	254.3%		263.5%	6.3%
	Hypertensive heart disease	0.016	0.007		0.007	0.002	1.6%	12.4%		-12.4%	0.9%
	Hemorrhagic stroke	0.007	-0.008		-0.013	-0.011	0.7%	-14.5%		22.0%	-5.1%
	LRI	0.008	0.007		-0.004	0.004	0.8%	12.8%		5.8%	1.6%
	Cancer	0.095	0.050		0.060	0.081	9.6%	90.5%		-98.6%	36.4%
	Diabetes mellitus	0.017	0.007		-0.017	-0.024	1.8%	12.4%		28.4%	-10.8%
	Rest	0.574	0.008		0.010	0.148	58.1%	15.4%		-16.1%	66.7%
	Total	0.989	0.055		-0.060	0.222	100.0%	100.0%		100.0%	100.0%
2010-2015	Alcohol use disorder	0.009	0.011		0.008	0.008	6.7%	3.1%		0.3%	0.4%
	Liver disease & cirrhosis	0.022	0.030		0.046	0.033	16.4%	8.0%		1.5%	1.7%
	Pancreatitis	0.003	-0.002		0.004	0.001	2.3%	-0.6%		0.1%	0.0%
	Suicide	0.066	0.062		0.025	0.017	50.2%	17.0%		0.8%	0.9%
	Motor vehicle accident	0.048	0.073		0.021	0.025	36.5%	19.9%		0.7%	1.3%
	Unintentional injury*	0.013	-0.007		0.064	0.030	9.6%	-2.0%		2.1%	1.6%
	IHD & ischemic stroke	-0.036	-0.001		0.398	0.281	-27.4%	-0.3%		12.7%	14.5%
	Hypertensive heart disease	0.023	0.009		0.050	0.030	17.2%	2.3%		1.6%	1.5%
	Hemorrhagic stroke	0.013	0.014		0.046	0.019	9.9%	3.9%		1.5%	1.0%
	LRI	-0.012	-0.014		0.002	-0.008	-8.9%	-3.9%		0.1%	-0.4%

		Absolute increase/decrease in the life expectancy gap in years†					Percent contribution to total increases/decreases in the life expectancy gap				
		Men			Women		Men			Women	
Years	Cause of death	Middle compared to high education	Low compared to high education		Middle compared to high education	Low compared to high education	Middle compared to high education	Low compared to high education		Middle compared to high education	Low compared to high education
	Cancer	-0.006	0.043		0.140	0.080	-4.7%	11.8%		4.5%	4.1%
	Diabetes mellitus	0.039	0.028		0.077	0.040	29.2%	7.5%		2.5%	2.1%
	Rest	-0.049	0.123		2.244	1.383	-37.0%	33.3%		71.8%	71.3%
	Total	0.132	0.368		3.124	1.939	100.0%	100.0%		100.0%	100.0%
2015-2018	Alcohol use disorder	0.008	0.013		0.009	0.007	-3.3%	1.5%		-0.4%	-1.9%
	Liver disease & cirrhosis	0.006	0.013		0.006	0.015	-2.3%	1.4%		-0.2%	-4.0%
	Pancreatitis	-0.001	-0.001		-0.003	0.000	0.5%	-0.1%		0.1%	0.1%
	Suicide	0.021	0.061		0.011	0.024	-8.3%	6.8%		-0.5%	-6.2%
	Motor vehicle accident	0.014	0.069		0.015	0.047	-5.5%	7.6%		-0.7%	-12.5%
	Unintentional injury*	-0.011	0.014		-0.054	-0.011	4.5%	1.6%		2.3%	2.9%
	IHD & ischemic stroke	-0.063	0.060		-0.312	-0.107	24.9%	6.6%		13.6%	28.1%
	Hypertensive heart disease	-0.005	0.006		-0.036	-0.039	1.8%	0.7%		1.6%	10.2%
	Hemorrhagic stroke	0.000	0.015		-0.029	0.001	0.0%	1.6%		1.3%	-0.3%
	LRI	0.006	0.005		0.002	-0.002	-2.5%	0.6%		-0.1%	0.5%
	Cancer	0.028	0.033		-0.115	-0.009	-11.2%	3.7%		5.0%	2.4%
	Diabetes mellitus	0.007	0.037		-0.035	-0.002	-2.7%	4.1%		1.5%	0.6%
	Rest	-0.262	0.577		-1.750	-0.304	104.1%	63.9%		76.4%	80.1%
	Total	-0.252	0.904		-2.291	-0.380	100.0%	100.0%		100.0%	100.0%

SOURCE: Authors' analysis of mortality data from the National Vital Statistics System and population data from Current Population Surveys. NOTES: Low education = high school degree or less; middle education = some college but no college degree; and high education = college degree or more. * Other

than motor vehicle accidents. † A positive value indicates an increase in the differences in life expectancy between low/middle and high education. IHD ischemic heart disease. LRI lower respiratory infections.